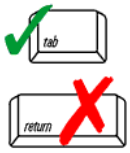
**Massachusetts Department of Environmental Protection**
Bureau of Resource Protection - Wetlands Program

# Checklist for Stormwater Report

## A. Introduction

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




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

The Stormwater Report must include:

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

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

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

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

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

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

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# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

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

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

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

## Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

5-13-13

Signature and Date

## Checklist

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

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

# Checklist for Stormwater Report

## Checklist (continued)

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

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

**Standard 1: No New Untreated Discharges**

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

# Checklist for Stormwater Report

## Checklist (continued)

**Standard 2: Peak Rate Attenuation**

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

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

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

**Standard 3: Recharge**

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

# Checklist for Stormwater Report

## Checklist (continued)

**Standard 3: Recharge** (continued)

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

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

**Standard 4: Water Quality**

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

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

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

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

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

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

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

# Checklist for Stormwater Report

## Checklist (continued)

**Standard 4: Water Quality** (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

**Standard 6: Critical Areas**

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

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

# Checklist for Stormwater Report

## Checklist (continued)

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

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

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

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

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

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

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

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

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

# Checklist for Stormwater Report

## Checklist (continued)

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

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

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

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

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

**Standard 9: Operation and Maintenance Plan**

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

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

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

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

**Standard 10: Prohibition of Illicit Discharges**

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

☐ An Illicit Discharge Compliance Statement is attached;

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

**Stormwater Management Report**

# *Danforth Green*

## Framingham
## Massachusetts

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May 2013

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# 1

# Stormwater Report Narrative

This revised Stormwater Report has been prepared to document compliance with the Massachusetts Stormwater Management Standards in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00). The conditions described herein represent an interim step in the project's stormwater system design. Final design will be completed after the collection of additional geotechnical data.

## Project Summary

Danforth Green LLC (herein after referred to as the Applicant) proposes to construct a residential development known as Danforth Green (the Project) on an approximately 145 acre site in Framingham, Massachusetts (the Site).

As depicted on VHB's plans (Plans) dated April 16, 2013, and as described in conditions approved by the Framingham Planning Board on April 29, 2013, the Project includes the construction of 353 for sale and rental housing units in both town homes and apartment buildings along with appurtenant roadways, utility infrastructure and a stormwater management system designed in accordance with the Massachusetts Stormwater Management Regulations. The Project stormwater management system is designed to provide water quality treatment and mitigate increases in peak rates of runoff. The Project also includes a complete erosion and sedimentation control program with provisions to minimize areas of disturbance, limit erosion through stabilization, and prevent sediment from leaving the Site.

Runoff generated from the Project will be collected and treated in accordance with design guidelines[1] developed by Department of Environmental Protection (DEP). Project includes a detailed Long Term Stormwater Operations and Maintenance Plan (O&M Plan) to identify long term stormwater operations and maintenance required.

As described in the Notice of Intent (NOI) prepared for the Project and submitted under separate cover, no portions of the Project will occur within resource areas

1 DEP, 2008. *Massachusetts Stormwater Handbook.*

regulated under the Massachusetts Wetlands Protection Act (WPA) or within buffer zones of areas regulated under the WPA. Portions of the Site do contain isolated depressions that are regulated under the Town of Framingham Wetlands By-Law (By-Law) and the Project will impact some of these areas subject to approval by the Framingham Conservation Commission.

## Site Description

The Site will be located within the limits of the former New England Sand and Gravel pit that is bounded by the Sudbury River to the west and the north, an NStar Utility easement and the Town of Framingham water supply wells (out of service) to the east and residential development to the south. The MWRA Hultman Aqueduct runs through the Site from east to west.

According to the regional survey,[2] soils mapped at the property include Haven, Hinckley, Pooratuck, Rippowam, Saco, Windsor and Udorthents series. The Saco series consist of muck or mucky silts that form in wetlands. Extensive geotechnical investigations have been completed on the site and geotechnical reports are attached hereto.

As a result of its prior use as a gravel pit, the Site consists of areas with minimal vegetation that lack topsoil to areas that exist in varying stages of early succession vegetative communities. According to the atlas[3] produced by the Natural Heritage & Endangered Species Program (NHESP), no Priority Habitats of Rare Species or Estimated Habitats of Rare Wildlife occur on the Site. NHESP mapping identifies one certified vernal pool and several potential vernal pools within Site boundaries.

Elevations on the Site range from approximately 150 feet to 210 feet. The Flood Insurance Rate Maps (FIRM)[4] produced for the Town of Framingham indicates that portions of the Site bordering the Sudbury River are subject to flooding during a 100-year storm (Appendix F). The floodplain occurs below the elevations 125-feet and 126-feet (NAVD 88). The Project results in no disturbance to, or work in the FEMA mapped 100 year floodplain.

## Existing Drainage Conditions

Figure 3 illustrates the existing drainage conditions at the Site.

▼

2 USDA Natural Resources Conservation Service, 1989. *Soil Survey of Middlesex County, Massachusetts.*
3 NHESP, 2008. *Massachusetts Natural Heritage Atlas: 13th Edition.*
4 Federal Emergency Management Agency, 2010. *Middlesex County.* Community Panel Numbers 25017C0610E. Map 610 of 656.

The Project will occupy an area that is currently used primarily for gravel excavation and mining. Impervious areas on the Site include the entrance roadway that extends from River Path Drive to an MWRA facility just north of the aqueduct and a parking area and garage. South of the aqueduct, the Project area is primarily exposed gravel with some areas of forest and wetland vegetation. North of the aqueduct, the Project area is vegetated with woods and wetland with a small gravel roadway and relatively small gravel piles. The Proposed development will primarily occupy the area south of the aqueduct.

Portions of the Project Area drain:

- West to the Sudbury River.
- North to an MWRA culvert that passes underneath the aqueduct.
- East to undeveloped land, and ultimately Podd Meadow, which is located adjacent to the Sudbury River.

Runoff that flows east passes through a series of depressions, relics of the gravel mining operations, and then flows to Podd Meadow and the Sudbury River. It is VHB's understanding that both the Town of Framingham DPW and the Applicant wish to eliminate the depressions in the 400' well head protective radius as they provide a more direct route for untreated stormwater to migrate directly into the aquifer. VHB's plans depict proposed grading to achieve this goal. Both the existing and proposed condition hydrologic and hydraulic models produced as part of this study reflect the assumption that the depressions in the well head area will be filled. This assumption results in model comparisons that isolate the impact of the development itself on the surrounding hydrology in accordance with the Massachusetts Stormwater Management Standards.

Several offsite areas located to the south of the subject property drain overland onto the Site (W 3.4, W 3.1, W 9.1A). Another off-site area drains to the subject property via an existing culvert that passes beneath RiverPath Drive (E 1.1B-4).

In the existing condition, the Project area is divided into 34 subcatchments flowing to five design points. Table 1 below provides a summary of the existing conditions hydrologic data for the developed portions of the Site.

- **DP Wellhead –** Eastern portions of the Site that drain to the Wellhead Protection Area. This design point is not included as an object in the hydraulic model, it is represented as the sum of all outflows from the eastern project area.
- **DP North –** Central portions of the Site that drain to the MWRA Culvert that passes underneath the aqueduct.
- **DP West –** Western portions of the Site that drain overland directly to the Sudbury River.

- **DP Sudbury –** All runoff from the project site ultimately reaches the Sudbury River. This design point represents the sum of the runoff from the other design points to the River.
- **DP L E 1.0 (Podd Meadow) –** All runoff from areas between the eastern limits of the Site and Podd Meadow.

## Table 1 Existing Conditions Hydrologic Data

| Drainage Area | Discharge Location | Design Point | Area (ac) | Curve Number | Time of Concentration (minutes) |
|---|---|---|---|---|---|
| E 1.0 | L E 1.0 | L E 1.0 | 13.5 | 65 | 11 |
| E 1.0A | L E 1.0 | L E 1.0 | 0.1 | 77 | 6 |
| E 1.0B | L E 1.0 | L E 1.0 | 0.8 | 70 | 6 |
| E 1.0C | L E 1.0 | L E 1.0 | 6.5 | 65 | 6 |
| E 1.0D | L E 1.0 | L E 1.0 | 1.2 | 58 | 6 |
| E 1.1A | P E 1.1A | L E 1.0 | 2.7 | 82 | 6 |
| E 1.1B | P E 1.1B | L E 1.0 | 4.2 | 53 | 33 |
| E 1.1B-1 | P E 1.1B | L E 1.0 | 1.4 | 56 | 8 |
| E 1.1B-2 | P E 1.1B | L E 1.0 | 5.4 | 55 | 6 |
| E 1.1B-3 | P E 1.1B | L E 1.0 | 6.2 | 70 | 37 |
| E 1.1B-4 | P E 1.1B | L E 1.0 | 2.1 | 61 | 6 |
| E 1.1C | P E 1.1C | L E 1.0 | 5.3 | 79 | 7 |
| E 1.1D | P E 1.1D | L E 1.0 | 5.8 | 79 | 6 |
| E 1.2A | P E 1.2A | L E 1.0 | 5.0 | 56 | 24 |
| E 1.2A-1 | P E 1.2A | L E 1.0 | 1.4 | 59 | 6 |
| E 1.2A-2 | P E 1.2A | L E 1.0 | 4.9 | 62 | 15 |
| E 1.2B | P E 1.2A | L E 1.0 | 1.9 | 85 | 6 |
| E 1.2B-1 | P E 1.2A | L E 1.0 | 0.9 | 85 | 6 |
| E 1.2B-2 | P E 1.2A | L E 1.0 | 0.1 | 76 | 6 |
| E 1.2C | P E 1.2A | L E 1.0 | 1.1 | 82 | 6 |
| E 1.2C-1 | P E 1.2A | L E 1.0 | 0.2 | 85 | 6 |
| E 1.2D | P E 1.2D | L E 1.0 | 2.9 | 76 | 16 |
| E 1.2E | P E 1.2E | L E 1.0 | 0.3 | 71 | 6 |
| E 1.3A | L E 1.0 | L E 1.0 | 4.6 | 67 | 38 |
| E 4.0 | L E 4.0 | DP North | 14.0 | 58 | 38 |
| W 10.0 | L W 10.0 | DP North | 2.4 | 70 | 8 |
| W 2.0 | L W 2.0 | DP West | 7.6 | 55 | 16 |
| W 3.1 | P W 3.1 | DP West | 11.5 | 84 | 12 |
| W 3.4 | P W 3.4 | DP West | 3.7 | 48 | 15 |
| W 3.5 | P W 3.5 | DP North | 0.1 | 64 | 6 |
| W 9.1 | P W 9.1 | DP North | 5.2 | 69 | 6 |
| W 9.1A | P E 1.1D | L E 1.0 | 2.2 | 85 | 8 |
| W 9.1B | P W 9.1B | DP North | 0.6 | 63 | 6 |
| W 9.1C | P W 9.1C | DP North | 4.8 | 83 | 6 |
| **Grand Total** | | | **130.6** | | |

## Proposed Drainage Conditions

As shown on the Plans, the Project will result in the creation of approximately 19 acres of impervious surfaces including roadways, rooftops, sidewalks, decks, and concrete slabs. Runoff from rooftops will be directed to subsurface leaching dry wells; runoff from roadways and other impervious areas will be directed into the Project's stormwater management system. In an effort to maximize the use of Low Impact Design (LID) the stormwater management system makes use of country drainage and minimizes the use of curbs and gutters and conveyance infrastructure to the maximum extent practicable.

Proposed stormwater facilities will include:

- Deep-sump, hooded catch-basins
- Rain Gardens (with Sediment Forebays)
- Detention Basins (with Sediment Forebays)
- Leaching Dry-wells (Roof top only)
- Subsurface Infiltration Structures
- Structural Water Quality Treatment Units

In the proposed condition, the Site stormwater flow regimes can be described as follows:

- All stormwater from non-roof impervious areas will receive water quality treatment in accordance with the requirements of the Stormwater Regulations.
- Overall runoff patterns will be maintained and proposed stormwater flows will mimic existing conditions as described in the bullets below (with some exceptions):
  - Portions of the Site will continue to drain west directly to the Sudbury River; the back yards of several housing units (W 2.0) will flow freely down-gradient to the Sudbury River. The overflow from the roof drain dry-well units will also flow directly down-gradient to the Sudbury River.
  - Runoff from portions of the Site will be directed into the interior of the access roadway for treatment in a one of three rain gardens. The western-most rain garden (W-2) will discharge to a swale leading west to the Sudbury River. The two easternmost rain gardens (W-3 and W-4) will discharge north to the culvert at the MWRA Aqueduct. The inlet and outlet of the MWRA culvert will be cleaned of debris and a broad, flat channel will be constructed at the outlet of the culvert to address current sediment build-up issues.
  - Runoff from the northeastern portion of the Site will be directed through detention and treatment systems (E-1, E-2, E-4A, E-4B, E-7, E-8, INF-E-1, INF-E-2, INF-E-3, INF-E-4A, INF-E-4B DET-1, DET-2, DET-3) to a culvert that bypasses the Wellhead Area and discharges to Podd Meadow Pond. Runoff

from the southeastern portion of the Site will be directed across the RiverPath Extension to the east through detention and treatment systems (E-9) to the southern portion of the Wellhead Area. The final design of this culvert and detention basin at its outlet remains outstanding and must occur prior to construction.

  - Offsite areas that drain on to the site will be accommodated. Run-on from off-site areas to the south (W 3.4, W 3.3 and W 9.1A) will be collected and piped directly to the MWRA culvert bypassing the proposed treatment system. Run-on from south of Riverpath Drive will be collected in a new culvert and piped to the eastern edge of the Subject Property, consistent with existing drainage patterns.

- The Project is designed to reduce peak runoff rates from the property. Runoff will decrease from all areas, but will increase to design point L E 1.0. In the existing condition, there are no direct runoff discharges to L E 1.0. In the proposed condition, as requested by the Town to protect the groundwater quality in the Wellhead area, discharges will routed past the wellhead area to design point L E 1.0. Future design work, that must be completed prior to construction, (not described or documented herein) will provide detention sufficient to maintain peak runoff rates to L E 1.0 (Podd Meadow Pond).

In the proposed condition, the Project area is divided into 193 subcatchments flowing to five design points. Table 2 below provides a summary of the proposed conditions hydrologic data for the developed portions of the Site.

- **DP Wellhead** – Eastern portions of the Site that drain to the Wellhead Protection Area. This design point is not included as an object in the hydraulic model, it is represented as the sum of all outflows from the eastern project area.
- **DP North** – Central portions of the Site that drain to the MWRA Culvert that passes underneath the aqueduct.
- **DP West** – Western portions of the Site that drain overland directly to the Sudbury River.
- **DP Sudbury** – All runoff from the project site ultimately reaches the Sudbury River. This design point represents the sum of the runoff from the other design points to the River.
- **DP L E 1.0 (Podd Meadow)** – All runoff from areas between the eastern limits of the Site and Podd Meadow.

## Table 2 Proposed Conditions Hydrologic Data

| Drainage Area | Discharge Location | Design Point | Area (ac) | Curve Number | Time of concentration (minutes) |
|---|---|---|---|---|---|
| E 1.0 | Podd Meadow | L E 1.0 | 13.5 | 65 | 11.3 |
| E 1.0A | Podd Meadow | L E 1.0 | 0.1 | 77 | 6 |
| E 1.0B | Podd Meadow | L E 1.0 | 0.8 | 53 | 6 |
| E 1.0C | Podd Meadow | L E 1.0 | 6.5 | 65 | 6 |
| E 1.0D | Podd Meadow | L E 1.0 | 1.2 | 58 | 6 |
| E 1.1A | P E 1.1A | L E 1.0 | 2.7 | 82 | 6 |
| E 1.1B | P E 1.1B | L E 1.0 | 4.2 | 53 | 32.8 |
| E 1.1B-1 | P E 1.1B | L E 1.0 | 1.4 | 56 | 7.5 |
| E 1.1B-2 | P E 1.1B | L E 1.0 | 5.4 | 55 | 6 |
| E 1.1B-4 | P E 1.1B | L E 1.0 | 0.9 | 61 | 6 |
| E 1.2A | P E 1.2A | L E 1.0 | 5.0 | 56 | 23.9 |
| E 1.2A-1 | P E 1.2A | L E 1.0 | 1.4 | 59 | 6 |
| E 1.2A-2 | P E 1.2A | L E 1.0 | 1.1 | 52 | 6 |
| E 1.2B | P E 1.2A | L E 1.0 | 1.9 | 79 | 6 |
| E 1.2B-1 | P E 1.2A | L E 1.0 | 0.7 | 62 | 8 |
| E 1.2C | P E 1.2A | L E 1.0 | 1.1 | 82 | 6 |
| E 1.2C-1 | P E 1.2A | L E 1.0 | 0.4 | 66 | 6 |
| E 1.2C-2 | P E 1.2A | L E 1.0 | 0.5 | 61 | 7.7 |
| E 1.3A | Podd Meadow | L E 1.0 | 4.6 | 64 | 20.9 |
| E 4.0 | Sudbury River | DP Sudbury | 13.9 | 58 | 50 |
| E-CULV-S | P E 1.1B | L E 1.0 | 4.5 | 64 | 9.5 |
| RG-E-1 | P RG-E-1 | L E 1.0 | 2.4 | 71 | 7.6 |
| RG-E-2 | P RG-E-2 | L E 1.0 | 0.5 | 78 | 6 |
| RG-E-4A | P RG-E-4A | L E 1.0 | 0.5 | 73 | 6 |
| RG-E-4B | P RG-E-4B | L E 1.0 | 0.5 | 83 | 6 |
| RG-E-7 | INF-E-4A | L E 1.0 | 1.0 | 90 | 6 |
| RG-E-8 | INF-E-4A | L E 1.0 | 0.7 | 74 | 6 |
| RG-E-9A | P E 1.1B | L E 1.0 | 1.0 | 75 | 8.2 |
| RG-E-9B | P E 1.1B | L E 1.0 | 0.5 | 60 | 6 |
| RG-W-1 | P RG-W-2 | DP West | 1.5 | 75 | 6 |
| RG-W-2 | P RG-W-2 | DP West | 2.6 | 67 | 6 |
| RG-W-3 | P RG-W-3 | DP North | 2.1 | 64 | 6 |
| RG-W-3A | P RG-W-3 | DP North | 0.9 | 86 | 6 |
| RG-W-4 | P-RG-W-4 | DP North | 2.3 | 74 | 6.1 |
| RG-W-5 | P-RG-W-5 | DP North | 1.0 | 68 | 6 |
| ROOF-1 | P RG-E-9 | L E 1.0 | 0.11 | 98 | 6 |
| ROOF-10 | DET-1 | L E 1.0 | 0.10 | 98 | 6 |
| ROOF-100 | INF-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-101 | INF-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-102 | INF-E-1 | L E 1.0 | 0.03 | 98 | 6 |

**Table 2 Proposed Conditions Hydrologic Data (Continued)**

| Drainage Area | Discharge Location | Design Point | Area (ac) | Curve Number | Time of concentration (minutes) |
|---|---|---|---|---|---|
| ROOF-103 | INF-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-104 | P RG-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-105 | P RG-W 5 | DP North | 0.05 | 98 | 6 |
| ROOF-106 | P RG-E-1 | L E 1.0 | 0.05 | 98 | 6 |
| ROOF-107 | P RG-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-108 | P RG-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-109 | P RG-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-11 | DET-1 | L E 1.0 | 0.11 | 98 | 6 |
| ROOF-110 | P E 1.2A | L E 1.0 | 0.04 | 98 | 6 |
| ROOF-111 | P E 1.2A | L E 1.0 | 0.07 | 98 | 6 |
| ROOF-112 | P E 1.2A | L E 1.0 | 0.04 | 98 | 6 |
| ROOF-113 | P E 1.2A | L E 1.0 | 0.04 | 98 | 6 |
| ROOF-114 | P E 1.2A | L E 1.0 | 0.07 | 98 | 6 |
| ROOF-115 | P E 1.2A | L E 1.0 | 0.06 | 98 | 6 |
| ROOF-117 | P E 1.2A | L E 1.0 | 0.05 | 98 | 6 |
| ROOF-118 | P E 1.2A | L E 1.0 | 0.06 | 98 | 6 |
| ROOF-119 | P E 1.2A | L E 1.0 | 0.05 | 98 | 6 |
| ROOF-11MAIL | | | 0.00 | 98 | 6 |
| ROOF-12 | P RG-E-9 | P E 1.1B | 0.05 | 98 | 6 |
| ROOF-120 | P E 1.2A | L E 1.0 | 0.05 | 98 | 6 |
| ROOF-121 | P E 1.2A | L E 1.0 | 0.06 | 98 | 6 |
| ROOF-122 | P E 1.2A | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-123 | P E 1.2A | L E 1.0 | 0.06 | 98 | 6 |
| ROOF-13 | P RG-E-9 | P E 1.1B | 0.03 | 98 | 6 |
| ROOF-14 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-15 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-16 | INF-E-3 | L E 1.0 | 0.05 | 98 | 6 |
| ROOF-17 | INF-E-3 | L E 1.0 | 0.07 | 98 | 6 |
| ROOF-18 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-19 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-2 | DET-3 | L E 1.0 | 0.12 | 98 | 6 |
| ROOF-20 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-21 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-22 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-23 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-24 | INF-E-3 | L E 1.0 | 0.07 | 98 | 6 |
| ROOF-25 | INF-E-3 | L E 1.0 | 0.04 | 98 | 6 |
| ROOF-26 | INF-E-3 | L E 1.0 | 0.11 | 98 | 6 |
| ROOF-27 | INF-E-3 | L E 1.0 | 0.10 | 98 | 6 |
| ROOF-28 | INF-E-3 | L E 1.0 | 0.07 | 98 | 6 |

**Table 2 Proposed Conditions Hydrologic Data (Continued)**

| Drainage Area | Discharge Location | Design Point | Area (ac) | Curve Number | Time of concentration (minutes) |
|---|---|---|---|---|---|
| ROOF-29 | P RG-W-3 | DP North | 0.11 | 98 | 6 |
| ROOF-3 | DET-3 | L E 1.0 | 0.25 | 98 | 6 |
| ROOF-30 | P RG-W-3 | L E 1.0 | 0.11 | 98 | 6 |
| ROOF-31 | P RG-W-3 | DP North | 0.06 | 98 | 6 |
| ROOF-32 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-33 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-34 | P RG-W-3 | DP North | 0.04 | 98 | 6 |
| ROOF-35 | P RG-W-3 | DP North | 0.04 | 98 | 6 |
| ROOF-36 | P RG-W-3 | DP North | 0.04 | 98 | 6 |
| ROOF-37 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-38 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-39 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-4 | DET-3 | L E 1.0 | 0.22 | 98 | 6 |
| ROOF-40 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-41 | P RG-W-3 | DP North | 0.04 | 98 | 6 |
| ROOF-42 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-43 | P RG-W-3 | DP North | 0.04 | 98 | 6 |
| ROOF-44 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-45 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-46 | P RG-W-2 | DP West | 0.03 | 98 | 6 |
| ROOF-47 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-48 | P RG-W-2 | DP West | 0.03 | 98 | 6 |
| ROOF-49 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-5 | DET-2 | L E 1.0 | 0.23 | 98 | 6 |
| ROOF-50 | P RG-W-2 | DP West | 0.03 | 98 | 6 |
| ROOF-51 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-52 | P RG-W-2 | DP West | 0.03 | 98 | 6 |
| ROOF-53 | P RG-W-3 | DP North | 0.07 | 98 | 6 |
| ROOF-54 | P RG-W-2 | DP West | 0.07 | 98 | 6 |
| ROOF-55 | P RG-W-2 | DP West | 0.07 | 98 | 6 |
| ROOF-56 | Sudbury River | DP West | 0.11 | 98 | 6 |
| ROOF-57 | P RG-W-2 | DP West | 0.07 | 98 | 6 |
| ROOF-58 | Sudbury River | DP West | 0.07 | 98 | 6 |
| ROOF-59 | Sudbury River | DP West | 0.10 | 98 | 6 |
| ROOF-6 | DET-2 | L E 1.0 | 0.23 | 98 | 6 |
| ROOF-60 | Sudbury River | DP West | 0.07 | 98 | 6 |
| ROOF-61 | Sudbury River | DP West | 0.10 | 98 | 6 |
| ROOF-62 | P RG-W-2 | DP West | 0.07 | 98 | 6 |
| ROOF-63 | Sudbury River | DP West | 0.07 | 98 | 6 |
| ROOF-64 | P W 3.1 | DP West | 0.10 | 98 | 6 |

**Table 2 Proposed Conditions Hydrologic Data (Continued)**

| Drainage Area | Discharge Location | Design Point | Area (ac) | Curve Number | Time of concentration (minutes) |
|---|---|---|---|---|---|
| ROOF-65 | P RG-W-2 | DP West | 0.10 | 98 | 6 |
| ROOF-66 | P W 3.1 | DP West | 0.07 | 98 | 6 |
| ROOF-67 | P RG-W-2 | DP West | 0.11 | 98 | 6 |
| ROOF-68 | P W 3.1 | DP West | 0.10 | 98 | 6 |
| ROOF-69 | P RG-W-2 | DP West | 0.07 | 98 | 6 |
| ROOF-7 | INF-E-3 | L E 1.0 | 0.11 | 98 | 6 |
| ROOF-70 | P W 3.1 | DP West | 0.07 | 98 | 6 |
| ROOF-71 | P W 3.1 | DP West | 0.03 | 98 | 6 |
| ROOF-72 | P RG-W-2 | DP West | 0.03 | 98 | 6 |
| ROOF-73 | W-CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-74 | P RG-W-2 | DP West | 0.03 | 98 | 6 |
| ROOF-75 | W-CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-76 | P RG-W-2 | DP West | 0.03 | 98 | 6 |
| ROOF-77 | W-CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-78 | P RG-W-2 | DP West | 0.05 | 98 | 6 |
| ROOF-79 | W-CULV-N | DP North | 0.05 | 98 | 6 |
| ROOF-8 | DET-1 | L E 1.0 | 0.26 | 98 | 6 |
| ROOF-80 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-81 | W-CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-82 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-83 | W-CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-84 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-85 | W-CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-86 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-87 | W-CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-88 | P RG-W-3 | DP North | 0.03 | 98 | 6 |
| ROOF-89 | W-CULV-N | DP North | 0.07 | 98 | 6 |
| ROOF-9 | INF-E-2B | L E 1.0 | 0.11 | 98 | 6 |
| ROOF-90 | P RG-W-3 | DP North | 0.11 | 98 | 6 |
| ROOF-91 | P CULV-N | DP North | 0.07 | 98 | 6 |
| ROOF-92 | P RG-W-5 | DP North | 0.05 | 98 | 6 |
| ROOF-93 | P CULV-N | DP North | 0.06 | 98 | 6 |
| ROOF-94 | P RG-W-5 | DP North | 0.03 | 98 | 6 |
| ROOF-95 | P CULV-N | DP North | 0.03 | 98 | 6 |
| ROOF-96 | P RG-W-5 | DP North | 0.10 | 98 | 6 |
| ROOF-97 | P RG-W-5 | DP North | 0.11 | 98 | 6 |
| ROOF-98 | INF-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-99 | INF-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-BS1 | P RG-E-9 | P E 1.1B | 0.00 | 98 | 6 |
| ROOF-MAIL20 | DET-3 | L E 1.0 | 0.00 | 98 | 6 |

**Table 2 Proposed Conditions Hydrologic Data (Continued)**

| Drainage Area | Discharge Location | Design Point | Area (ac) | Curve Number | Time of concentration (minutes) |
|---|---|---|---|---|---|
| ROOF-MAIL29 | P RG-W-4 | DP North | 0.00 | 98 | 6 |
| ROOF-MAIL5 | DET-2 | L E 1.0 | 0.00 | 98 | 6 |
| ROOF-MAIL64 | P RG-W-2 | DP West | 0.00 | 98 | 6 |
| ROOF-MAIL8 | INF-E-2B | L E 1.0 | 0.00 | 98 | 6 |
| ROOF-MAIL91 | P RG-W-4 | DP North | 0.00 | 98 | 6 |
| ROOF-MAINT11 | DET-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-PL11 | INF-E-1 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-PL6 | INF-E-3 | L E 1.0 | 0.03 | 98 | 6 |
| ROOF-POOL | P RG-E-9 | P E 1.1B | 0.01 | 98 | 6 |
| ROOF-RECY | P RG-E-9 | P E 1.1B | 0.02 | 98 | 6 |
| S-CB-E-1 | P-RG-E-9 | P E 1.1B | 1.1 | 78 | 6 |
| S-CB-INF-E-3 | INF-E-3 | L E 1.0 | 0.6 | 91 | 6 |
| S-CB-INF-E-4A | INF-E-4A | L E 1.0 | 0.6 | 94 | 6 |
| S-DET-1 | Culvert to Podd Meadow | L E 1.0 | 0.4 | 63 | 9.6 |
| S-DET-3 | Culvert to Podd Meadow | L E 1.0 | 0.4 | 66 | 8.8 |
| S-INF-E-1 | Culvert to Podd Meadow | L E 1.0 | 1.2 | 78 | 8.3 |
| S-INF-E-2 | Culvert to Podd Meadow | L E 1.0 | 1.2 | 83 | 6.6 |
| S-INF-E-3 | Culvert to Podd Meadow | L E 1.0 | 1.7 | 76 | 13.2 |
| S-LD-1 | Culvert to Podd Meadow | L E 1.0 | 1.1 | 65 | 13.4 |
| S-LD-11 | DET-2 | L E 1.0 | 0.4 | 66 | 6 |
| S-LD-2 | INF-E-3 | L E 1.0 | 1.7 | 68 | 6 |
| S-LD-4 | INF-E-3 | L E 1.0 | 2.2 | 75 | 8.3 |
| W 10.0 | Sudbury River | DP Sudbury | 2.4 | 70 | 8.8 |
| W 2.0 | Sudbury River | DP Sudbury | 7.6 | 51 | 15.6 |
| W 3.1 | Sudbury River | DP Sudbury | 1.3 | 72 | 8.1 |
| W 3.2 | W-CULV-N | DP North | 0.8 | 61 | 12.9 |
| W 3.3 | W-CULV-N | DP North | 2.0 | 89 | 6 |
| W 3.4 | W-CULV-N | DP North | 3.0 | 41 | 14.6 |
| W 9.1A | W-CULV-N | DP North | 1.5 | 85 | 6 |
| W 9.1B | W-CULV-N | DP North | 0.6 | 63 | 6 |
| W-CULV-N | Sudbury River | DP North | 1.7 | 46 | 6 |
| W-D-1 | RG-W-3 | DP North | 0.6 | 44 | 22.9 |
| W-D-3 | W-CULV-N | DP North | 0.2 | 43 | 6 |
| Total* | | | 130.6 | | |

*Sum of items in the table may not add up to the total due to rounding errors.

## Hydrologic Analysis for Stormwater Management

This section of the report contains technical information to support the stormwater review.

VHB used HydroCAD stormwater modeling software to simulate design rainfall and runoff events under the existing and proposed conditions. VHB used the methods described in Technical Report 55: Urban Hydrology for Small Watersheds published by the U.S. Department of Agriculture (USDA) National Resources Conservation Service (NRCS) in June 1986 (TR-55).

The TR-55 method requires the following information:

- Precipitation:
  - Depth
  - Return Period
  - Distribution
  - Duration
- Watershed Delineations
- Land Characteristics:
  - Soils
  - Landuse/Land Cover
- Surface Runoff Flow Paths

### Precipitation

This report describes hydrologic analyses for the Site for precipitation events with return periods of 2-, 10-, 25- and 100-years in accordance with Massachusetts DEP, Town of Framingham stormwater design for subdivisions, and Federal Emergency Management Agency (FEMA) requirements. The design events are consistent with the Northeast Regional Climate Center extreme precipitation database distributed by Cornell University. (http://precip.eas.cornell.edu/)

### Table 3 Precipitation

| Return Period (Years) | Depth (inches) | Duration (hours) | Distribution | To satisfy the requirements of: |
|---|---|---|---|---|
| 2 | 3.15 | 24 | NCDC Distribution for Framingham, MA | 1 |
| 10 | 4.71 | 24 | NCDC Distribution for Framingham, MA | 1 |
| 25 | 5.92 | 24 | NCDC Distribution for Framingham, MA | 2 |
| 100 | 8.39 | 24 | NCDC Distribution for Framingham, MA | 3 |

NCDC – National Climatic Data Center
1 MassDEP Stormwater Management Standards
2 Framingham stormwater infrastructure design requirements
3 FEMA regulatory (100-year) flood analysis

## Watersheds

VHB delineated the drainage watersheds in a geographical Information Services (GIS) environment using existing topographic survey data and proposed grading plans.

## Runoff Curve Number

TR-55 describes the Runoff Curve Number Method of Abstraction for estimating the proportion of rainfall that runs off an area based on surface characteristics including the land cover and the underlying soils. VHB used GIS software to calculate the area-weighted curve number for each subwatershed. **Error! Reference source not found.** lists the source data used to determine the subwatershed runoff curve numbers.

### Table 4 Data Sources for RCN Calculations

| Data | Source | Notes |
|---|---|---|
| Watershed Delineations | VHB, for this study | |
| Land Use/Land Cover | MassGIS 2005 Land Use | Existing conditions, outside Project area |
| | VHB, for this study | Proposed conditions |
| NRCS Soils Data | NRCS SSURGO via MassGIS | |

VHB assigned each of the land use -hydrologic soils group combinations to an equivalent category listed in TR-55, Table 5.

### Table 5 Runoff Curve Number by Land Use and Hydrologic Soil Group

| | Hydrologic Soils Group | | | | | |
|---|---|---|---|---|---|---|
| Landuse | A | B | C | D | W* | TR-55 Equivalent Description |
| Deck | 98 | 98 | n/a | n/a | n/a | Impervious |
| Forest | 30 | 55 | 70 | 77 | 98 | Woods, Good |
| Forested Wetland | 45 | 66 | 77 | 83 | 98 | Woods, Poor |
| grass | 39 | 61 | n/a | 80 | n/a | Open Space, Good |
| gravel | 77 | 85 | 90 | n/a | n/a | Streets and Roads, Gravel |
| IMP | 98 | 98 | n/a | n/a | n/a | Impervious |
| Mining | 77 | 86 | 91 | n/a | n/a | Bare Soil |
| Non-Forested Wetland | n/a | n/a | 78 | n/a | n/a | Engineering judgment |
| Powerline/Utility | n/a | 79 | n/a | n/a | n/a | Open Space, Poor |
| Roof | 98 | 98 | n/a | n/a | n/a | Impervious |
| Sidewalk | 98 | 98 | n/a | n/a | n/a | Impervious |
| Urban Public/Institutional | 42 | 63 | n/a | n/a | n/a | Engineering judgment |
| Water | 98 | n/a | 98 | 98 | 98 | Impervious |
| Woods | 30 | 55 | n/a | 77 | n/a | Woods, Good |

* W = Water

Table 1 and Table 2present the summary of composite RCN's for each watershed for the existing and proposed conditions, respectively.

## Time of Concentration Flowpaths

Drainage flowpaths for each subwatershed (and flowpath segment lengths and slopes) were determined in a GIS environment using topography data derived from the existing conditions survey or the proposed conditions grading plan. The properties of each flowpath segment were assigned based on the landuse/landcover of the underlying surface. The maximum length of a sheet flow reach is 50 feet. Table 6 presents the Manning's "n" friction factors and the Kv velocity factors assumed for each land surface/cover type.

**Table 6 Time of Concentration Flow Path Manning's "n" and Velocity Factor Assignments**

| | Sheet Flow | | Shallow Concentrated Flow | |
|---|---|---|---|---|
| Landuse | Description | Manning's "n" | Description | Kv (ft/s) |
| Forested Wetland | Woods: Dense Underbrush | 0.8 | Woodland | 5 |
| GRASS | Grass: Short | 0.15 | Short Grass Pasture | 7 |
| GRAVEL | Range | 0.13 | Unpaved | 16.1 |
| IMP | Smooth surfaces | 0.011 | Paved | 20.3 |
| Mining | Smooth surfaces | 0.011 | Nearly Bare & Untilled | 10 |
| Non-Forested Wetland | Woods: Dense Underbrush | 0.8 | Forest w/Heavy Litter | 2.5 |
| Powerline/Utility | Range | 0.13 | Nearly Bare & Untilled | 10 |
| Urban Public/Institutional | Grass: Short | 0.15 | Nearly Bare & Untilled | 10 |
| W | Smooth Surface | 0.011 | Paved | 20.3 |
| Water | Smooth surfaces | 0.011 | Paved | 20.3 |
| WOODS | Woods: Light Underbrush | 0.4 | Woodland | 5 |

## Design Points

The hydrologic/hydraulic conditions are evaluated at five design points for both the existing and proposed conditions. The design points are described as follows:

### DP Wellhead

The eastern section of the Subject Property is occupied by a Town of Framingham Wellhead Protection Area. No stormwater management infrastructure may be constructed in this area. All stormwater management infrastructure is designed to bypass this area. Runoff that passes through the Wellhead Protection Area proceeds eastward to Podd Meadow to the Sudbury River and ultimately to DP Sudbury as described below. Some clean runoff from the back yards of several buildings will continue to drain overland to this design point.

### DP North

The central portion of the project Site drains northward to the MWRA culvert that passes underneath the aqueduct. Stormwater management infrastructure is designed

to treat and attenuate runoff prior to passing through this culvert. Runoff that passes through the culvert proceeds northward to the Sudbury River. This design point represents the Sudbury River north of the Site.

### DP West

The western portion of the project Site drains westward directly to the Sudbury River. This design point represents the Sudbury River west of the Site. Stormwater management infrastructure is designed to treat and attenuate runoff prior to passing through this culvert. Stormwater that flows to DP West enters the Sudbury River.

### DP Sudbury

This design point represents the total contributions of the Project Area (DP Wellhead, DP North, and DP West) to the Sudbury River. In this location, the Sudbury River flows generally west to east. Contributions from DP West are upstream of contributions to DP North, which are upstream of contributions from DP Wellhead. While the contributing design points are spread out over a river reach approximately 1 mile in length, this design point is included in the model to provide a summation of the total runoff rates and volumes from the Project site as they impact this reach of the Sudbury River.

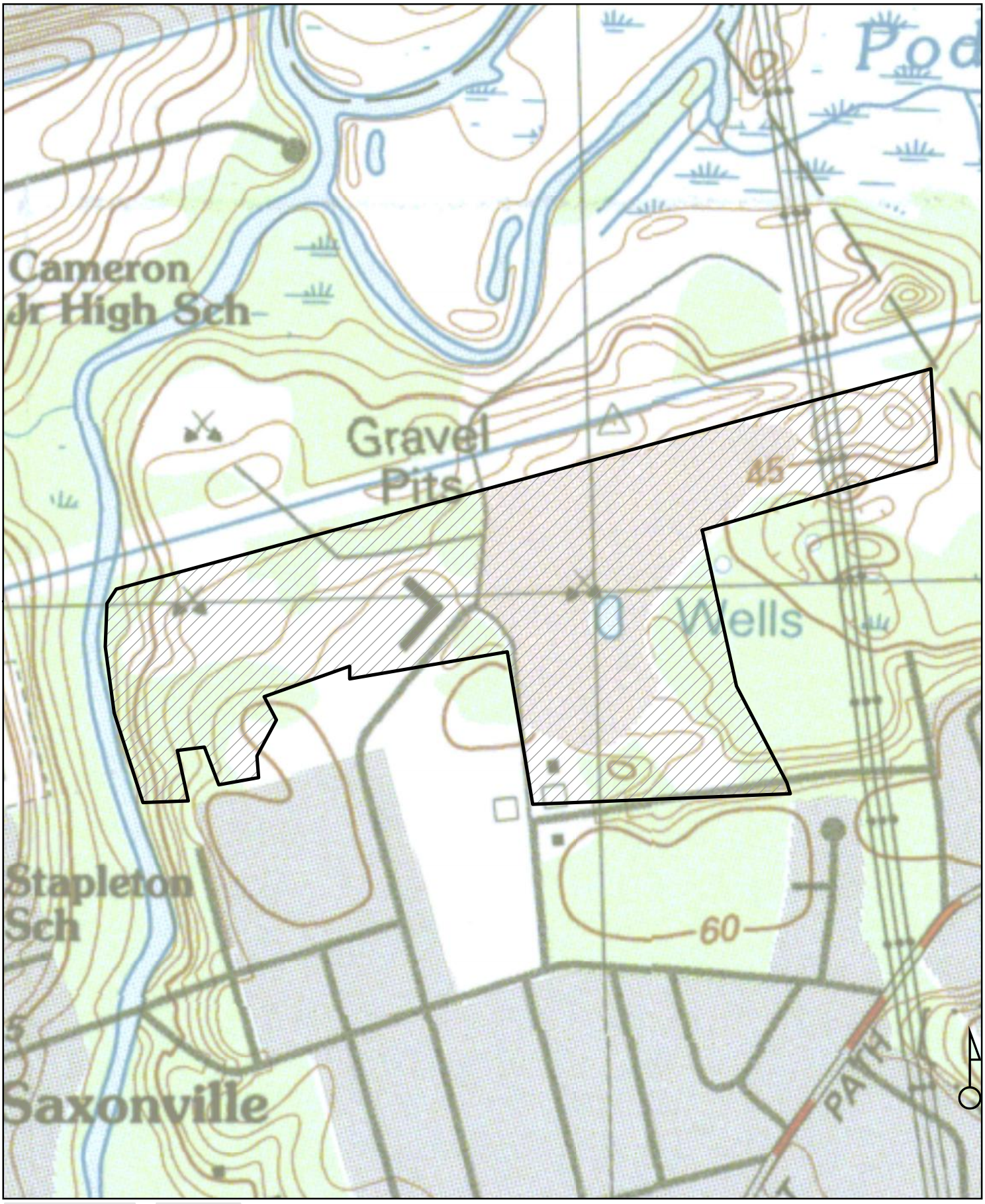
### DP L E 1.0 – Podd Meadow Pond

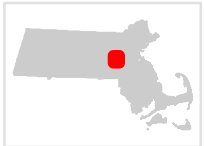
This design point represents the inflows to Podd Meadow Pond, located south of the MWRA aqueduct. The proposed stormwater infrastructure will bypass the wellhead area and deliver flows directly to this design point. Runoff from the northeastern portion of the Site will be directed through detention and treatment systems (E-1, E-2, E-4A, E-4B, E-7, E-8, INF-E-1, INF-E-2, INF-E-3, INF-E-4A, INF-E-4B DET-1, DET-2, DET-3) to a culvert that bypasses the Wellhead Area and discharges to Podd Meadow Pond. Runoff from the southeastern portion of the Site will be directed across the RiverPath Extension to the east through detention and treatment systems (E-9) to the southern portion of the Wellhead Area. The final design of this culvert and detention basin at its outlet remains outstanding and must occur prior to construction.

## Hydraulic Analysis of Proposed Stormwater Management Infrastructure

As required by the Town of Framingham Subdivision Bylaw, structural components of the stormwater management system (e.g. pipes) are designed to convey the 25-year storm. Details of the entire proposed drainage system are depicted on the Plans and calculations supporting the pipe sizing are included in Appendix B.

source:



**Vanasse Hangen and Brustlin, Inc.**

1 inch = 500 feet

0 250 500

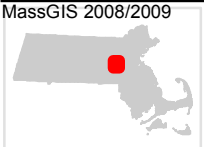
Feet

Site Location Map
Danforth Green
Framingham, Massachusetts

Figure 1
Date 9/2012
Project Area

source:

MassGIS 2008/2009



**Vanasse Hangen and Brustlin, Inc.**

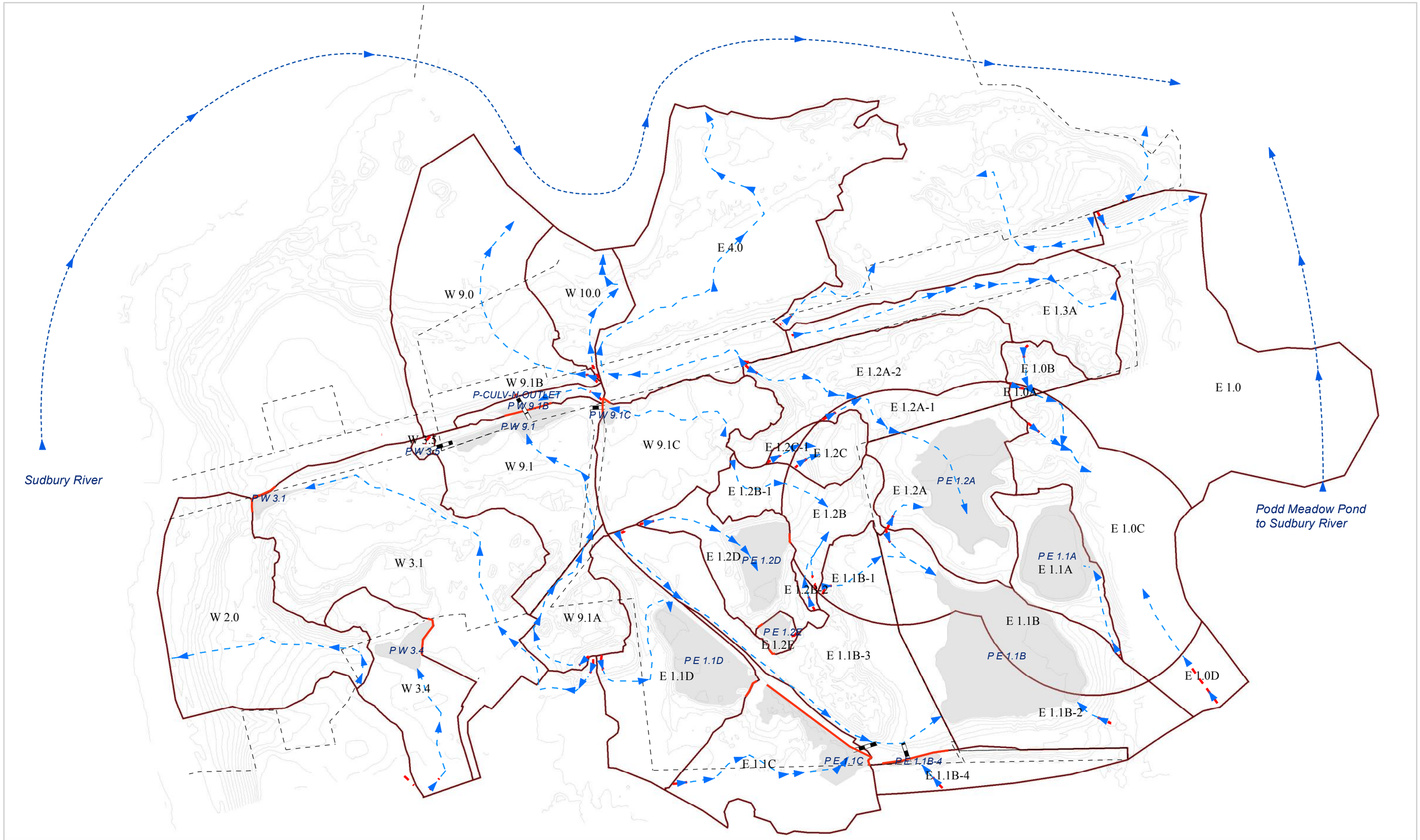
1 inch = 500 feet

0 250 500

Feet

Site Location Map (Aerial)
Danforth Green
Framingham, Massachusetts

Figure 2
Date 9/2012
Project Area




Vanasse Hangen Brustlin, Inc.
May 2013

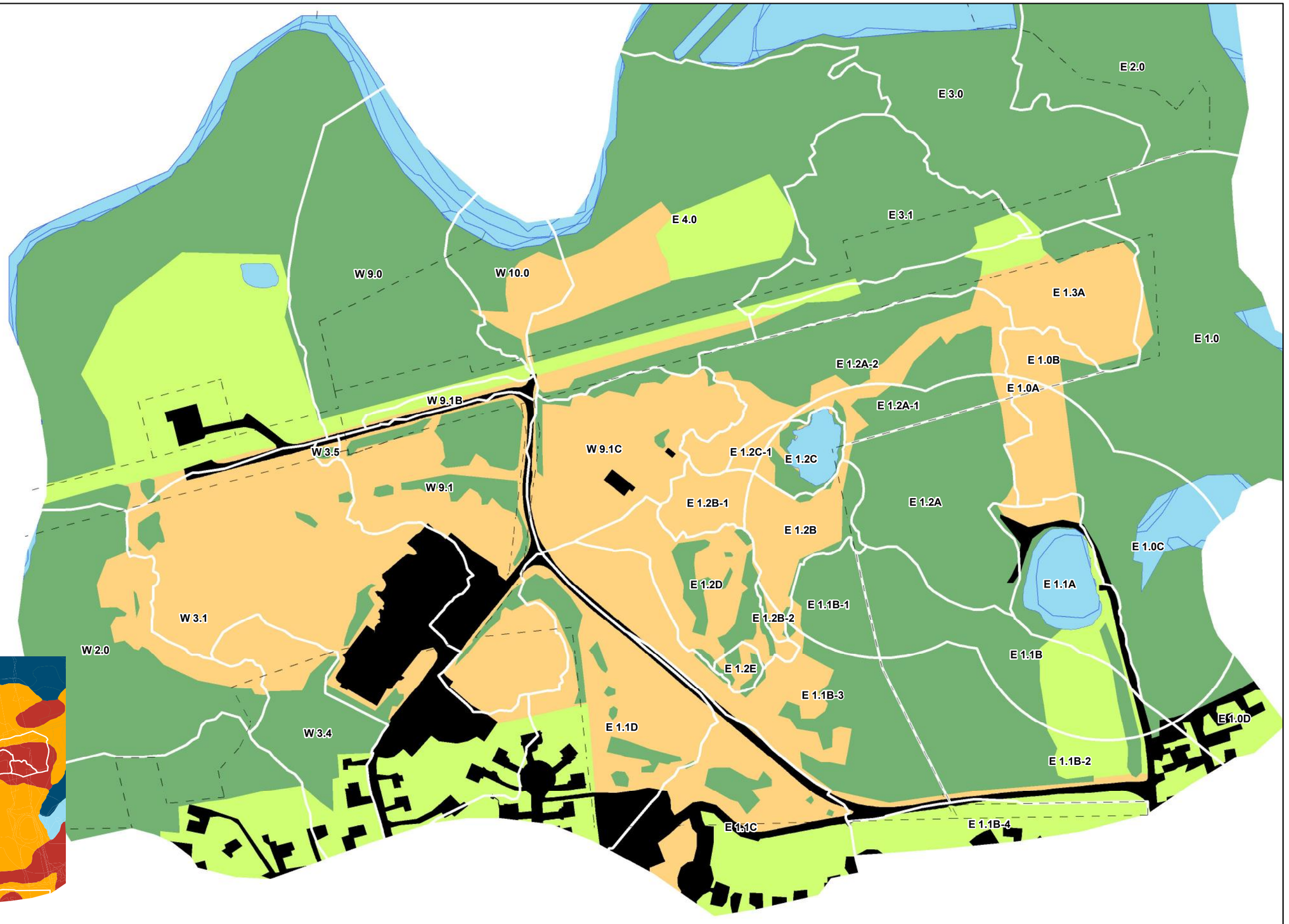
0 140 280 Feet
1 inch = 300 feet

**Conveyance Structures**
Weir
Culvert

Storage Areas (Maximum Impoundment)
Subcatchment Boundaries

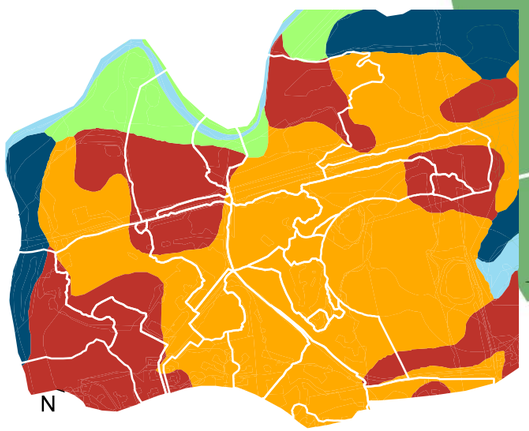
Danforth Green
Riverpath Drive
Framingham, Massachusetts

Figure 3
Stormwater Report
Existing Conditions Drainage Areas




**Hydrologic Soils Group**

- A
- B
- C
- D
- W




Vanasse Hangen Brustlin, Inc.
May 2013

0 140 280 560 Feet

1 inch = 280 feet

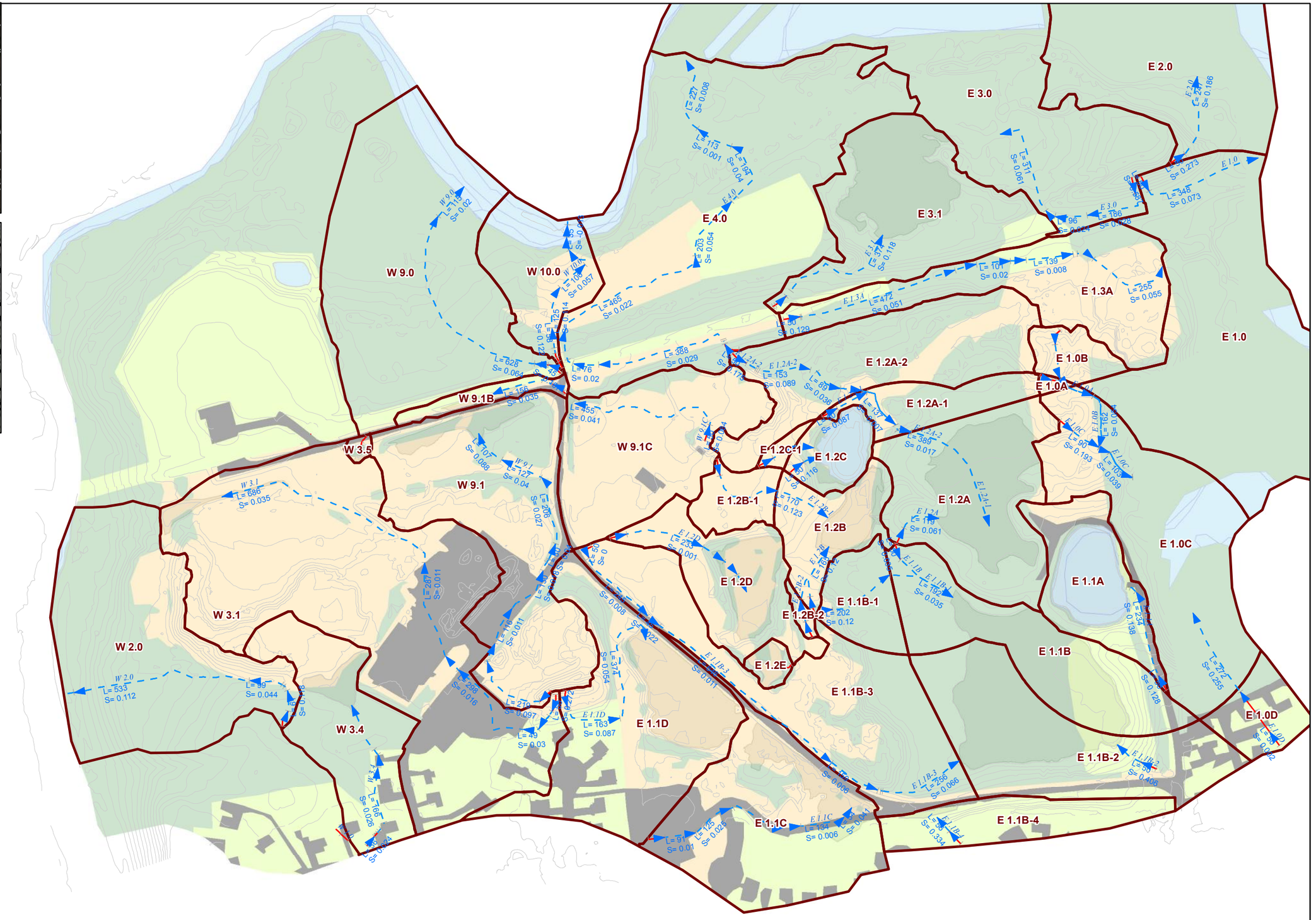
- Property Lines
- Watershed Boundaries

**Landuse**

- Forest
- Forested Wetland
- GRASS
- GRAVEL
- IMPERVIOUS
- Mining
- Non-Forested Wetland
- Powerline/Utility
- Urban Public/Institutional
- W
- WOODS
- Water

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Figure 4
Stormwater Report
Existing Conditions Landuse





VHB Vanasse Hangen Brustlin, Inc.
November 2012


0 140 280 560 Feet

1 inch = 280 feet

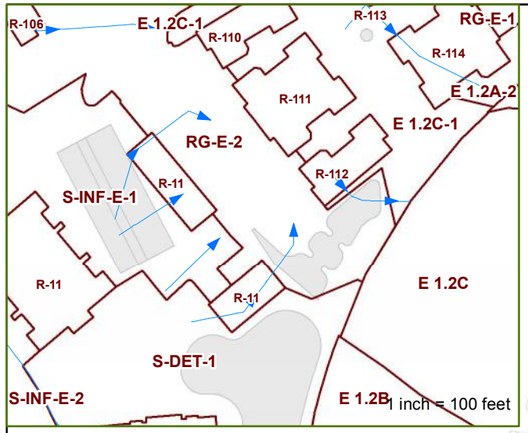
Watershed Boundaries

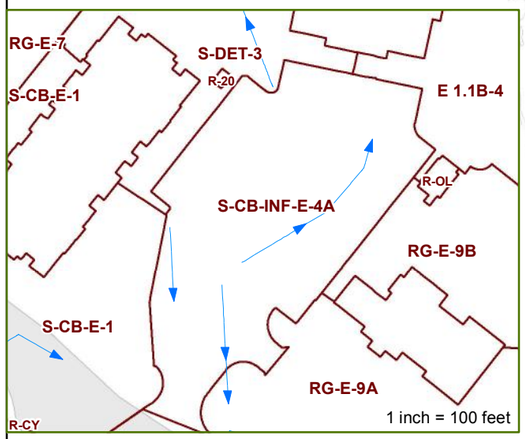
**Flow path Type**
- Shallow
- Sheet

**Landuse**
- Forest
- Forested Wetland
- GRASS
- GRAVEL
- IMPERVIOUS
- Mining
- Non-Forested Wetland
- Powerline/Utility
- Urban Public/Institutional
- W
- WOODS
- Water

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Figure 5
Stormwater Report
Existing Conditions TC Flowpaths



Flow path — – Property Lines

Watershed Boundaries

Roof watersheds are abbreviated as "R-"

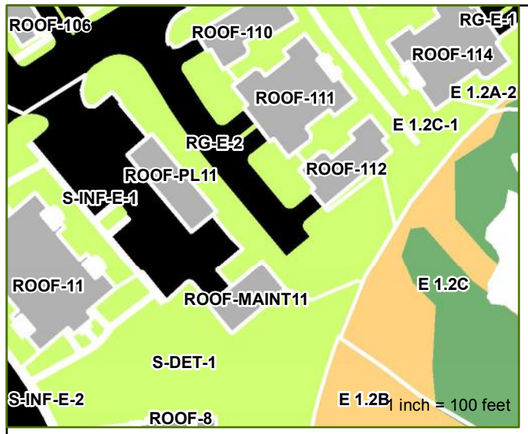
0 140 280 Feet

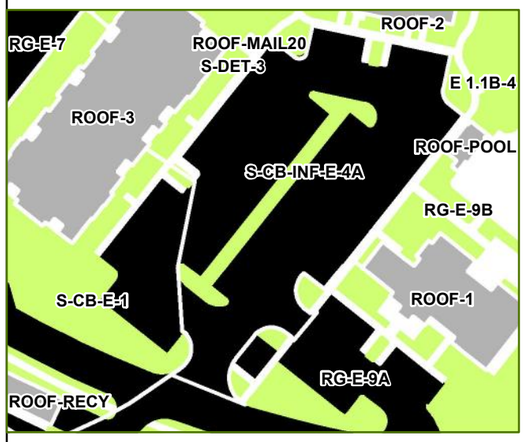
1 inch = 280 feet

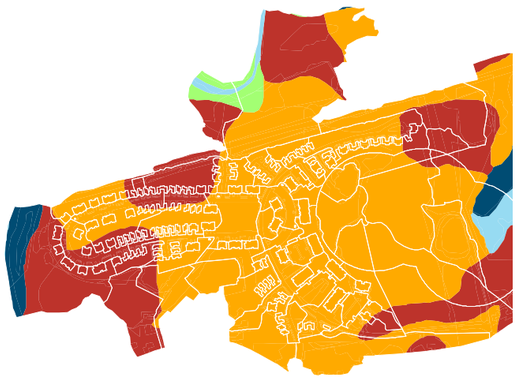
VHB Vanasse Hangen Brustlin, Inc.
November 2012

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Figure 6
Stormwater Report
Proposed Conditions Watersheds



VHB Vanasse Hangen Brustlin, Inc.
May 2013

0 140 280 Feet
1 inch = 280 feet

Roof watersheds are abbreviated as "R-"

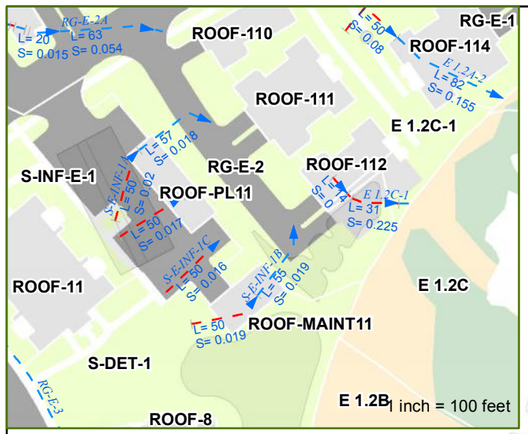
Watershed Boundaries
Property Lines

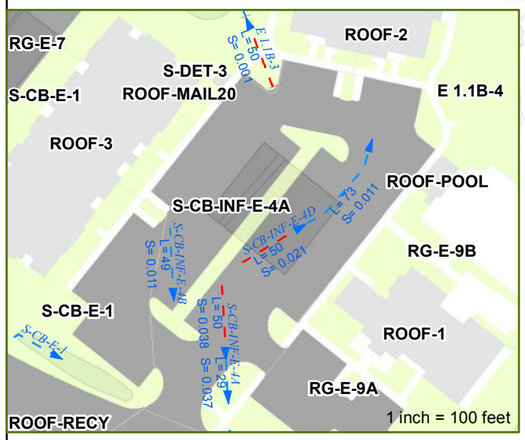
**Landuse**

- DECK
- Deck
- Forest
- Forested Wetland
- GRASS
- GRAVEL
- IMP
- Mining
- Non-Forested Wetland
- Powerline/Utility
- ROOF
- SIDEWALK
- Sidewalk
- Urban Public/Institutional
- Water
- WATER
- WOODS
- Water

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Figure 7
Stormwater Report
Proposed Conditions Landuse



VHB Vanasse Hangen Brustlin, Inc.
May 2013

0 140 280 Feet
1 inch = 280 feet

**Flow path**
- Property Lines
- Pipe
- Watershed Boundaries
- Shallow
- Sheet

**Landuse**
- Deck
- Forest
- Forested Wetland
- GRASS
- GRAVEL
- IMPERVIOUS
- Mining
- Non-Forested Wetland
- Powerline/Utility
- ROOF
- Sidewalk
- Urban Public/Institutional
- WOODS
- Water

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Figure 8
Stormwater Report
Proposed Conditions TC Flowpaths

# 2

# Regulatory Compliance

## Massachusetts Department of Environmental Protection (DEP) – Stormwater Management Standards

### Regulatory Compliance

The purpose of the stormwater management plan is to provide long-term protection of natural resources in and around the Site. This is achieved by implementing water quality and quantity control measures designed to decrease the amount of pollutants discharged from the Site and control discharge rates.

The following stormwater regulations and guidelines apply to the Project:

- MassDEP Stormwater Management Performance Standards and Guidelines Department of Environmental Protection and Office of Coastal Zone Management (DEP/CZM, March 1997).
- Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Stormwater Permit for Construction Activities disturbing greater than one acre (EPA, Federal Register, December 8, 1999 and amendments).

The Site is a former gravel pit and is highly disturbed. The Site includes abandoned roads and buildings as well as man-made soil piles and pits. Although the Project is a redevelopment the proposed stormwater management system meets all of the criteria of a new project on an undeveloped Site.

The following section of this report describes how the Project complies with each of the Stormwater Management Standards.

## Standard 1: No New Untreated Discharges or Erosion to Wetlands

No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The Project is designed to fully comply with Standard 1. All runoff from the Site will be treated to fully comply with the Stormwater Management Standard 4. All outlets will be located in upland areas and are designed with scour protection suitable to prevent erosion during the 100-year design event. No outlets will discharge runoff directly to wetlands or waters of the Commonwealth.

Appendix A presents the computations for sizing outlet structures and flared end sections to prevent erosion at discharge points.

## Standard 2: Peak Rate Attenuation

Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

The Project is designed to fully comply with Standard 2 with respect to the proposed development. VHB used HydroCAD software to evaluate the rainfall-runoff response of the Project area under existing and proposed conditions for the 2-, 10-, and 100-year recurrence interval storm events. Table 7and Table 8 present the results of the analysis. Stormwater infrastructure is designed to maintain or decrease runoff rates from the developed portions of the site. However, runoff from the eastern portions of the site will be directed around the Wellhead area, its natural discharge point, to Podd Meadow Pond. The project, as presented herein, does not meet the requirements to maintain or reduce peak discharge rates to Podd Meadow Pond. The proposed culvert that will bypass the Wellhead area and the proposed detention area downstream of the culvert outlet will be designed to maintain peak discharge rates. The final design remains outstanding and must occur prior to construction.

Model results indicate that the Project will result in decreases in peak discharge rates to each of the four design points during the 2- and 10- year events and with these decreases in peak rates of runoff come a significant increase in the quantity of stormwater infiltration and aquifer recharge. Appendix B presents the computations and supporting information regarding the hydrologic/hydraulic models.

**Table 7 Peak Discharge Rates (cubic feet per second)**

| Return Period (years) | Condition | DP Wellhead | DP North | DP West | DP Sudbury | DP Podd Meadow Pond (LE 1.0)[1] |
|---|---|---|---|---|---|---|
| 2 | Existing | 11.9 | 35.8 | 19.3 | 46.4 | 10.7 |
| | Proposed | 6.0 | 10.2 | 1.0 | 23.7 | 14.0 |
| | Δ | -5.9 | -25.6 | -18.3 | -22.7 | 3.25 |
| 10 | Existing | 21.78 | 60.5 | 35.7 | 93.8 | 30.8 |
| | Proposed | 21.76 | 26.4 | 12.8 | 72.9 | 52.5 |
| | Δ | -0.02 | -34.1 | -22.9 | -20.9 | 21.7 |

1. In the existing condition, no runoff from the project site reaches Podd Meadow Pond during the 2- and 10-year events. The increases in runoff rates to DP Podd Meadow Pond shown herein result directly from construction of the culvert that bypasses the Wellhead Area.

Massachusetts Stormwater Management Standards indicate that the stormwater analysis must address the impacts of the Project on off-site flooding during the 100-year, 24-hour design event. Table 8 presents the peak rates of runoff from the Site to DP Sudbury. Model results indicate that all runoff from the Project Area will flow to the Sudbury River approximately one half hour following the peak rainfall. The contributing area at the project site is greater than 15 square miles and the peak in the Sudbury River hydrograph will occur much later. The peak runoff from the project site will come well before the peak discharge and elevations in the Sudbury River, therefore the project will not cause an increase in the peak discharge rates and elevations at the Sudbury River. In addition, the Project will not result in an increase in runoff volumes to the Sudbury River

**Table 8 Peak Discharge Rates (cubic feet per second)**

| Return Period (years) | Condition | DP Sudbury |
|---|---|---|
| 100 | Existing | 240.9 |
| | Proposed | 266.1 |
| | Δ | 25.2 |

## Standard 3: Stormwater Recharge

Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures, including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based

on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The Project is designed to fully comply with Standard 3.

Appendix C presents the detailed static-method calculations supporting the Stormwater Recharge requirement. The results are summarized here.

Proposed impervious areas including roadways, sidewalks, decks, and rooftops will occupy approximately 19.6 acres of the Site. Approximately 17.2 of the impervious acres will drain directly to the stormwater management system. All impervious roadways will drain directly to the stormwater management system; areas bypassing the system include sidewalks and decks.

The NRCS Soil Survey indicates that the soils in the Project Area are primarily defined as Hydrologic Soil Group A and B soils. The Geotechnical Report, attached as Appendix G, indicates that in situ observations are consistent with the NRCS Soil Survey. As mentioned previously, the Site is highly disturbed and was previously used for gravel mining operations. If necessary, layers of rubble and/or demolition debris that are encountered below infiltration systems will be handled in accordance with the Stormwater Regulations.

The Geotechnical Report indicates that soils on site are favorable for infiltration. The natural substrate is sand and gravel. In some areas, pockets of silt have accumulated in depressions resulting in a perched water table. Soils beneath these layers are generally sand and gravel. Evidence of high seasonal groundwater was not encountered in many borings and test-pits. In places where evidence was found, groundwater was determined to be very deep and will not rise to within two feet of the bottom of any of the proposed infiltration structures.

Based on the proposed impervious areas and the NRCS hydrologic soils groups, the total required recharge volume for the Project is approximately 28,300 cubic feet. The total recharge volume provided in the rain gardens, infiltration basins, and subsurface infiltration structures will exceed 45,700 cubic feet. The total recharge volume provided in the individual roof-drain dry wells will exceed 50,000 cubic feet.

All surface features including rain gardens and infiltration basins are designed to draw down completely within 72 hours as required by the Stormwater Management Standards and as recommended by the EPA for mosquito control.

All the infiltration features including rain gardens, infiltration basins, and subsurface infiltration structures are sized with a sufficient footprint (bottom area) to infiltrate the required recharge volume within 72 hours. The total volume infiltrated to groundwater within 72 hours will exceed 45,700 cubic feet.

Outlet controls for both the surface and subsurface infiltration structures are designed to result in systems that draw down within 72 hours.

## Standard 4: Water Quality

Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter are implemented and maintained;

b. Stormwater BMPs are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

The Project is designed to fully comply with Standard 4.

Appendix D presents the TSS removal calculations for each treatment train in the Project Area. All runoff from proposed impervious roadways will be captured and treated to remove a minimum of 80% of TSS. The Project Site lies within a Wellhead Protection area; therefore, all runoff from proposed impervious roadways will be treated to remove a minimum of 44% of TSS prior to infiltrating to groundwater.

Appendix G presents the Stormwater Management System Operations and Maintenance Manual (O&M Manual) prepared by VHB for the Project. As described in the O&M Manual, the Manual has been developed using design phase information and must be updated by the Project Operator with as-built information following the completion of construction.

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

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt and stormwater runoff, the proponent shall use the specific stormwater BMPs determined by the Department to be suitable for such use as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c.

21, §§ 26-53, and the regulations promulgated there under at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

The Project is not considered a LUHPPL.

## Standard 6: Critical Areas

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

The Project is within a Zone II Wellhead Protection Area (WPA) and abuts a Zone I WPA. Accordingly, it is designed to fully comply with Standard 6. All runoff from impervious roadway surfaces will be treated to remove a minimum of 44% of TSS prior to infiltrating to groundwater.

## Standard 7: Redevelopments and Other Projects Subject to the Standards only to the Maximum Extent Practicable

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

The project can be considered a redevelopment, the entire site has been disturbed in the recent past. However, the stormwater management infrastructure presented herein is designed to fully meet the Stormwater Management Standards. As presented, the project fully meets standards 3, 4, 5, and6. The project fully meets Standard 2 at all design points with the exception of Podd Meadow Pond. The proposed culvert that will bypass the Wellhead Area and the proposed detention

area downstream of the culvert will be designed to maintain peak discharge rates. The final design remains outstanding and must occur prior to construction.

## Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls

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

The Project will disturb more than 1 acre of land and is required to obtain coverage under the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit. As required under this permit, a Stormwater Pollution Prevention Plan (SWPPP) will be developed and submitted before land disturbance begins.

## Standard 9: Operation and Maintenance Plan

A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.

The Stormwater Management System Operations and Maintenance Manual (O&M Manual) prepared by VHB for the Project. As outlined in the O&M Manual, it has been developed using design phase information and must be updated by the Project Operator with as-built information following the completion of construction.

## Standard 10: Prohibition of Illicit Discharges

All illicit discharges to the stormwater management system are prohibited.

The design plans submitted with this report have been developed so that the components included therein are in full compliance with current standards. The O&M Manual includes measures to prevent illicit discharges.

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# Appendix A: Standard 1 Computations and Supporting Information

- Apron Rip-Rap Sizing Calculations
  - Summary Sheet
  - Nomographs

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# Apron and Rip-Rap Sizing Calculations

**Project Name:** Danforth Green **Proj. No.:** 12004.00

**Date:** 5/10/2013

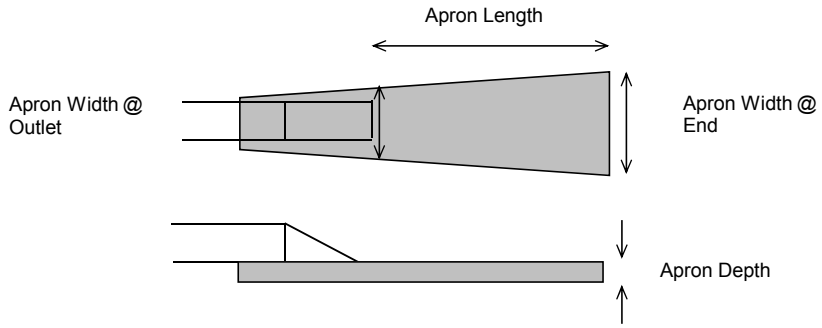
**Project Location:** Framingham, MA **Calculated by:** SAW

**Checked by:**

Sources: Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas
Massachusetts Department of Environmental Protection - Reprinted 2003 (pp. 118-120)

Erosion and Sediment Control Handbook - Third Edition 1992 (Chapter 3.18)
Virginia Department of Conservation and Recreation (DCR)

Attachments: Virginia DCR Erosion and Sediment Control Handbook Plate 3.18-3




Apron Width at Outlet ($3D_o$): Width = 3 x pipe dia. (or width of channel)

Apron Length (La): Length = From Virginia DCR Handbook - Plate 3.18 if Tw depth is < 1/2 dia.
Length = From Virginia DCR Handbook - Plate 3.18 if Tw dwpth is >= 1/2 dia.

Apron Width at End (W): Width = dia. + apron length if Tw depth is < 1/2 dia.
Width = dia. + 0.4 x apron length if Tw dwpth is >= 1/2 dia.
or apron width = channel width if a well defined channel exists

Rock Riprap: Median Diameter ($d_{50}$) = From Virginia DCR Handbook - Plate 3.18-3 or 4
Largest stone dia = 1.5 x $d_{50}$

Apron Depth: 6" or 1.5 x largest stone dia

| Design Element | Outlet Description | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Inlet | Outlet | Outlet | | | | Outlet | | Outlet | Outlet |
| | RG-W-2 | to grass | RG-W-2 | RG-3-W | RG-3-W | RG-3-W | N Culv | | S Culv | RG-E-9 |
| | FES 1 | FES 2 | FES 3 | FES 4 | FES 5 | FES 6 | FES 7 | FES 8 | FES 9 | FES 10 |
| Design Storm (yr): | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Defined Channel (yes/no) | no | no | no | no | no | no | no | no | no | no |
| Pipe Dia ($D_o$), in | 12.0 | 12.0 | 12.0 | 18.0 | 12.0 | 12.0 | 12.0 | 24.0 | 18.0 | 18.0 |
| Tail Water (Tw), ft | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow (Q), cfs | 4.5 | 4.5 | 1.3 | 3.9 | 2.4 | 2.9 | 2.1 | 32.3 | 10.6 | 8.1 |
| Apron Width ($3D_o$) (outlet), ft | 3.0 | 3.0 | 3.0 | 4.5 | 3.0 | 3.0 | 3.0 | 6.0 | 4.5 | 4.5 |
| Apron Length (La), ft | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 20.0 | 12.0 | 10.0 |
| Apron Width (W) (end), ft | **11.0** | **11.0** | **11.0** | **11.5** | **11.0** | **11.0** | **11.0** | **22.0** | **13.5** | **11.5** |
| Median Stone Dia. ($d_{50}$), ft | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Median Stone Dia. ($d_{50}$), in | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Largest Stone Dia., ft | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Largest Stone Dia., in | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| Apron Depth, ft | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 |
| Apron Depth, in | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 |

# Apron and Rip-Rap Sizing Calculations

**Project Name:** Danforth Green **Proj. No.:** 12004.00

**Date:** 5/10/2013

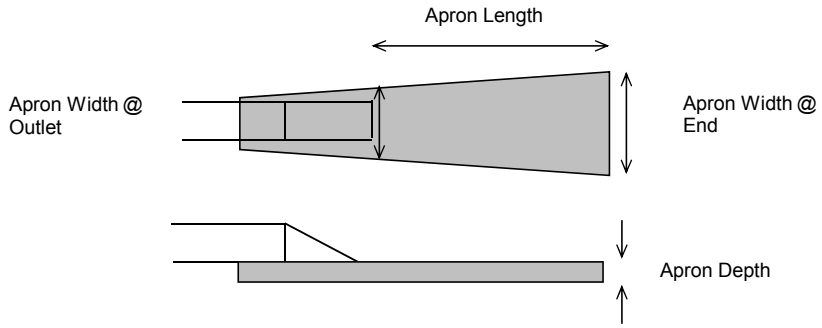
**Project Location:** Framingham, MA **Calculated by:** SAW

**Checked by:**

Sources: Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas
Massachusetts Department of Environmental Protection - Reprinted 2003 (pp. 118-120)

Erosion and Sediment Control Handbook - Third Edition 1992 (Chapter 3.18)
Virginia Department of Conservation and Recreation (DCR)

Attachments: Virginia DCR Erosion and Sediment Control Handbook Plate 3.18-3




Apron Width at Outlet ($3D_o$): Width = 3 x pipe dia. (or width of channel)

Apron Length (La): Length = From Virginia DCR Handbook - Plate 3.18 if Tw depth is < 1/2 dia.
Length = From Virginia DCR Handbook - Plate 3.18 if Tw dwpth is >= 1/2 dia.

Apron Width at End (W): Width = dia. + apron length if Tw depth is < 1/2 dia.
Width = dia. + 0.4 x apron length if Tw dwpth is >= 1/2 dia.
or apron width = channel width if a well defined channel exists

Rock Riprap: Median Diameter ($d_{50}$) = From Virginia DCR Handbook - Plate 3.18-3 or 4
Largest stone dia = 1.5 x $d_{50}$

Apron Depth: 6" or 1.5 x largest stone dia

| | RG-E-9 FES 11 | BLDG 2 FES 12 | BLDG 3 FES 13 | Inlet Spur Road FES 14 | Outlet Spur Road FES 15 | Inlet Spur Road FES-16 | Outlet Spur Road FES-17 | BLDG 4 FES 18 | BLDG 5 FES 19 | BLDG 6 FES-20 |
|---|---|---|---|---|---|---|---|---|---|---|
| Design Storm (yr): | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Defined Channel (yes/no) | no | no | no | no | no | no | no | no | no | no |
| Pipe Dia ($D_o$), in | 18.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| Tail Water (Tw), ft | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow (Q), cfs | 6.5 | 0.7 | 1.4 | 1.8 | 1.8 | 0.3 | 0.3 | 1.2 | 1.2 | 1.2 |
| Apron Width ($3D_o$) (outlet), ft | 4.5 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Apron Length (La), ft | 12.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Apron Width (W) (end), ft | **13.5** | **11.0** | **11.0** | **11.0** | **11.0** | **11.0** | **11.0** | **11.0** | **11.0** | **11.0** |
| Median Stone Dia. ($d_{50}$), ft | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Median Stone Dia. ($d_{50}$), in | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Largest Stone Dia., ft | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Largest Stone Dia., in | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| Apron Depth, ft | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 |
| Apron Depth, in | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 |

# Apron and Rip-Rap Sizing Calculations

**Project Name:** Danforth Green **Proj. No.:** 12004.00

**Date:** 5/10/2013

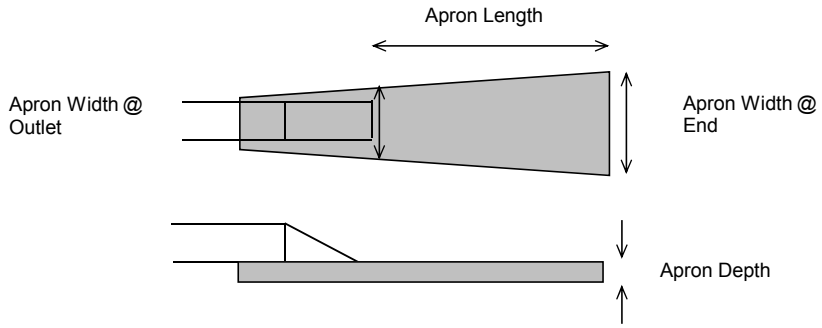
**Project Location:** Framingham, MA **Calculated by:** SAW

**Checked by:**

Sources: Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas
Massachusetts Department of Environmental Protection - Reprinted 2003 (pp. 118-120)

Erosion and Sediment Control Handbook - Third Edition 1992 (Chapter 3.18)
Virginia Department of Conservation and Recreation (DCR)

Attachments: Virginia DCR Erosion and Sediment Control Handbook Plate 3.18-3




Apron Width at Outlet ($3D_o$): Width = 3 x pipe dia. (or width of channel)

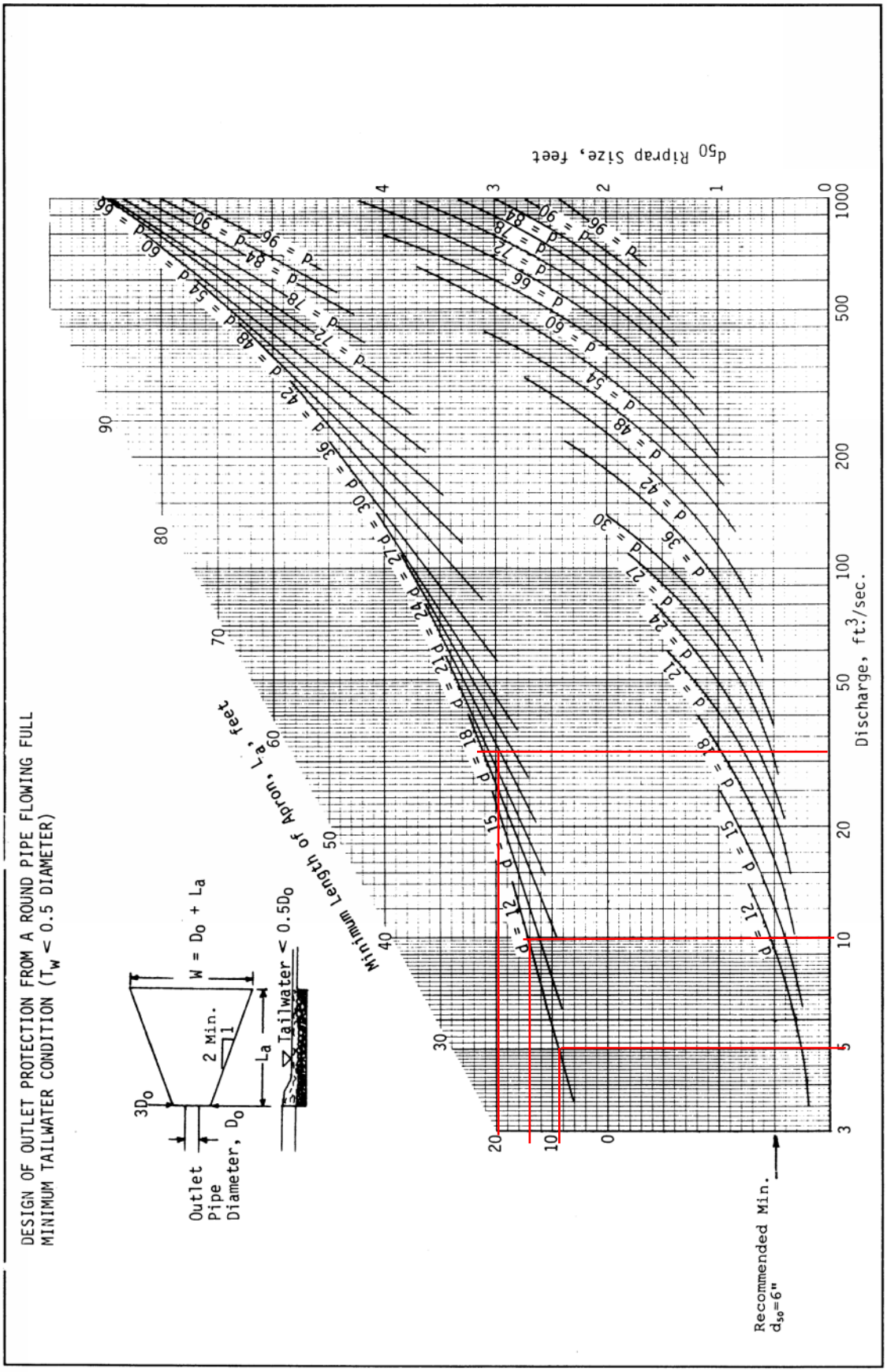
Apron Length (La): Length = From Virginia DCR Handbook - Plate 3.18 if Tw depth is < 1/2 dia.
Length = From Virginia DCR Handbook - Plate 3.18 if Tw dwpth is >= 1/2 dia.

Apron Width at End (W): Width = dia. + apron length if Tw depth is < 1/2 dia.
Width = dia. + 0.4 x apron length if Tw dwpth is >= 1/2 dia.
or apron width = channel width if a well defined channel exists

Rock Riprap: Median Diameter ($d_{50}$) = From Virginia DCR Handbook - Plate 3.18-3 or 4
Largest stone dia = 1.5 x $d_{50}$

Apron Depth: 6" or 1.5 x largest stone dia

| | BLDG 8<br>FES 21 | DMH 36<br>FES 22 | BLDG 11<br>FES 23 | RG-E-1<br>FES 24 | RG-E-1<br>FES 25 |
|---|---|---|---|---|---|
| Design Storm (yr): | 25 | 25 | 25 | 25 | 25 |
| Defined Channel (yes/no) | no | no | no | no | no |
| Pipe Dia ($D_o$), in | 12.0 | 12.0 | 12.0 | 12.0 | 18.0 |
| Tail Water (Tw), ft | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Flow (Q), cfs | 1.4 | 1.1 | 0.6 | 0.4 | 8.5 |
| Apron Width ($3D_o$) (outlet), ft | 3.0 | 3.0 | 3.0 | 3.0 | 4.5 |
| Apron Length (La), ft | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Apron Width (W) (end), ft | **11.0** | **11.0** | **11.0** | **11.0** | **11.5** |
| Median Stone Dia. ($d_{50}$), ft | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Median Stone Dia. ($d_{50}$), in | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Largest Stone Dia., ft | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Largest Stone Dia., in | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| Apron Depth, ft | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 |
| Apron Depth, in | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 |




Source: USDA-SCS Plate 3.18-3

# Appendix B: Standard 2 Computations and Supporting Information

- Data Disks with HydroCAD Reports Including
  - Existing Conditions
    - Node Diagram
    - 2-year
    - 10-year
    - 25-year
    - 100-year
  - Proposed Condition
    - Node Diagram
    - 2-year
    - 10-year
    - 25-year
    - 100-year
  - StormCAD Reports for the stormwater infrastructure 25-year Design Event

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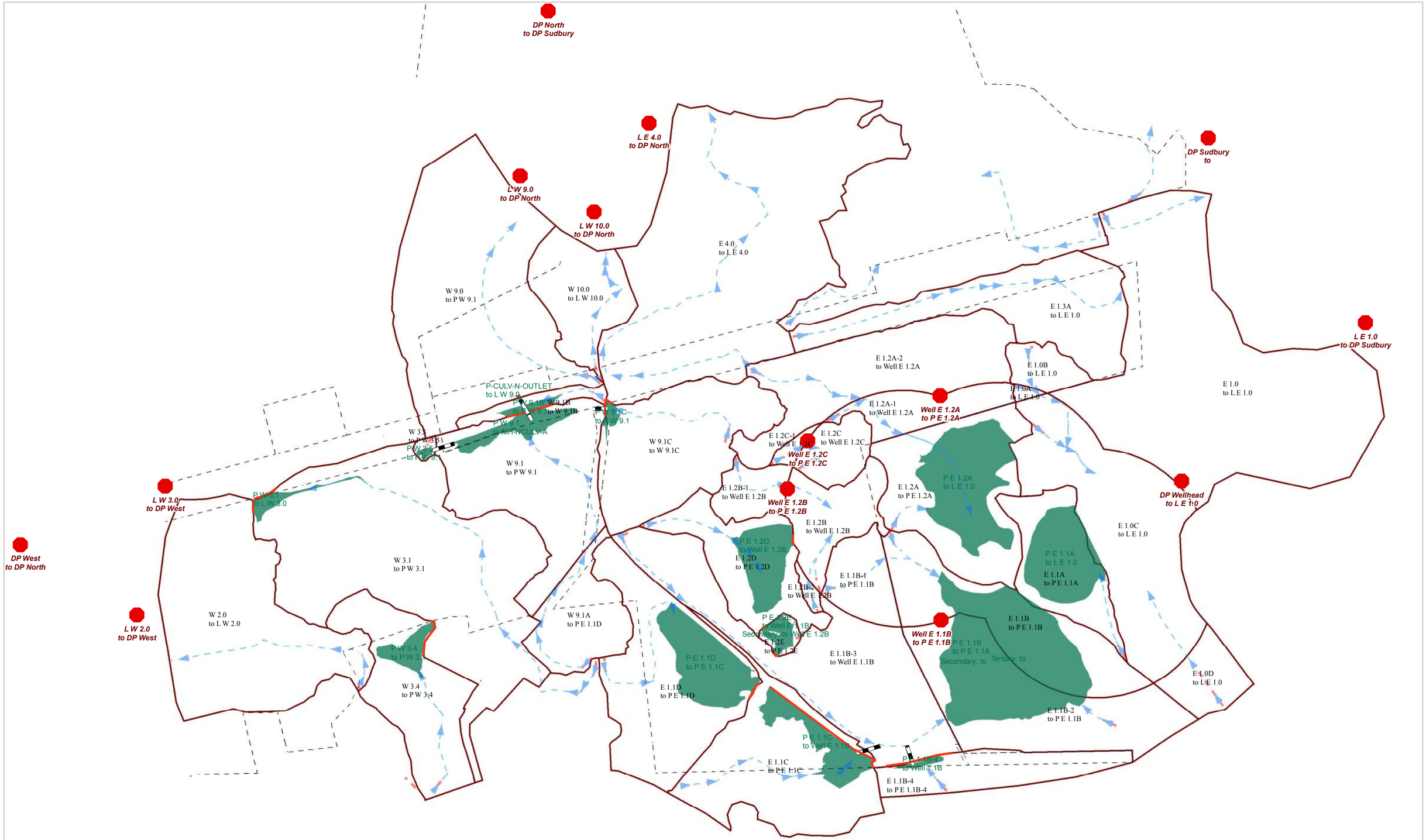



Vanasse Hangen Brustlin, Inc.
May 2013

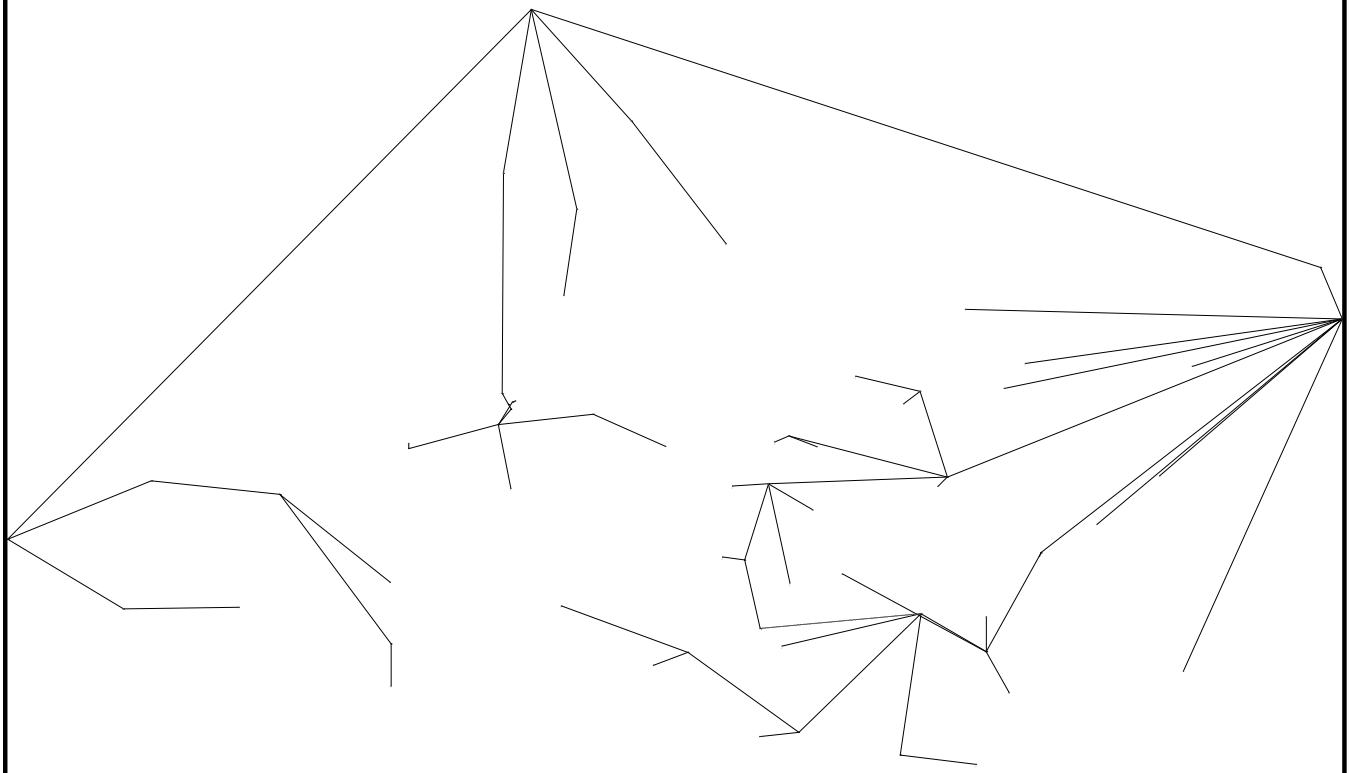
0 140 280 Feet
1 inch = 300 feet

Links **Conveyance Structures**
Weir
Culvert

Storage Areas (Maximum Impoundment)
Subcatchment Boundaries

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Stormwater Report
Existing Conditions Node Diagram



Subcat Reach Pond Link

**Routing Diagram for EX-12004**
Prepared by VHB, Inc., Printed 5/8/2013
HydroCAD® 10.00 s/n 07577 © 2012 HydroCAD Software Solutions LLC

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 5.244 | 30 | Forest, 0% imperv, HSG A (E 1.0, E 1.0C, E 4.0, W 10.0, W 2.0) |
| 6.873 | 55 | Forest, 0% imperv, HSG B (E 1.0, E 1.0C, E 1.3A, E 4.0) |
| 0.898 | 70 | Forest, 0% imperv, HSG C (E 4.0, W 10.0) |
| 3.960 | 77 | Forest, 0% imperv, HSG D (E 1.0, E 1.0C, E 4.0, W 2.0) |
| 0.610 | 98 | Forest, 0% imperv, HSG W (E 1.0, E 1.0C, E 4.0, W 10.0) |
| 0.851 | 45 | Forested Wetland, 0% imperv, HSG A (E 4.0) |
| 0.761 | 66 | Forested Wetland, 0% imperv, HSG B (E 1.0, E 4.0) |
| 0.031 | 77 | Forested Wetland, 0% imperv, HSG C (E 4.0) |
| 0.857 | 83 | Forested Wetland, 0% imperv, HSG D (E 1.0, W 2.0) |
| 4.001 | 39 | GRASS, 0% imperv, HSG A (E 1.0, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E 1.1B-3, E 1.1B-4, E 1.2A-1, E 4.0, W 10.0, W 3.1, W 3.4, W 9.1B) |
| 7.881 | 61 | GRASS, 0% imperv, HSG B (E 1.0C, E 1.1A, E 1.1B, E 1.1B-1, E 1.1B-2, E 1.1B-3, E 1.1B-4, E 1.1C, E 1.1D, E 1.2A-1, E 1.2B, E 1.2C, E 1.3A, E 4.0, W 10.0, W 3.1, W 3.4) |
| 11.976 | 77 | GRAVEL, 65% imperv, HSG A (E 1.0, E 1.0A, E 1.0B, E 1.0C, E 1.1B-3, E 1.1C, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.3A, E 4.0, W 10.0, W 2.0, W 3.1, W 3.4, W 3.5, W 9.1, W 9.1B) |
| 30.210 | 85 | GRAVEL, 65% imperv, HSG B (E 1.0, E 1.0C, E 1.1A, E 1.1B-1, E 1.1B-2, E 1.1B-3, E 1.1C, E 1.1D, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.2B, E 1.2B-1, E 1.2B-2, E 1.2C, E 1.2C-1, E 1.2D, E 1.2E, E 1.3A, E 4.0, W 10.0, W 2.0, W 3.1, W 9.1, W 9.1A, W 9.1B, W 9.1C) |
| 0.596 | 90 | GRAVEL, 65% imperv, HSG C (E 4.0, W 10.0) |
| 2.025 | 98 | IMP, 100% imperv, HSG A (E 1.0C, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E 1.1B-3, E 1.1B-4, E 1.1C, W 3.1, W 3.4, W 3.5, W 9.1, W 9.1B) |
| 7.382 | 98 | IMP, 100% imperv, HSG B (E 1.0C, E 1.1A, E 1.1B-2, E 1.1B-3, E 1.1B-4, E 1.1C, E 1.1D, E 1.2A, E 4.0, W 3.1, W 9.1, W 9.1A, W 9.1B, W 9.1C) |
| 0.193 | 77 | Mining, 0% imperv, HSG A (E 1.0, E 4.0, W 10.0) |
| 1.302 | 86 | Mining, 0% imperv, HSG B (E 4.0, W 10.0) |
| 0.005 | 91 | Mining, 0% imperv, HSG C (E 4.0) |
| 0.097 | 78 | Non-Forested Wetland, 0% imperv, HSG A (E 1.0, E 1.0C) |
| 1.079 | 78 | Non-Forested Wetland, 0% imperv, HSG B (E 1.0, E 1.0C) |
| 0.576 | 78 | Non-Forested Wetland, 0% imperv, HSG D (E 1.0, E 1.0C) |
| 2.334 | 98 | Non-Forested Wetland, 0% imperv, HSG W (E 1.0, E 1.0C) |
| 0.545 | 79 | Powerline/Utility, 0% imperv, HSG B (E 1.0, E 1.3A, E 4.0) |
| 1.165 | 98 | W, 100% imperv, HSG B (E 1.1A) |
| 0.547 | 98 | WATER, 100% imperv, HSG B (E 1.2C) |
| 12.739 | 30 | WOODS, 0% imperv, HSG A (E 1.0, E 1.0B, E 1.0C, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E 1.1B-3, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.3A, W 2.0, W 3.1, W 3.4, W 3.5, W 9.1) |
| 23.926 | 55 | WOODS, 0% imperv, HSG B (E 1.0, E 1.0C, E 1.1A, E 1.1B, E 1.1B-1, E 1.1B-2, E 1.1B-3, E 1.1C, E 1.1D, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.2B, E 1.2B-1, E 1.2B-2, E 1.2C, E 1.2D, E 1.2E, E 1.3A, E 4.0, W 2.0, W 3.1, W 3.4, W 9.1, W 9.1A, W 9.1B, W 9.1C) |

## Area Listing (all nodes) (continued)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.659 | 77 | WOODS, 0% imperv, HSG D (W 2.0) |
| 0.031 | 98 | Water, 0% imperv, HSG A (E 4.0) |
| 0.346 | 98 | Water, 0% imperv, HSG C (E 4.0, W 10.0) |
| 0.443 | 98 | Water, 0% imperv, HSG D (W 2.0) |
| 0.456 | 98 | Water, 0% imperv, HSG W (E 4.0, W 10.0, W 2.0) |
| **130.597** | **67** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 37.155 | HSG A | E 1.0, E 1.0A, E 1.0B, E 1.0C, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E 1.1B-3, E 1.1B-4, E 1.1C, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.3A, E 4.0, W 10.0, W 2.0, W 3.1, W 3.4, W 3.5, W 9.1, W 9.1B |
| 81.670 | HSG B | E 1.0, E 1.0C, E 1.1A, E 1.1B, E 1.1B-1, E 1.1B-2, E 1.1B-3, E 1.1B-4, E 1.1C, E 1.1D, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.2B, E 1.2B-1, E 1.2B-2, E 1.2C, E 1.2C-1, E 1.2D, E 1.2E, E 1.3A, E 4.0, W 10.0, W 2.0, W 3.1, W 3.4, W 9.1, W 9.1A, W 9.1B, W 9.1C |
| 1.876 | HSG C | E 4.0, W 10.0 |
| 6.495 | HSG D | E 1.0, E 1.0C, E 4.0, W 2.0 |
| 3.401 | Other | E 1.0, E 1.0C, E 4.0, W 10.0, W 2.0 |
| **130.597** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchme Numbers |
|---|---|---|---|---|---|---|---|
| 5.244 | 6.873 | 0.898 | 3.960 | 0.610 | 17.584 | Forest, 0% imperv | |
| 0.851 | 0.761 | 0.031 | 0.857 | 0.000 | 2.499 | Forested Wetland, 0% imperv | |
| 4.001 | 7.881 | 0.000 | 0.000 | 0.000 | 11.882 | GRASS, 0% imperv | |
| 11.976 | 30.210 | 0.596 | 0.000 | 0.000 | 42.782 | GRAVEL, 65% imperv | |
| 2.025 | 7.382 | 0.000 | 0.000 | 0.000 | 9.407 | IMP, 100% imperv | |
| 0.193 | 1.302 | 0.005 | 0.000 | 0.000 | 1.500 | Mining, 0% imperv | |
| 0.097 | 1.079 | 0.000 | 0.576 | 2.334 | 4.086 | Non-Forested Wetland, 0% imperv | |
| 0.000 | 0.545 | 0.000 | 0.000 | 0.000 | 0.545 | Powerline/Utility, 0% imperv | |
| 0.000 | 1.165 | 0.000 | 0.000 | 0.000 | 1.165 | W, 100% imperv | |
| 0.000 | 0.547 | 0.000 | 0.000 | 0.000 | 0.547 | WATER, 100% imperv | |
| 12.739 | 23.926 | 0.000 | 0.659 | 0.000 | 37.323 | WOODS, 0% imperv | |
| 0.031 | 0.000 | 0.346 | 0.443 | 0.456 | 1.276 | Water, 0% imperv | |
| **37.155** | **81.670** | **1.876** | **6.495** | **3.401** | **130.597** | **TOTAL AREA** | |

## Pipe Listing (all nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Diam/Width (inches) | Height (inches) | Inside-Fill (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | MH-NCULV-A | 147.58 | 147.58 | 19.8 | 0.0000 | 0.011 | 42.0 | 42.0 | 0.0 |
| 2 | MH-NCULV-B | 147.58 | 148.58 | 35.3 | -0.0283 | 0.011 | 42.0 | 42.0 | 0.0 |
| 3 | P E 1.1B-4 | 167.00 | 165.40 | 69.5 | 0.0230 | 0.011 | 12.0 | 0.0 | 0.0 |
| 4 | P E 1.1C | 165.64 | 165.18 | 85.2 | 0.0054 | 0.011 | 15.0 | 0.0 | 0.0 |
| 5 | P W 3.5 | 156.12 | 155.29 | 77.2 | 0.0108 | 0.011 | 12.0 | 0.0 | 0.0 |
| 6 | P W 9.1 | 151.58 | 147.58 | 25.2 | 0.1587 | 0.011 | 42.0 | 42.0 | 0.0 |
| 7 | P W 9.1C | 165.00 | 164.00 | 49.5 | 0.0202 | 0.011 | 12.0 | 0.0 | 0.0 |

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>0.48"
Flow Length=583' Tc=11.3 min CN=65 Runoff=6.44 cfs 0.540 af

**SubcatchmentE 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>1.03"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.13 cfs 0.008 af

**SubcatchmentE 1.0B: Onsite East South** Runoff Area=33,969 sf 55.29% Impervious Runoff Depth>0.69"
Flow Length=152' Tc=6.0 min CN=70 Runoff=0.71 cfs 0.045 af

**SubcatchmentE 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>0.48"
Flow Length=277' Tc=6.0 min CN=65 Runoff=3.82 cfs 0.262 af

**SubcatchmentE 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>0.26"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=0.25 cfs 0.026 af

**SubcatchmentE 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>1.34"
Flow Length=346' Tc=6.0 min CN=82 Runoff=4.93 cfs 0.301 af

**SubcatchmentE 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>0.13"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=0.11 cfs 0.046 af

**SubcatchmentE 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>0.20"
Flow Length=252' Tc=7.5 min CN=56 Runoff=0.15 cfs 0.023 af

**SubcatchmentE 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>0.18"
Flow Length=139' Tc=6.0 min CN=55 Runoff=0.46 cfs 0.081 af

**SubcatchmentE 1.1B-3: Pond E 1.1B -** Runoff Area=271,752 sf 34.13% Impervious Runoff Depth>0.67"
Flow Length=1,410' Tc=36.9 min CN=70 Runoff=2.50 cfs 0.349 af

**SubcatchmentE 1.1B-4: Pond E 1.1B -** Runoff Area=90,649 sf 0.00% Impervious Runoff Depth>0.35"
Flow Length=106' Tc=6.0 min CN=61 Runoff=0.74 cfs 0.060 af

**SubcatchmentE 1.1C: Culvert 1** Runoff Area=232,650 sf 24.09% Impervious Runoff Depth>1.15"
Flow Length=663' Tc=6.6 min CN=79 Runoff=8.29 cfs 0.512 af

**SubcatchmentE 1.1D: Pond E 1.1D** Runoff Area=253,534 sf 35.03% Impervious Runoff Depth>1.15"
Flow Length=600' Tc=6.0 min CN=79 Runoff=9.17 cfs 0.558 af

**SubcatchmentE 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>0.20"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=0.35 cfs 0.084 af

**SubcatchmentE 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>0.29"
Flow Length=344' Tc=6.0 min CN=59 Runoff=0.36 cfs 0.034 af

**SubcatchmentE 1.2A-2: Pond E 1.2A -** Runoff Area=214,415 sf 23.56% Impervious Runoff Depth>0.37"
Flow Length=434' Tc=14.7 min CN=62 Runoff=1.43 cfs 0.154 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>1.15"
Flow Length=448' Tc=6.0 min CN=79 Runoff=3.00 cfs 0.183 af

**SubcatchmentE 1.2B-1: Pond E 1.2B -** Runoff Area=41,348 sf 64.96% Impervious Runoff Depth>1.54"
Flow Length=261' Tc=6.0 min CN=85 Runoff=1.98 cfs 0.122 af

**SubcatchmentE 1.2B-2: Pond E 1.2B -** Runoff Area=6,456 sf 44.51% Impervious Runoff Depth>0.98"
Flow Length=116' Tc=6.0 min CN=76 Runoff=0.20 cfs 0.012 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>1.34"
Flow Length=193' Tc=6.0 min CN=82 Runoff=1.93 cfs 0.118 af

**SubcatchmentE 1.2C-1: Pond E 1.2C -** Runoff Area=8,435 sf 65.00% Impervious Runoff Depth>1.54"
Flow Length=126' Tc=6.0 min CN=85 Runoff=0.40 cfs 0.025 af

**SubcatchmentE 1.2D: Pond E 1.2D -** Runoff Area=127,255 sf 46.37% Impervious Runoff Depth>0.97"
Flow Length=473' Tc=16.2 min CN=76 Runoff=2.81 cfs 0.237 af

**SubcatchmentE 1.2E: Pond E 1.2E** Runoff Area=13,294 sf 34.60% Impervious Runoff Depth>0.73"
Flow Length=34' Tc=6.0 min CN=71 Runoff=0.30 cfs 0.019 af

**SubcatchmentE 1.3A: Aqueductonto** Runoff Area=199,579 sf 34.45% Impervious Runoff Depth>0.55"
Flow Length=1,196' Tc=37.8 min CN=67 Runoff=1.39 cfs 0.208 af

**SubcatchmentE 4.0: Offsite to Sudbury R** Runoff Area=607,734 sf 9.67% Impervious Runoff Depth>0.25"
Flow Length=1,859' Tc=38.1 min CN=58 Runoff=1.21 cfs 0.289 af

**SubcatchmentW 10.0: Offsite to Sudbury** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>0.68"
Flow Length=509' Tc=7.8 min CN=70 Runoff=2.08 cfs 0.139 af

**SubcatchmentW 2.0: Onsite to Sudbury R** Runoff Area=329,977 sf 11.49% Impervious Runoff Depth>0.18"
Flow Length=793' Tc=15.6 min CN=55 Runoff=0.47 cfs 0.113 af

**SubcatchmentW 3.1: Pond P W 3.1** Runoff Area=500,344 sf 43.56% Impervious Runoff Depth>1.47"
Flow Length=1,553' Tc=11.6 min CN=84 Runoff=19.20 cfs 1.406 af

**SubcatchmentW 3.4: Gravel Processing** Runoff Area=162,229 sf 16.97% Impervious Runoff Depth>0.05"
Flow Length=460' Tc=14.6 min CN=48 Runoff=0.03 cfs 0.016 af

**SubcatchmentW 3.5: Small Depressionto** Runoff Area=4,759 sf 27.98% Impervious Runoff Depth>0.45"
Flow Length=43' Tc=6.0 min CN=64 Runoff=0.06 cfs 0.004 af

**SubcatchmentW 9.1: Gravel Pit to Big** Runoff Area=227,372 sf 34.47% Impervious Runoff Depth>0.64"
Flow Length=440' Tc=6.1 min CN=69 Runoff=4.37 cfs 0.279 af

**SubcatchmentW 9.1A: Gravel Pit to** Runoff Area=94,325 sf 52.60% Impervious Runoff Depth>1.54"
Flow Length=875' Tc=7.4 min CN=85 Runoff=4.34 cfs 0.278 af

**SubcatchmentW 9.1B: Aqueductto Big** Runoff Area=24,364 sf 16.03% Impervious Runoff Depth>0.41"
Flow Length=235' Tc=6.0 min CN=63 Runoff=0.26 cfs 0.019 af

**SubcatchmentW 9.1C: Culvert 2** Runoff Area=206,937 sf 57.07% Impervious Runoff Depth>1.40"
Flow Length=505' Tc=6.0 min CN=83 Runoff=9.07 cfs 0.556 af

**Pond MH-NCULV-A: MH-NCULV-A** Peak Elev=153.47' Inflow=15.12 cfs 0.864 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=15.55 cfs 0.863 af

**Pond MH-NCULV-B: MH-NCULV-B** Peak Elev=153.48' Inflow=15.55 cfs 0.863 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=15.85 cfs 0.861 af

**Pond P E 1.1A: 284** Peak Elev=133.32' Storage=13,116 cf Inflow=4.93 cfs 0.301 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B: 283** Peak Elev=145.47' Storage=46,569 cf Inflow=10.02 cfs 1.070 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B-4: P E 1.1B-4** Peak Elev=167.39' Storage=21 cf Inflow=0.74 cfs 0.060 af
Outflow=0.73 cfs 0.060 af

**Pond P E 1.1C: P E 1.1C** Peak Elev=168.29' Storage=49 cf Inflow=8.29 cfs 0.512 af
Outflow=8.29 cfs 0.512 af

**Pond P E 1.1D: P E 1.1D** Peak Elev=171.06' Storage=36,397 cf Inflow=13.49 cfs 0.836 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.2A: 282** Peak Elev=134.63' Storage=31,783 cf Inflow=8.50 cfs 0.730 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.2D: P E 1.2D** Peak Elev=157.60' Storage=26,298 cf Inflow=2.81 cfs 0.237 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.2E: P E 1.2E** Peak Elev=171.65' Storage=808 cf Inflow=0.30 cfs 0.019 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond P W 3.1: P W 3.1** Peak Elev=156.16' Storage=7,963 cf Inflow=19.20 cfs 1.406 af
Outflow=19.17 cfs 1.238 af

**Pond P W 3.4: P W 3.4** Peak Elev=180.65' Storage=694 cf Inflow=0.03 cfs 0.016 af
Outflow=0.00 cfs 0.000 af

**Pond P W 3.5: P W 3.5** Peak Elev=157.00' Storage=0 cf Inflow=0.06 cfs 0.004 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.06 cfs 0.004 af

**Pond P W 9.1: P W 9.1** Peak Elev=153.62' Storage=2,683 cf Inflow=13.74 cfs 0.838 af
42.0" x 42.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=15.12 cfs 0.846 af

**Pond P W 9.1B: P W 9.1B** Peak Elev=157.61' Storage=833 cf Inflow=0.26 cfs 0.019 af
Outflow=0.00 cfs 0.000 af

**Pond P W 9.1C: P W 9.1C** Peak Elev=166.14' Storage=394 cf Inflow=9.07 cfs 0.556 af
Outflow=9.32 cfs 0.555 af

**Pond P-CULV-N-OUTLET:P-CULV-N-OUTLET** Peak Elev=153.43' Storage=488 cf Inflow=15.85 cfs 0.861 af
Outflow=14.97 cfs 0.852 af

**Link DP North: DP North** Inflow=35.76 cfs 2.631 af
Primary=35.76 cfs 2.631 af

**Link DP Sudbury: (new Link)** Inflow=46.40 cfs 3.720 af
Primary=46.40 cfs 3.720 af

**Link DP Wellhead: DP Wellhead**
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=19.34 cfs 1.351 af
Primary=19.34 cfs 1.351 af

**Link L E 1.0: L E 1.0** Inflow=10.73 cfs 1.089 af
Primary=10.73 cfs 1.089 af

**Link L E 4.0: L E 4.0** Inflow=1.21 cfs 0.289 af
Primary=1.21 cfs 0.289 af

**Link L W 10.0: L W 10.0** Inflow=2.08 cfs 0.139 af
Primary=2.08 cfs 0.139 af

**Link L W 2.0: L W 2.0** Inflow=0.47 cfs 0.113 af
Primary=0.47 cfs 0.113 af

**Link L W 3.0: L W 3.0** Inflow=19.17 cfs 1.238 af
Primary=19.17 cfs 1.238 af

**Link L W 9.0: L W 9.0** Inflow=14.97 cfs 0.852 af
Primary=14.97 cfs 0.852 af

**Link Well E 1.1B: Well E 1.1B** Inflow=9.56 cfs 0.920 af
Primary=9.56 cfs 0.920 af

**Link Well E 1.2A: Well E 1.2A** Inflow=1.65 cfs 0.187 af
Primary=1.65 cfs 0.187 af

**Link Well E 1.2B: Well E 1.2B** Inflow=5.18 cfs 0.317 af
Primary=5.18 cfs 0.317 af

**Link Well E 1.2C: Well E 1.2C** Inflow=2.33 cfs 0.143 af
Primary=2.33 cfs 0.143 af

**Total Runoff Area = 130.597 ac Runoff Volume = 7.104 af Average Runoff Depth = 0.65"**
**78.71% Pervious = 102.789 ac 21.29% Impervious = 27.808 ac**

## Summary for Subcatchment E 1.0: (blank)

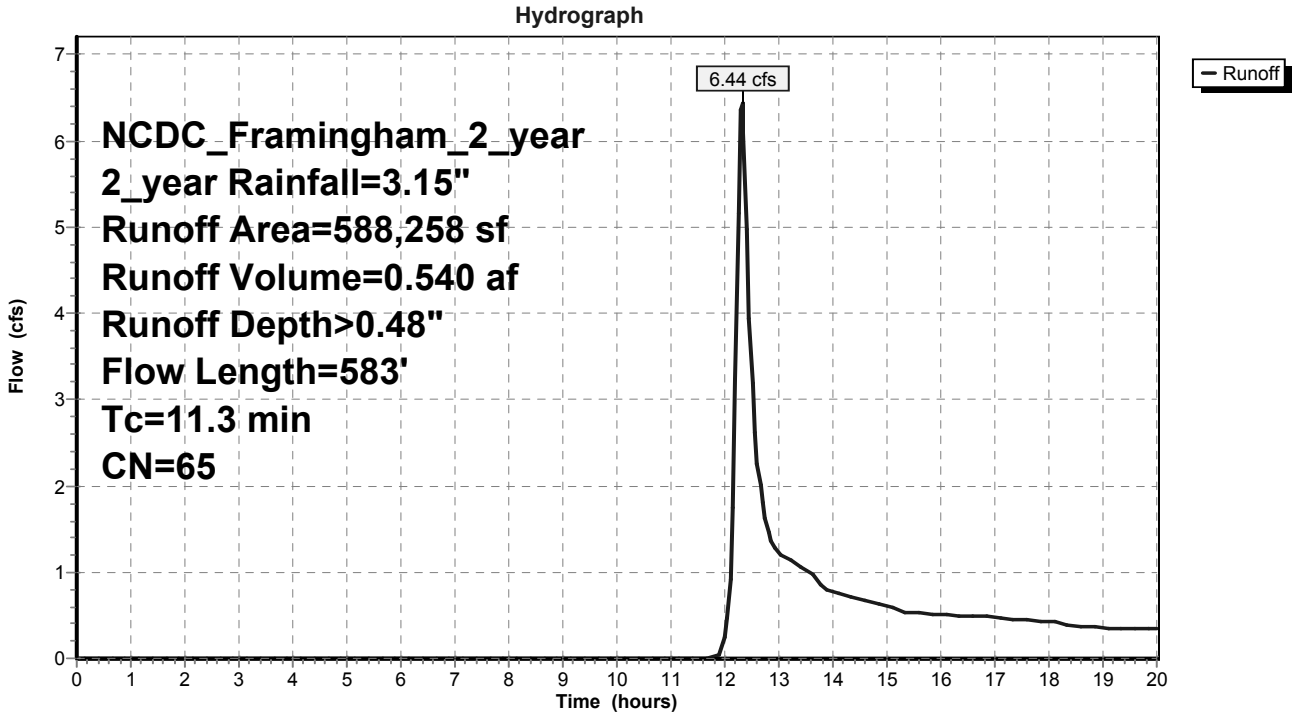
Runoff = 6.44 cfs @ 12.32 hrs, Volume= 0.540 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

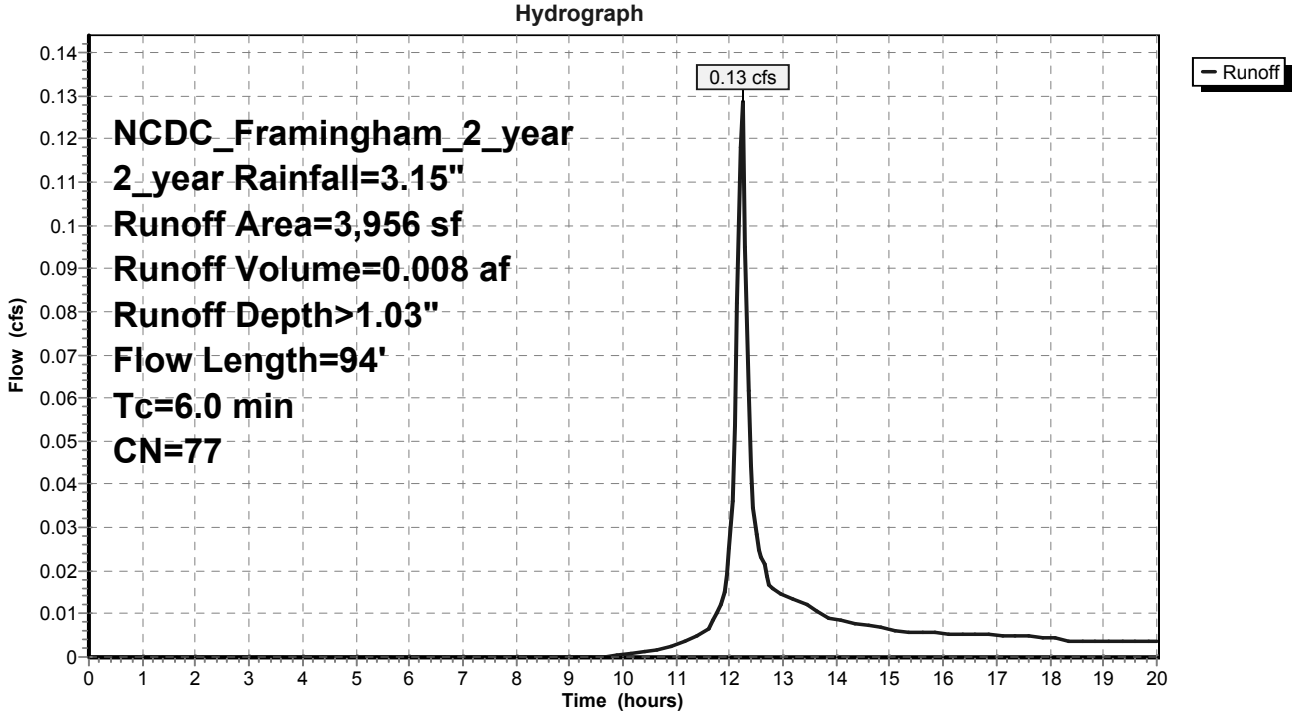
Runoff = 0.13 cfs @ 12.24 hrs, Volume= 0.008 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: Onsite East South of Aqueduct

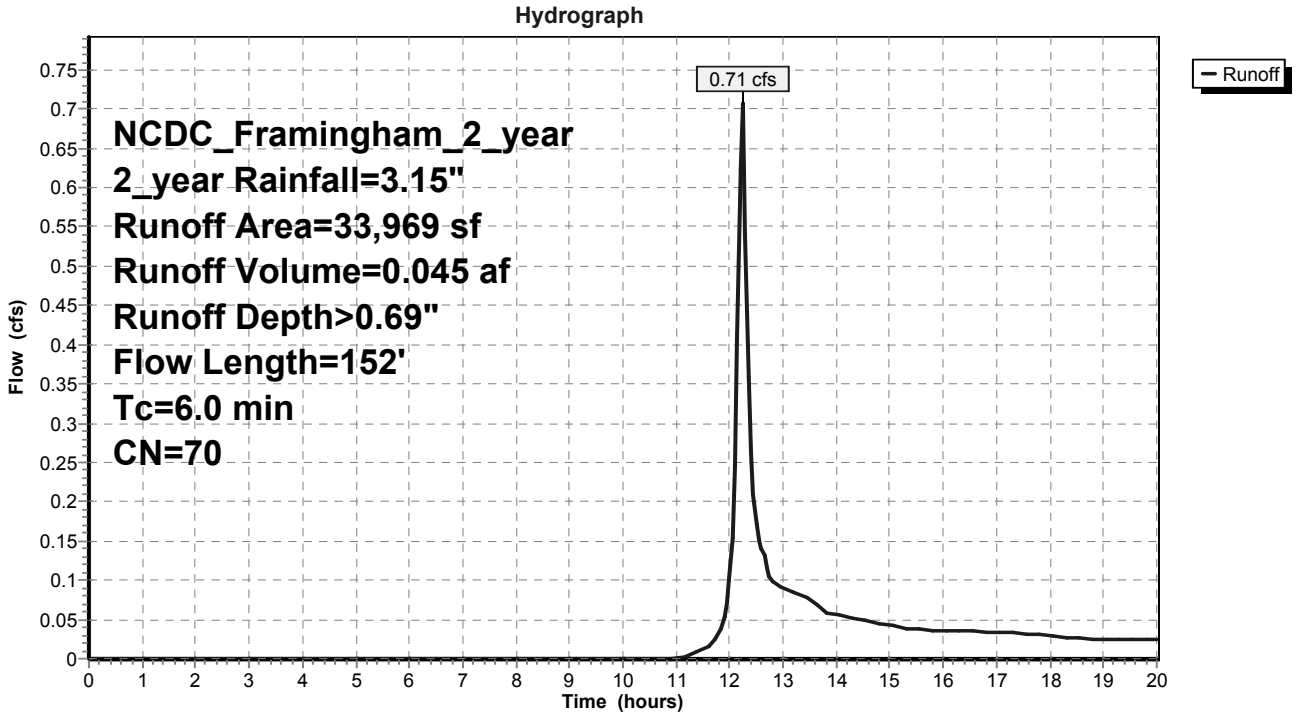
Runoff = 0.71 cfs @ 12.24 hrs, Volume= 0.045 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 28,892 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,969 | 70 | Weighted Average |
| | 15,189 | | 44.71% Pervious Area |
| | 18,780 | | 55.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 152 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: Onsite East South of Aqueduct



## Summary for Subcatchment E 1.0C: (blank)

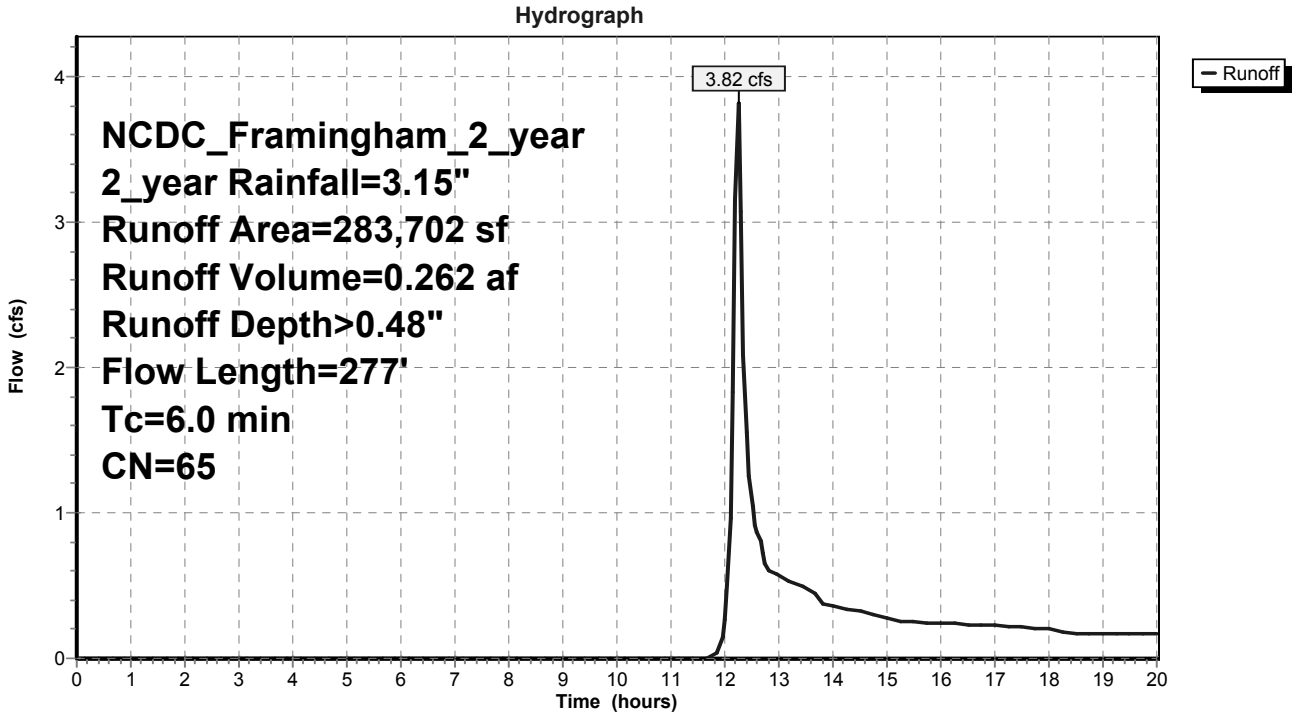
Runoff = 3.82 cfs @ 12.25 hrs, Volume= 0.262 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

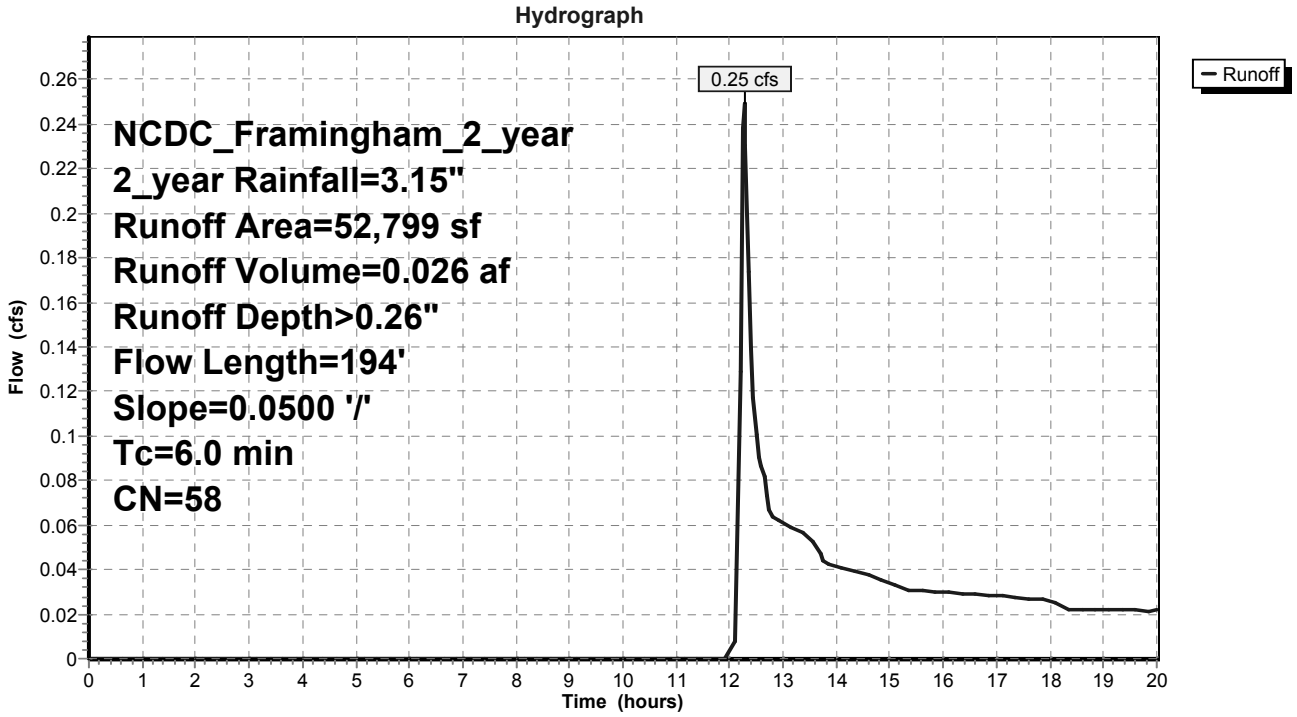
Runoff = 0.25 cfs @ 12.27 hrs, Volume= 0.026 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

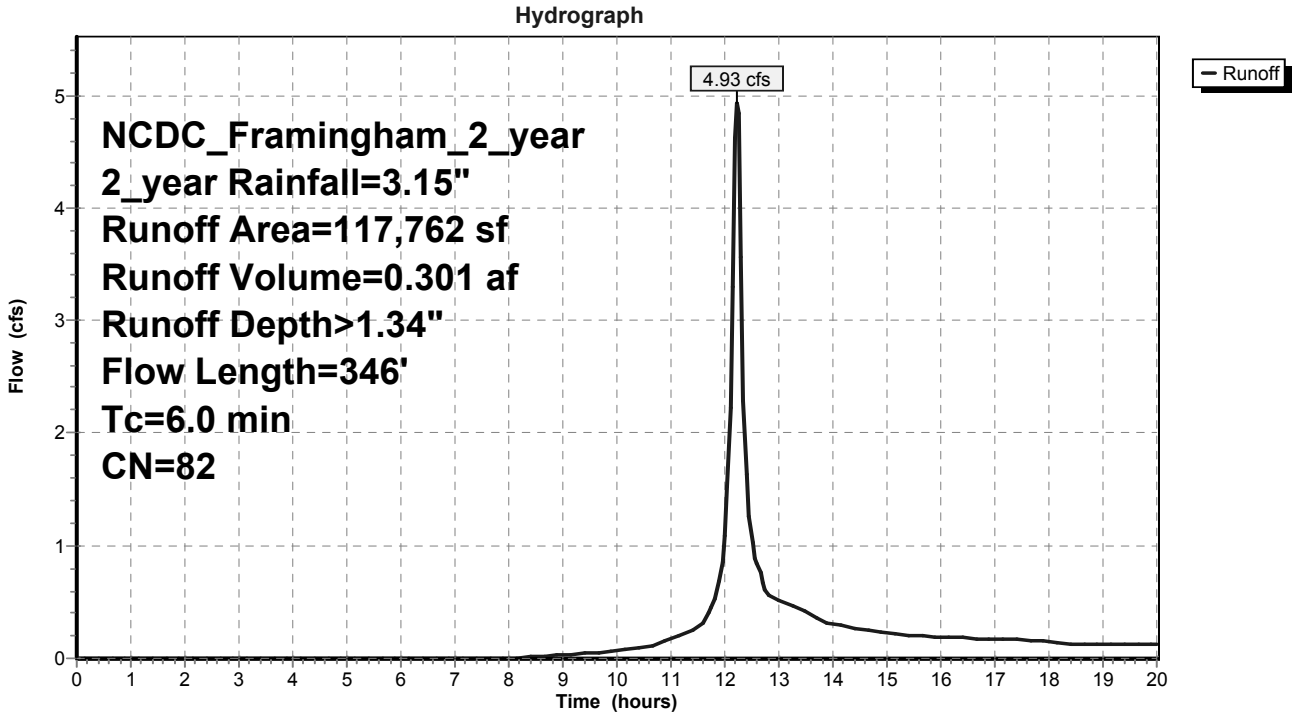
Runoff = 4.93 cfs @ 12.23 hrs, Volume= 0.301 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

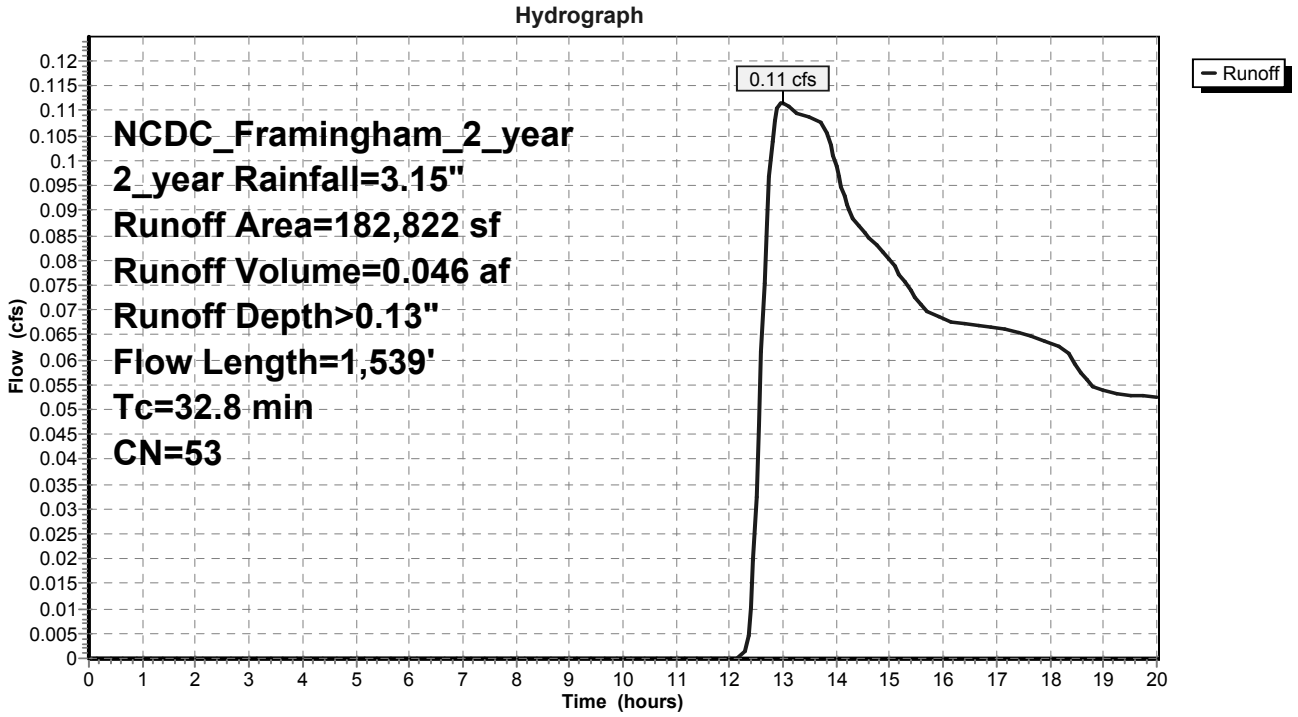
Runoff = 0.11 cfs @ 12.99 hrs, Volume= 0.046 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

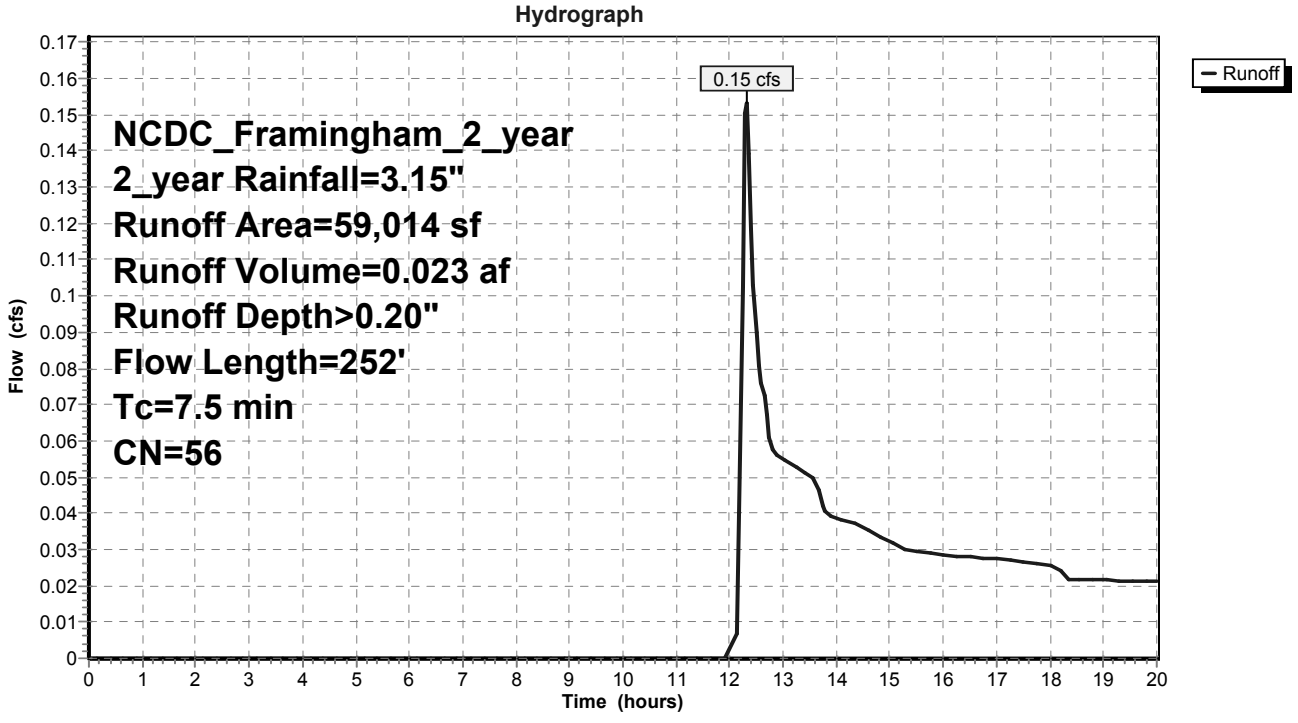
Runoff = 0.15 cfs @ 12.32 hrs, Volume= 0.023 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

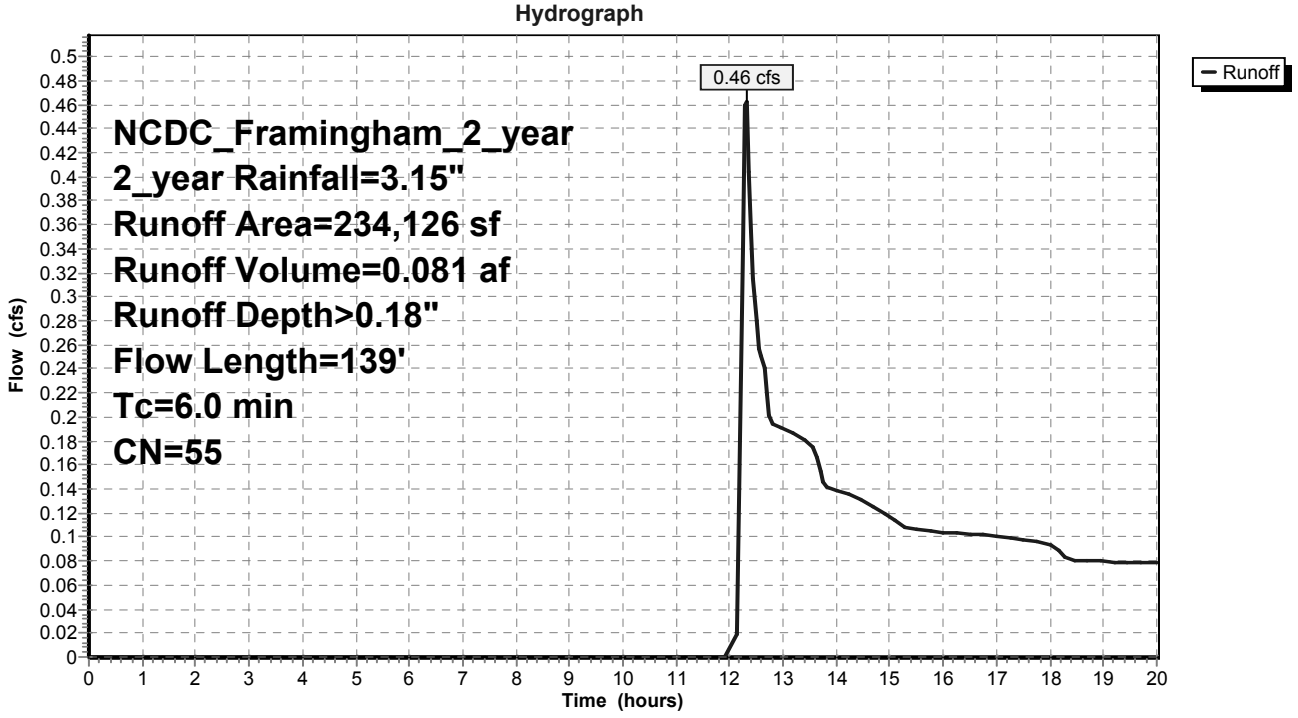
Runoff = 0.46 cfs @ 12.31 hrs, Volume= 0.081 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



## Summary for Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer

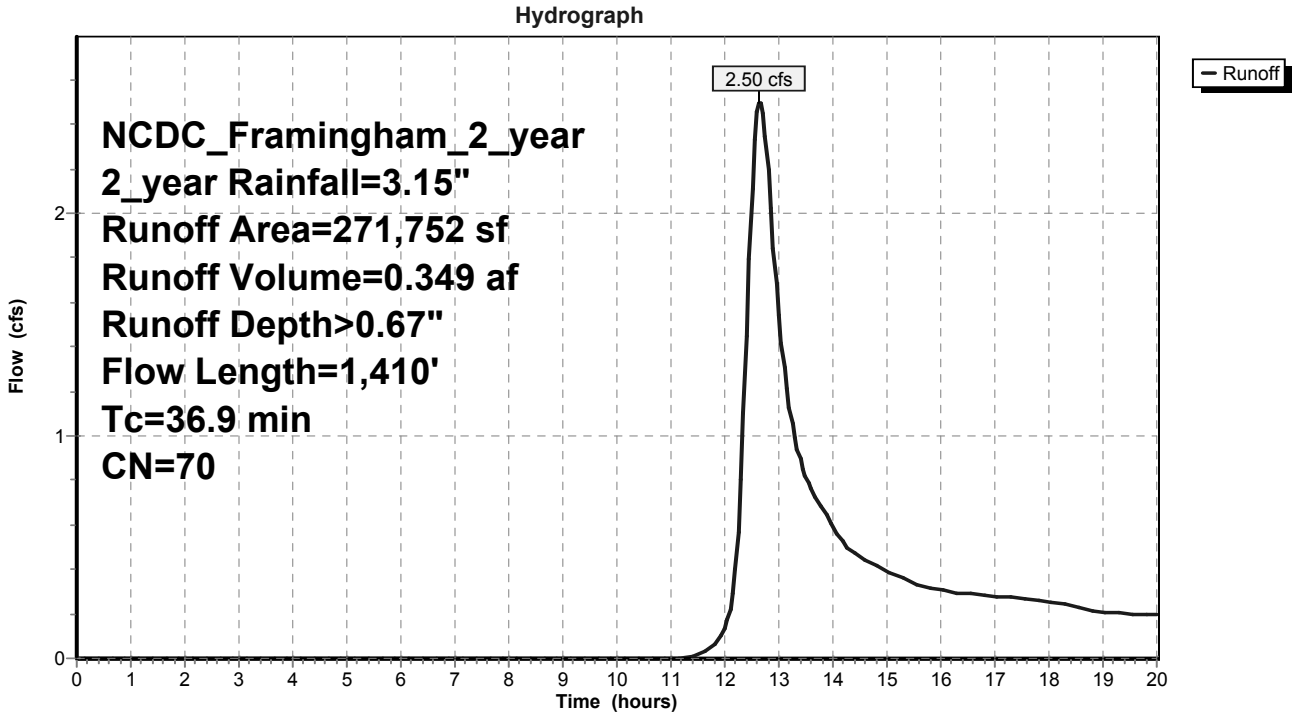
Runoff = 2.50 cfs @ 12.65 hrs, Volume= 0.349 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 39 | GRASS, 0% imperv, HSG A |
| * | 149 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,802 | 30 | WOODS, 0% imperv, HSG A |
| * | 87,233 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,883 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 138,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,521 | 98 | IMP, 100% imperv, HSG A |
| * | 8,368 | 98 | IMP, 100% imperv, HSG B |
| | 271,752 | 70 | Weighted Average |
| | 179,014 | | 65.87% Pervious Area |
| | 92,738 | | 34.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.2 | 50 | 0.0010 | 0.05 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.3 | 256 | 0.0659 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 36.9 | 1,410 | Total | | | |

## Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer

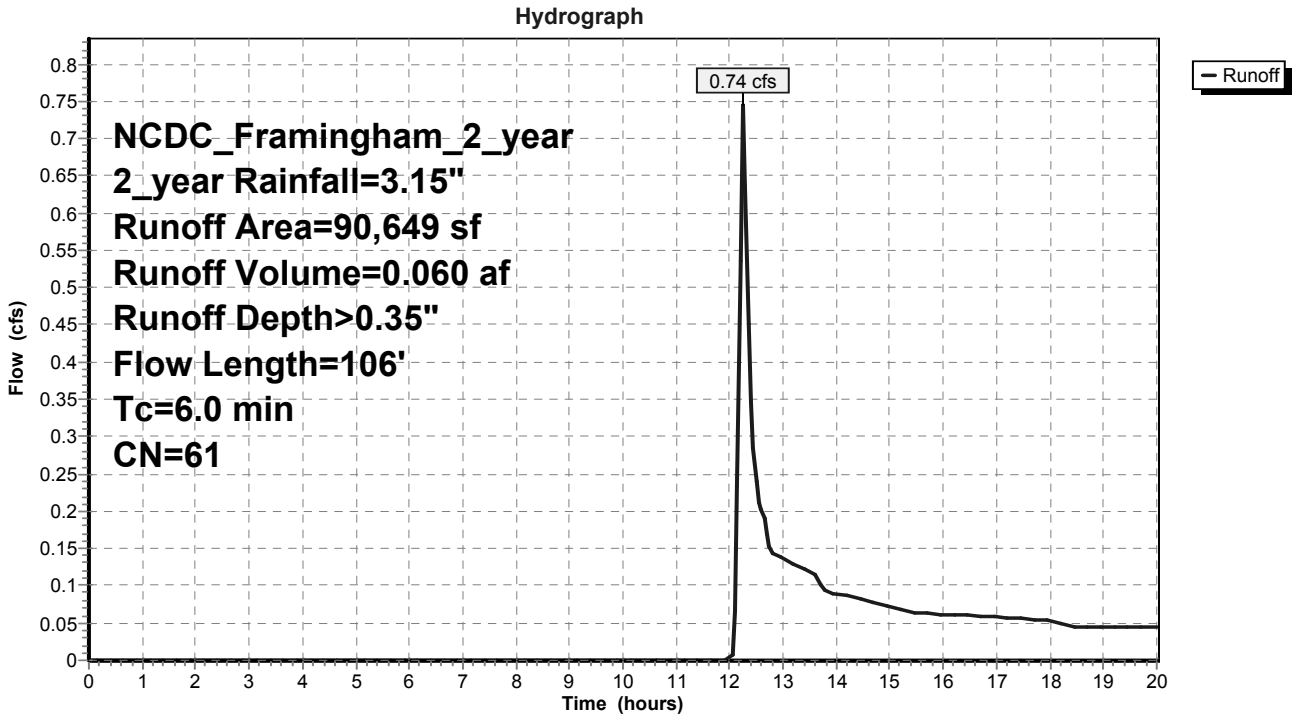
Runoff = 0.74 cfs @ 12.26 hrs, Volume= 0.060 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 66,969 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 3,863 | 98 | IMP, 100% imperv, HSG B |
| | 90,649 | 61 | Weighted Average |
| | 90,649 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.0 | 50 | 0.1057 | 0.28 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 56 | 0.3343 | 4.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.2 | 106 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer



## Summary for Subcatchment E 1.1C: Culvert 1

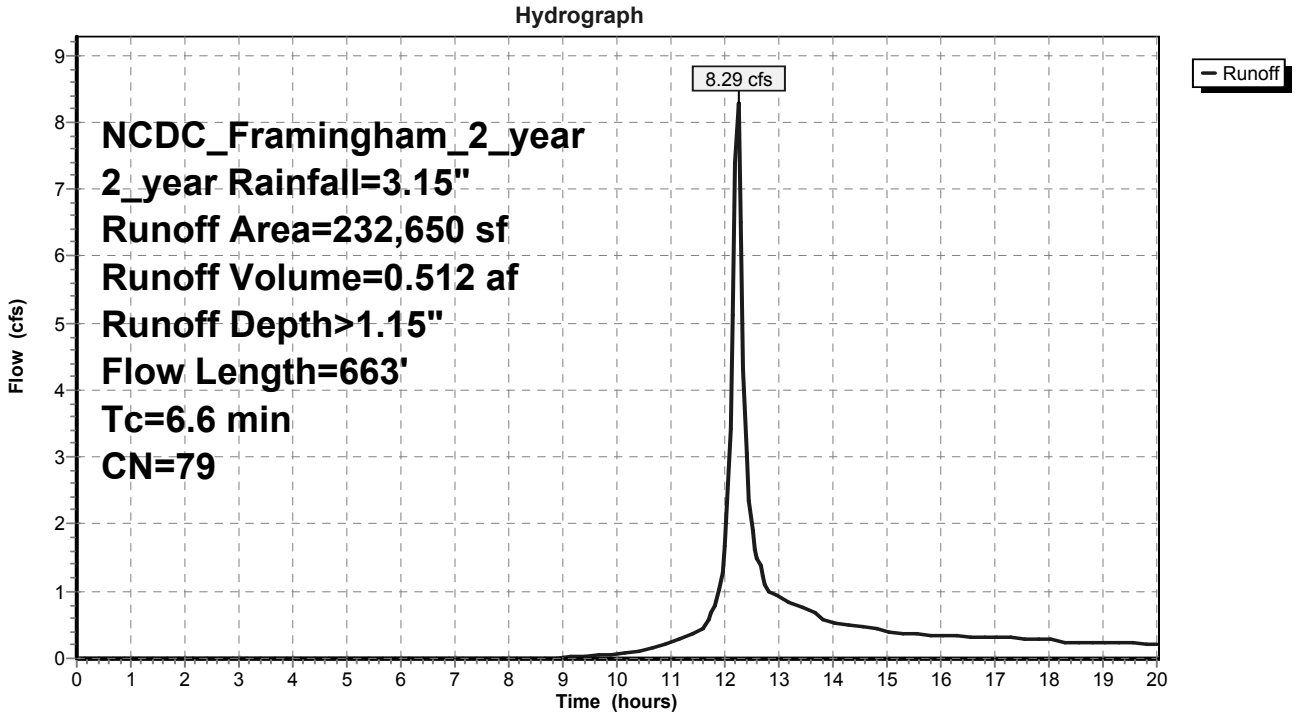
Runoff = 8.29 cfs @ 12.24 hrs, Volume= 0.512 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 70,758 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,422 | 55 | WOODS, 0% imperv, HSG B |
| * | 420 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 85,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 64 | 98 | IMP, 100% imperv, HSG A |
| * | 61,196 | 98 | IMP, 100% imperv, HSG B |
| | 232,650 | 79 | Weighted Average |
| | 176,613 | | 75.91% Pervious Area |
| | 56,037 | | 24.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0104 | 0.89 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 91 | 0.0095 | 1.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 4 | 0.0148 | 1.96 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 125 | 0.0252 | 3.22 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.8 | 7 | 0.0001 | 0.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 166 | 0.0832 | 5.85 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0531 | 4.68 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 49 | 0.0163 | 2.06 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.4 | 134 | 0.0064 | 1.62 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 34 | 0.0414 | 3.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.6 | 663 | Total | | | |

## Subcatchment E 1.1C: Culvert 1



## Summary for Subcatchment E 1.1D: Pond E 1.1D

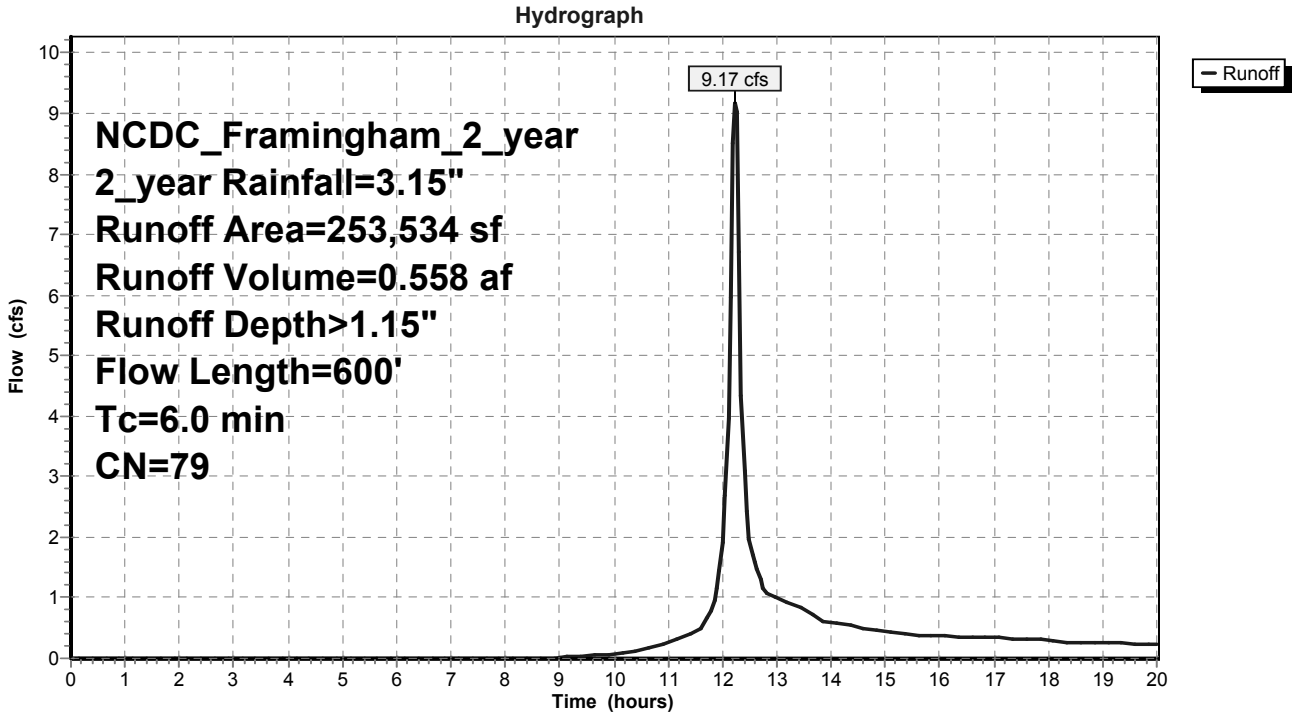
Runoff = 9.17 cfs @ 12.23 hrs, Volume= 0.558 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 41,894 | 61 | GRASS, 0% imperv, HSG B |
| * | 33,714 | 55 | WOODS, 0% imperv, HSG B |
| * | 136,649 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 41,277 | 98 | IMP, 100% imperv, HSG B |
| | 253,534 | 79 | Weighted Average |
| | 164,713 | | 64.97% Pervious Area |
| | 88,822 | | 35.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.7 | 50 | 0.3362 | 0.50 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 13 | 0.3558 | 9.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 163 | 0.0873 | 2.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.7 | 374 | 0.0540 | 3.74 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.7 | 600 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1D: Pond E 1.1D



## Summary for Subcatchment E 1.2A: (blank)

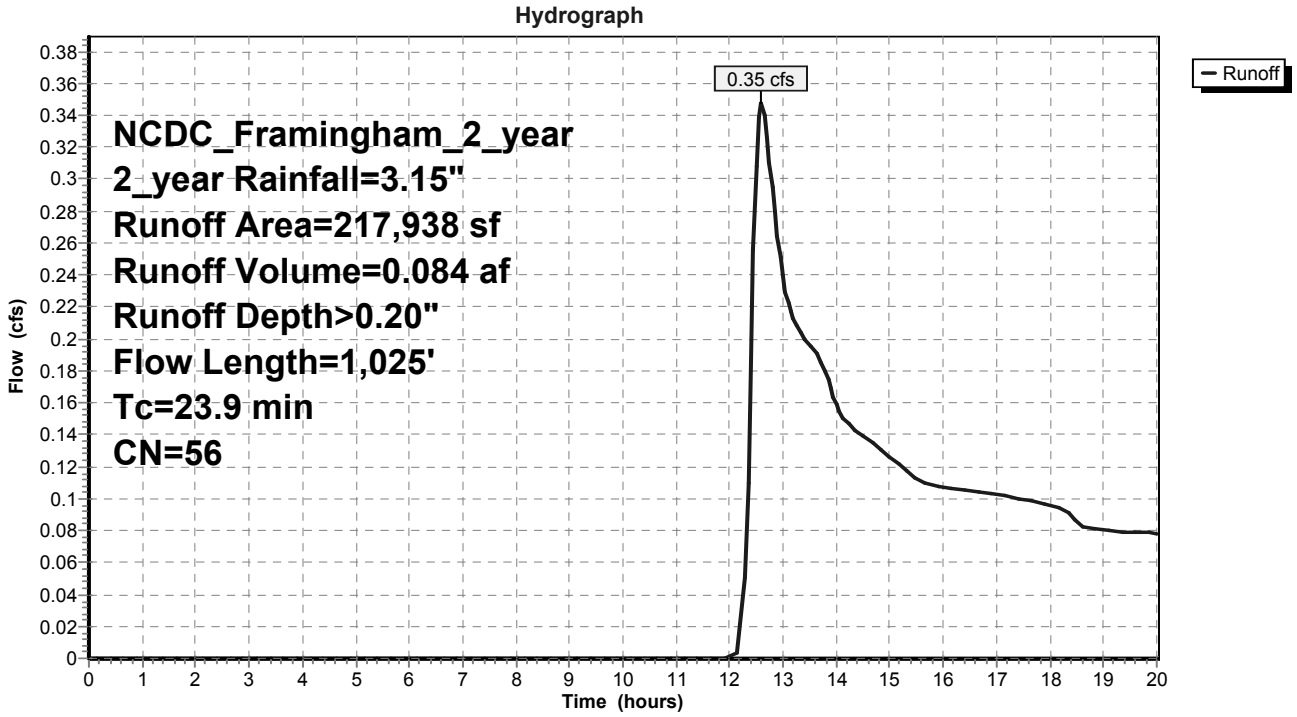
Runoff = 0.35 cfs @ 12.60 hrs, Volume= 0.084 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

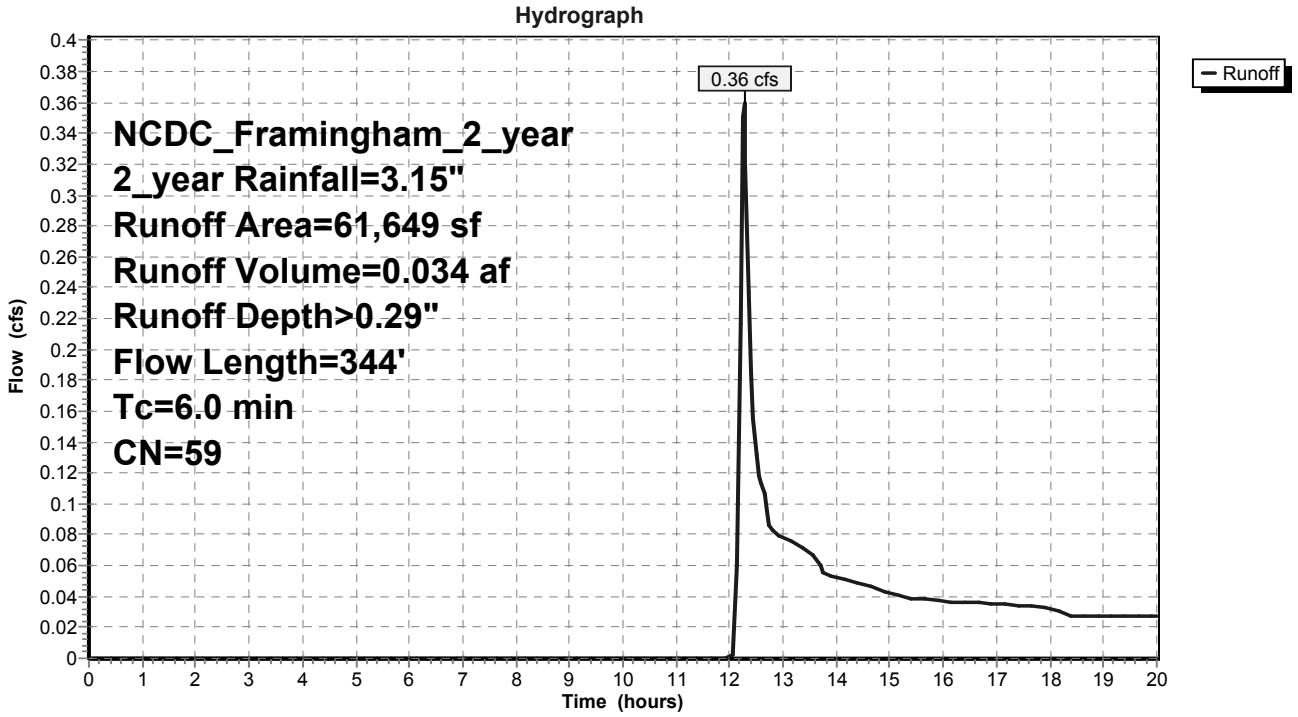
Runoff = 0.36 cfs @ 12.27 hrs, Volume= 0.034 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone

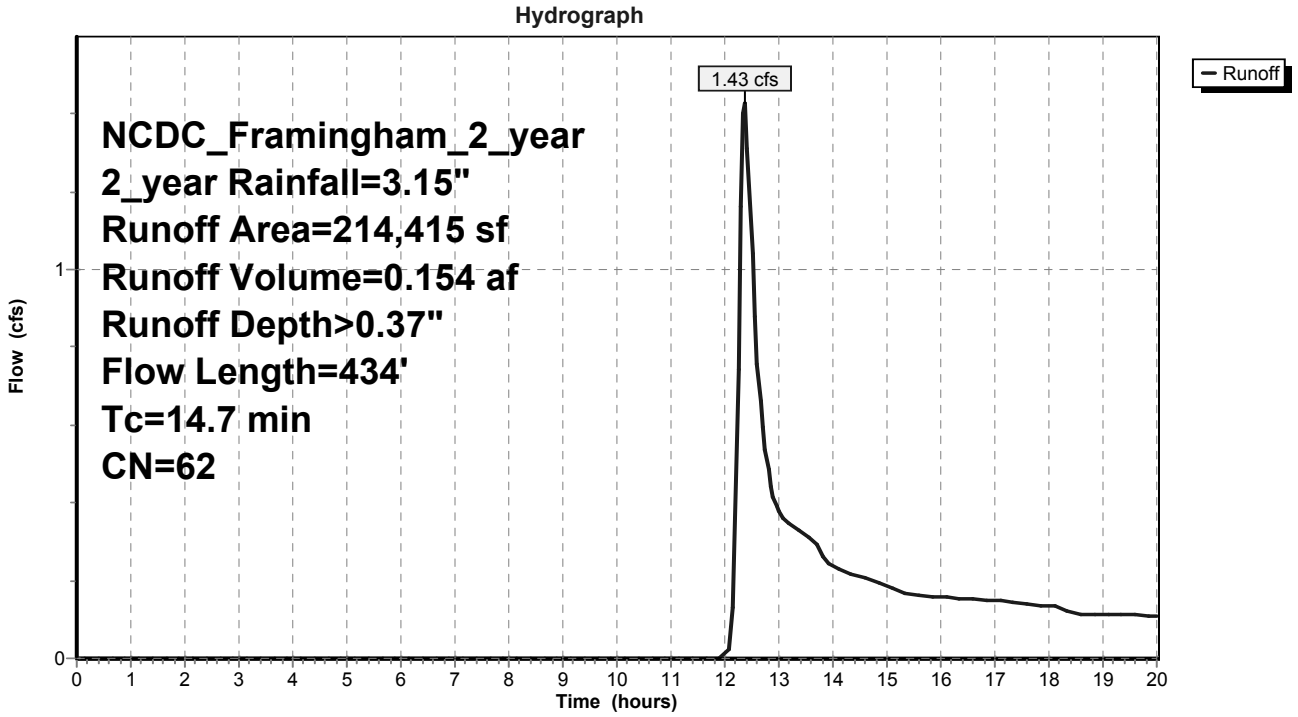
Runoff = 1.43 cfs @ 12.37 hrs, Volume= 0.154 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 24,009 | 30 | WOODS, 0% imperv, HSG A |
| * | 112,703 | 55 | WOODS, 0% imperv, HSG B |
| * | 20,960 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 56,743 | 85 | GRAVEL, 65% imperv, HSG B |
| | 214,415 | 62 | Weighted Average |
| | 163,908 | | 76.44% Pervious Area |
| | 50,507 | | 23.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0161 | 0.63 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 63 | 0.0993 | 5.07 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.7 | 434 | Total | | | |

## Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2B: (blank)

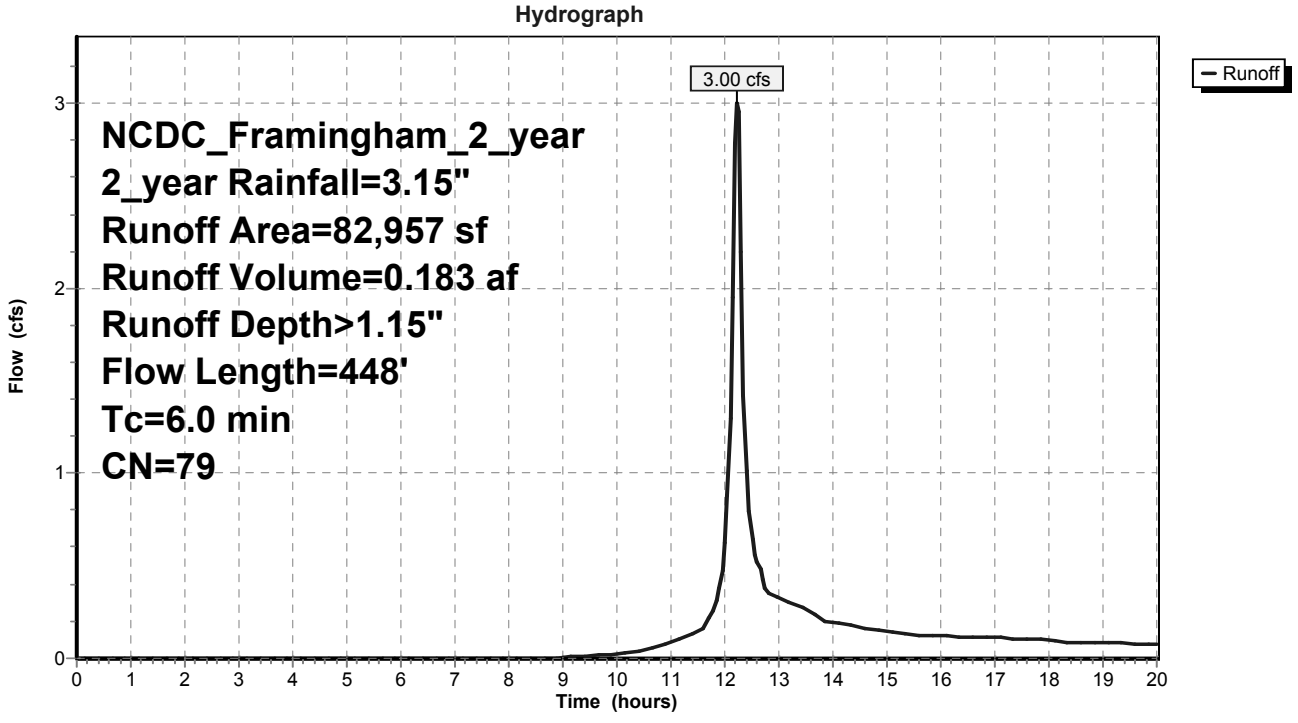
Runoff = 3.00 cfs @ 12.23 hrs, Volume= 0.183 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer

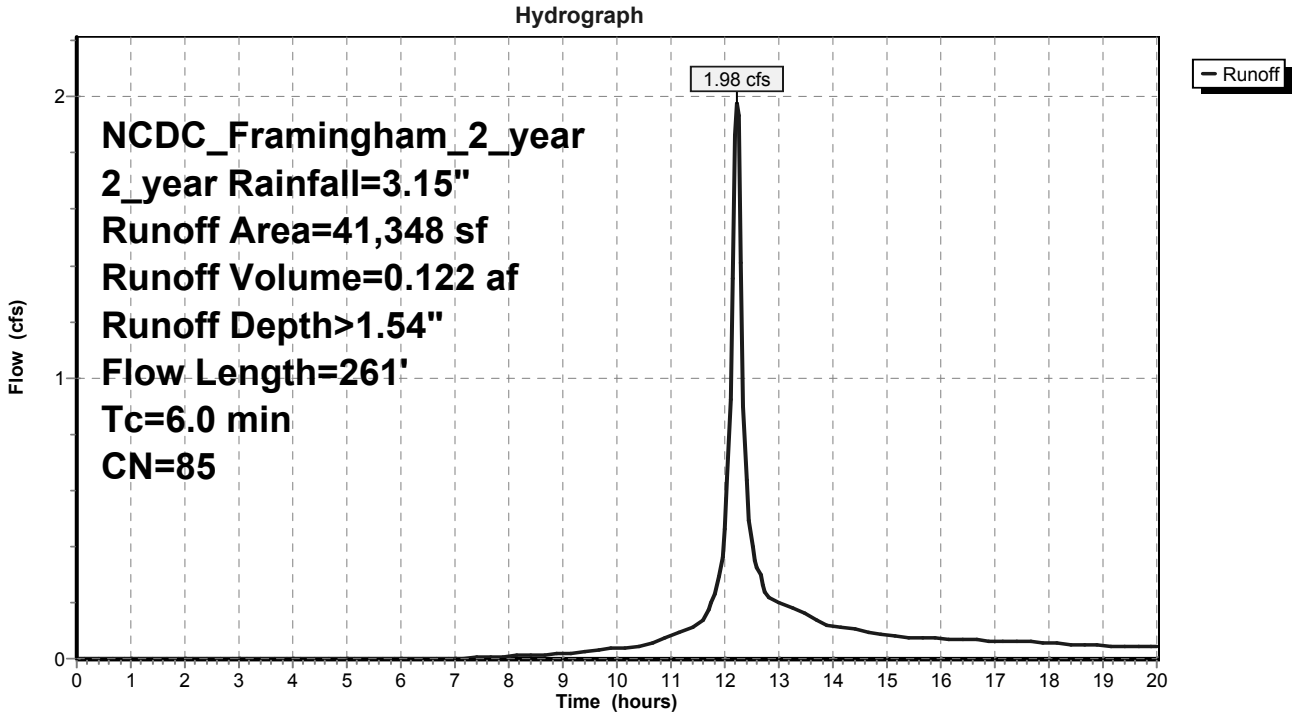
Runoff = 1.98 cfs @ 12.23 hrs, Volume= 0.122 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27 | 55 | WOODS, 0% imperv, HSG B |
| * | 41,322 | 85 | GRAVEL, 65% imperv, HSG B |
| | 41,348 | 85 | Weighted Average |
| | 14,489 | | 35.04% Pervious Area |
| | 26,859 | | 64.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 211 | 0.0326 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.1 | 261 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer

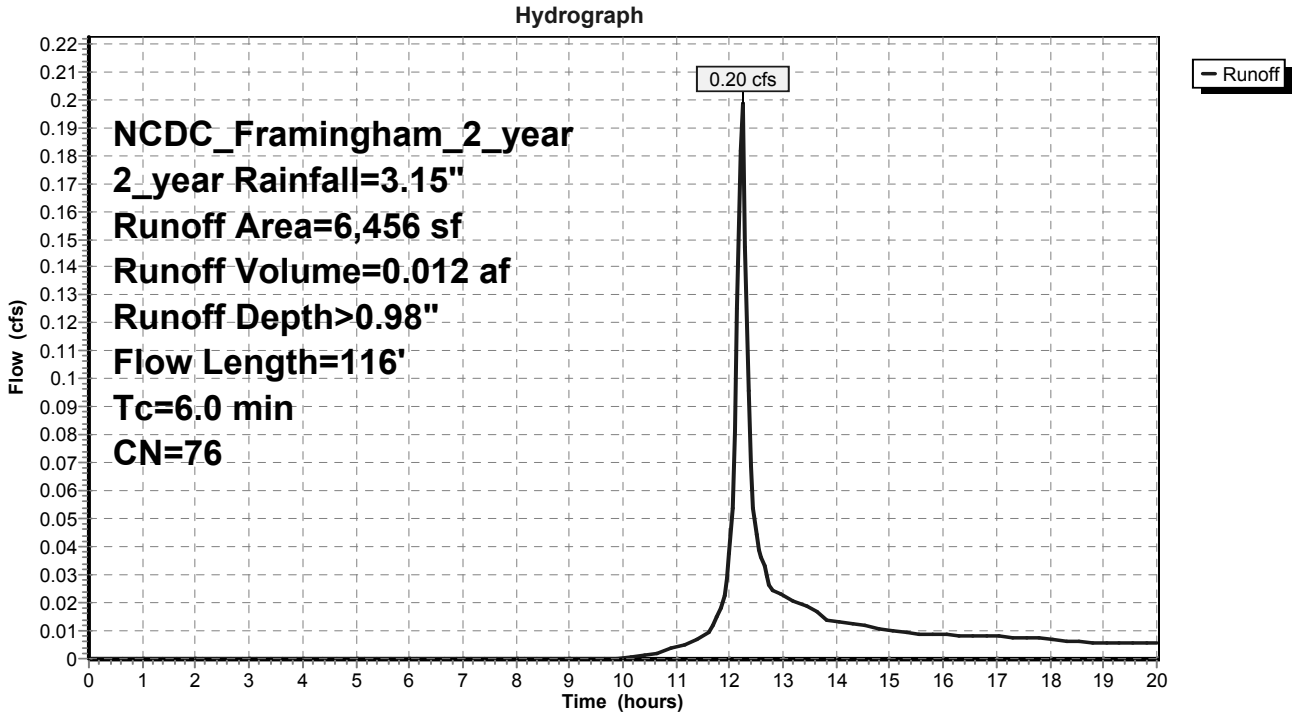
Runoff = 0.20 cfs @ 12.24 hrs, Volume= 0.012 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,035 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,421 | 85 | GRAVEL, 65% imperv, HSG B |
| | 6,456 | 76 | Weighted Average |
| | 3,582 | | 55.49% Pervious Area |
| | 2,874 | | 44.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0740 | 1.71 | | **Sheet Flow,** Range n= 0.013 P2= 3.00" |
| 0.2 | 66 | 0.0982 | 5.05 | | **Shallow Concentrated Flow,** GRAVEL Kv= 16.1 fps |
| 0.7 | 116 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2C: (blank)

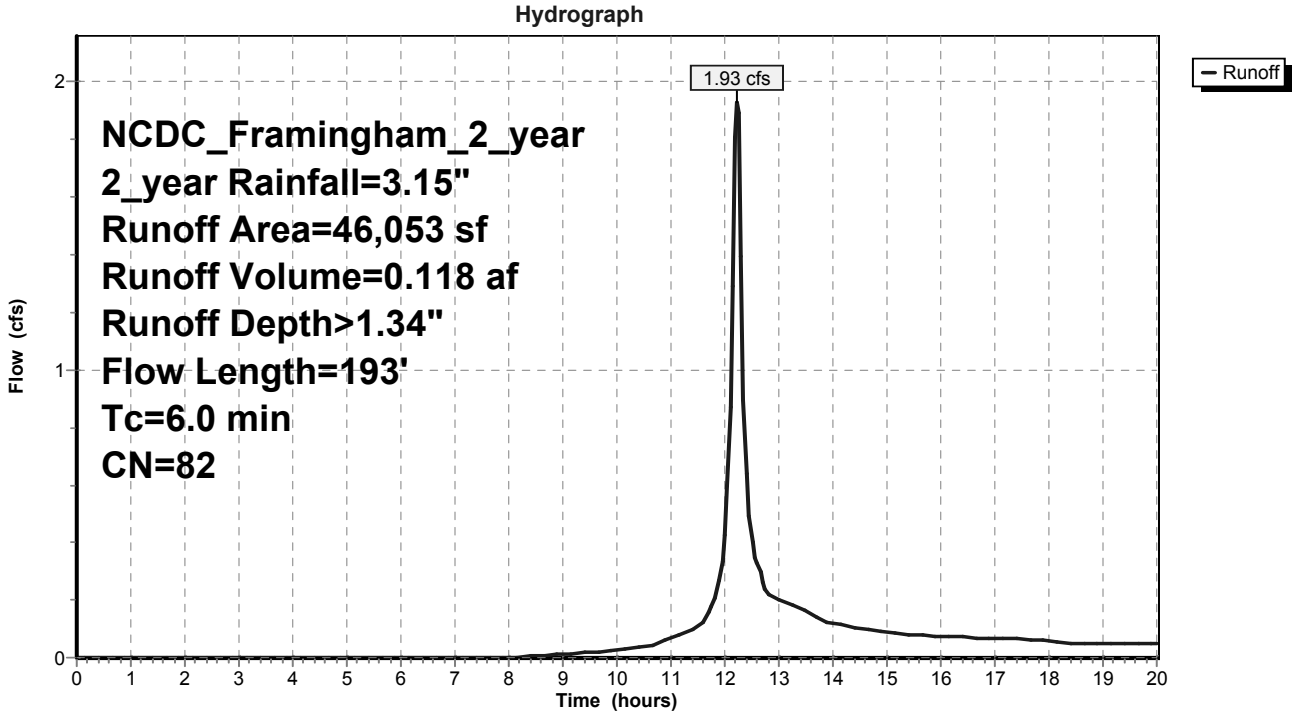
Runoff = 1.93 cfs @ 12.23 hrs, Volume= 0.118 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone

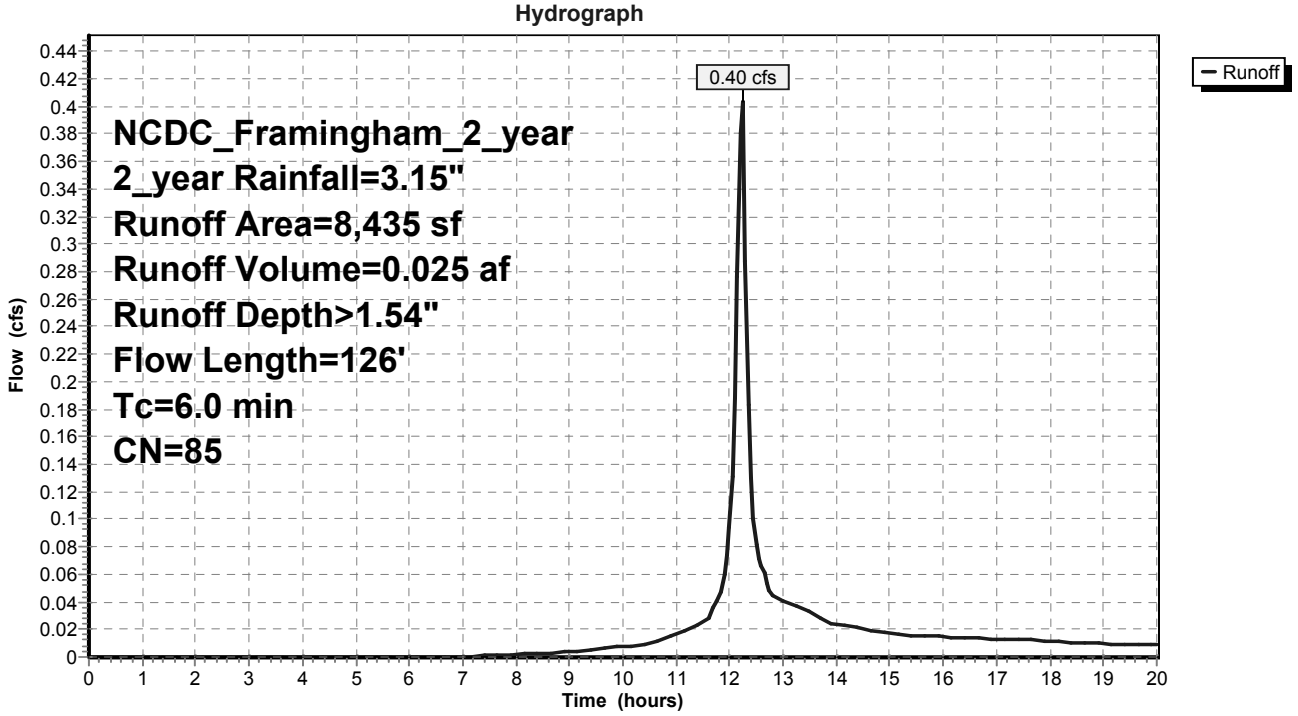
Runoff = 0.40 cfs @ 12.23 hrs, Volume= 0.025 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 8,435 | 85 | GRAVEL, 65% imperv, HSG B |
| | 2,952 | | 35.00% Pervious Area |
| | 5,483 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 76 | 0.1026 | 5.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.6 | 126 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer

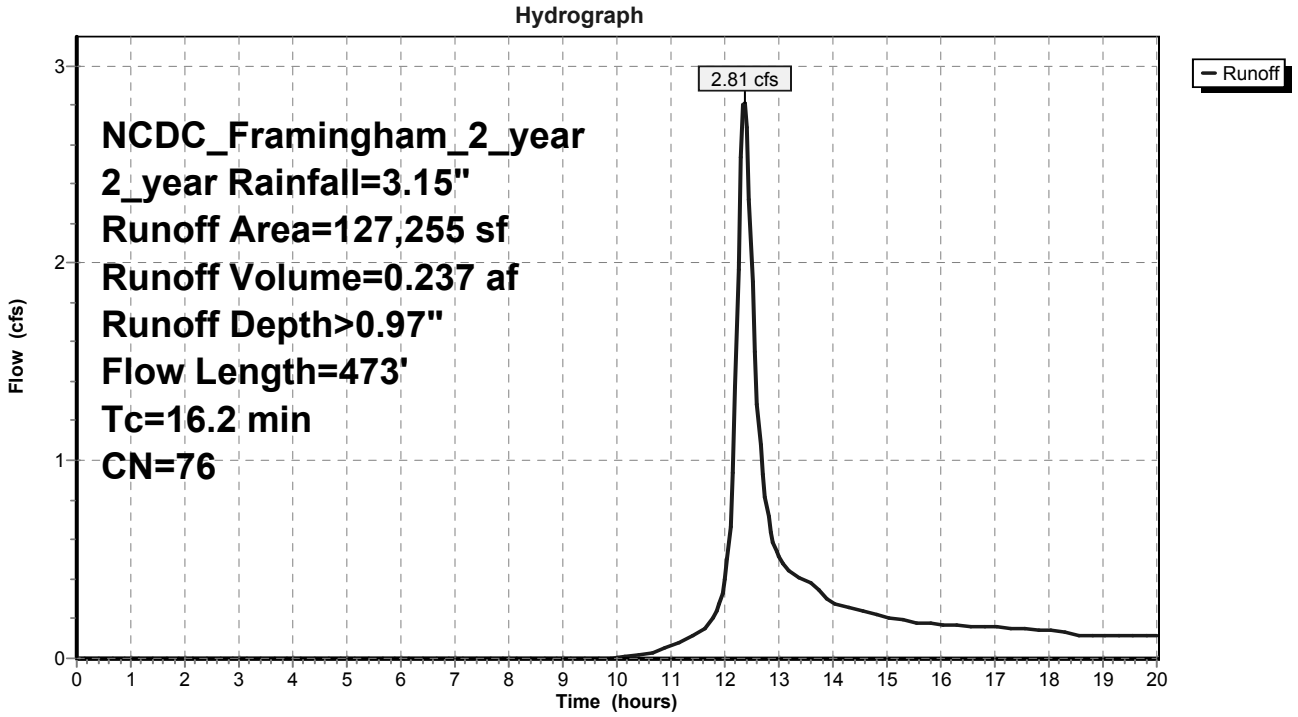
Runoff = 2.81 cfs @ 12.36 hrs, Volume= 0.237 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 36,476 | 55 | WOODS, 0% imperv, HSG B |
| * | 90,779 | 85 | GRAVEL, 65% imperv, HSG B |
| | 127,255 | 76 | Weighted Average |
| | 68,249 | | 53.63% Pervious Area |
| | 59,006 | | 46.37% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | 50 | 0.0137 | 0.14 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 8.0 | 233 | 0.0009 | 0.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.5 | 75 | 0.2333 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 54 | 0.0131 | 1.84 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 19 | 0.0056 | 0.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 41 | 0.0176 | 2.13 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 16.2 | 473 | Total | | | |

## Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2E: Pond E 1.2E

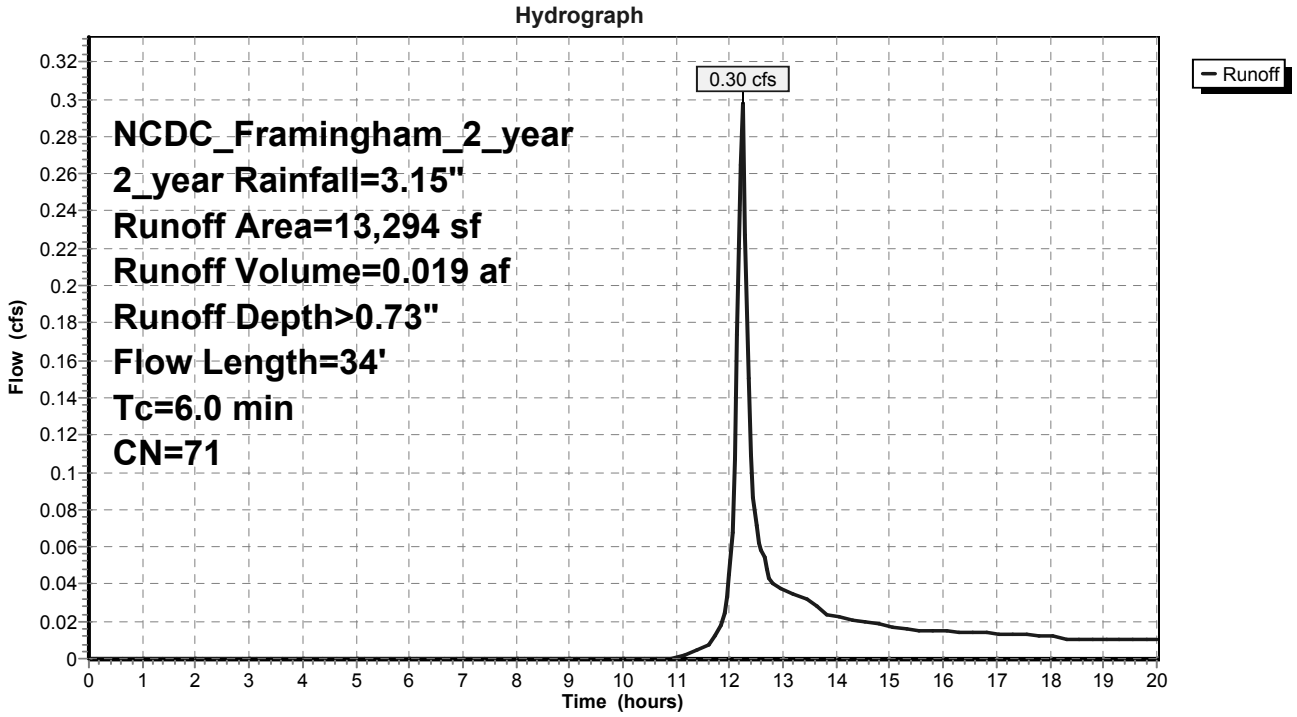
Runoff = 0.30 cfs @ 12.24 hrs, Volume= 0.019 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,218 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,076 | 85 | GRAVEL, 65% imperv, HSG B |
| | 13,294 | 71 | Weighted Average |
| | 8,695 | | 65.40% Pervious Area |
| | 4,600 | | 34.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.9 | 31 | 0.3269 | 0.18 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 2 | 0.3283 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 3.0 | 34 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2E: Pond E 1.2E



## Summary for Subcatchment E 1.3A: Aqueduct onto SITE

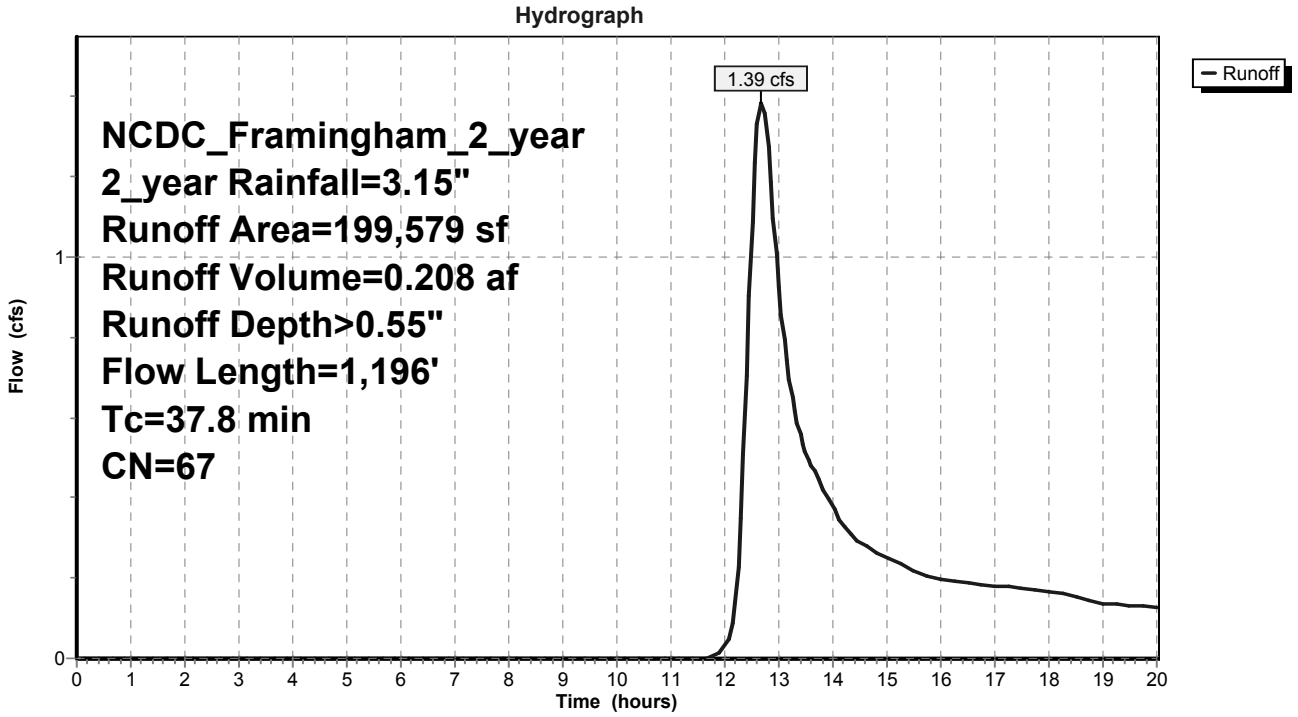
Runoff = 1.39 cfs @ 12.67 hrs, Volume= 0.208 af, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,883 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 6,497 | 30 | WOODS, 0% imperv, HSG A |
| * | 62,664 | 55 | WOODS, 0% imperv, HSG B |
| * | 94,997 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 199,579 | 67 | Weighted Average |
| | 130,818 | | 65.55% Pervious Area |
| | 68,761 | | 34.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 1 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 12 | 0.0472 | 3.50 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 17.9 | 54 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 37.8 | 1,196 | Total | | | |

## Subcatchment E 1.3A: Aqueduct onto SITE



## Summary for Subcatchment E 4.0: Offsite to Sudbury R

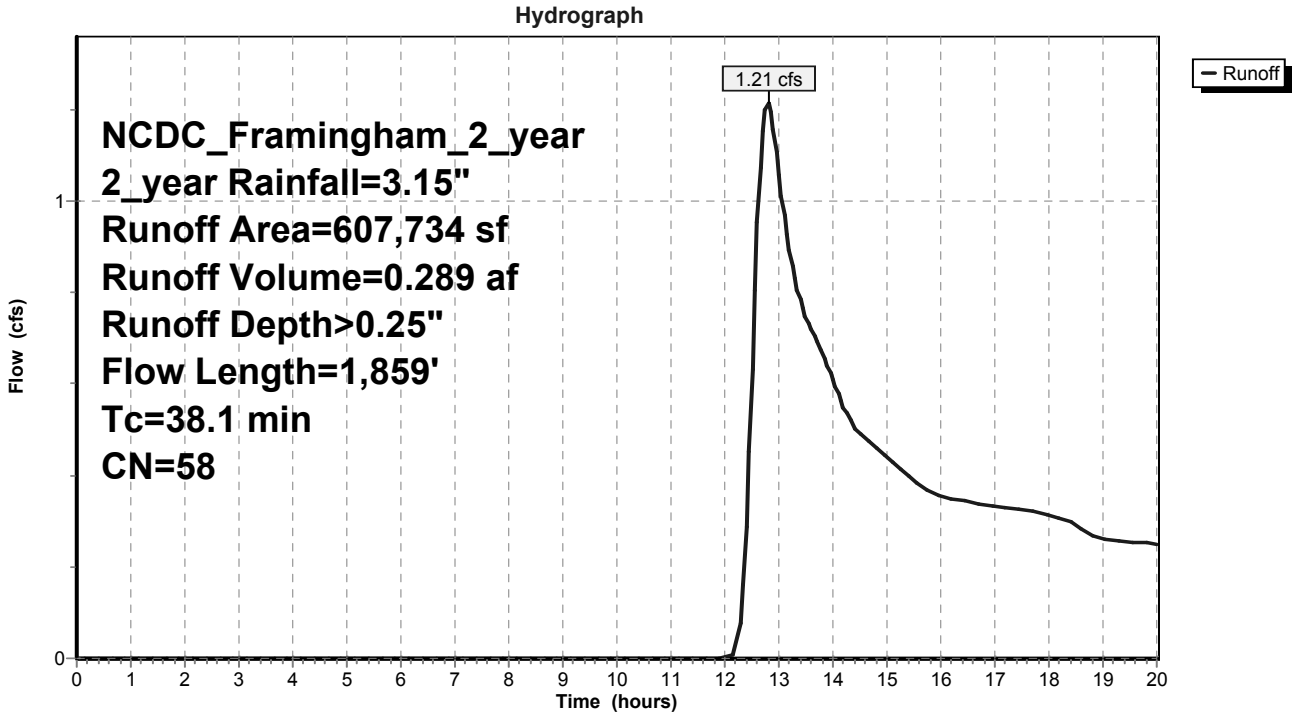
Runoff = 1.21 cfs @ 12.80 hrs, Volume= 0.289 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 78,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 27,532 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,227 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,518 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 0% imperv, HSG A |
| * | 6,326 | 98 | Water, 0% imperv, HSG C |
| * | 12,063 | 98 | Water, 0% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 607,734 | 58 | Weighted Average |
| | 548,979 | | 90.33% Pervious Area |
| | 58,756 | | 9.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.2 | 194 | 0.0399 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 8.7 | 227 | 0.0076 | 0.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 38.1 | 1,859 | Total | | | |

## Subcatchment E 4.0: Offsite to Sudbury R



## Summary for Subcatchment W 10.0: Offsite to Sudbury R

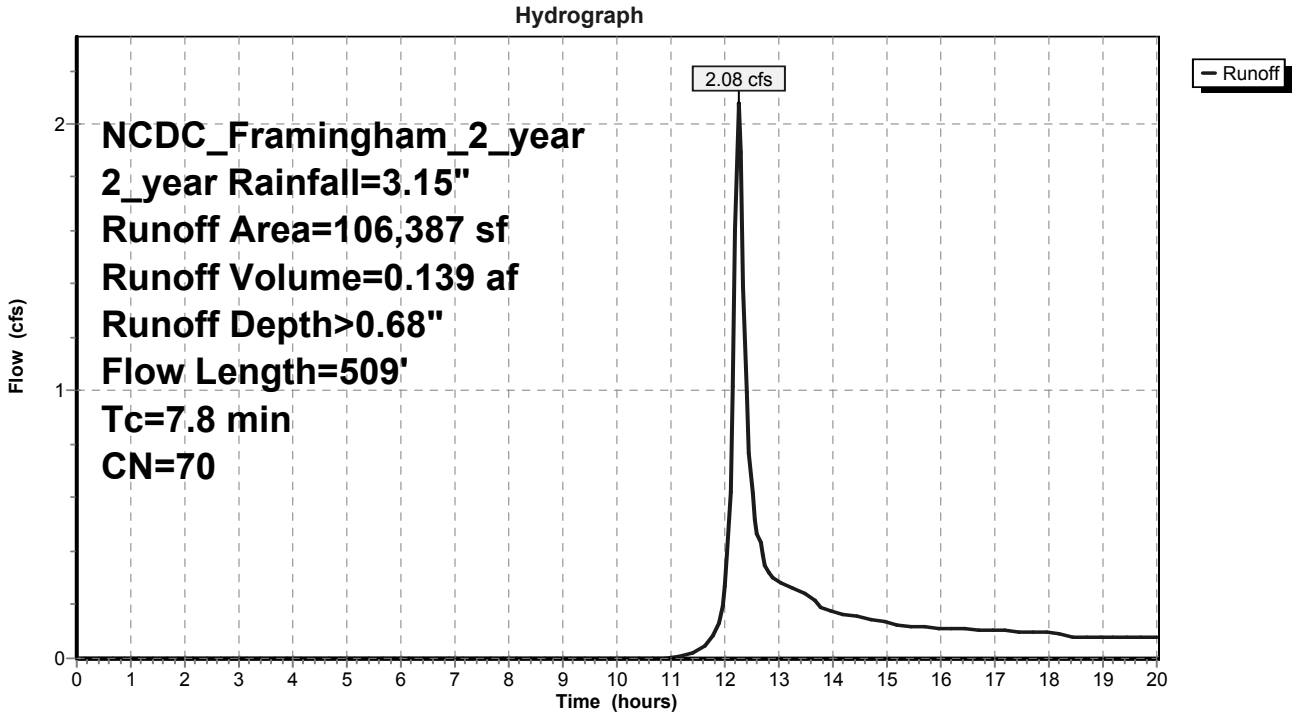
Runoff = 2.08 cfs @ 12.26 hrs, Volume= 0.139 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 0% imperv, HSG C |
| * | 6,541 | 98 | Water, 0% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 41 | 0.0223 | 0.75 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 11 | 0.2240 | 2.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 7.8 | 509 | Total | | | |

## Subcatchment W 10.0: Offsite to Sudbury R



## Summary for Subcatchment W 2.0: Onsite to Sudbury R

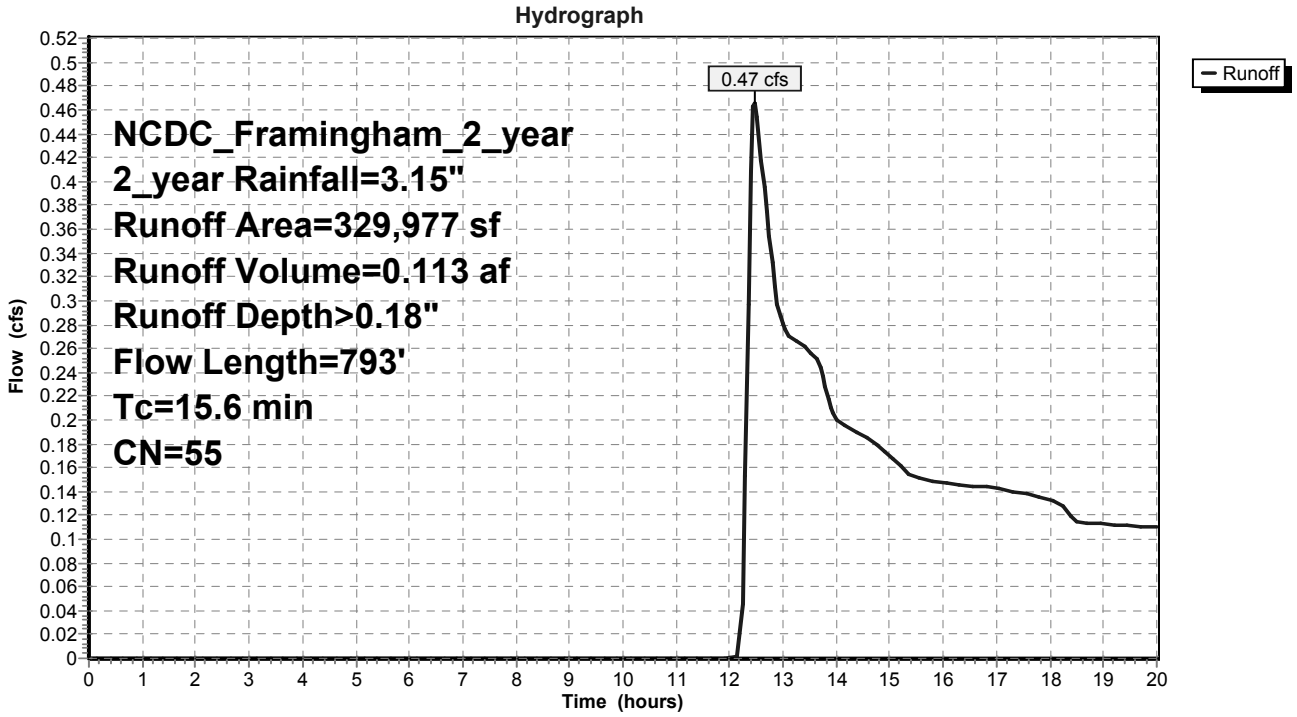
Runoff = 0.47 cfs @ 12.48 hrs, Volume= 0.113 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 160,572 | 30 | WOODS, 0% imperv, HSG A |
| * | 22 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 58,308 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 0 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 19,292 | 98 | Water, 0% imperv, HSG D |
| * | 1,268 | 98 | Water, 0% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 329,977 | 55 | Weighted Average |
| | 292,076 | | 88.51% Pervious Area |
| | 37,900 | | 11.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: Onsite to Sudbury R



## Summary for Subcatchment W 3.1: Pond P W 3.1

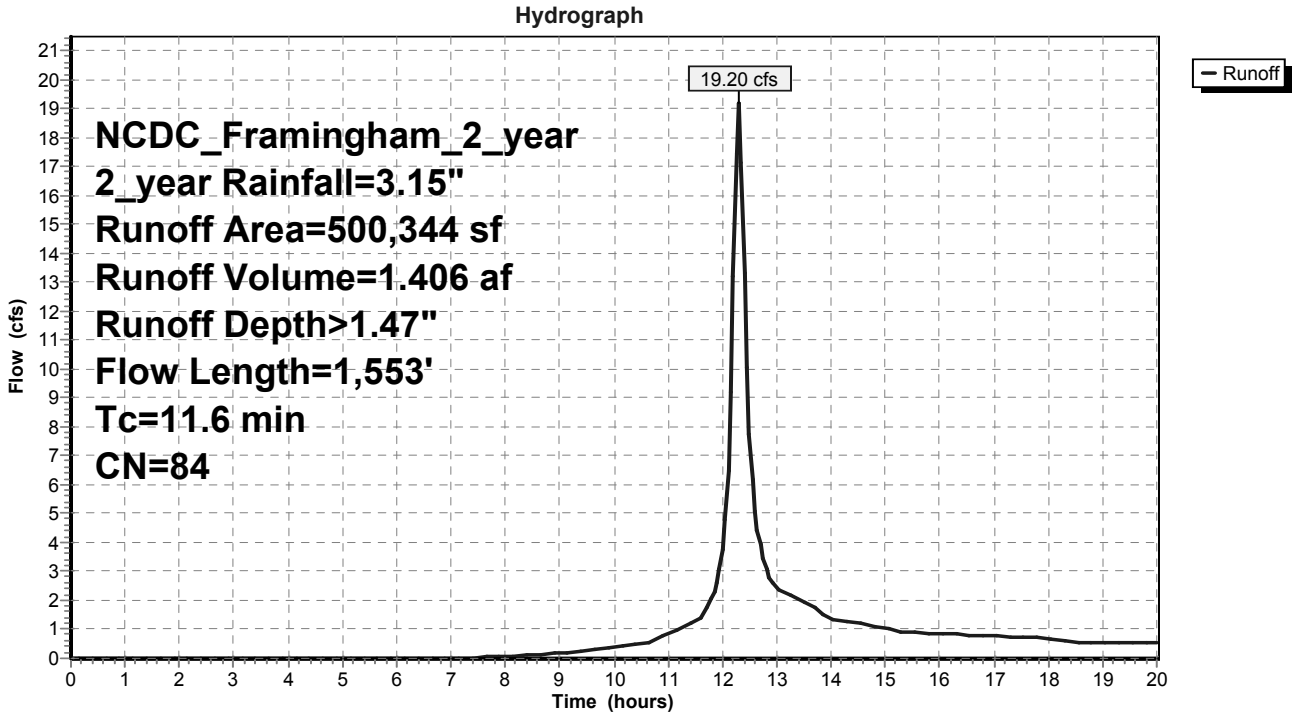
Runoff = 19.20 cfs @ 12.30 hrs, Volume= 1.406 af, Depth> 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 149 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 12,067 | 30 | WOODS, 0% imperv, HSG A |
| * | 10,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 137,585 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 197,738 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 22,211 | 98 | IMP, 100% imperv, HSG A |
| * | 118,525 | 98 | IMP, 100% imperv, HSG B |
| | 500,344 | 84 | Weighted Average |
| | 282,384 | | 56.44% Pervious Area |
| | 217,960 | | 43.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 50 | 0.0032 | 0.55 | | **Sheet Flow,** Smooth Surfaces n= 0.011 P2= 3.00" |
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 287 | 0.0109 | 2.12 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.8 | 686 | 0.0355 | 3.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 11.6 | 1,553 | Total | | | |

## Subcatchment W 3.1: Pond P W 3.1



## Summary for Subcatchment W 3.4: Gravel Processing Facility

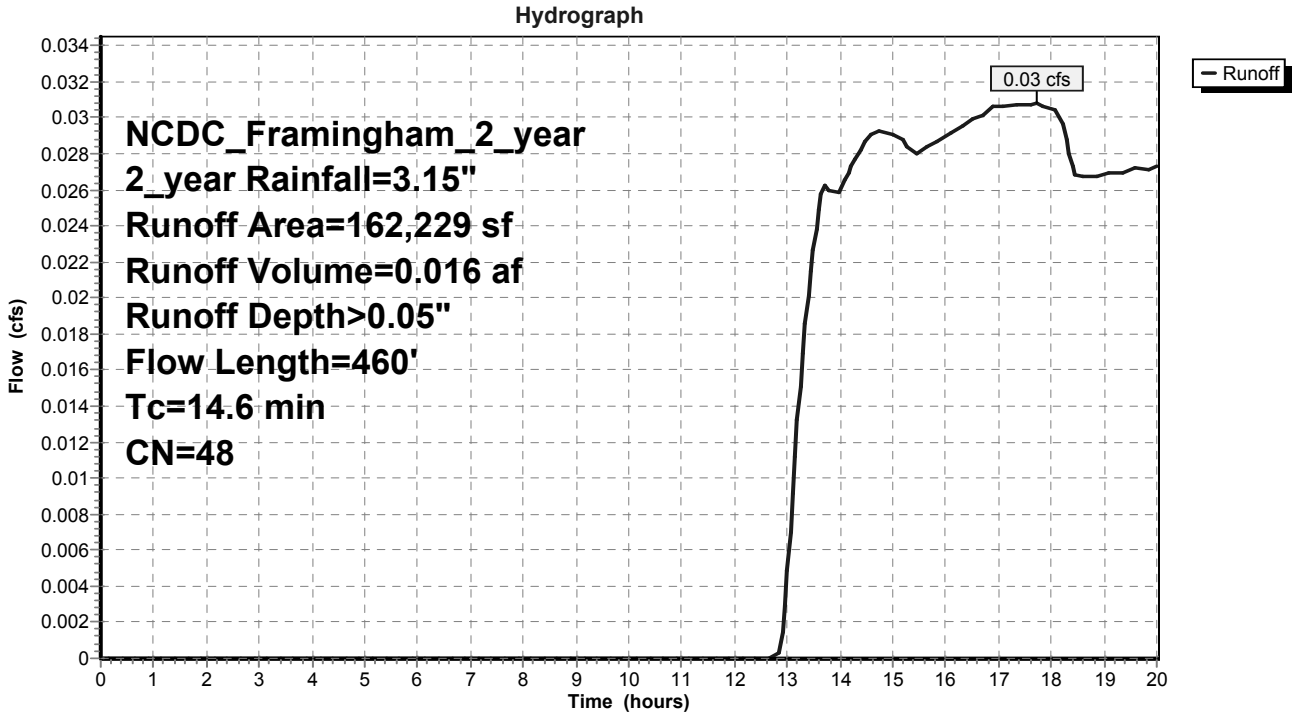
Runoff = 0.03 cfs @ 17.73 hrs, Volume= 0.016 af, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,975 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,153 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 42,351 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 162,229 | 48 | Weighted Average |
| | 134,701 | | 83.03% Pervious Area |
| | 27,528 | | 16.97% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: Gravel Processing Facility



## Summary for Subcatchment W 3.5: Small Depression to Big Box

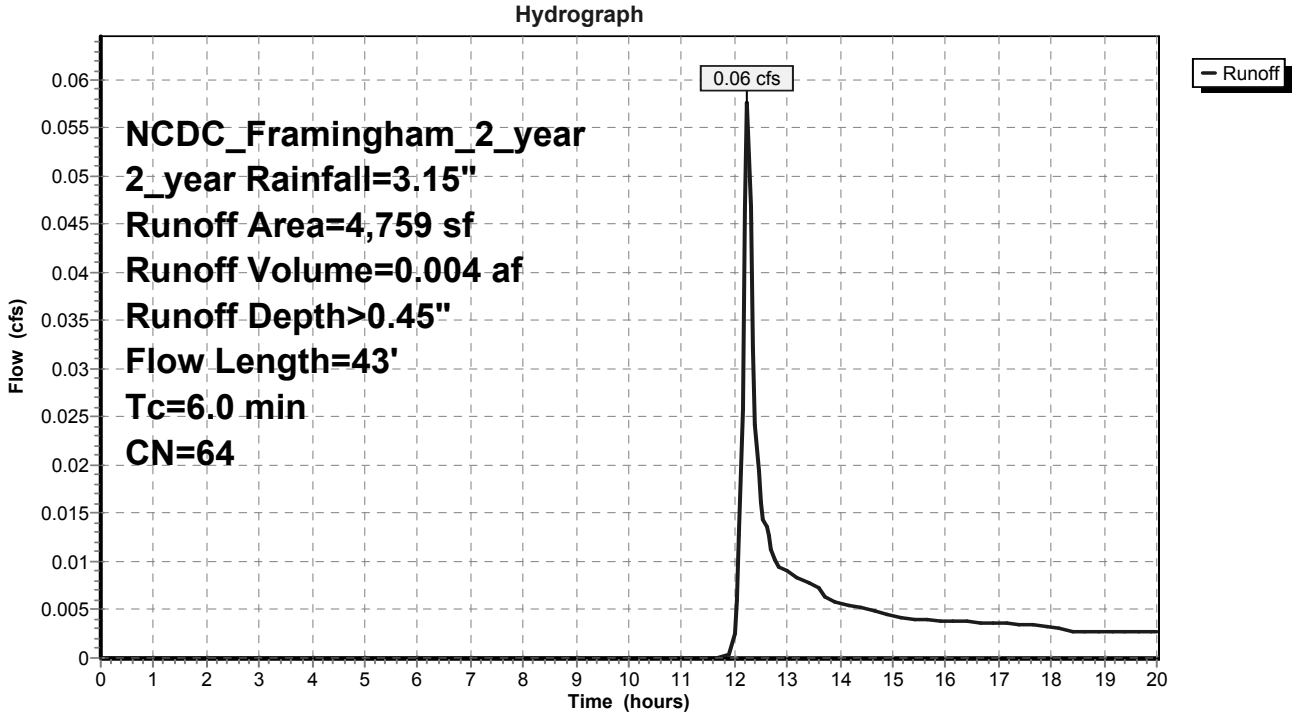
Runoff = 0.06 cfs @ 12.25 hrs, Volume= 0.004 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,714 | 30 | WOODS, 0% imperv, HSG A |
| * | 2,049 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 997 | 98 | IMP, 100% imperv, HSG A |
| | 4,759 | 64 | Weighted Average |
| | 3,427 | | 72.02% Pervious Area |
| | 1,332 | | 27.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 20 | 0.0320 | 1.16 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 12 | 0.1533 | 0.27 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.3 | 12 | 0.3938 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 2.3 | 43 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.5: Small Depression to Big Box



## Summary for Subcatchment W 9.1: Gravel Pit to Big Box Culvert

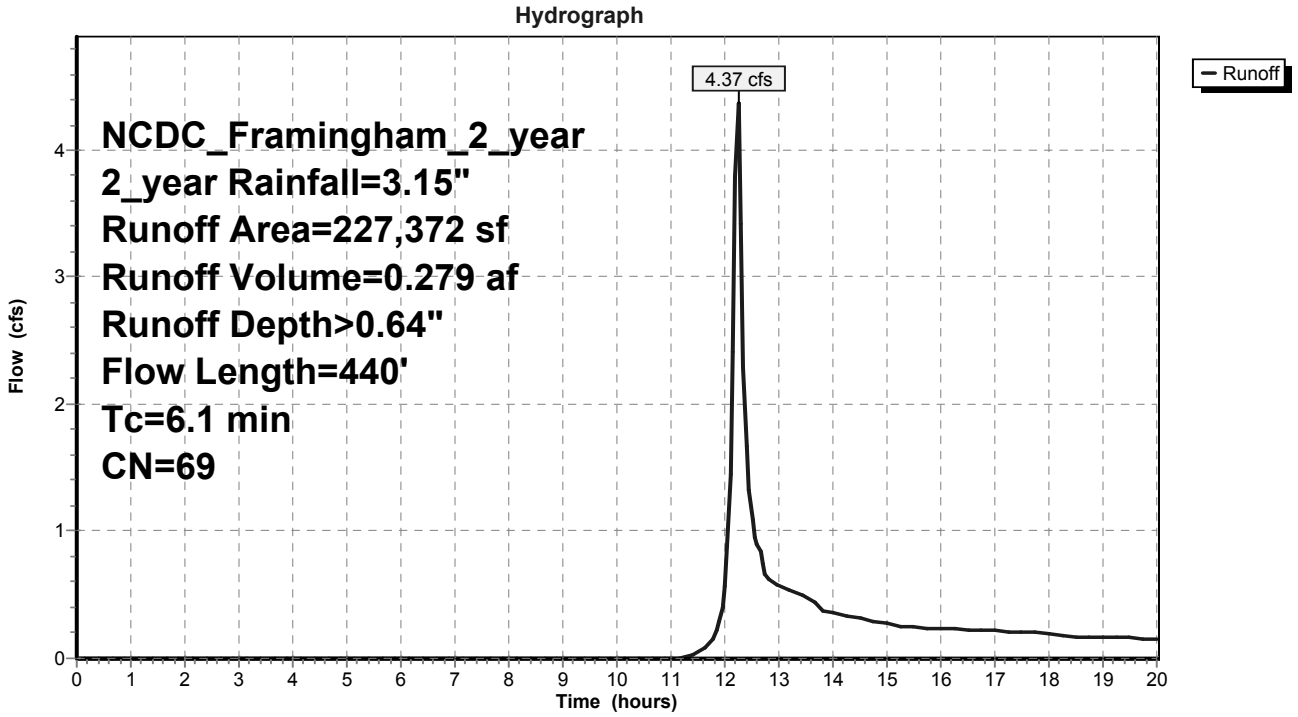
Runoff = 4.37 cfs @ 12.24 hrs, Volume= 0.279 af, Depth> 0.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 55,301 | 30 | WOODS, 0% imperv, HSG A |
| * | 14,585 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,790 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 53,800 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 6,069 | 98 | IMP, 100% imperv, HSG A |
| * | 30,826 | 98 | IMP, 100% imperv, HSG B |
| | 227,372 | 69 | Weighted Average |
| | 148,989 | | 65.53% Pervious Area |
| | 78,384 | | 34.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 206 | 0.0265 | 0.81 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 127 | 0.0402 | 3.23 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.2 | 107 | 0.0880 | 1.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 6.1 | 440 | Total | | | |

## Subcatchment W 9.1: Gravel Pit to Big Box Culvert



## Summary for Subcatchment W 9.1A: Gravel Pit to Roadway

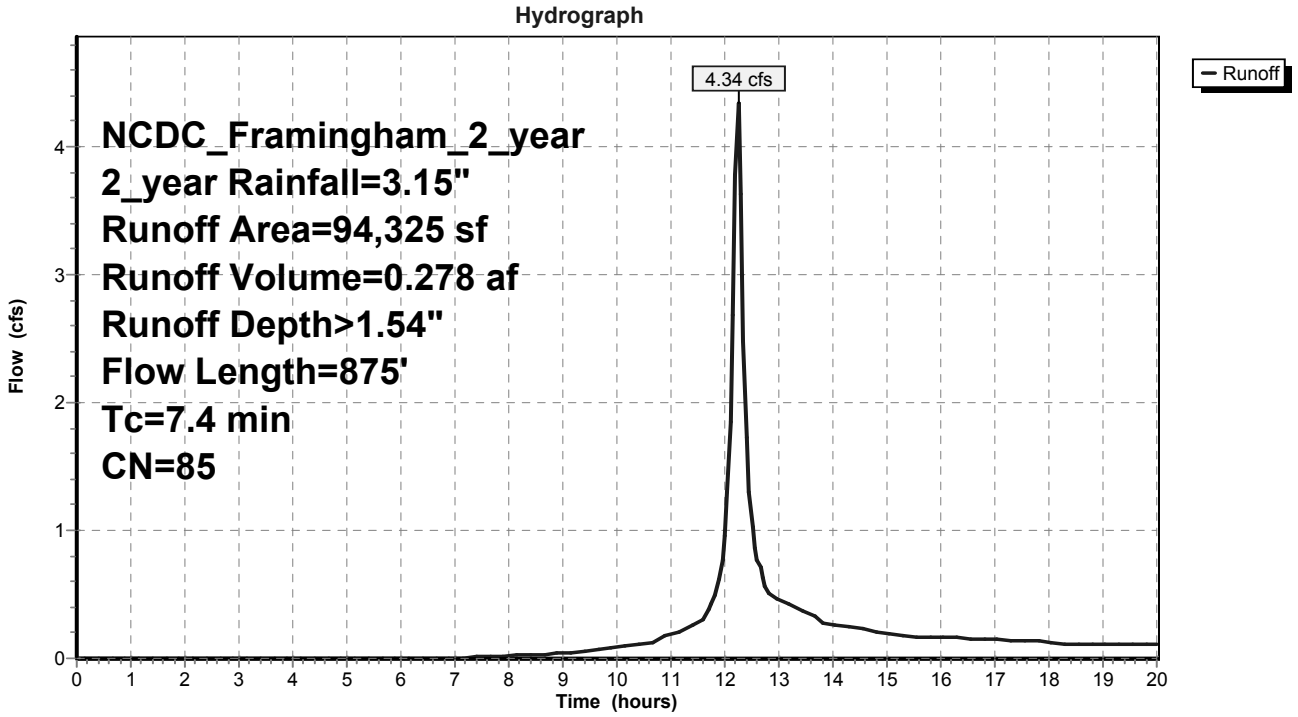
Runoff = 4.34 cfs @ 12.25 hrs, Volume= 0.278 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,124 | 55 | WOODS, 0% imperv, HSG B |
| * | 76,325 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 11,877 | 98 | IMP, 100% imperv, HSG B |
| | 94,325 | 85 | Weighted Average |
| | 44,714 | | 47.40% Pervious Area |
| | 49,611 | | 52.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 116 | 0.0112 | 2.15 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 20 | 0.0178 | 2.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 130 | 0.0176 | 2.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.0327 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 11 | 0.0775 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 2 | 0.0429 | 1.04 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0151 | 0.61 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.4 | 875 | Total | | | |

## Subcatchment W 9.1A: Gravel Pit to Roadway



## Summary for Subcatchment W 9.1B: Aqueduct to Big Box

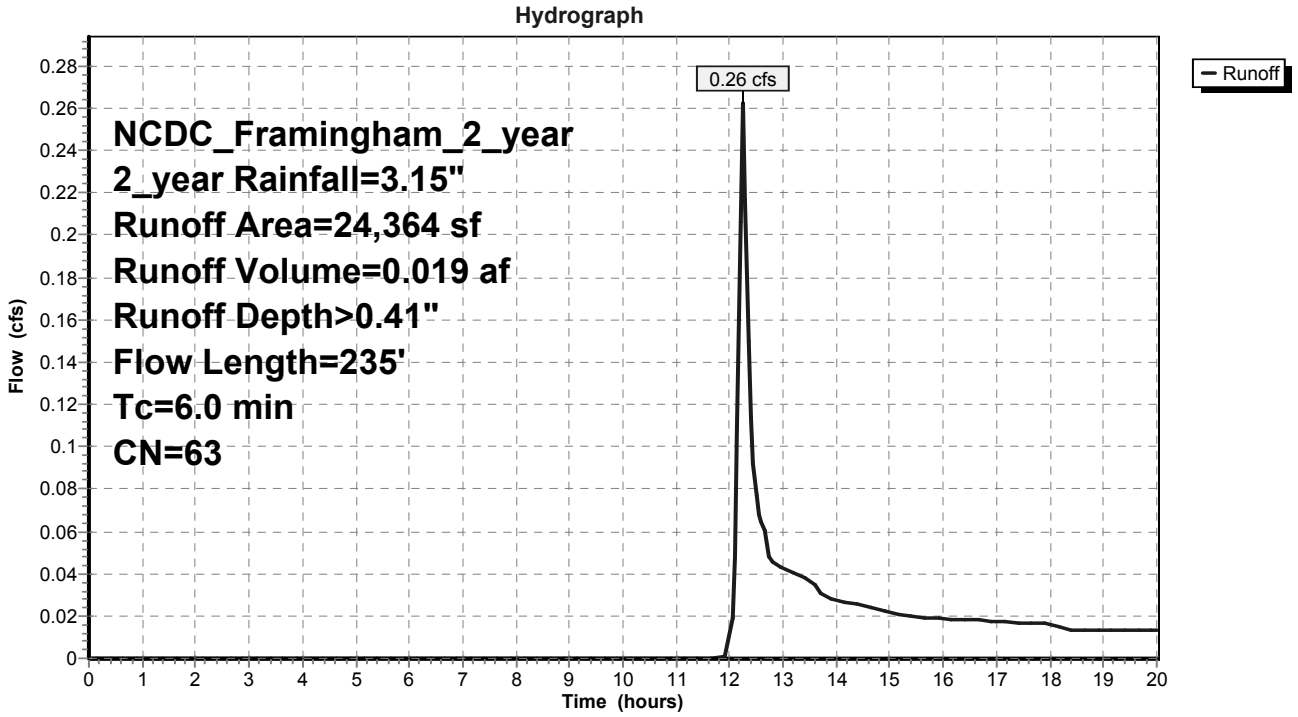
Runoff = 0.26 cfs @ 12.25 hrs, Volume= 0.019 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 123 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 681 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,458 | | 83.97% Pervious Area |
| | 3,905 | | 16.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: Aqueduct to Big Box



## Summary for Subcatchment W 9.1C: Culvert 2

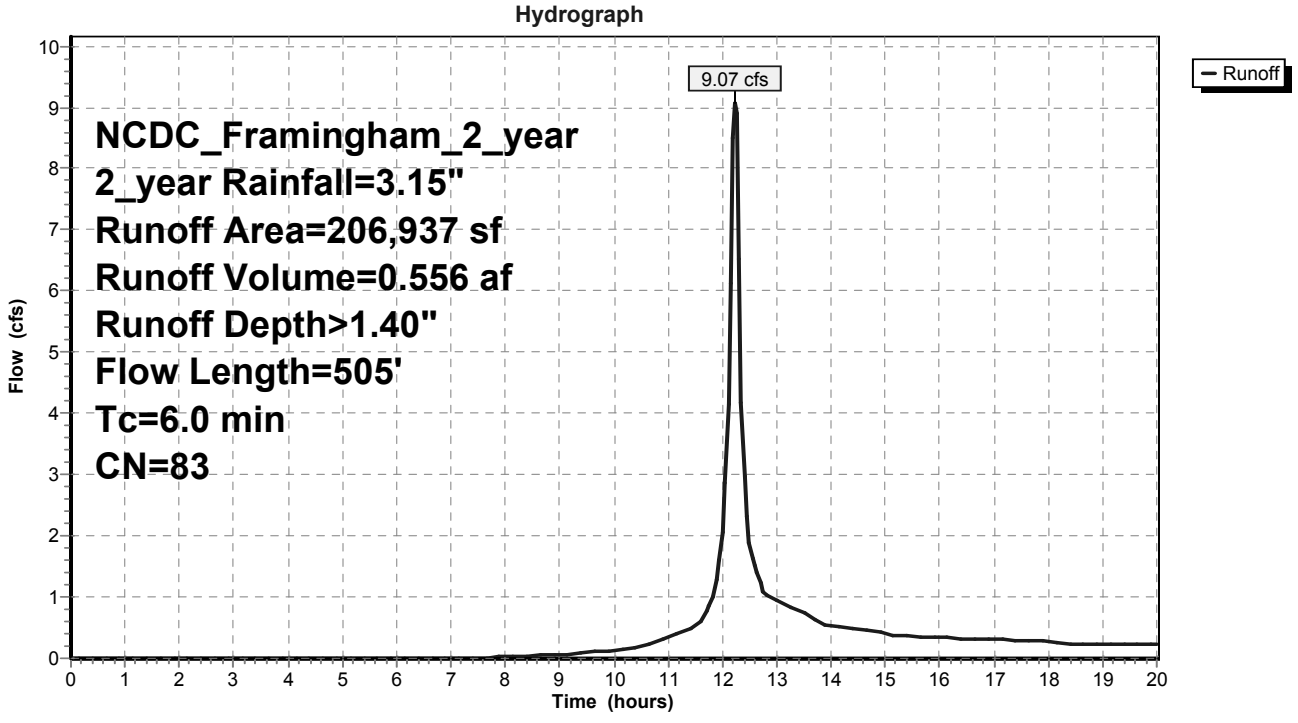
Runoff = 9.07 cfs @ 12.23 hrs, Volume= 0.556 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,598 | 55 | WOODS, 0% imperv, HSG B |
| * | 181,699 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,640 | 98 | IMP, 100% imperv, HSG B |
| | 206,937 | 83 | Weighted Average |
| | 88,833 | | 42.93% Pervious Area |
| | 118,104 | | 57.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 50 | 0.0641 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.3 | 455 | 0.0405 | 3.24 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 505 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1C: Culvert 2



## Summary for Pond MH-NCULV-A: MH-NCULV-A

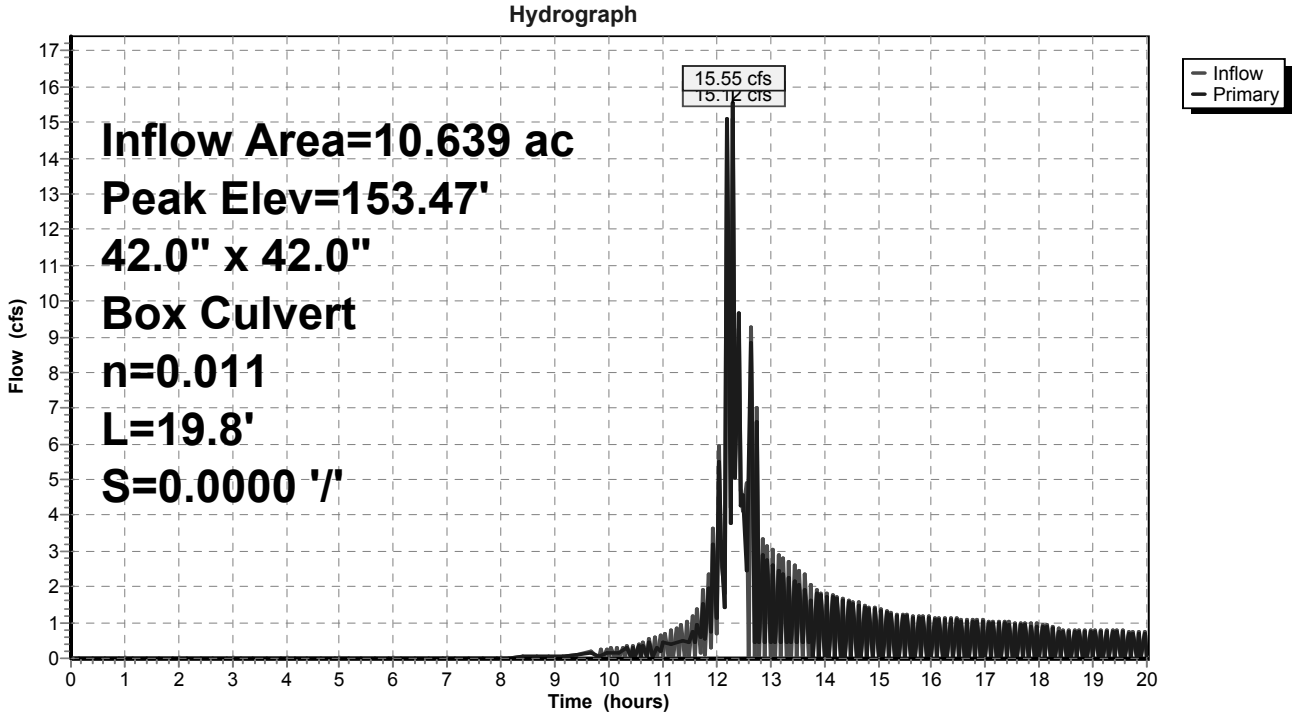
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 0.97" for 2_year event
Inflow = 15.12 cfs @ 12.30 hrs, Volume= 0.864 af
Outflow = 15.55 cfs @ 12.30 hrs, Volume= 0.863 af, Atten= 0%, Lag= 0.0 min
Primary = 15.55 cfs @ 12.30 hrs, Volume= 0.863 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 153.47' @ 12.26 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.30 hrs HW=153.33' TW=153.48' (Dynamic Tailwater)
**1=3.5' x 3.5' Box** ( Controls 0.00 cfs)

## Pond MH-NCULV-A: MH-NCULV-A



## Summary for Pond MH-NCULV-B: MH-NCULV-B

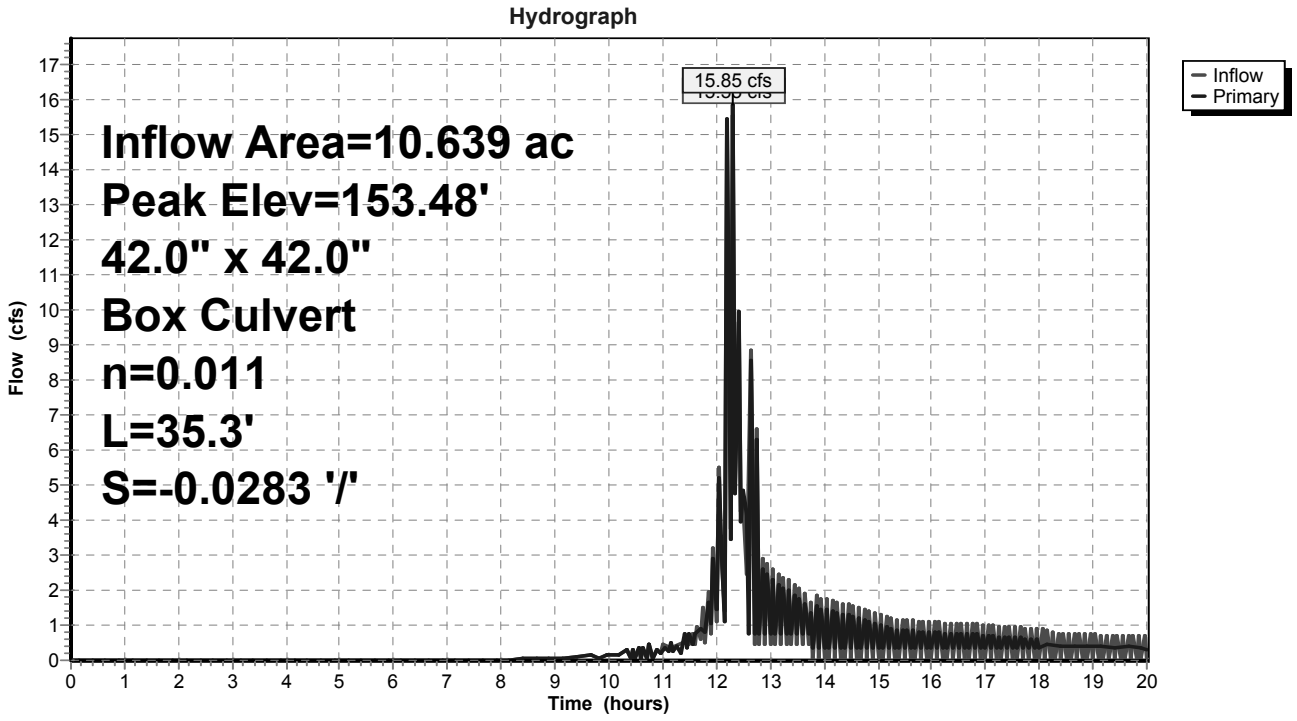
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 0.97" for 2_year event
Inflow = 15.55 cfs @ 12.30 hrs, Volume= 0.863 af
Outflow = 15.85 cfs @ 12.30 hrs, Volume= 0.861 af, Atten= 0%, Lag= 0.0 min
Primary = 15.85 cfs @ 12.30 hrs, Volume= 0.861 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 153.48' @ 12.30 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=14.06 cfs @ 12.30 hrs HW=153.48' TW=153.42' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 14.06 cfs @ 1.15 fps)

## Pond MH-NCULV-B: MH-NCULV-B



## Summary for Pond P E 1.1A: 284

Inflow Area = 35.276 ac, 19.71% Impervious, Inflow Depth > 0.10" for 2_year event
Inflow = 4.93 cfs @ 12.23 hrs, Volume= 0.301 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 133.32' @ 20.00 hrs Surf.Area= 41,779 sf Storage= 13,116 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

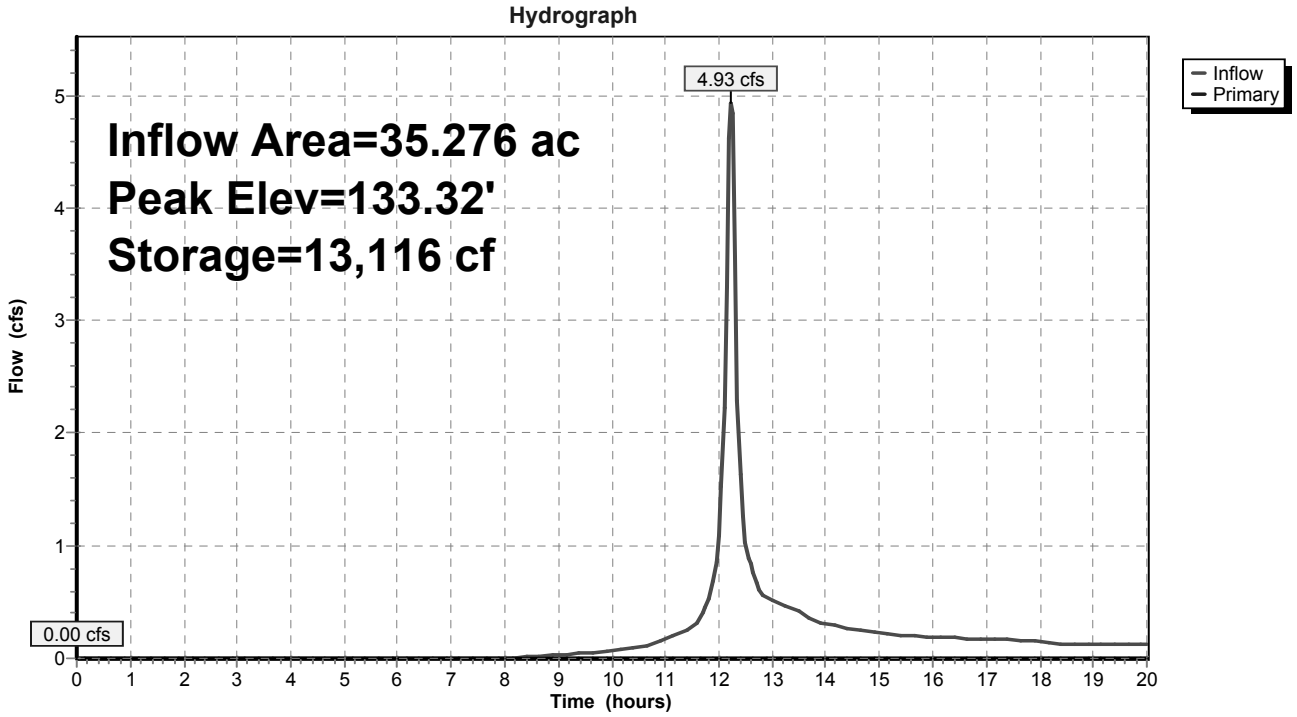
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 32.573 ac, 20.73% Impervious, Inflow Depth > 0.39" for 2_year event
Inflow = 10.02 cfs @ 12.25 hrs, Volume= 1.070 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 145.47' @ 20.00 hrs Surf.Area= 35,320 sf Storage= 46,569 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

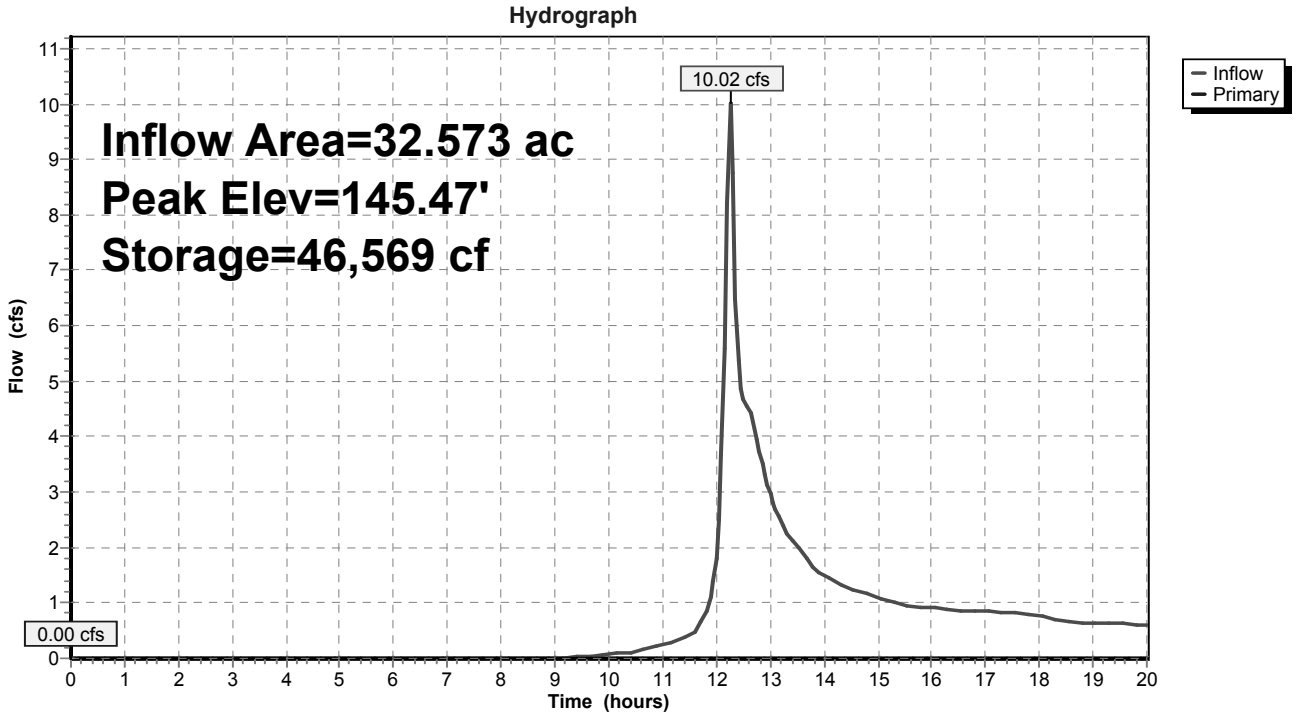
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=142.00' TW=133.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.1B-4: P E 1.1B-4

Inflow Area = 2.081 ac, 0.00% Impervious, Inflow Depth > 0.35" for 2_year event
Inflow = 0.74 cfs @ 12.26 hrs, Volume= 0.060 af
Outflow = 0.73 cfs @ 12.27 hrs, Volume= 0.060 af, Atten= 1%, Lag= 0.5 min
Primary = 0.73 cfs @ 12.27 hrs, Volume= 0.060 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 167.39' @ 12.27 hrs Surf.Area= 108 sf Storage= 21 cf
Flood Elev= 170.00' Surf.Area= 2,939 sf Storage= 2,634 cf

Plug-Flow detention time= 0.5 min calculated for 0.060 af (100% of inflow)
Center-of-Mass det. time= 0.3 min ( 880.2 - 879.9 )

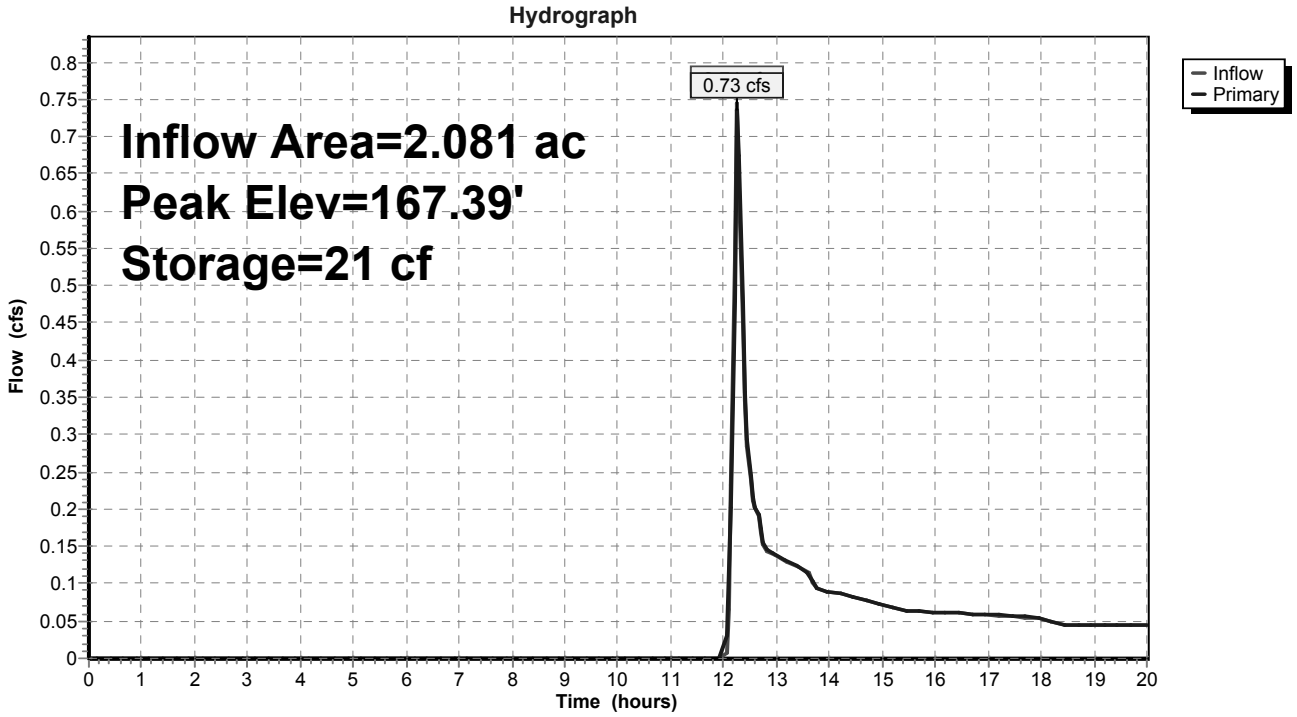
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 2,634 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 2 | 0 | 0 |
| 168.00 | 276 | 139 | 139 |
| 169.00 | 888 | 582 | 721 |
| 170.00 | 2,939 | 1,913 | 2,634 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 167.00' | **12.0" Round RCP_Round 15**<br>L= 69.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.00' / 165.40' S= 0.0230 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 169.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 72.00 148.00 229.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.70 cfs @ 12.27 hrs HW=167.38' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Inlet Controls 0.70 cfs @ 2.61 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B-4: P E 1.1B-4



## Summary for Pond P E 1.1C: P E 1.1C

Inflow Area = 13.327 ac, 33.50% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 8.29 cfs @ 12.24 hrs, Volume= 0.512 af
Outflow = 8.29 cfs @ 12.24 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.2 min
Primary = 8.29 cfs @ 12.24 hrs, Volume= 0.512 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 2 sf Storage= 0 cf
Peak Elev= 168.29' @ 12.25 hrs Surf.Area= 28 sf Storage= 49 cf
Flood Elev= 171.00' Surf.Area= 14,037 sf Storage= 8,304 cf

Plug-Flow detention time= 0.2 min calculated for 0.510 af (100% of inflow)
Center-of-Mass det. time= 0.1 min ( 820.9 - 820.8 )

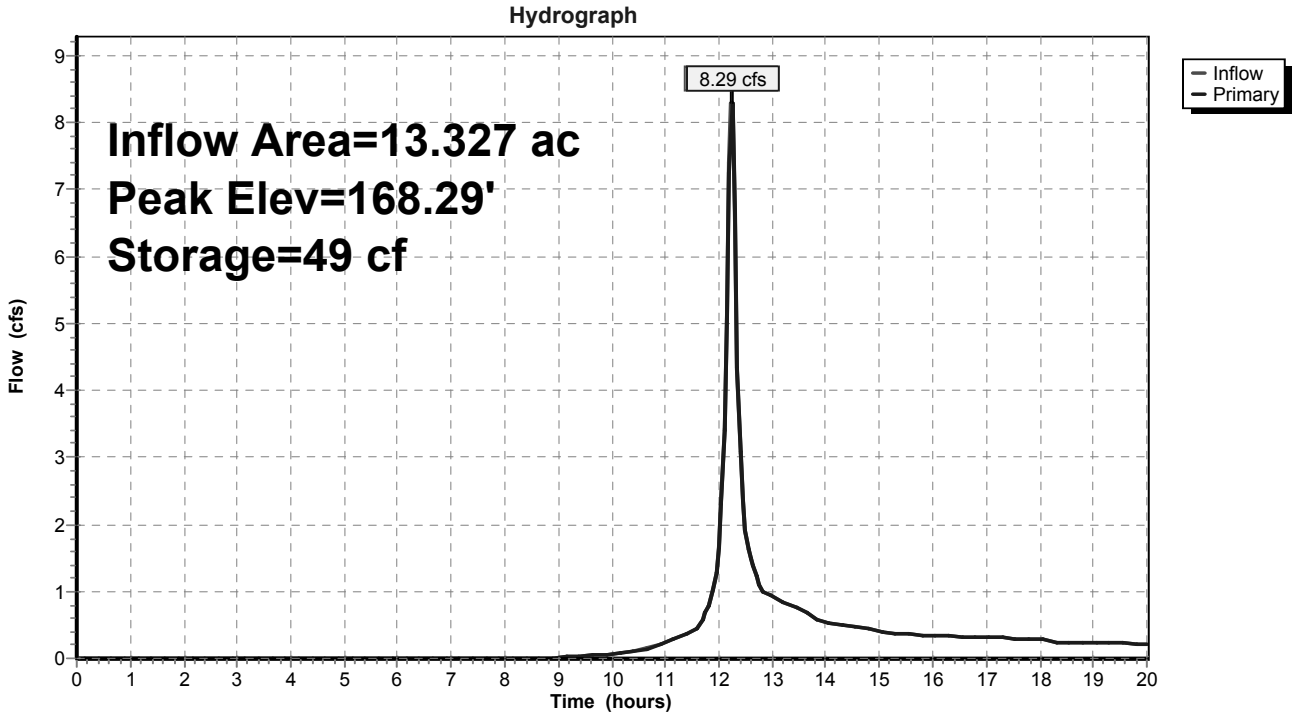
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 33,139 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 2 | 0 | 0 |
| 169.00 | 34 | 71 | 71 |
| 170.00 | 1,198 | 616 | 687 |
| 171.00 | 14,037 | 7,618 | 8,304 |
| 172.00 | 35,633 | 24,835 | 33,139 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.64' | **15.0" Round RCP_Round 15**<br>L= 85.2' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.64' / 165.18' S= 0.0054 '/' Cc= 0.900<br>n= 0.011, Flow Area= 1.23 sf |
| #2 | Primary | 171.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 200.00 333.00 436.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=8.17 cfs @ 12.24 hrs HW=168.24' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Barrel Controls 8.17 cfs @ 6.66 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1C: P E 1.1C



## Summary for Pond P E 1.1D: P E 1.1D

Inflow Area = 7.986 ac, 39.80% Impervious, Inflow Depth > 1.26" for 2_year event
Inflow = 13.49 cfs @ 12.24 hrs, Volume= 0.836 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 169.00' Surf.Area= 25 sf Storage= 0 cf
Peak Elev= 171.06' @ 20.00 hrs Surf.Area= 47,865 sf Storage= 36,397 cf
Flood Elev= 172.00' Surf.Area= 58,231 sf Storage= 86,010 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

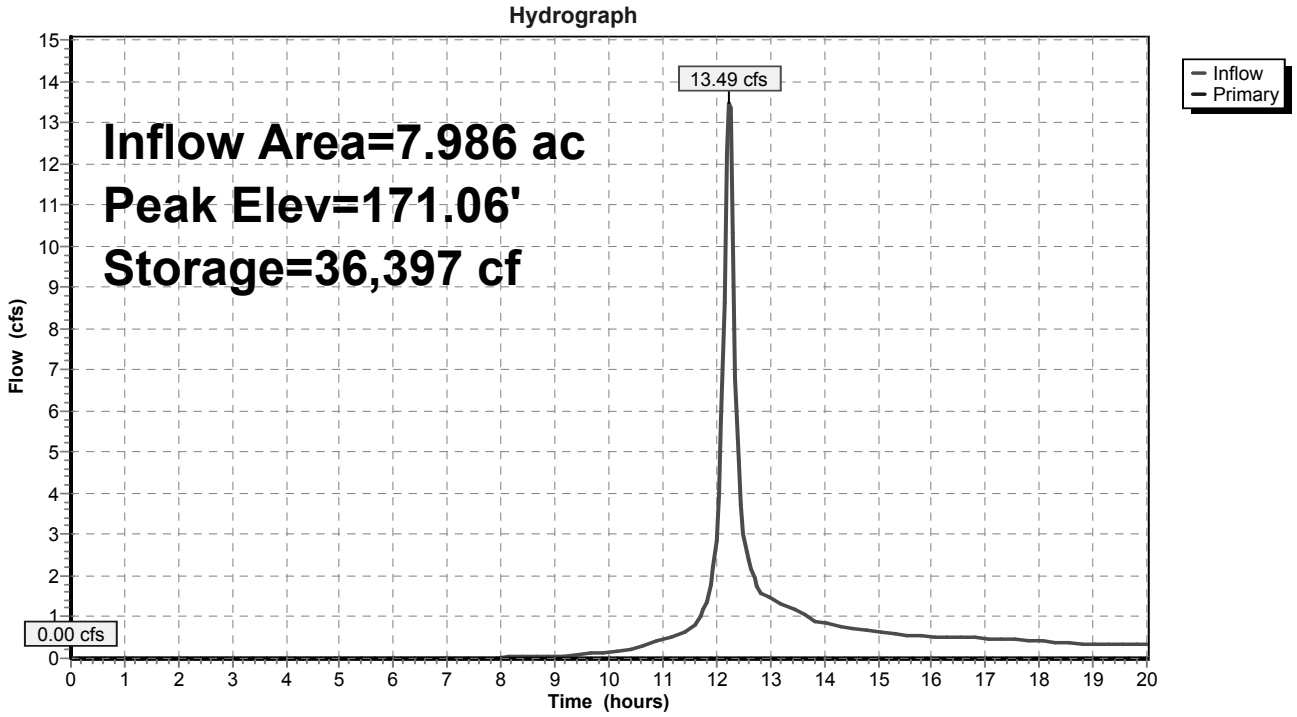
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 146,356 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 25 | 0 | 0 |
| 170.00 | 9,735 | 4,880 | 4,880 |
| 171.00 | 47,147 | 28,441 | 33,321 |
| 172.00 | 58,231 | 52,689 | 86,010 |
| 173.00 | 62,461 | 60,346 | 146,356 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 172.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 56.00 69.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=169.00' TW=165.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1D: P E 1.1D



## Summary for Pond P E 1.2A: 282

Inflow Area = 18.820 ac, 26.22% Impervious, Inflow Depth > 0.47" for 2_year event
Inflow = 8.50 cfs @ 12.24 hrs, Volume= 0.730 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 134.63' @ 20.00 hrs Surf.Area= 43,280 sf Storage= 31,783 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

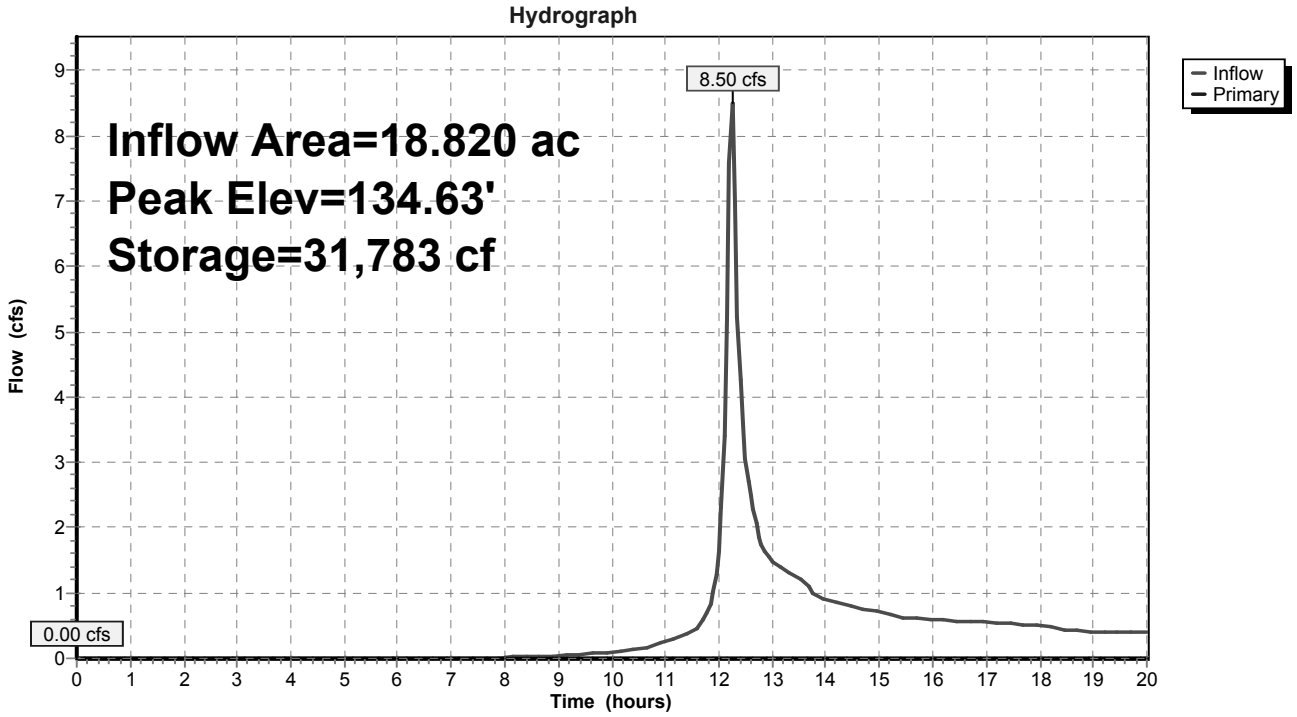
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2A: 282



## Summary for Pond P E 1.2D: P E 1.2D

Inflow Area = 3.227 ac, 45.26% Impervious, Inflow Depth > 0.88" for 2_year event
Inflow = 2.81 cfs @ 12.36 hrs, Volume= 0.237 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 10,809 sf Storage= 15,981 cf
Peak Elev= 157.60' @ 20.00 hrs Surf.Area= 23,536 sf Storage= 26,298 cf (10,316 cf above start)
Flood Elev= 159.00' Surf.Area= 39,090 sf Storage= 72,926 cf (56,945 cf above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

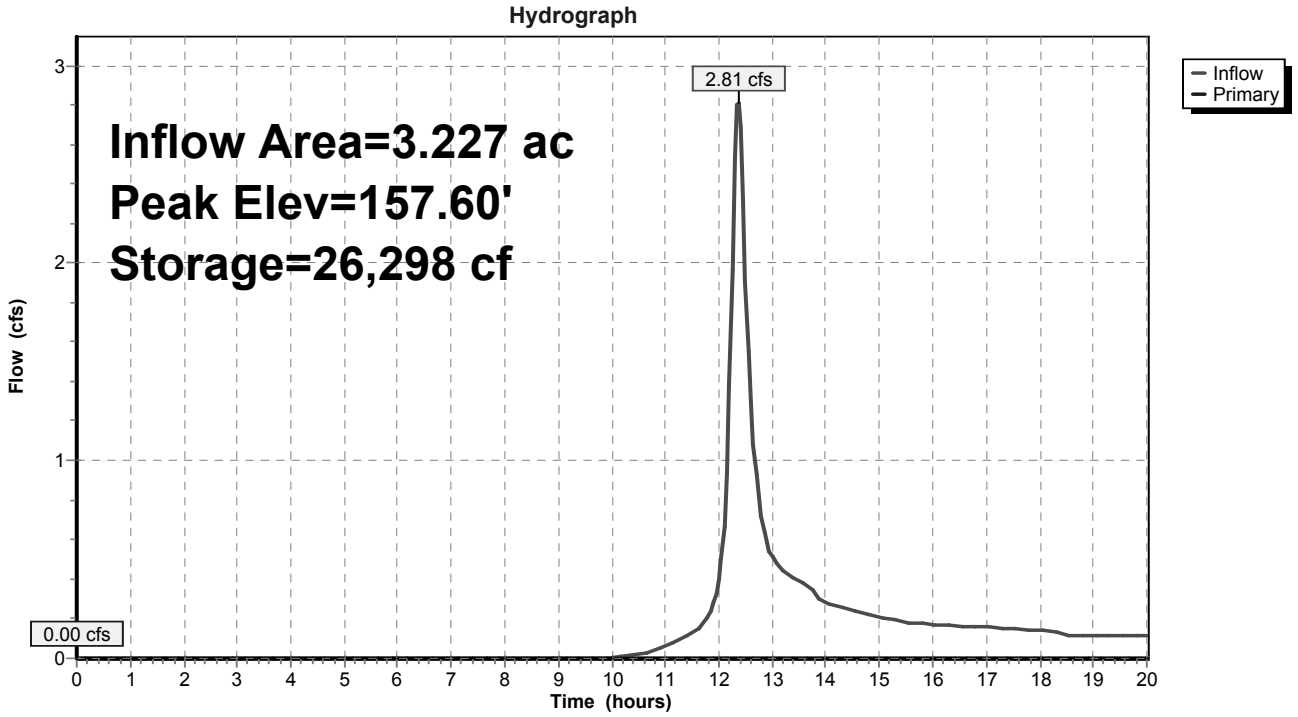
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 154.00' | 72,926 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 154.00 | 288 | 0 | 0 |
| 155.00 | 3,513 | 1,900 | 1,900 |
| 156.00 | 6,920 | 5,216 | 7,117 |
| 157.00 | 10,809 | 8,865 | 15,981 |
| 158.00 | 31,995 | 21,402 | 37,383 |
| 159.00 | 39,090 | 35,542 | 72,926 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 5.00 13.00 18.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=157.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2D: P E 1.2D



## Summary for Pond P E 1.2E: P E 1.2E

Inflow Area = 0.305 ac, 34.60% Impervious, Inflow Depth > 0.73" for 2_year event
Inflow = 0.30 cfs @ 12.24 hrs, Volume= 0.019 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 413 sf Storage= 0 cf
Peak Elev= 171.65' @ 20.00 hrs Surf.Area= 2,093 sf Storage= 808 cf
Flood Elev= 173.00' Surf.Area= 6,101 sf Storage= 6,273 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 21,312 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

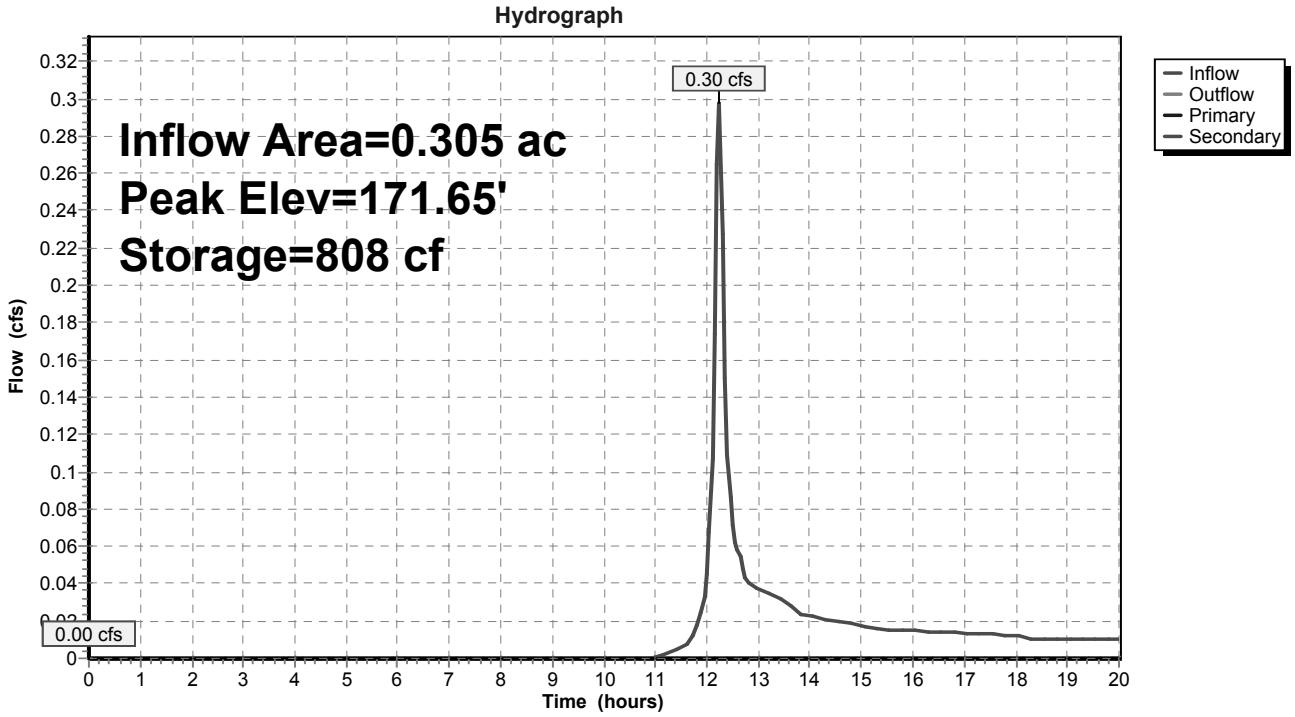
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 413 | 0 | 0 |
| 172.00 | 3,016 | 1,715 | 1,715 |
| 173.00 | 6,101 | 4,559 | 6,273 |
| 174.00 | 7,653 | 6,877 | 13,150 |
| 175.00 | 8,670 | 8,161 | 21,312 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 6.00 20.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Secondary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 20.00 25.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=157.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2E: P E 1.2E



## Summary for Pond P W 3.1: P W 3.1

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 1.11" for 2_year event
Inflow = 19.20 cfs @ 12.30 hrs, Volume= 1.406 af
Outflow = 19.17 cfs @ 12.31 hrs, Volume= 1.238 af, Atten= 0%, Lag= 0.4 min
Primary = 19.17 cfs @ 12.31 hrs, Volume= 1.238 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.16' @ 12.31 hrs Surf.Area= 4,853 sf Storage= 7,963 cf
Flood Elev= 157.00' Surf.Area= 7,260 sf Storage= 13,079 cf

Plug-Flow detention time= 61.2 min calculated for 1.235 af (88% of inflow)
Center-of-Mass det. time= 22.6 min ( 831.3 - 808.7 )

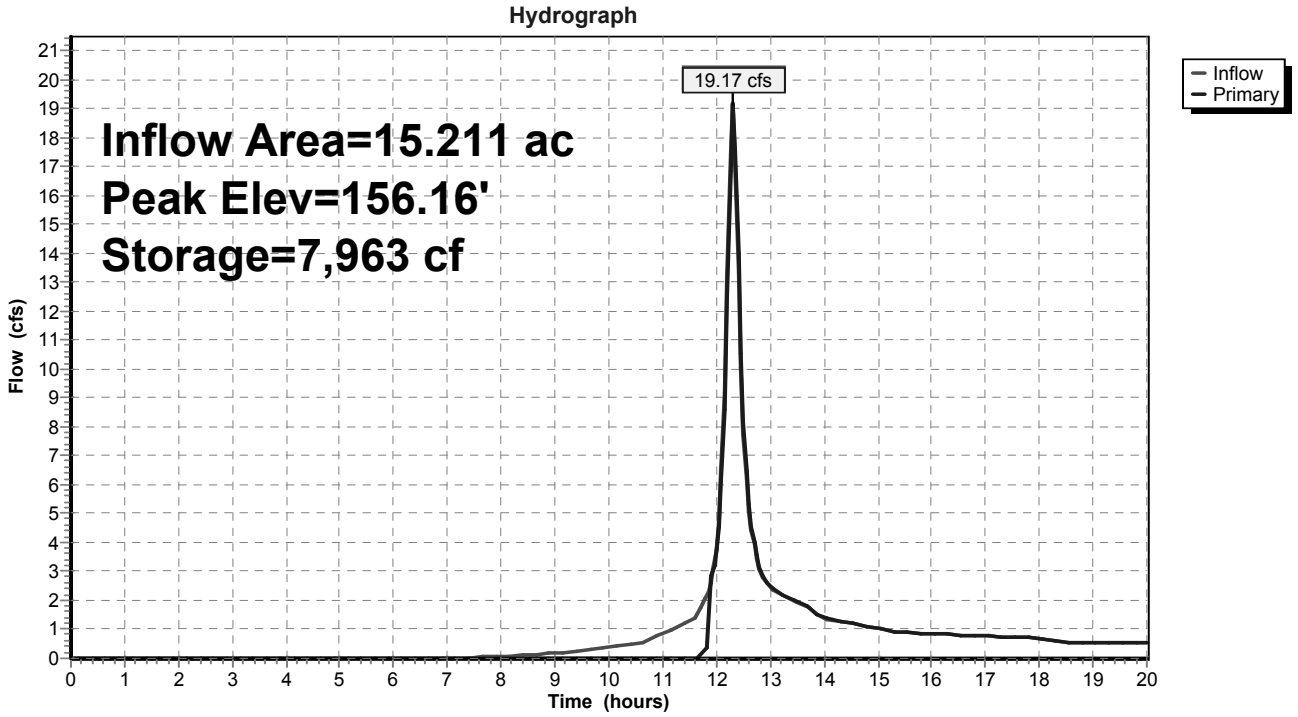
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 13,079 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,411 | 3,837 | 7,244 |
| 157.00 | 7,260 | 5,835 | 13,079 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=18.99 cfs @ 12.31 hrs HW=156.15' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 18.99 cfs @ 1.23 fps)

## Pond P W 3.1: P W 3.1



## Summary for Pond P W 3.4: P W 3.4

Inflow Area = 3.724 ac, 16.97% Impervious, Inflow Depth > 0.05" for 2_year event
Inflow = 0.03 cfs @ 17.73 hrs, Volume= 0.016 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 180.65' @ 20.00 hrs Surf.Area= 1,549 sf Storage= 694 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

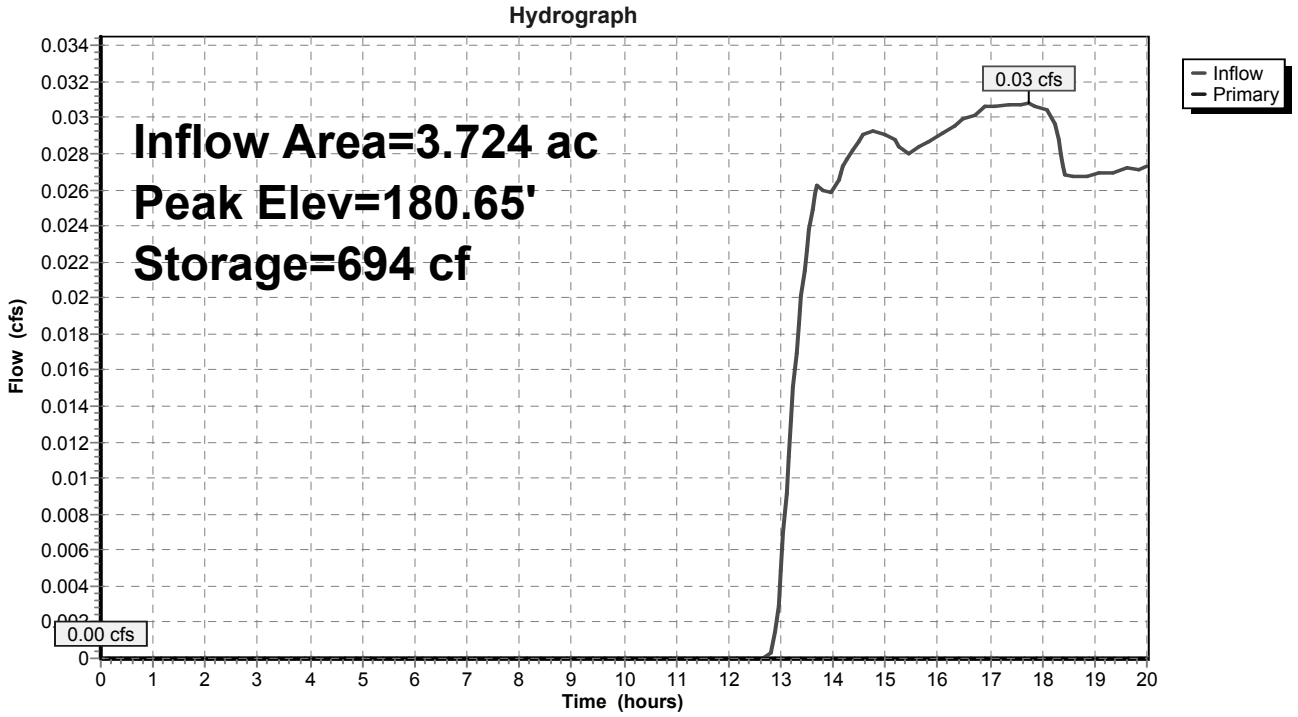
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=180.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 3.4: P W 3.4



## Summary for Pond P W 3.5: P W 3.5

Inflow Area = 0.109 ac, 27.98% Impervious, Inflow Depth > 0.45" for 2_year event
Inflow = 0.06 cfs @ 12.25 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.25 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
Primary = 0.06 cfs @ 12.25 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 9 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 9 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,452 sf Storage= 2,460 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 867.2 - 867.2 )

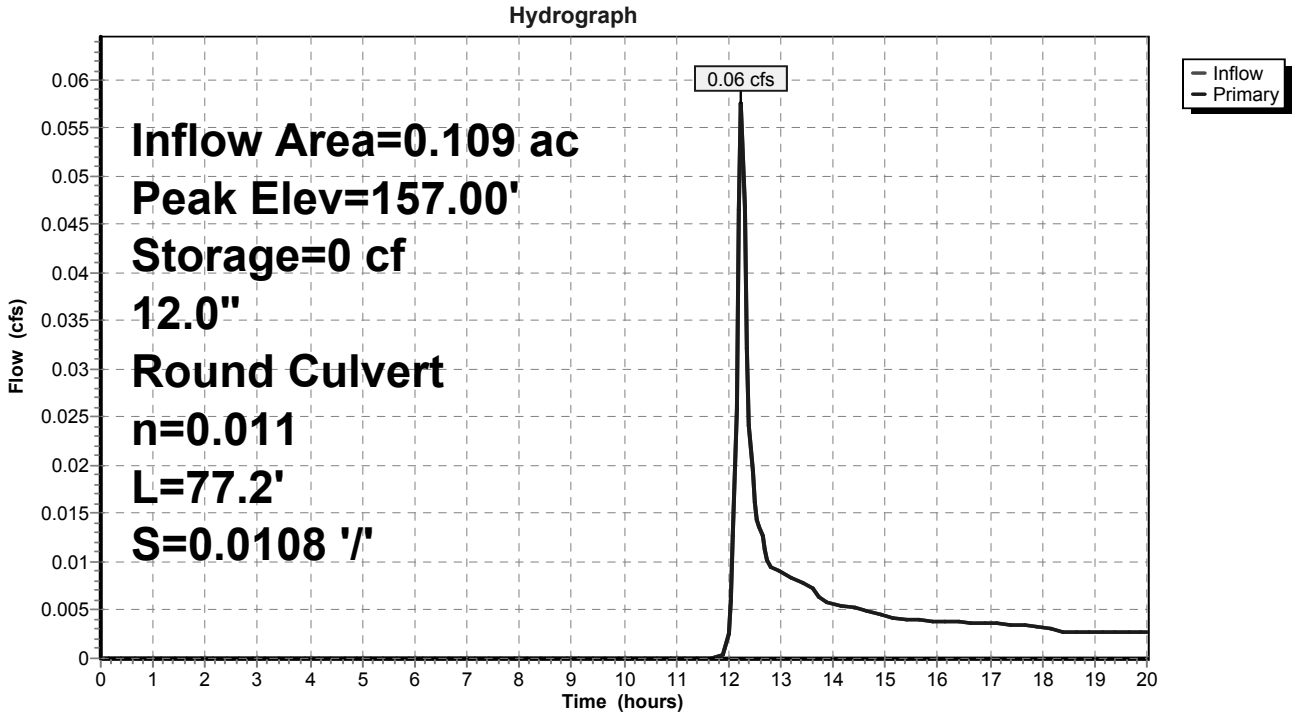
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 2,460 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 9 | 0 | 0 |
| 158.00 | 277 | 143 | 143 |
| 159.00 | 560 | 419 | 562 |
| 160.00 | 892 | 726 | 1,288 |
| 161.00 | 1,452 | 1,172 | 2,460 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Culvert**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.25 hrs HW=157.00' TW=153.52' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 1.85 cfs potential flow)

## Pond P W 3.5: P W 3.5



## Summary for Pond P W 9.1: P W 9.1

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 0.95" for 2_year event
Inflow = 13.74 cfs @ 12.24 hrs, Volume= 0.838 af
Outflow = 15.12 cfs @ 12.30 hrs, Volume= 0.846 af, Atten= 0%, Lag= 3.6 min
Primary = 15.12 cfs @ 12.30 hrs, Volume= 0.864 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 153.62' @ 12.30 hrs Surf.Area= 3,898 sf Storage= 2,683 cf
Flood Elev= 157.00' Surf.Area= 13,136 sf Storage= 31,231 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.8 min ( 823.8 - 823.0 )

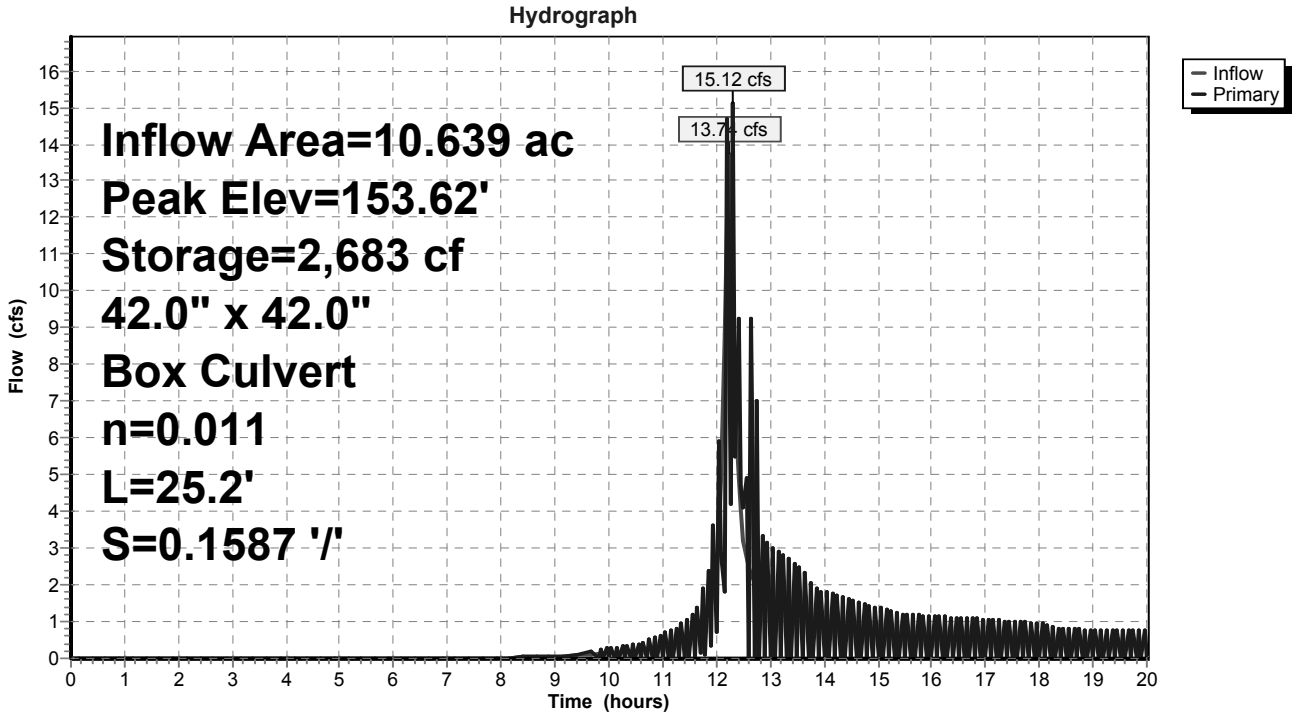
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 152.00' | 48,001 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 152.00 | 13 | 0 | 0 |
| 153.00 | 1,797 | 905 | 905 |
| 154.00 | 5,163 | 3,480 | 4,385 |
| 155.00 | 7,699 | 6,431 | 10,816 |
| 156.00 | 9,997 | 8,848 | 19,665 |
| 157.00 | 13,136 | 11,566 | 31,231 |
| 158.00 | 20,405 | 16,770 | 48,001 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=17.58 cfs @ 12.30 hrs HW=153.62' TW=153.33' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 17.58 cfs @ 2.46 fps)

## Pond P W 9.1: P W 9.1



## Summary for Pond P W 9.1B: P W 9.1B

Inflow Area = 0.559 ac, 16.03% Impervious, Inflow Depth > 0.41" for 2_year event
Inflow = 0.26 cfs @ 12.25 hrs, Volume= 0.019 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 157.61' @ 20.00 hrs Surf.Area= 2,009 sf Storage= 833 cf
Flood Elev= 158.00' Surf.Area= 2,833 sf Storage= 1,783 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

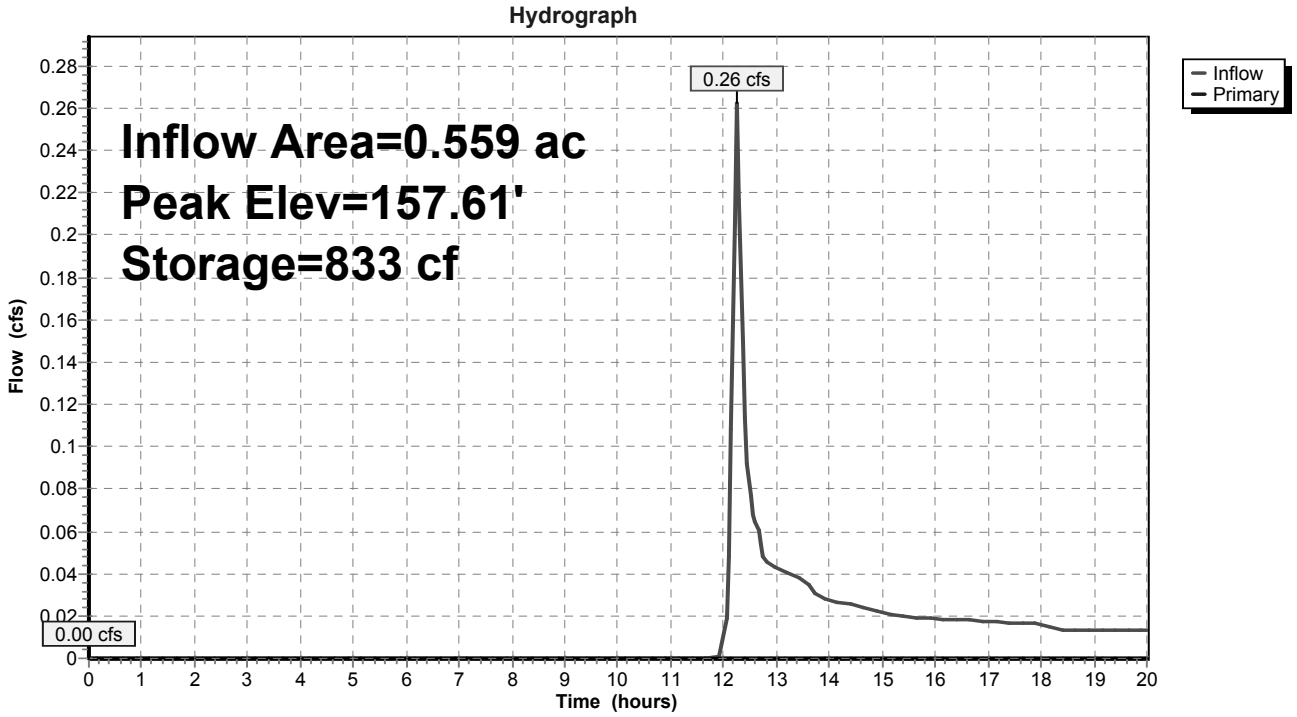
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=157.00' TW=152.00' (Dynamic Tailwater)
↑**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 9.1B: P W 9.1B



## Summary for Pond P W 9.1C: P W 9.1C

Inflow Area = 4.751 ac, 57.07% Impervious, Inflow Depth > 1.40" for 2_year event
Inflow = 9.07 cfs @ 12.23 hrs, Volume= 0.556 af
Outflow = 9.32 cfs @ 12.24 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.5 min
Primary = 9.32 cfs @ 12.24 hrs, Volume= 0.555 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 139 sf Storage= 0 cf
Peak Elev= 166.14' @ 12.24 hrs Surf.Area= 569 sf Storage= 394 cf
Flood Elev= 167.00' Surf.Area= 989 sf Storage= 1,067 cf

Plug-Flow detention time= 1.8 min calculated for 0.554 af (100% of inflow)
Center-of-Mass det. time= 1.2 min ( 809.1 - 808.0 )

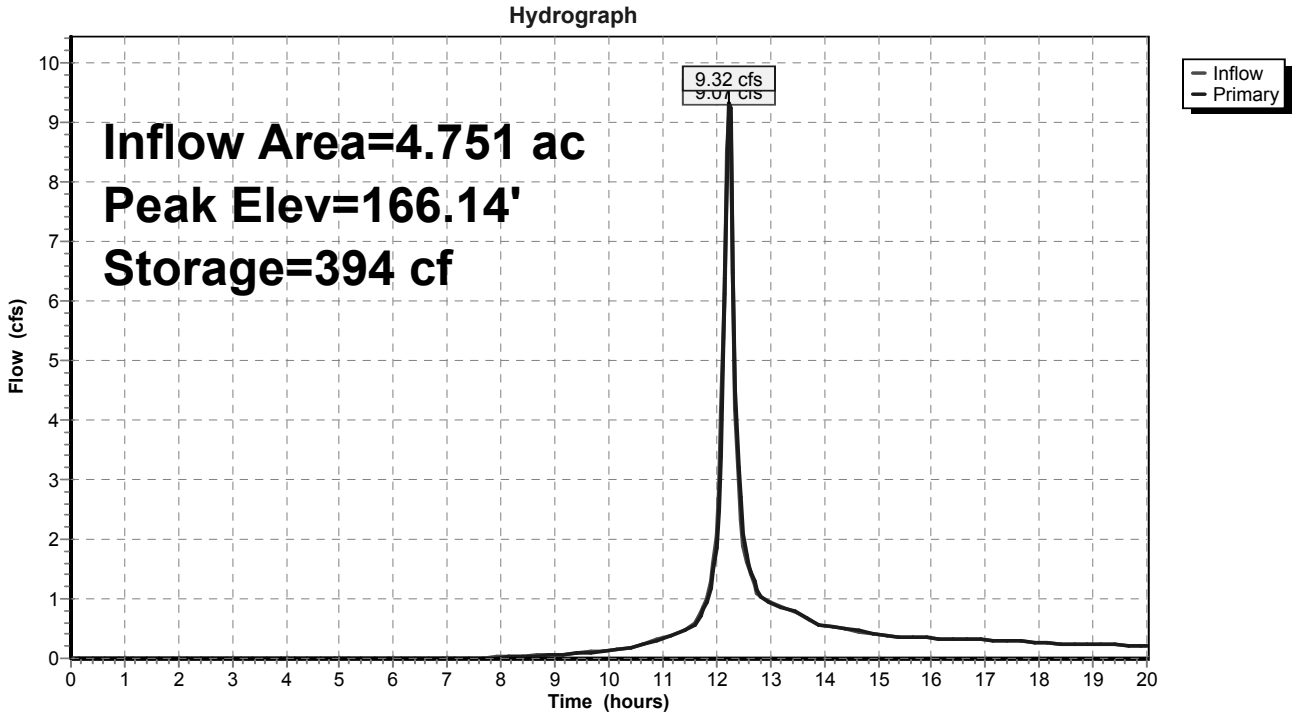
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 3,394 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 139 | 0 | 0 |
| 166.00 | 503 | 321 | 321 |
| 167.00 | 989 | 746 | 1,067 |
| 168.00 | 3,665 | 2,327 | 3,394 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.00' | **12.0" Round Culvert**<br>L= 49.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.00' / 164.00' S= 0.0202 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 166.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 15.00 46.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=8.99 cfs @ 12.24 hrs HW=166.13' TW=153.48' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 3.75 cfs @ 4.78 fps)
**2=Asymmetrical Weir** (Weir Controls 5.24 cfs @ 1.05 fps)

## Pond P W 9.1C: P W 9.1C



## Summary for Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 0.97" for 2_year event
Inflow = 15.85 cfs @ 12.30 hrs, Volume= 0.861 af
Outflow = 14.97 cfs @ 12.20 hrs, Volume= 0.852 af, Atten= 6%, Lag= 0.0 min
Primary = 14.97 cfs @ 12.20 hrs, Volume= 0.852 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 150.00' Surf.Area= 101 sf Storage= 0 cf
Peak Elev= 153.43' @ 12.20 hrs Surf.Area= 183 sf Storage= 488 cf
Flood Elev= 154.00' Surf.Area= 197 sf Storage= 595 cf

Plug-Flow detention time= 7.2 min calculated for 0.852 af (99% of inflow)
Center-of-Mass det. time= 3.2 min ( 825.5 - 822.3 )

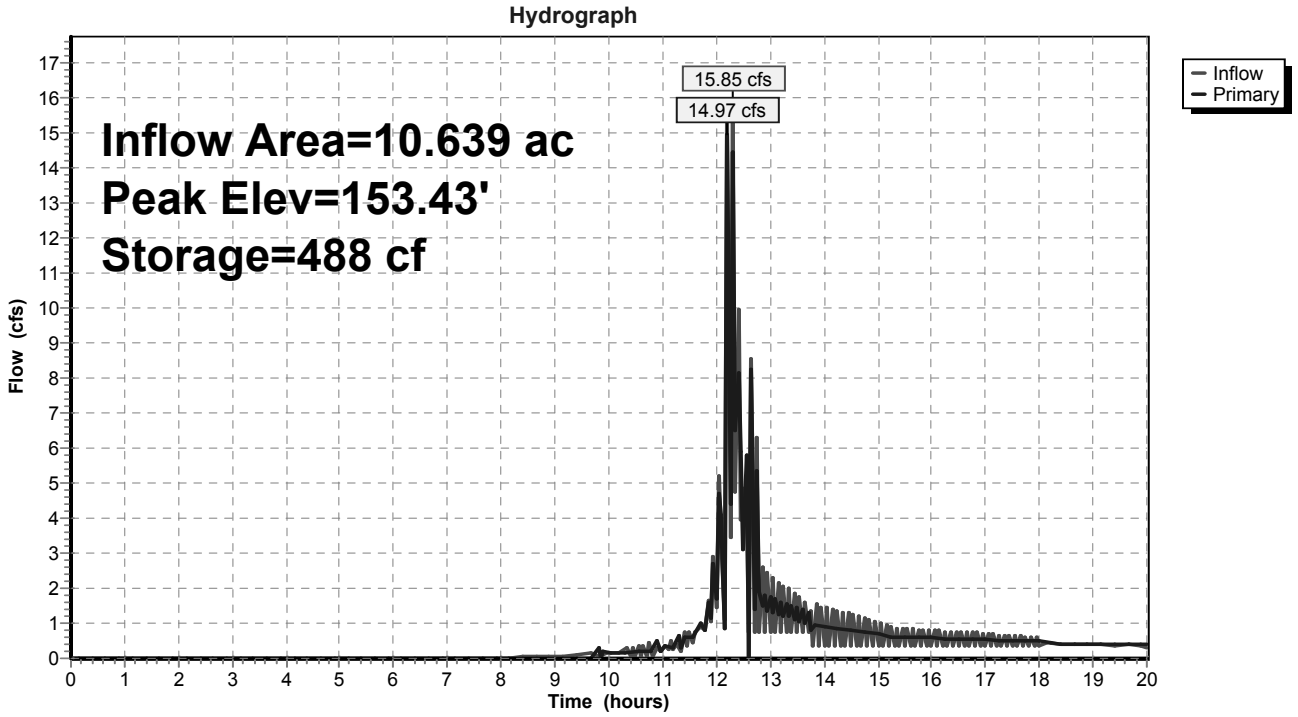
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 150.00' | 595 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 150.00 | 101 | 0 | 0 |
| 154.00 | 197 | 595 | 595 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 153.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 18.00 21.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=14.97 cfs @ 12.20 hrs HW=153.43' TW=0.00' (Dynamic Tailwater)
↑**1=Asymmetrical Weir** (Weir Controls 14.97 cfs @ 1.96 fps)

## Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

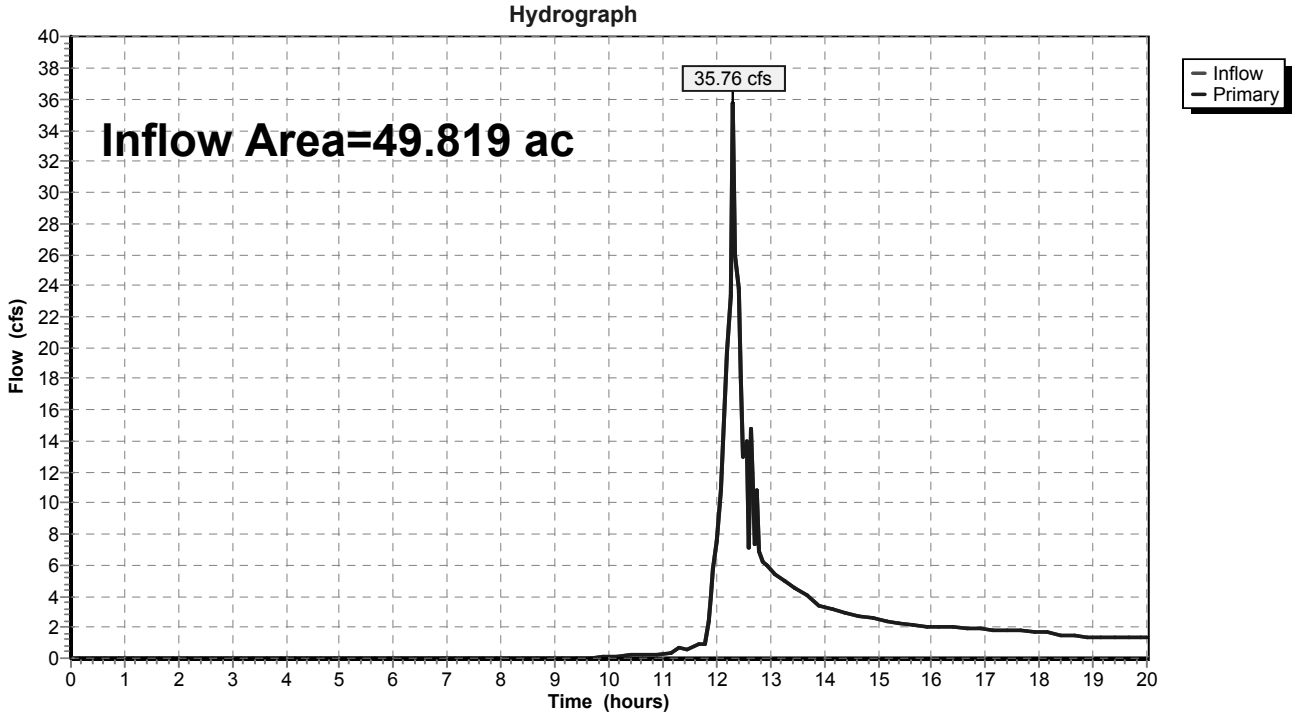


## Summary for Link DP North: DP North

Inflow Area = 49.819 ac, 26.12% Impervious, Inflow Depth > 0.63" for 2_year event
Inflow = 35.76 cfs @ 12.30 hrs, Volume= 2.631 af
Primary = 35.76 cfs @ 12.30 hrs, Volume= 2.631 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

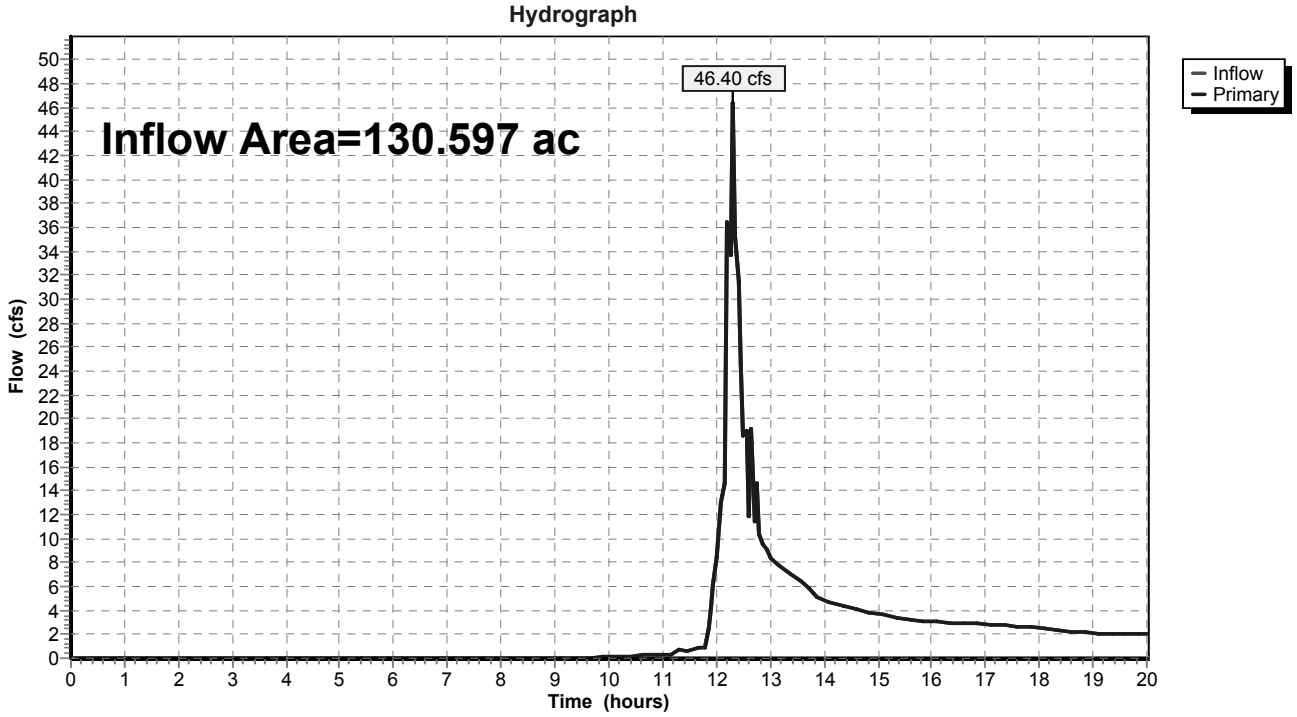


## Summary for Link DP Sudbury: (new Link)

Inflow Area = 130.597 ac, 21.29% Impervious, Inflow Depth > 0.34" for 2_year event
Inflow = 46.40 cfs @ 12.30 hrs, Volume= 3.720 af
Primary = 46.40 cfs @ 12.30 hrs, Volume= 3.720 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: (new Link)

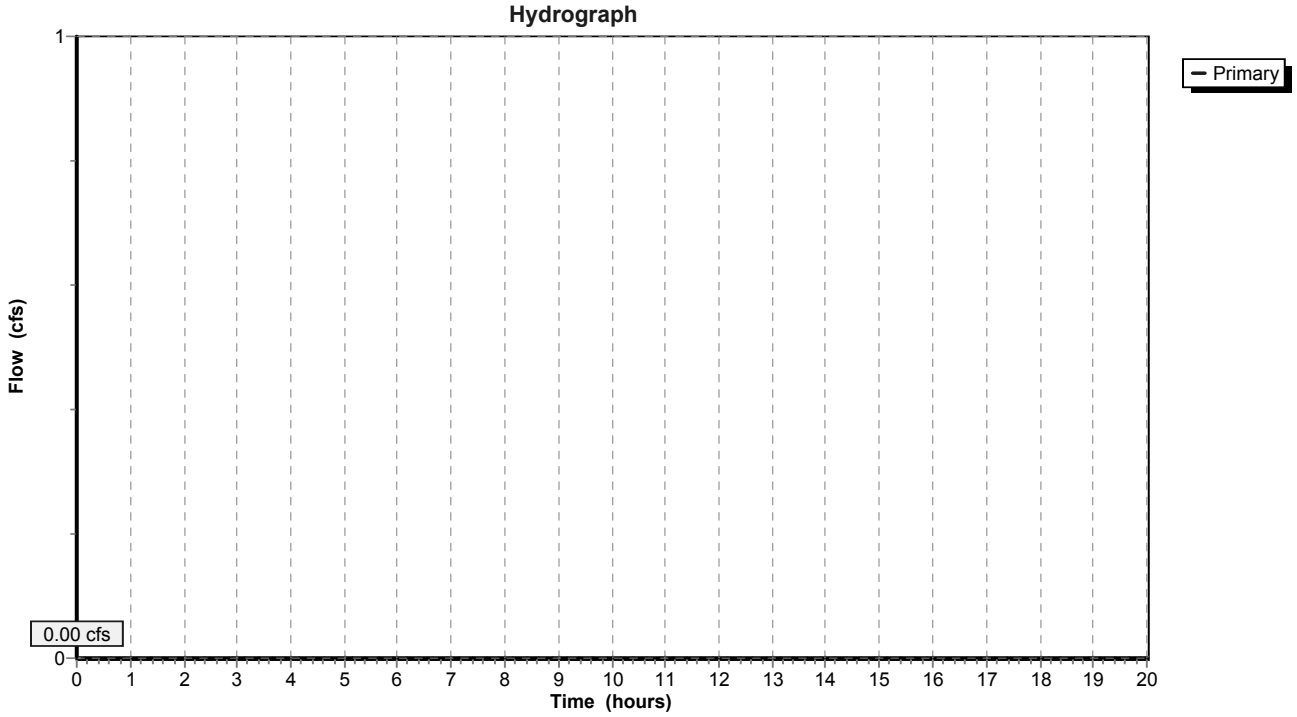


## Summary for Link DP Wellhead: DP Wellhead

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

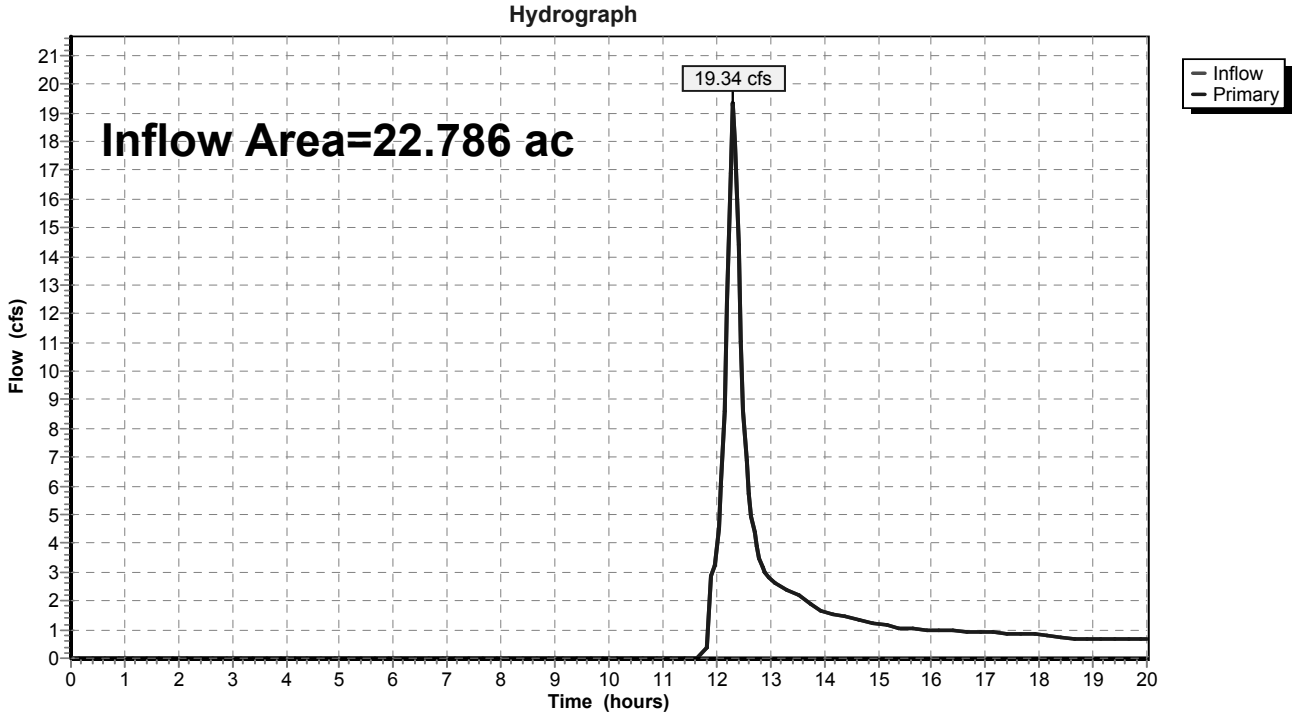


## Summary for Link DP West: DP West

Inflow Area = 22.786 ac, 28.55% Impervious, Inflow Depth > 0.71" for 2_year event
Inflow = 19.34 cfs @ 12.31 hrs, Volume= 1.351 af
Primary = 19.34 cfs @ 12.31 hrs, Volume= 1.351 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

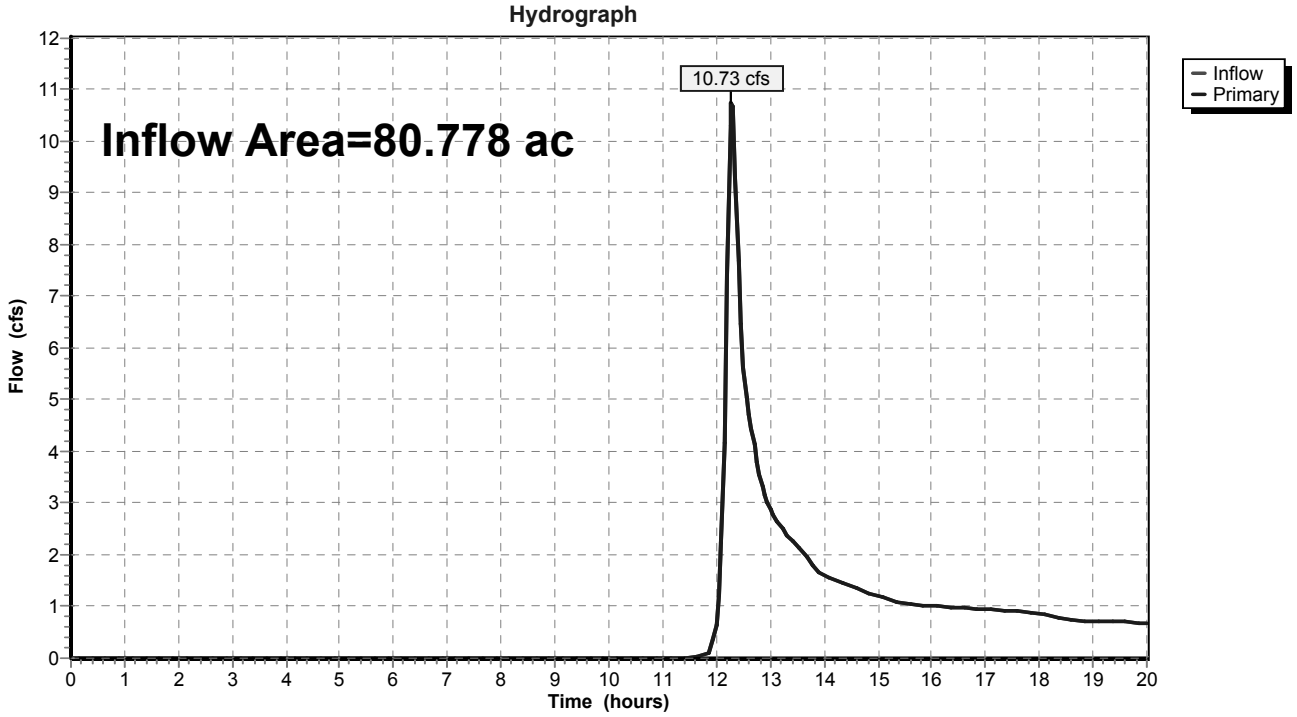


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 80.778 ac, 18.32% Impervious, Inflow Depth > 0.16" for 2_year event
Inflow = 10.73 cfs @ 12.29 hrs, Volume= 1.089 af
Primary = 10.73 cfs @ 12.29 hrs, Volume= 1.089 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

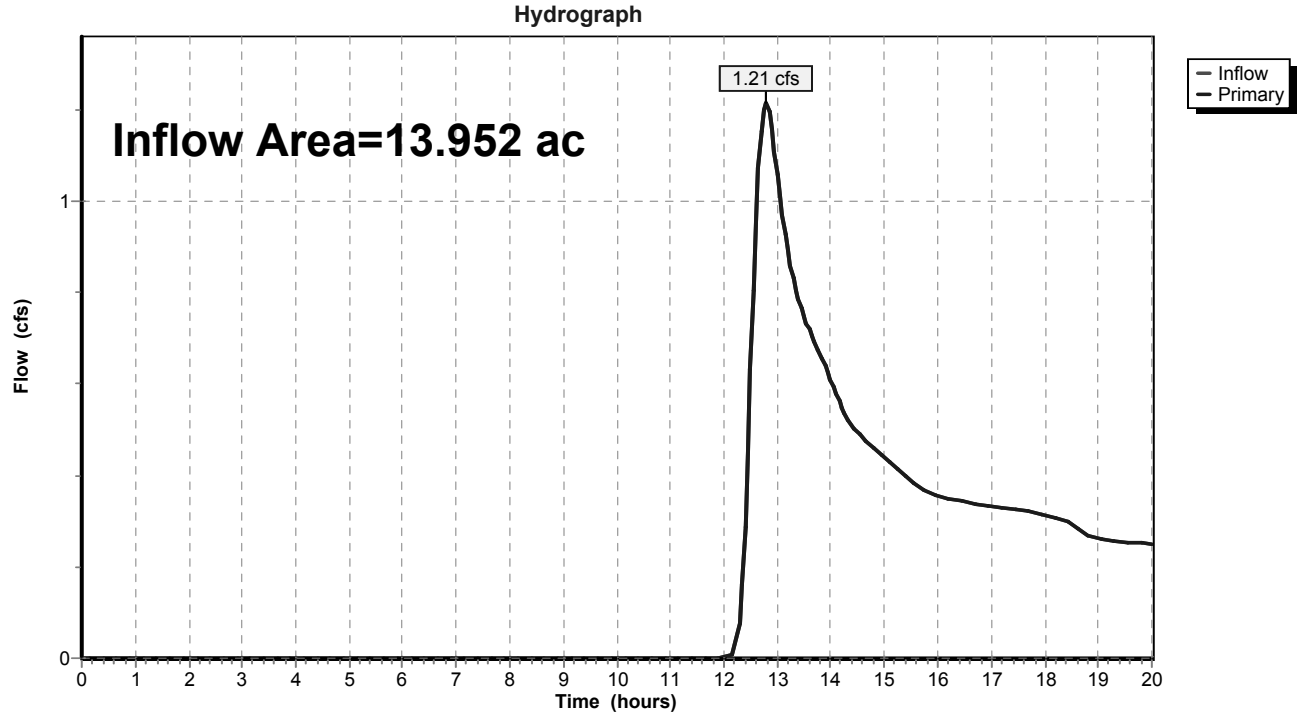


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.952 ac, 9.67% Impervious, Inflow Depth > 0.25" for 2_year event
Inflow = 1.21 cfs @ 12.80 hrs, Volume= 0.289 af
Primary = 1.21 cfs @ 12.80 hrs, Volume= 0.289 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

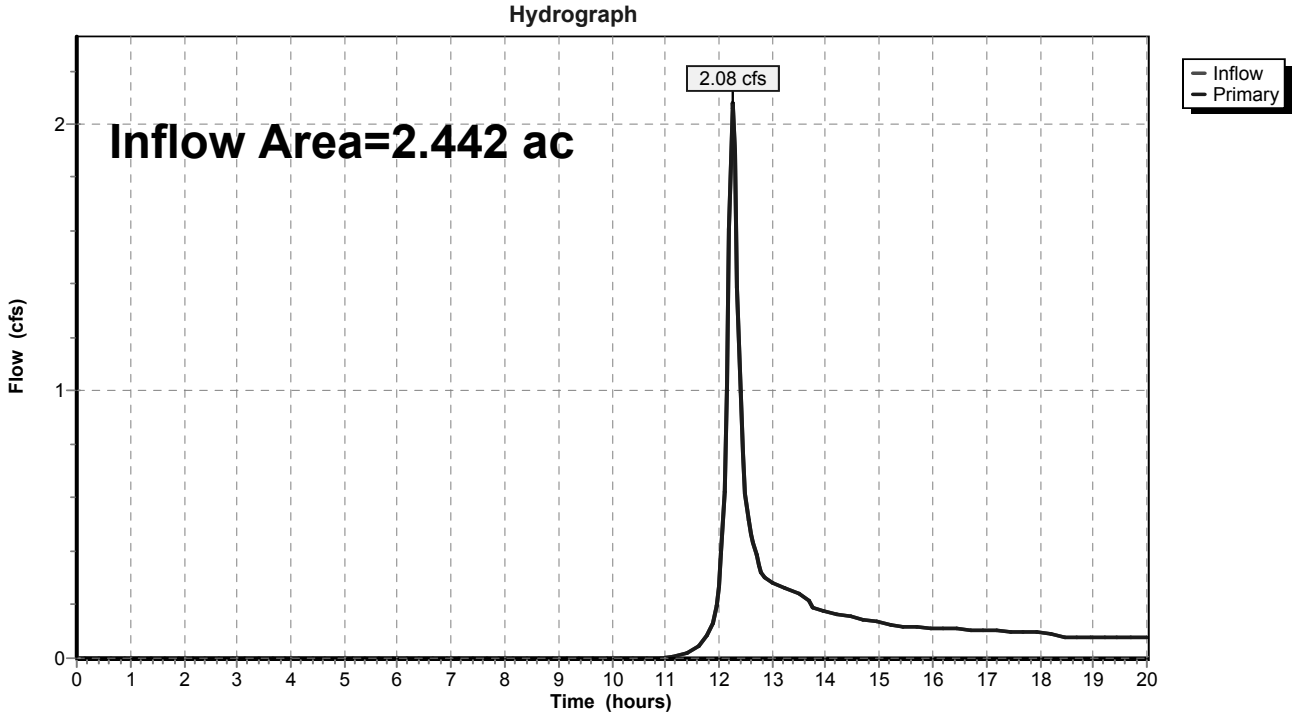


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 0.68" for 2_year event
Inflow = 2.08 cfs @ 12.26 hrs, Volume= 0.139 af
Primary = 2.08 cfs @ 12.26 hrs, Volume= 0.139 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 10.0: L W 10.0

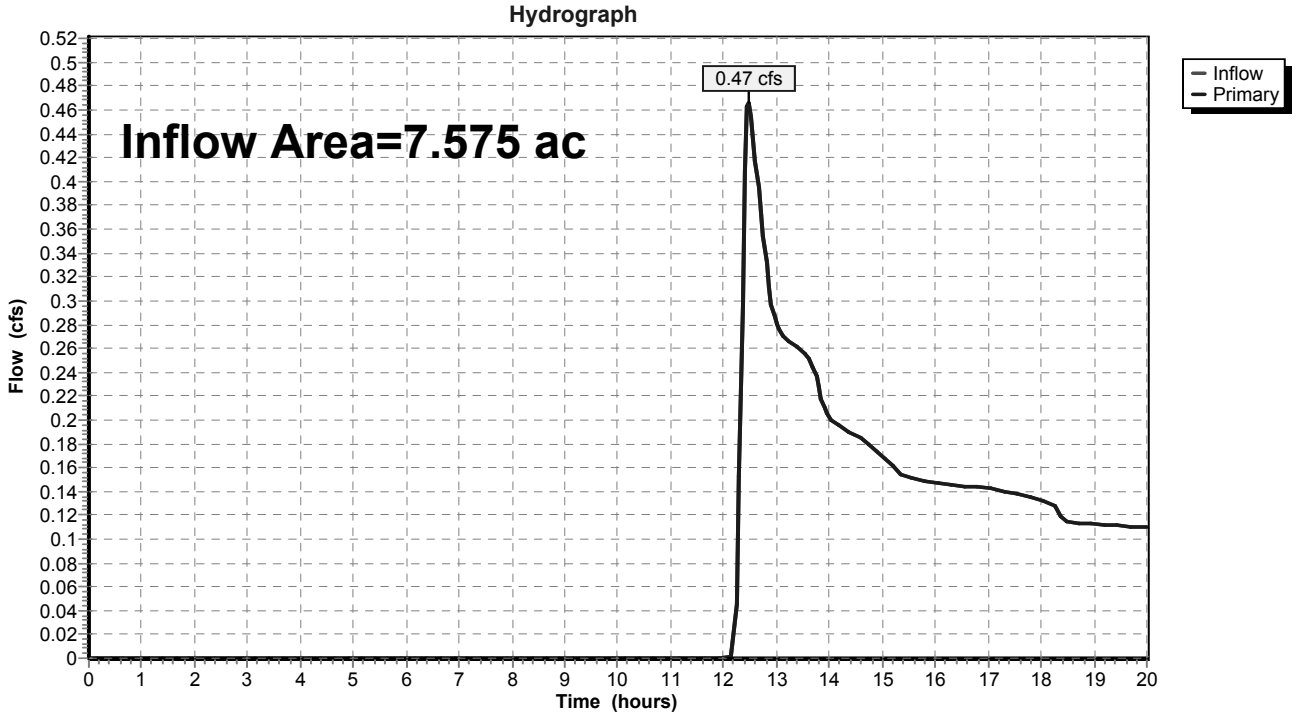


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 7.575 ac, 11.49% Impervious, Inflow Depth > 0.18" for 2_year event
Inflow = 0.47 cfs @ 12.48 hrs, Volume= 0.113 af
Primary = 0.47 cfs @ 12.48 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 2.0: L W 2.0

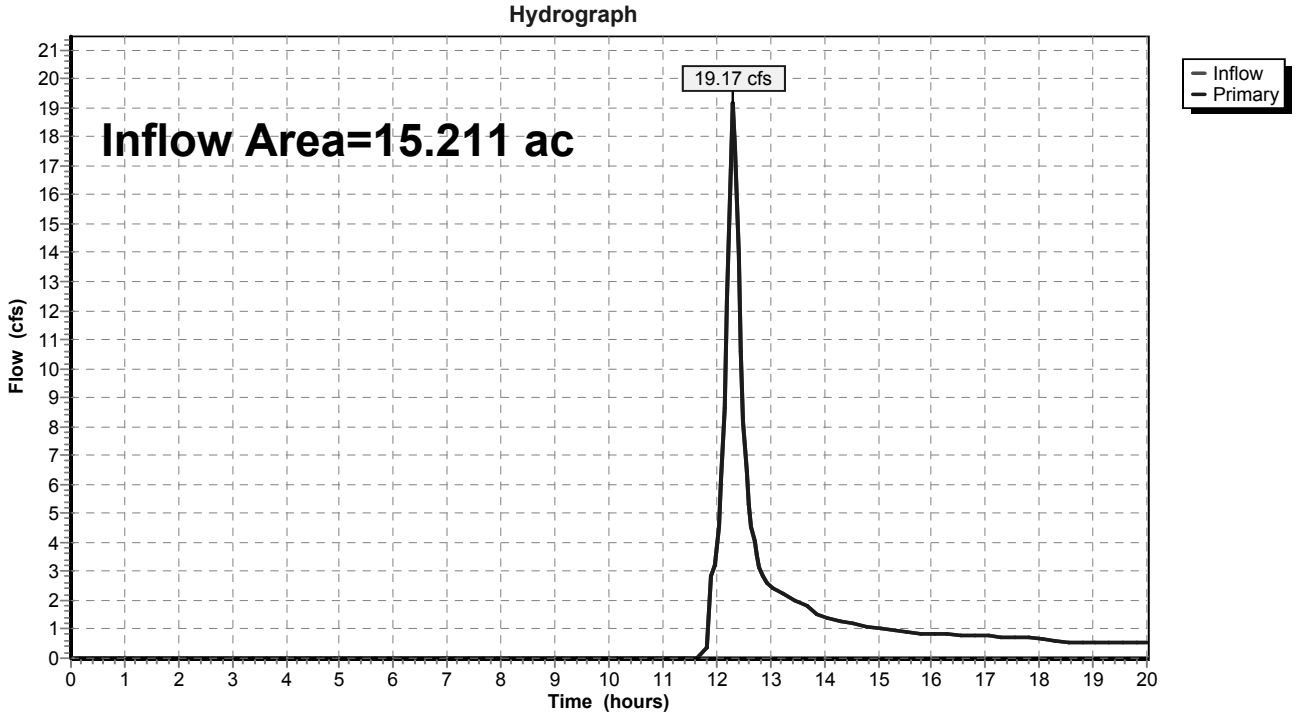


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 0.98" for 2_year event
Inflow = 19.17 cfs @ 12.31 hrs, Volume= 1.238 af
Primary = 19.17 cfs @ 12.31 hrs, Volume= 1.238 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 3.0: L W 3.0

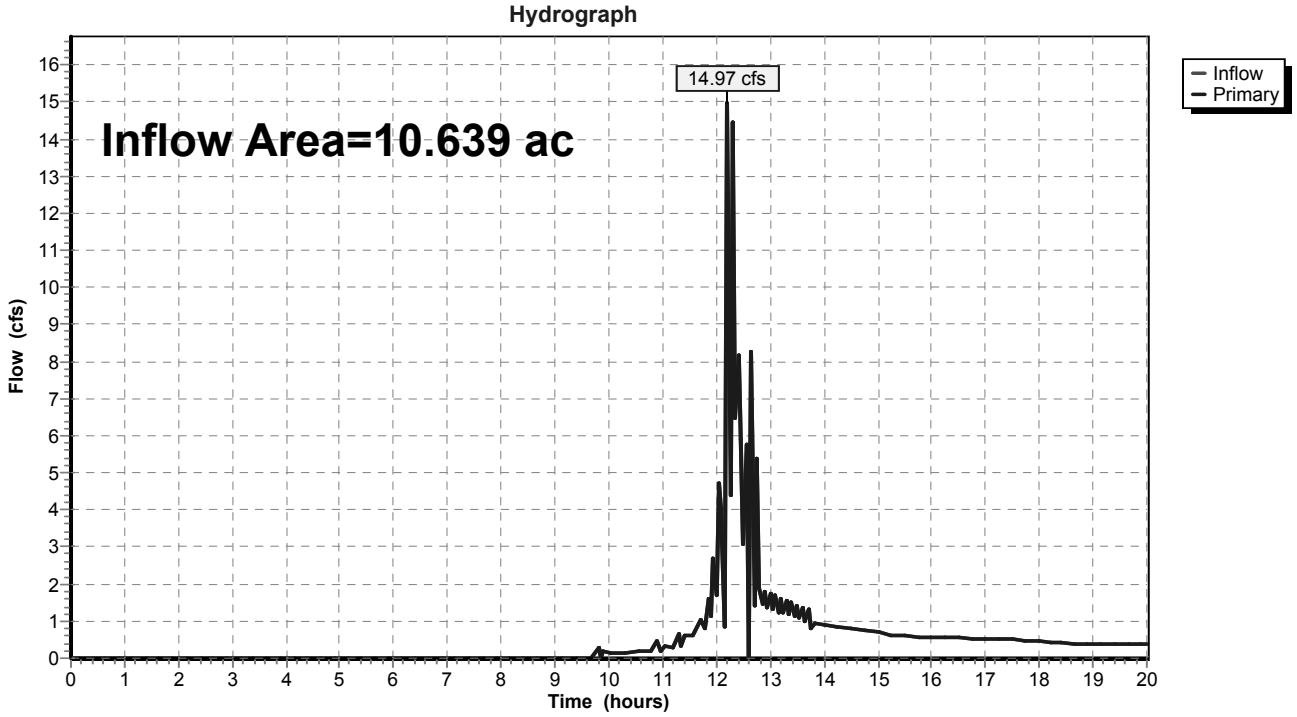


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 0.96" for 2_year event
Inflow = 14.97 cfs @ 12.20 hrs, Volume= 0.852 af
Primary = 14.97 cfs @ 12.20 hrs, Volume= 0.852 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

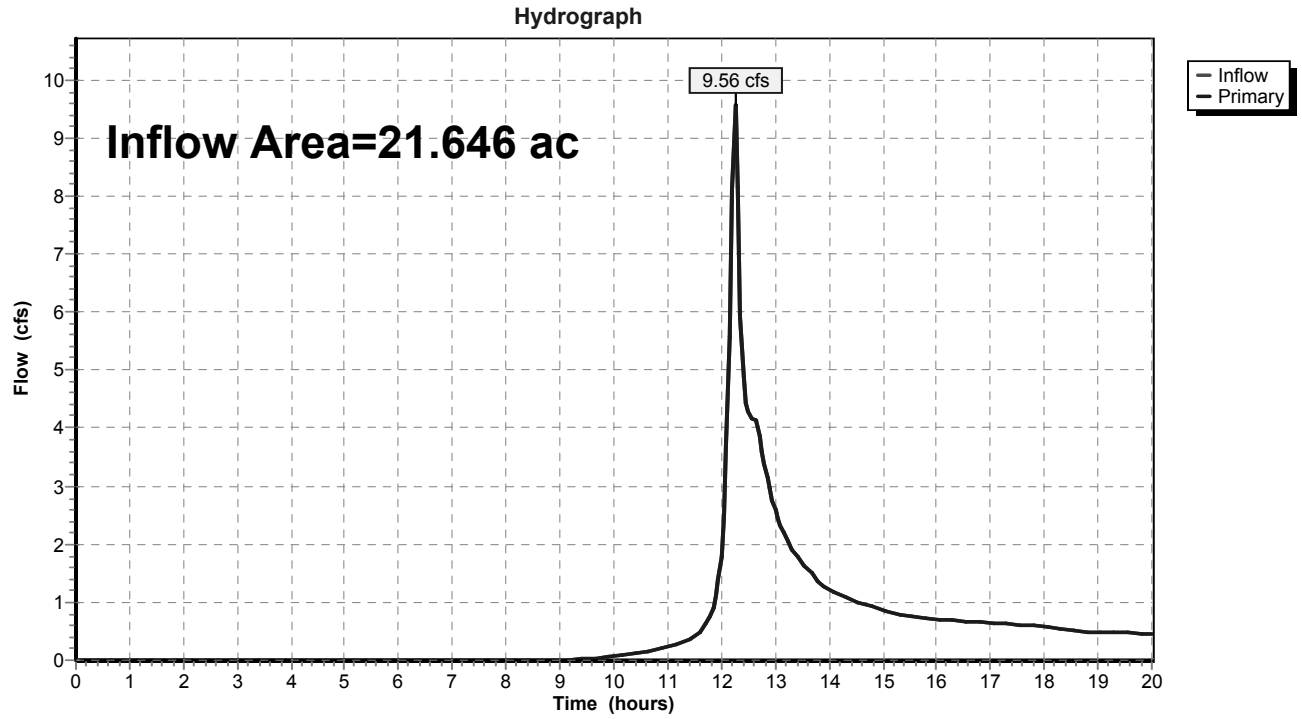


## Summary for Link Well E 1.1B: Well E 1.1B

Inflow Area = 21.646 ac, 30.46% Impervious, Inflow Depth > 0.51" for 2_year event
Inflow = 9.56 cfs @ 12.25 hrs, Volume= 0.920 af
Primary = 9.56 cfs @ 12.25 hrs, Volume= 0.920 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.1B: Well E 1.1B

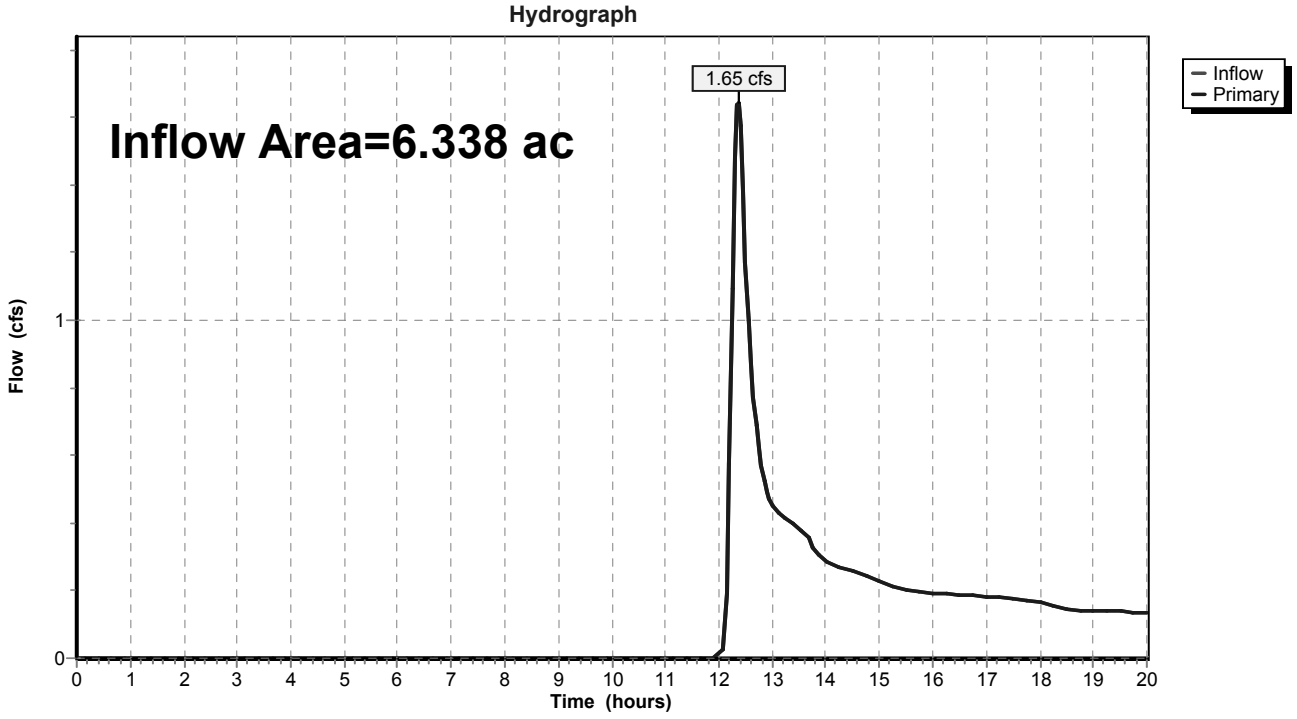


## Summary for Link Well E 1.2A: Well E 1.2A

Inflow Area = 6.338 ac, 22.15% Impervious, Inflow Depth > 0.35" for 2_year event
Inflow = 1.65 cfs @ 12.36 hrs, Volume= 0.187 af
Primary = 1.65 cfs @ 12.36 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2A: Well E 1.2A

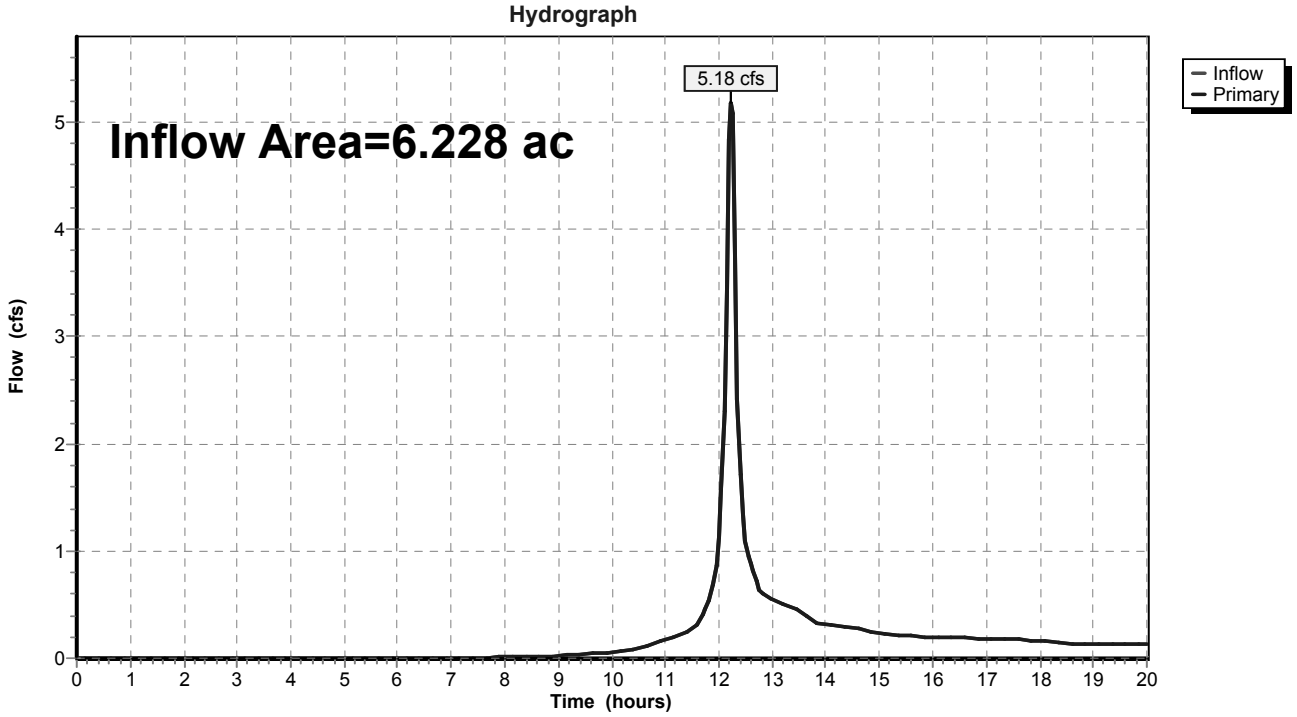


## Summary for Link Well E 1.2B: Well E 1.2B

Inflow Area = 6.228 ac, 50.45% Impervious, Inflow Depth > 0.61" for 2_year event
Inflow = 5.18 cfs @ 12.23 hrs, Volume= 0.317 af
Primary = 5.18 cfs @ 12.23 hrs, Volume= 0.317 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2B: Well E 1.2B

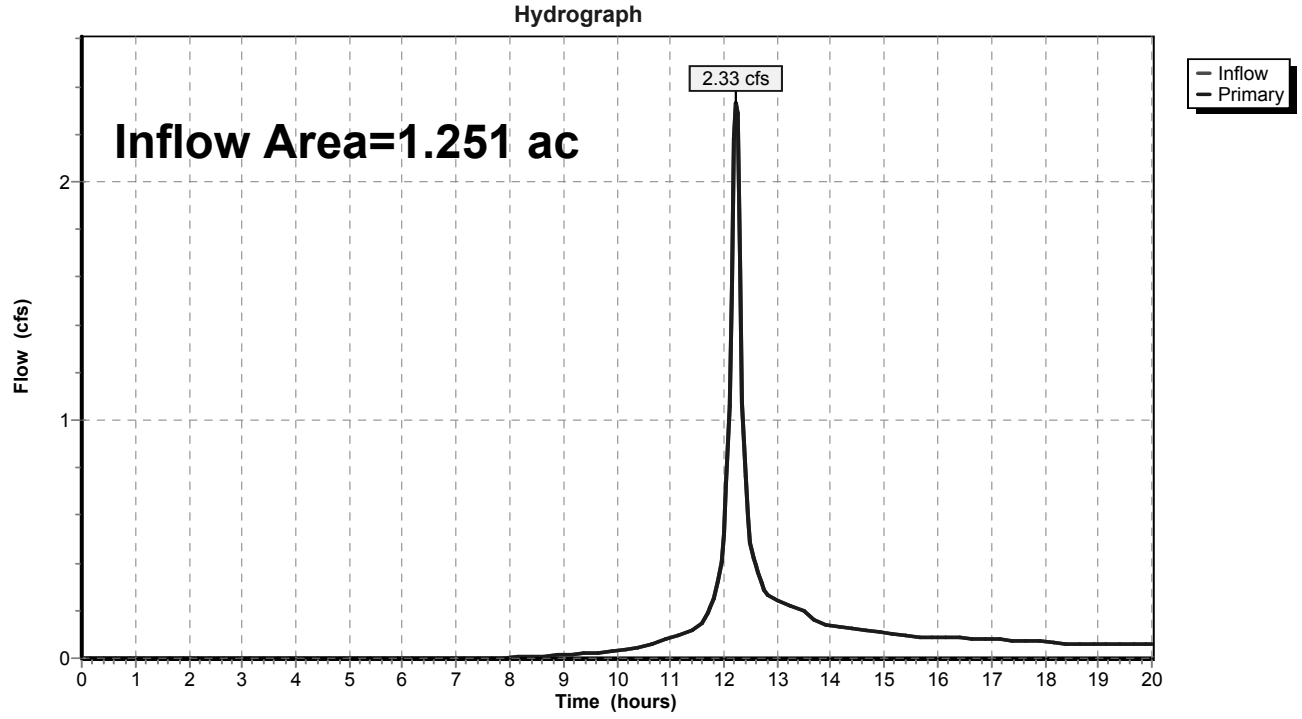


## Summary for Link Well E 1.2C: Well E 1.2C

Inflow Area = 1.251 ac, 18.55% Impervious, Inflow Depth > 1.37" for 2_year event
Inflow = 2.33 cfs @ 12.23 hrs, Volume= 0.143 af
Primary = 2.33 cfs @ 12.23 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2C: Well E 1.2C



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>1.28"
Flow Length=583' Tc=11.3 min CN=65 Runoff=17.95 cfs 1.436 af

**SubcatchmentE 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>2.15"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.24 cfs 0.016 af

**SubcatchmentE 1.0B: Onsite East South** Runoff Area=33,969 sf 55.29% Impervious Runoff Depth>1.62"
Flow Length=152' Tc=6.0 min CN=70 Runoff=1.57 cfs 0.105 af

**SubcatchmentE 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>1.28"
Flow Length=277' Tc=6.0 min CN=65 Runoff=10.26 cfs 0.695 af

**SubcatchmentE 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>0.86"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=1.21 cfs 0.087 af

**SubcatchmentE 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>2.57"
Flow Length=346' Tc=6.0 min CN=82 Runoff=8.42 cfs 0.578 af

**SubcatchmentE 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>0.59"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=1.23 cfs 0.208 af

**SubcatchmentE 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>0.76"
Flow Length=252' Tc=7.5 min CN=56 Runoff=1.08 cfs 0.085 af

**SubcatchmentE 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>0.71"
Flow Length=139' Tc=6.0 min CN=55 Runoff=4.13 cfs 0.316 af

**SubcatchmentE 1.1B-3: Pond E 1.1B -** Runoff Area=271,752 sf 34.13% Impervious Runoff Depth>1.59"
Flow Length=1,410' Tc=36.9 min CN=70 Runoff=6.05 cfs 0.827 af

**SubcatchmentE 1.1B-4: Pond E 1.1B -** Runoff Area=90,649 sf 0.00% Impervious Runoff Depth>1.03"
Flow Length=106' Tc=6.0 min CN=61 Runoff=2.58 cfs 0.179 af

**SubcatchmentE 1.1C: Culvert 1** Runoff Area=232,650 sf 24.09% Impervious Runoff Depth>2.31"
Flow Length=663' Tc=6.6 min CN=79 Runoff=14.95 cfs 1.028 af

**SubcatchmentE 1.1D: Pond E 1.1D** Runoff Area=253,534 sf 35.03% Impervious Runoff Depth>2.31"
Flow Length=600' Tc=6.0 min CN=79 Runoff=16.51 cfs 1.120 af

**SubcatchmentE 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>0.75"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=2.44 cfs 0.312 af

**SubcatchmentE 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>0.92"
Flow Length=344' Tc=6.0 min CN=59 Runoff=1.53 cfs 0.109 af

**SubcatchmentE 1.2A-2: Pond E 1.2A -** Runoff Area=214,415 sf 23.56% Impervious Runoff Depth>1.09"
Flow Length=434' Tc=14.7 min CN=62 Runoff=4.92 cfs 0.446 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>2.31"
Flow Length=448' Tc=6.0 min CN=79 Runoff=5.40 cfs 0.367 af

**SubcatchmentE 1.2B-1: Pond E 1.2B -** Runoff Area=41,348 sf 64.96% Impervious Runoff Depth>2.84"
Flow Length=261' Tc=6.0 min CN=85 Runoff=3.21 cfs 0.224 af

**SubcatchmentE 1.2B-2: Pond E 1.2B -** Runoff Area=6,456 sf 44.51% Impervious Runoff Depth>2.07"
Flow Length=116' Tc=6.0 min CN=76 Runoff=0.38 cfs 0.026 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>2.57"
Flow Length=193' Tc=6.0 min CN=82 Runoff=3.29 cfs 0.226 af

**SubcatchmentE 1.2C-1: Pond E 1.2C -** Runoff Area=8,435 sf 65.00% Impervious Runoff Depth>2.84"
Flow Length=126' Tc=6.0 min CN=85 Runoff=0.66 cfs 0.046 af

**SubcatchmentE 1.2D: Pond E 1.2D -** Runoff Area=127,255 sf 46.37% Impervious Runoff Depth>2.06"
Flow Length=473' Tc=16.2 min CN=76 Runoff=5.56 cfs 0.501 af

**SubcatchmentE 1.2E: Pond E 1.2E** Runoff Area=13,294 sf 34.60% Impervious Runoff Depth>1.69"
Flow Length=34' Tc=6.0 min CN=71 Runoff=0.64 cfs 0.043 af

**SubcatchmentE 1.3A: Aqueductonto** Runoff Area=199,579 sf 34.45% Impervious Runoff Depth>1.39"
Flow Length=1,196' Tc=37.8 min CN=67 Runoff=3.77 cfs 0.529 af

**SubcatchmentE 4.0: Offsite to Sudbury R** Runoff Area=607,734 sf 9.67% Impervious Runoff Depth>0.84"
Flow Length=1,859' Tc=38.1 min CN=58 Runoff=6.27 cfs 0.982 af

**SubcatchmentW 10.0: Offsite to Sudbury** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>1.62"
Flow Length=509' Tc=7.8 min CN=70 Runoff=4.67 cfs 0.329 af

**SubcatchmentW 2.0: Onsite to Sudbury R** Runoff Area=329,977 sf 11.49% Impervious Runoff Depth>0.70"
Flow Length=793' Tc=15.6 min CN=55 Runoff=4.13 cfs 0.443 af

**SubcatchmentW 3.1: Pond P W 3.1** Runoff Area=500,344 sf 43.56% Impervious Runoff Depth>2.74"
Flow Length=1,553' Tc=11.6 min CN=84 Runoff=32.23 cfs 2.621 af

**SubcatchmentW 3.4: Gravel Processing** Runoff Area=162,229 sf 16.97% Impervious Runoff Depth>0.38"
Flow Length=460' Tc=14.6 min CN=48 Runoff=0.73 cfs 0.119 af

**SubcatchmentW 3.5: Small Depressionto** Runoff Area=4,759 sf 27.98% Impervious Runoff Depth>1.22"
Flow Length=43' Tc=6.0 min CN=64 Runoff=0.16 cfs 0.011 af

**SubcatchmentW 9.1: Gravel Pit to Big** Runoff Area=227,372 sf 34.47% Impervious Runoff Depth>1.55"
Flow Length=440' Tc=6.1 min CN=69 Runoff=10.02 cfs 0.673 af

**SubcatchmentW 9.1A: Gravel Pit to** Runoff Area=94,325 sf 52.60% Impervious Runoff Depth>2.83"
Flow Length=875' Tc=7.4 min CN=85 Runoff=7.09 cfs 0.512 af

**SubcatchmentW 9.1B: Aqueductto Big** Runoff Area=24,364 sf 16.03% Impervious Runoff Depth>1.16"
Flow Length=235' Tc=6.0 min CN=63 Runoff=0.79 cfs 0.054 af

**SubcatchmentW 9.1C: Culvert 2** Runoff Area=206,937 sf 57.07% Impervious Runoff Depth>2.65"
Flow Length=505' Tc=6.0 min CN=83 Runoff=15.23 cfs 1.051 af

**Pond MH-NCULV-A: MH-NCULV-A** Peak Elev=153.83' Inflow=21.32 cfs 1.861 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=21.26 cfs 1.861 af

**Pond MH-NCULV-B: MH-NCULV-B** Peak Elev=153.72' Inflow=21.26 cfs 1.861 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=21.32 cfs 1.860 af

**Pond P E 1.1A: 284** Peak Elev=133.60' Storage=25,164 cf Inflow=8.42 cfs 0.578 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B: 283** Peak Elev=146.69' Storage=115,048 cf Inflow=21.82 cfs 2.644 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B-4: P E 1.1B-4** Peak Elev=167.80' Storage=88 cf Inflow=2.58 cfs 0.179 af
Outflow=2.54 cfs 0.179 af

**Pond P E 1.1C: P E 1.1C** Peak Elev=170.20' Storage=1,166 cf Inflow=14.95 cfs 1.028 af
Outflow=11.80 cfs 1.027 af

**Pond P E 1.1D: P E 1.1D** Peak Elev=171.74' Storage=71,026 cf Inflow=23.55 cfs 1.632 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.2A: 282** Peak Elev=135.05' Storage=53,067 cf Inflow=18.62 cfs 1.756 af
Outflow=1.60 cfs 0.561 af

**Pond P E 1.2D: P E 1.2D** Peak Elev=158.01' Storage=37,742 cf Inflow=5.56 cfs 0.501 af
Outflow=0.03 cfs 0.001 af

**Pond P E 1.2E: P E 1.2E** Peak Elev=172.05' Storage=1,869 cf Inflow=0.64 cfs 0.043 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond P W 3.1: P W 3.1** Peak Elev=156.22' Storage=8,271 cf Inflow=32.23 cfs 2.621 af
Outflow=32.20 cfs 2.453 af

**Pond P W 3.4: P W 3.4** Peak Elev=182.22' Storage=5,191 cf Inflow=0.73 cfs 0.119 af
Outflow=0.00 cfs 0.000 af

**Pond P W 3.5: P W 3.5** Peak Elev=157.00' Storage=0 cf Inflow=0.16 cfs 0.011 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.16 cfs 0.011 af

**Pond P W 9.1: P W 9.1** Peak Elev=154.11' Storage=4,951 cf Inflow=25.45 cfs 1.747 af
42.0" x 42.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=21.32 cfs 1.768 af

**Pond P W 9.1B: P W 9.1B** Peak Elev=158.00' Storage=1,791 cf Inflow=0.79 cfs 0.054 af
Outflow=0.04 cfs 0.013 af

**Pond P W 9.1C: P W 9.1C** Peak Elev=166.21' Storage=438 cf Inflow=15.23 cfs 1.051 af
Outflow=15.27 cfs 1.050 af

**Pond P-CULV-N-OUTLET:P-CULV-N-OUTLET** Peak Elev=153.57' Storage=513 cf Inflow=21.32 cfs 1.860 af
Outflow=23.09 cfs 1.852 af

**Link DP North: DP North** Inflow=60.54 cfs 6.059 af
Primary=60.54 cfs 6.059 af

**Link DP Sudbury: (new Link)** Inflow=92.83 cfs 9.489 af
Primary=92.83 cfs 9.489 af

**Link DP Wellhead: DP Wellhead**
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=35.74 cfs 2.896 af
Primary=35.74 cfs 2.896 af

**Link L E 1.0: L E 1.0** Inflow=30.81 cfs 3.430 af
Primary=30.81 cfs 3.430 af

**Link L E 4.0: L E 4.0** Inflow=6.27 cfs 0.982 af
Primary=6.27 cfs 0.982 af

**Link L W 10.0: L W 10.0** Inflow=4.67 cfs 0.329 af
Primary=4.67 cfs 0.329 af

**Link L W 2.0: L W 2.0** Inflow=4.13 cfs 0.443 af
Primary=4.13 cfs 0.443 af

**Link L W 3.0: L W 3.0** Inflow=32.20 cfs 2.453 af
Primary=32.20 cfs 2.453 af

**Link L W 9.0: L W 9.0** Inflow=23.09 cfs 1.852 af
Primary=23.09 cfs 1.852 af

**Link Well E 1.1B: Well E 1.1B** Inflow=16.64 cfs 2.034 af
Primary=16.64 cfs 2.034 af

**Link Well E 1.2A: Well E 1.2A** Inflow=5.86 cfs 0.555 af
Primary=5.86 cfs 0.555 af

**Link Well E 1.2B: Well E 1.2B** Inflow=9.00 cfs 0.617 af
Primary=9.00 cfs 0.617 af

**Link Well E 1.2C: Well E 1.2C** Inflow=3.95 cfs 0.272 af
Primary=3.95 cfs 0.272 af

**Total Runoff Area = 130.597 ac Runoff Volume = 16.304 af Average Runoff Depth = 1.50"**
**78.71% Pervious = 102.789 ac 21.29% Impervious = 27.808 ac**

## Summary for Subcatchment E 1.0: (blank)

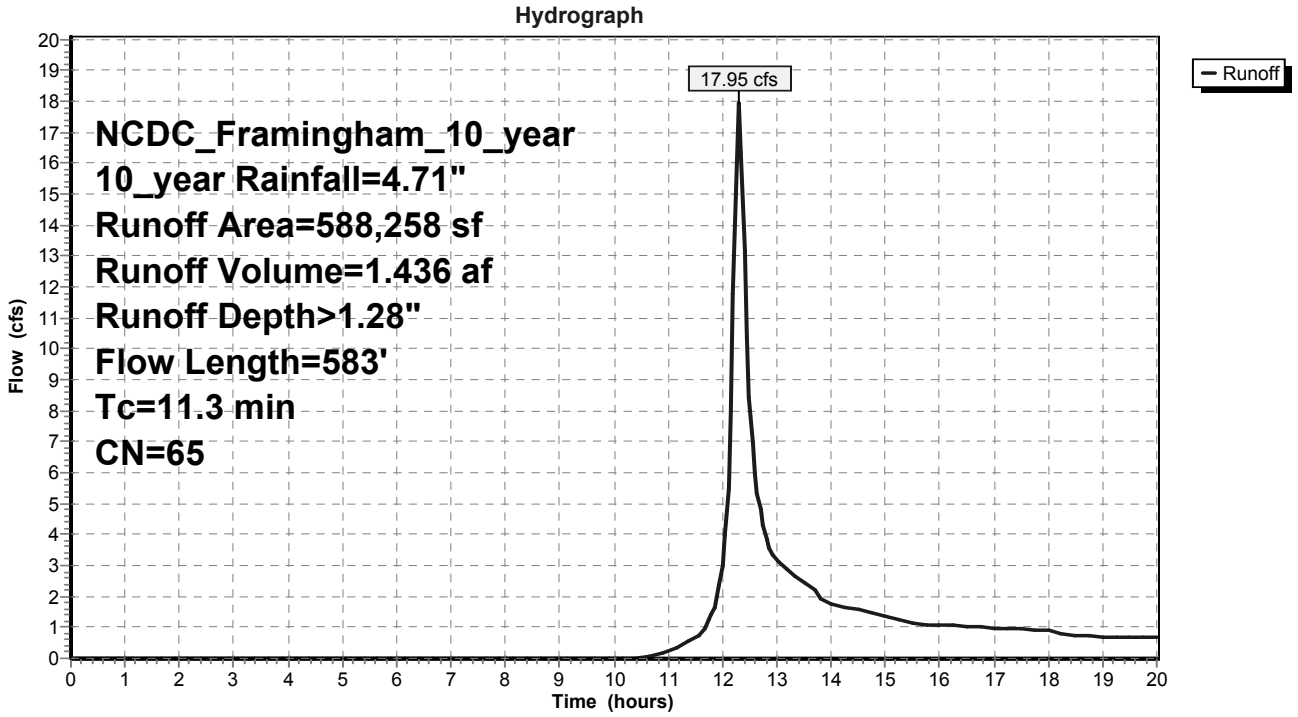
Runoff = 17.95 cfs @ 12.30 hrs, Volume= 1.436 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

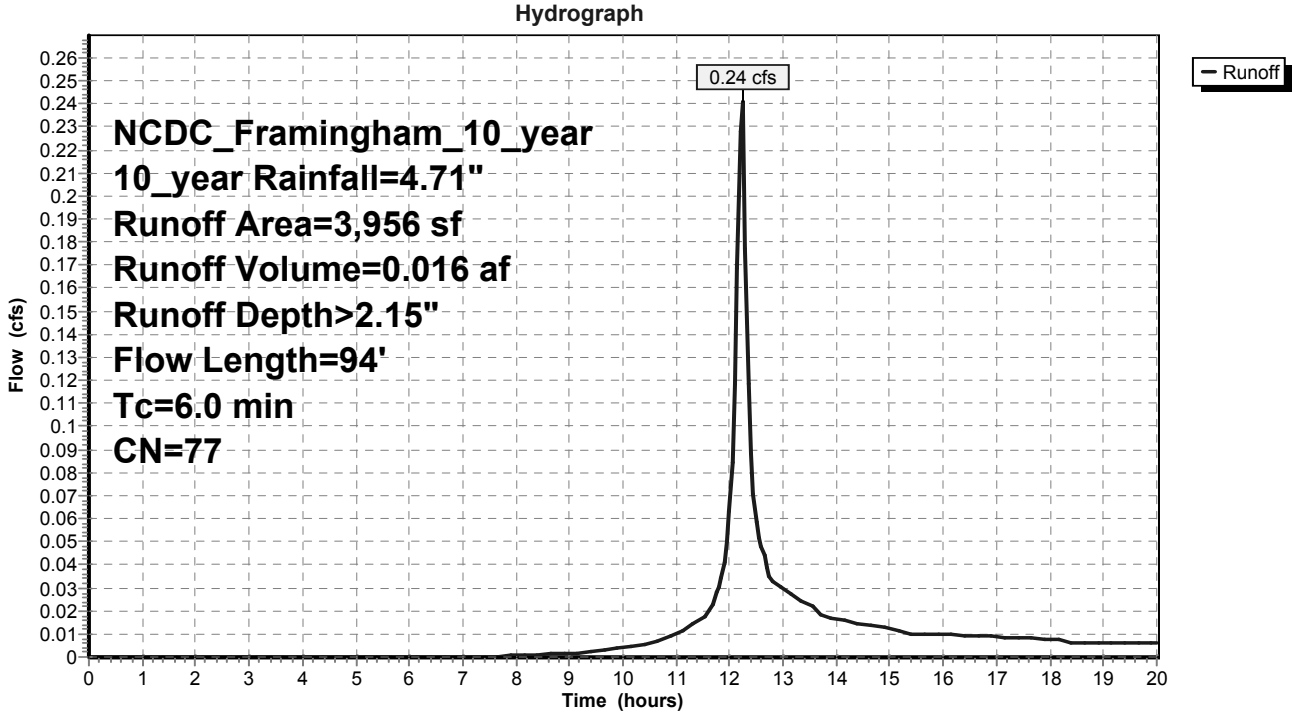
Runoff = 0.24 cfs @ 12.23 hrs, Volume= 0.016 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: Onsite East South of Aqueduct

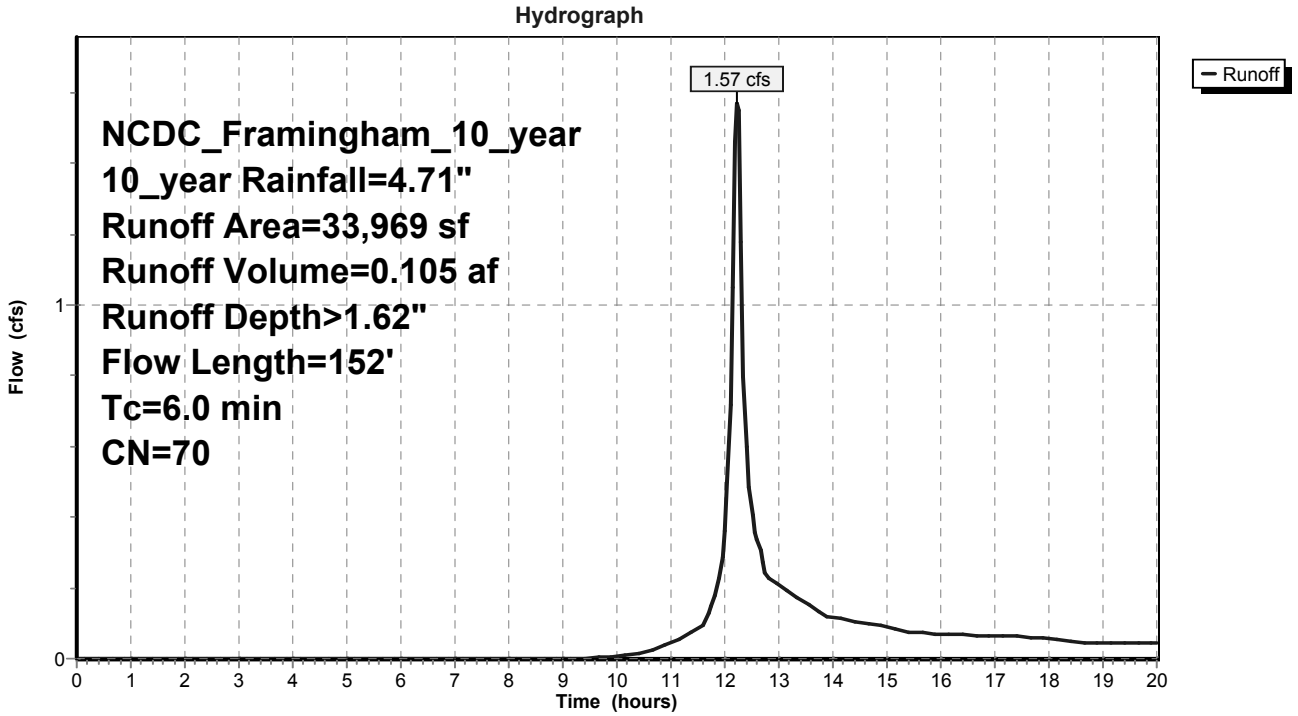
Runoff = 1.57 cfs @ 12.23 hrs, Volume= 0.105 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 28,892 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,969 | 70 | Weighted Average |
| | 15,189 | | 44.71% Pervious Area |
| | 18,780 | | 55.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 152 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: Onsite East South of Aqueduct



## Summary for Subcatchment E 1.0C: (blank)

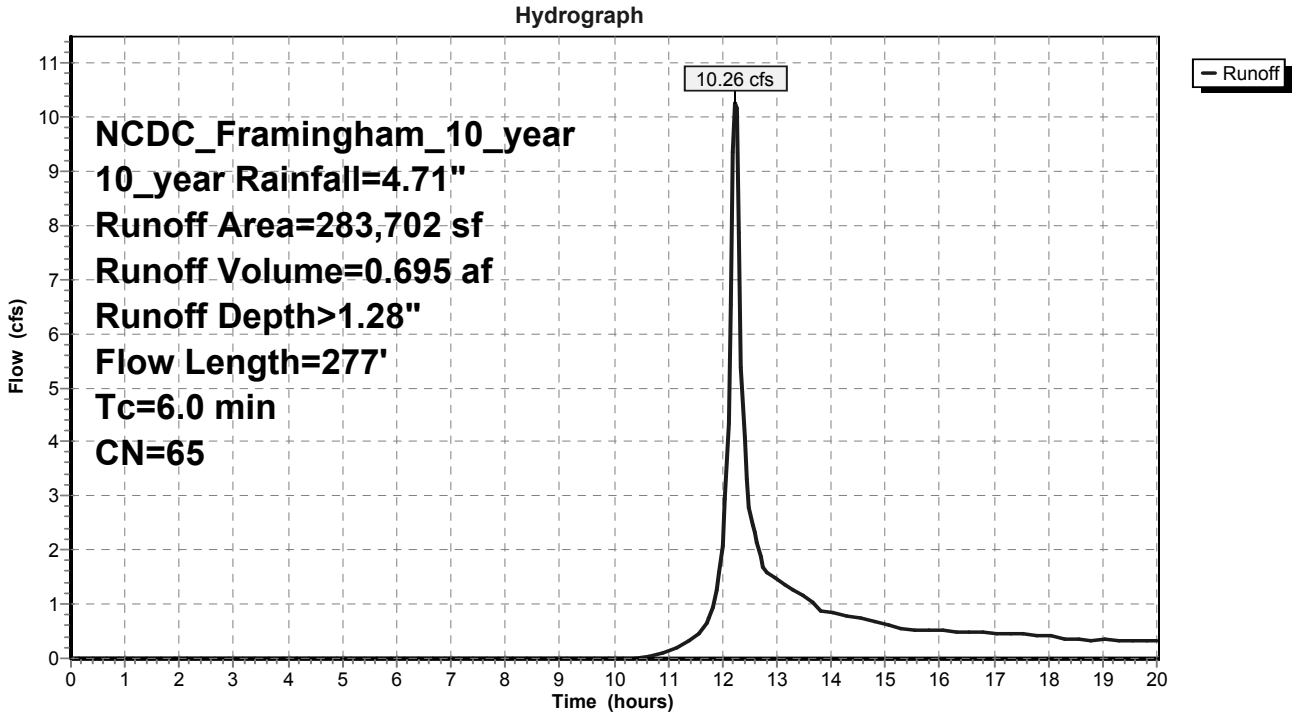
Runoff = 10.26 cfs @ 12.24 hrs, Volume= 0.695 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

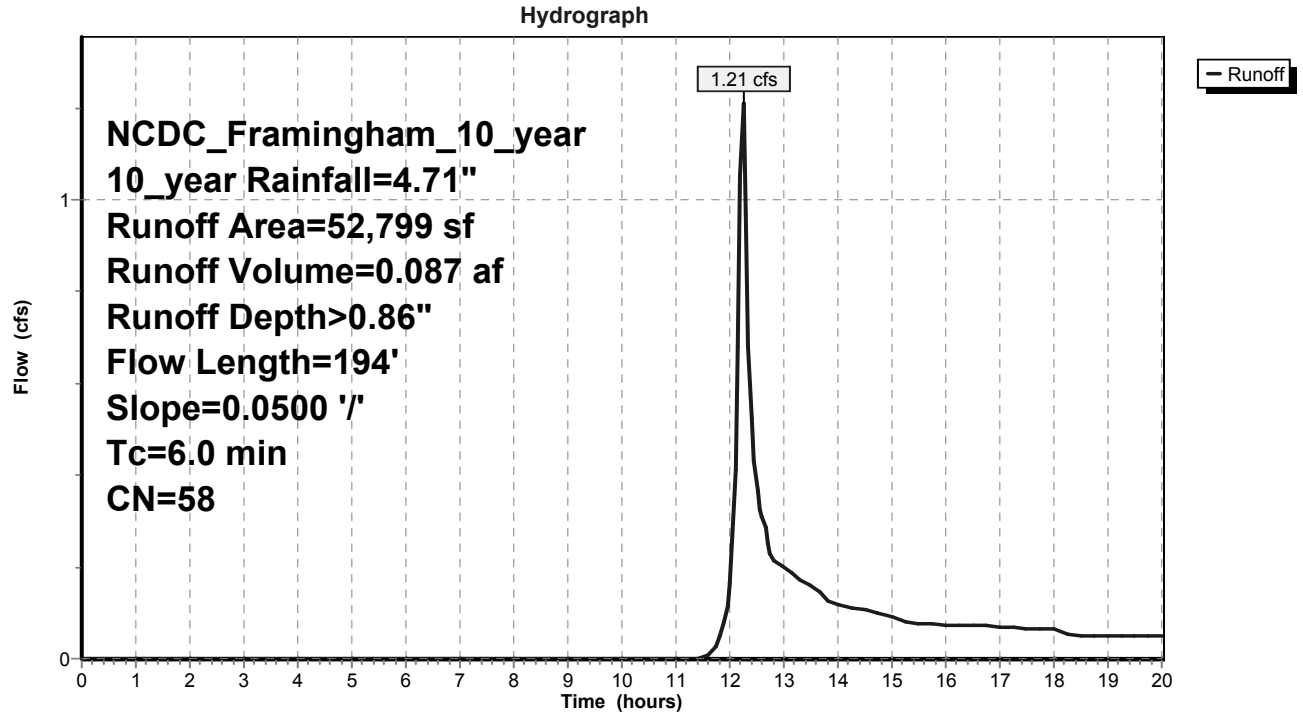
Runoff = 1.21 cfs @ 12.24 hrs, Volume= 0.087 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

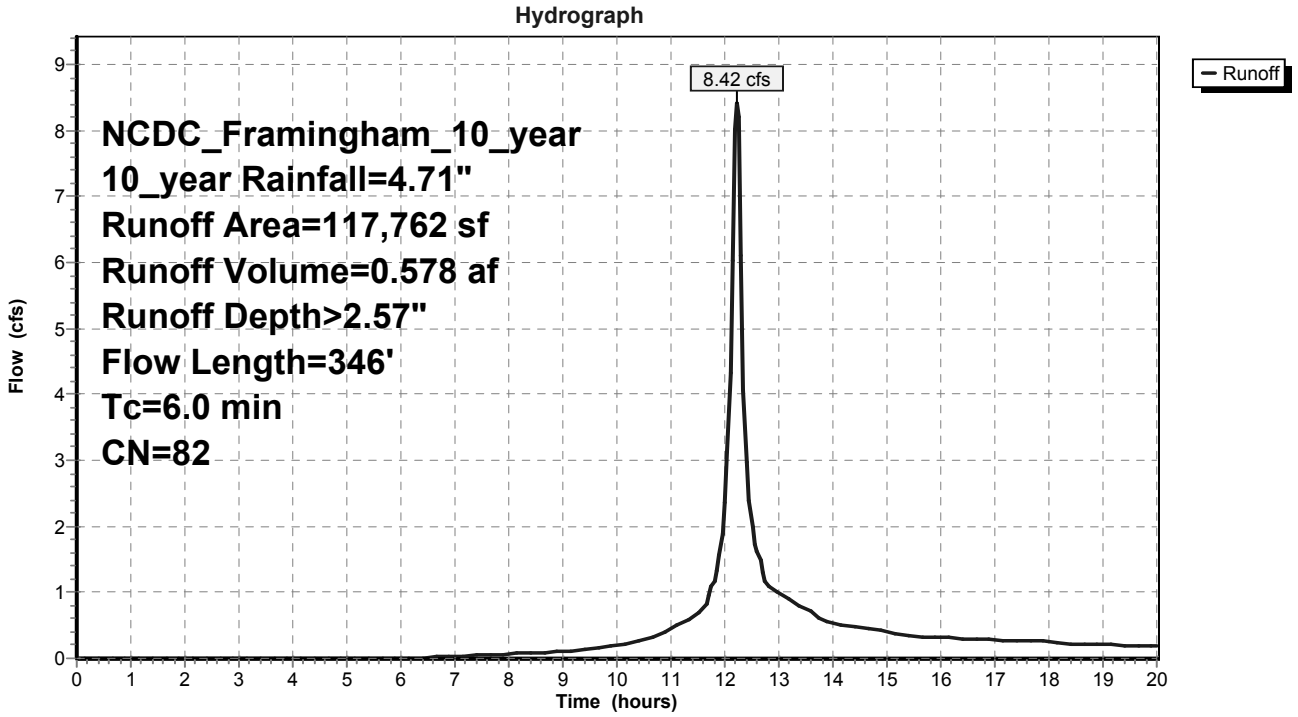
Runoff = 8.42 cfs @ 12.23 hrs, Volume= 0.578 af, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

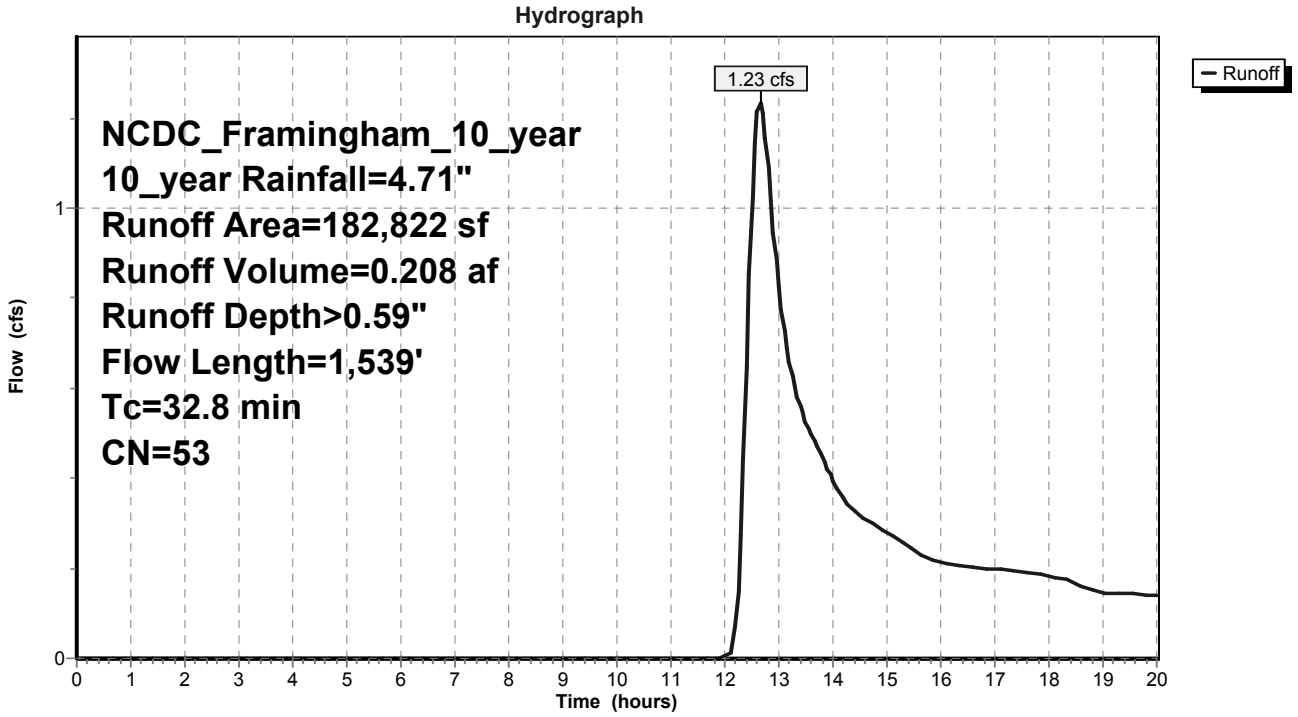
Runoff = 1.23 cfs @ 12.65 hrs, Volume= 0.208 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

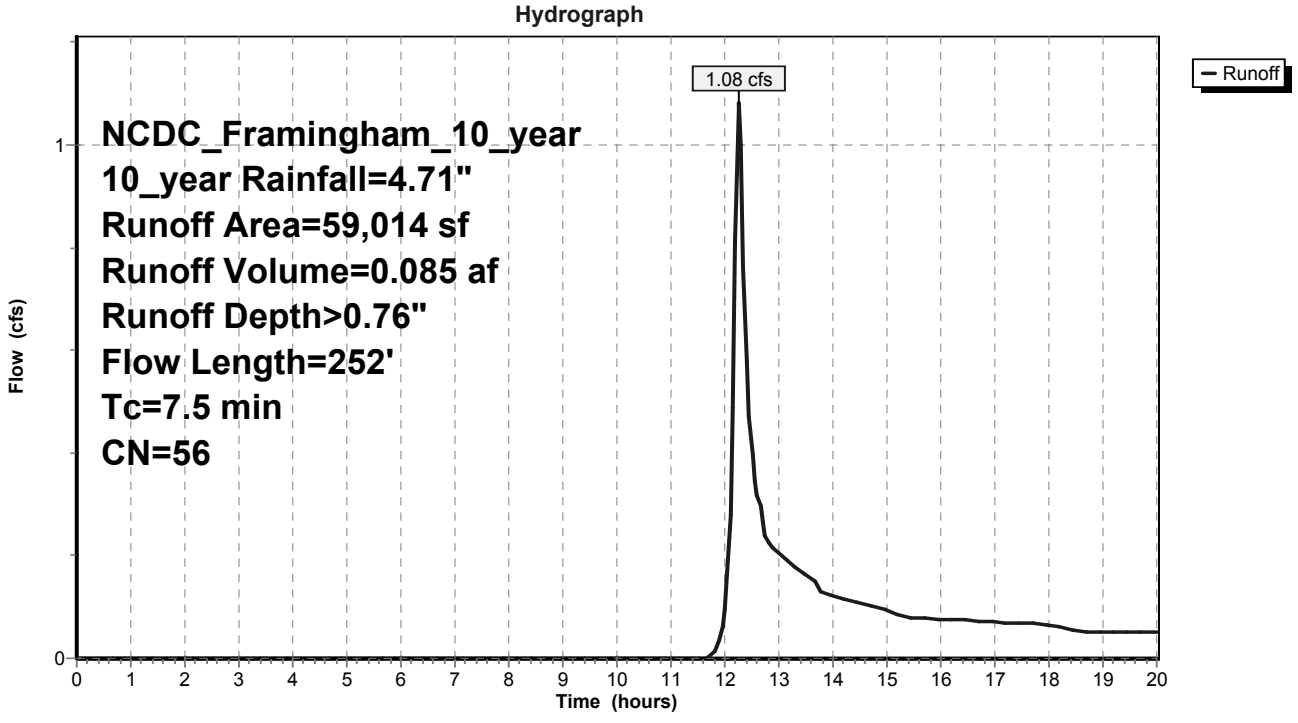
Runoff = 1.08 cfs @ 12.26 hrs, Volume= 0.085 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

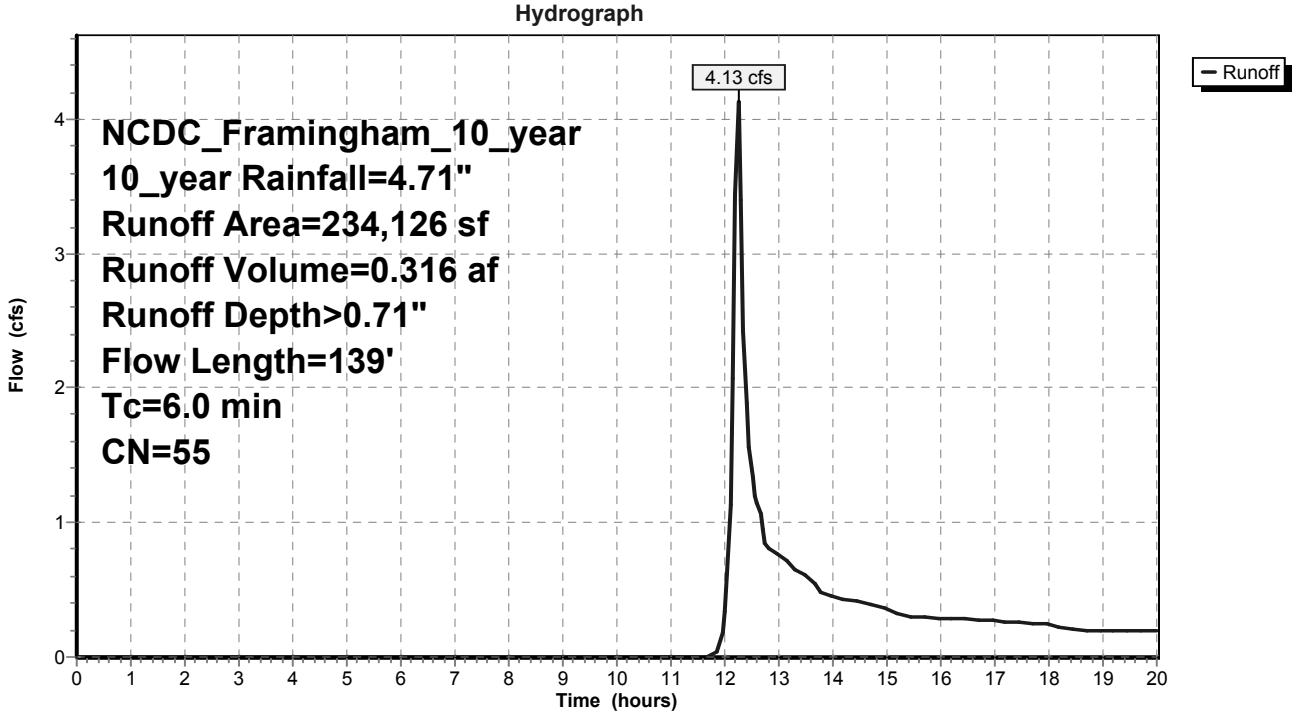
Runoff = 4.13 cfs @ 12.25 hrs, Volume= 0.316 af, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



## Summary for Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer

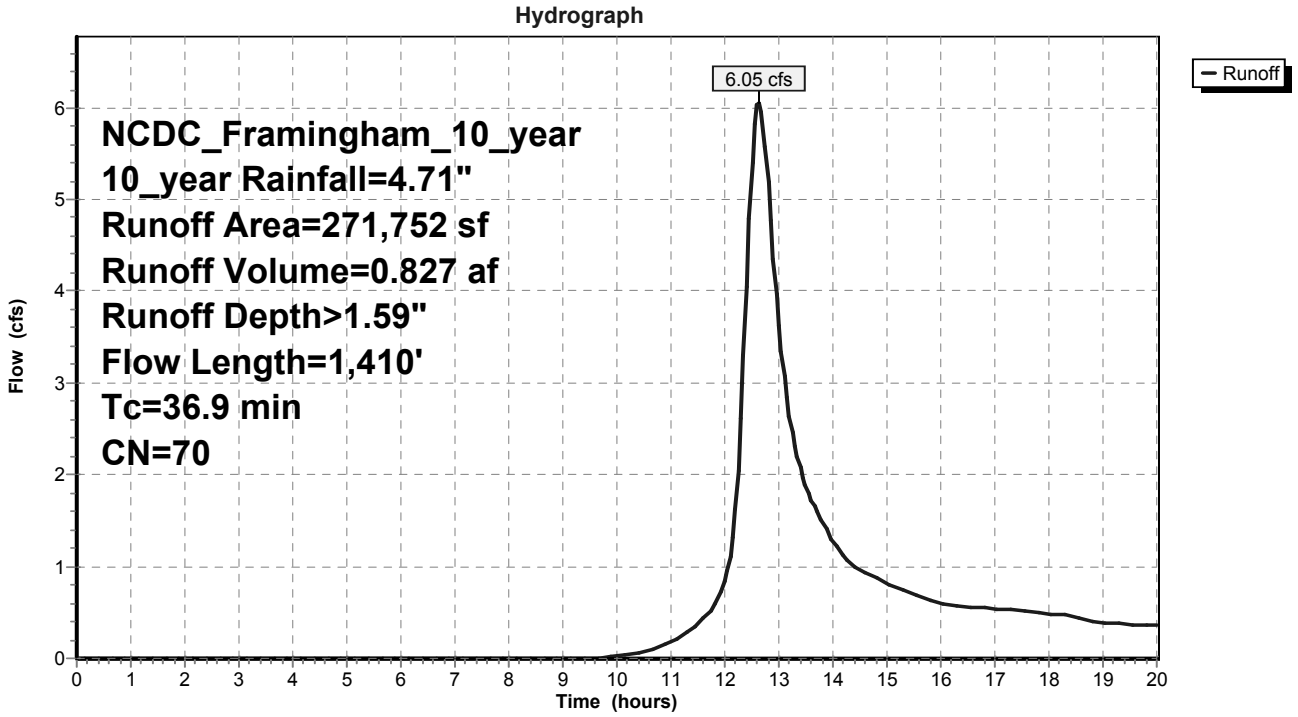
Runoff = 6.05 cfs @ 12.63 hrs, Volume= 0.827 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 39 | GRASS, 0% imperv, HSG A |
| * | 149 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,802 | 30 | WOODS, 0% imperv, HSG A |
| * | 87,233 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,883 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 138,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,521 | 98 | IMP, 100% imperv, HSG A |
| * | 8,368 | 98 | IMP, 100% imperv, HSG B |
| | 271,752 | 70 | Weighted Average |
| | 179,014 | | 65.87% Pervious Area |
| | 92,738 | | 34.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.2 | 50 | 0.0010 | 0.05 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.3 | 256 | 0.0659 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 36.9 | 1,410 | Total | | | |

## Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer

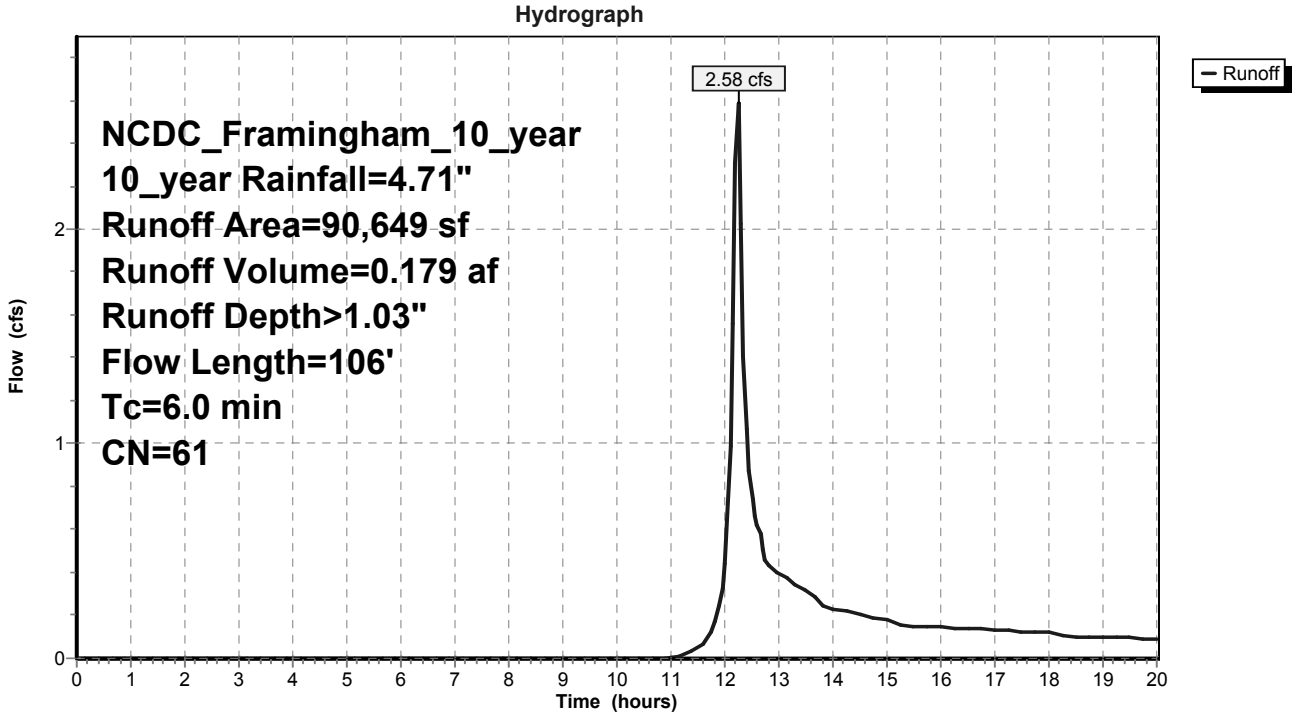
Runoff = 2.58 cfs @ 12.24 hrs, Volume= 0.179 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 66,969 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 3,863 | 98 | IMP, 100% imperv, HSG B |
| | 90,649 | 61 | Weighted Average |
| | 90,649 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.0 | 50 | 0.1057 | 0.28 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 56 | 0.3343 | 4.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.2 | 106 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer



## Summary for Subcatchment E 1.1C: Culvert 1

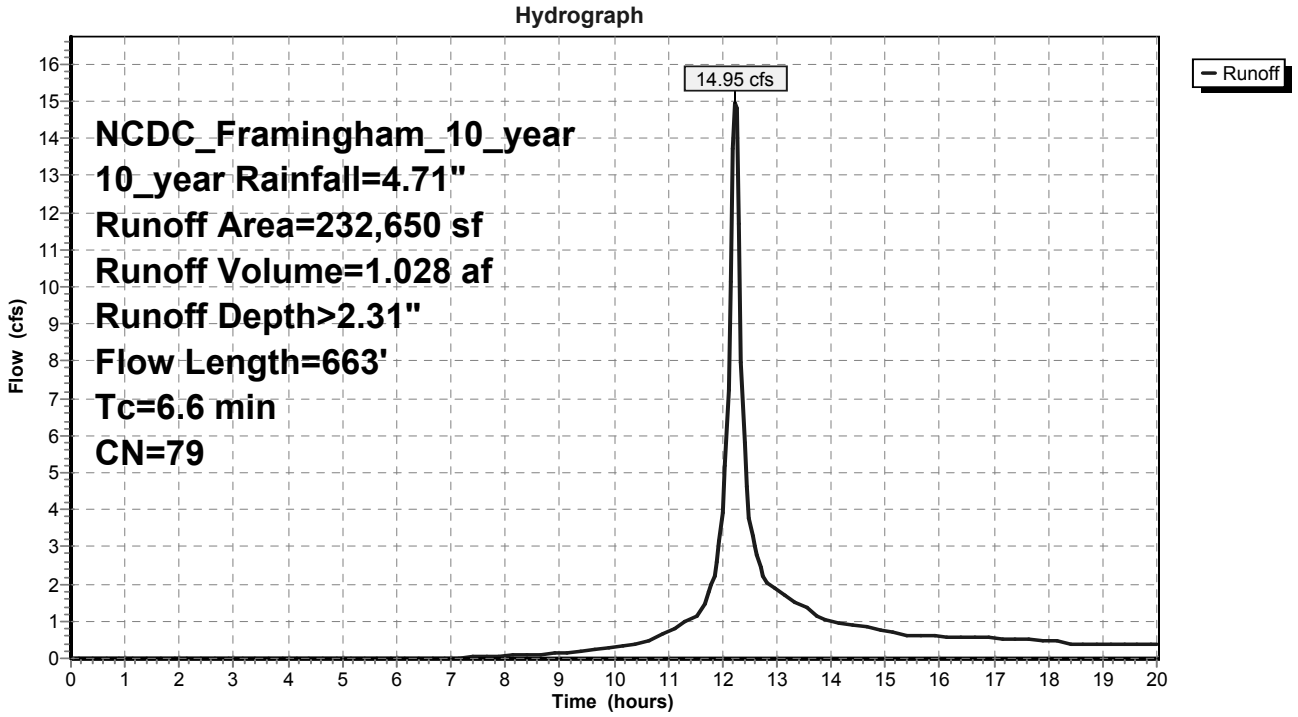
Runoff = 14.95 cfs @ 12.24 hrs, Volume= 1.028 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 70,758 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,422 | 55 | WOODS, 0% imperv, HSG B |
| * | 420 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 85,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 64 | 98 | IMP, 100% imperv, HSG A |
| * | 61,196 | 98 | IMP, 100% imperv, HSG B |
| | 232,650 | 79 | Weighted Average |
| | 176,613 | | 75.91% Pervious Area |
| | 56,037 | | 24.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0104 | 0.89 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 91 | 0.0095 | 1.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 4 | 0.0148 | 1.96 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 125 | 0.0252 | 3.22 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.8 | 7 | 0.0001 | 0.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 166 | 0.0832 | 5.85 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0531 | 4.68 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 49 | 0.0163 | 2.06 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.4 | 134 | 0.0064 | 1.62 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 34 | 0.0414 | 3.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.6 | 663 | Total | | | |

## Subcatchment E 1.1C: Culvert 1



## Summary for Subcatchment E 1.1D: Pond E 1.1D

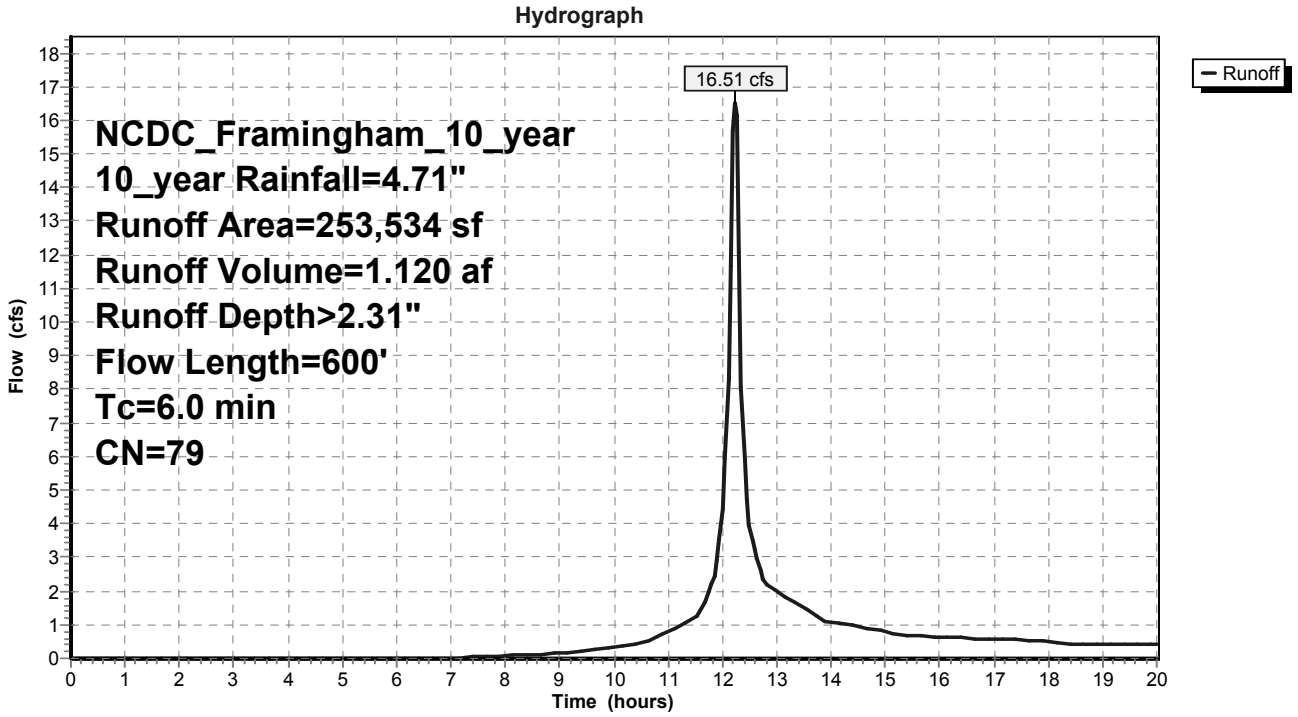
Runoff = 16.51 cfs @ 12.23 hrs, Volume= 1.120 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 41,894 | 61 | GRASS, 0% imperv, HSG B |
| * | 33,714 | 55 | WOODS, 0% imperv, HSG B |
| * | 136,649 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 41,277 | 98 | IMP, 100% imperv, HSG B |
| | 253,534 | 79 | Weighted Average |
| | 164,713 | | 64.97% Pervious Area |
| | 88,822 | | 35.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.7 | 50 | 0.3362 | 0.50 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 13 | 0.3558 | 9.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 163 | 0.0873 | 2.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.7 | 374 | 0.0540 | 3.74 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.7 | 600 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1D: Pond E 1.1D



## Summary for Subcatchment E 1.2A: (blank)

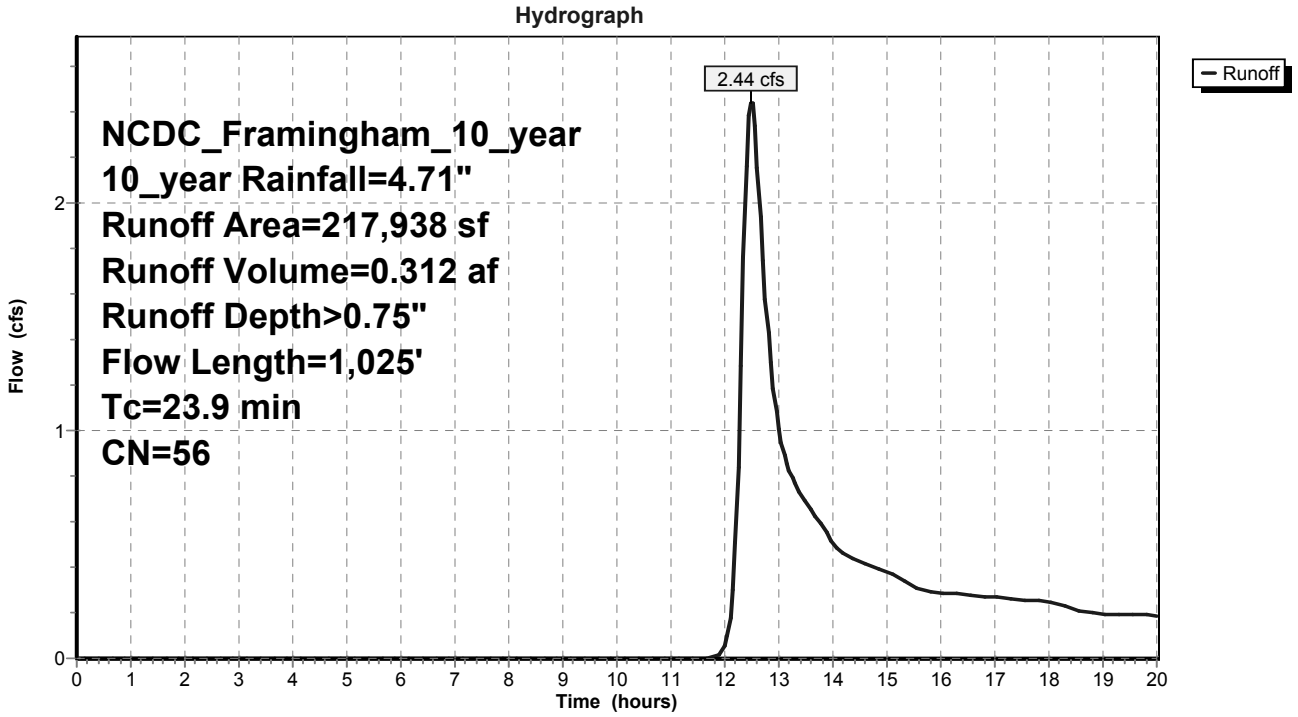
Runoff = 2.44 cfs @ 12.49 hrs, Volume= 0.312 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

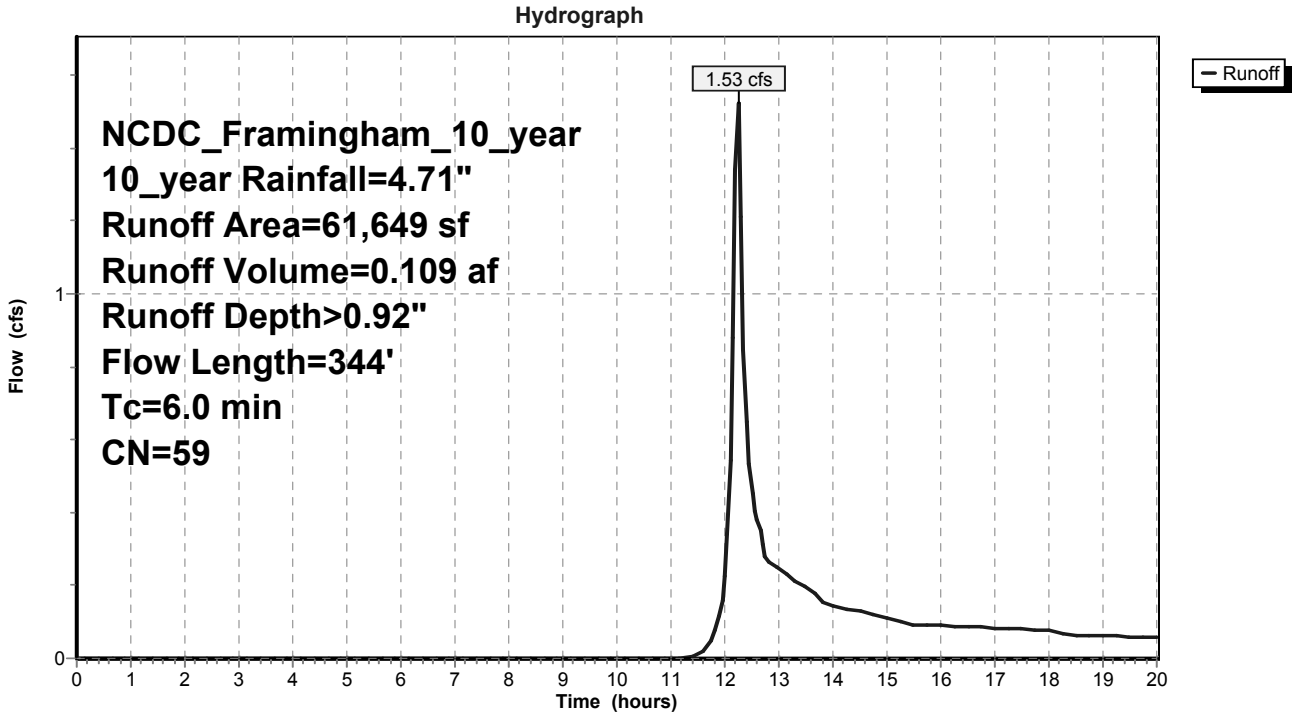
Runoff = 1.53 cfs @ 12.24 hrs, Volume= 0.109 af, Depth> 0.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone

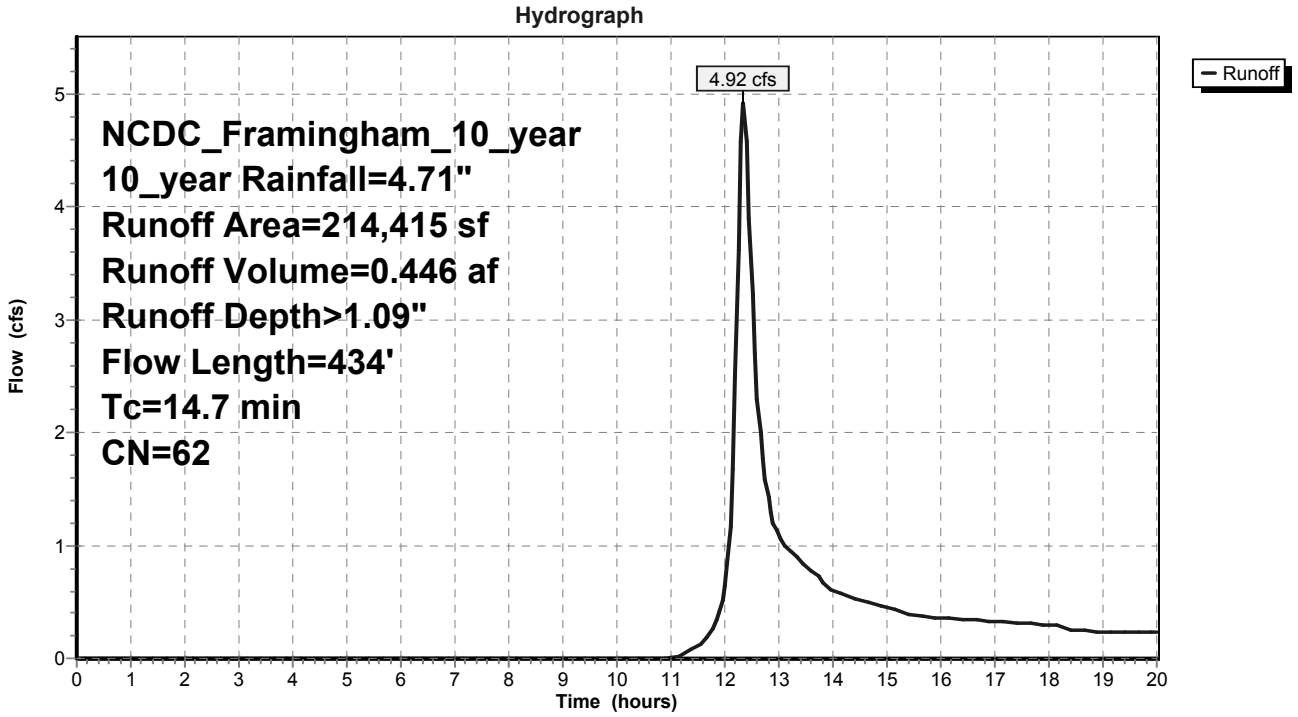
Runoff = 4.92 cfs @ 12.35 hrs, Volume= 0.446 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 24,009 | 30 | WOODS, 0% imperv, HSG A |
| * | 112,703 | 55 | WOODS, 0% imperv, HSG B |
| * | 20,960 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 56,743 | 85 | GRAVEL, 65% imperv, HSG B |
| | 214,415 | 62 | Weighted Average |
| | 163,908 | | 76.44% Pervious Area |
| | 50,507 | | 23.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0161 | 0.63 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 63 | 0.0993 | 5.07 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.7 | 434 | Total | | | |

## Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2B: (blank)

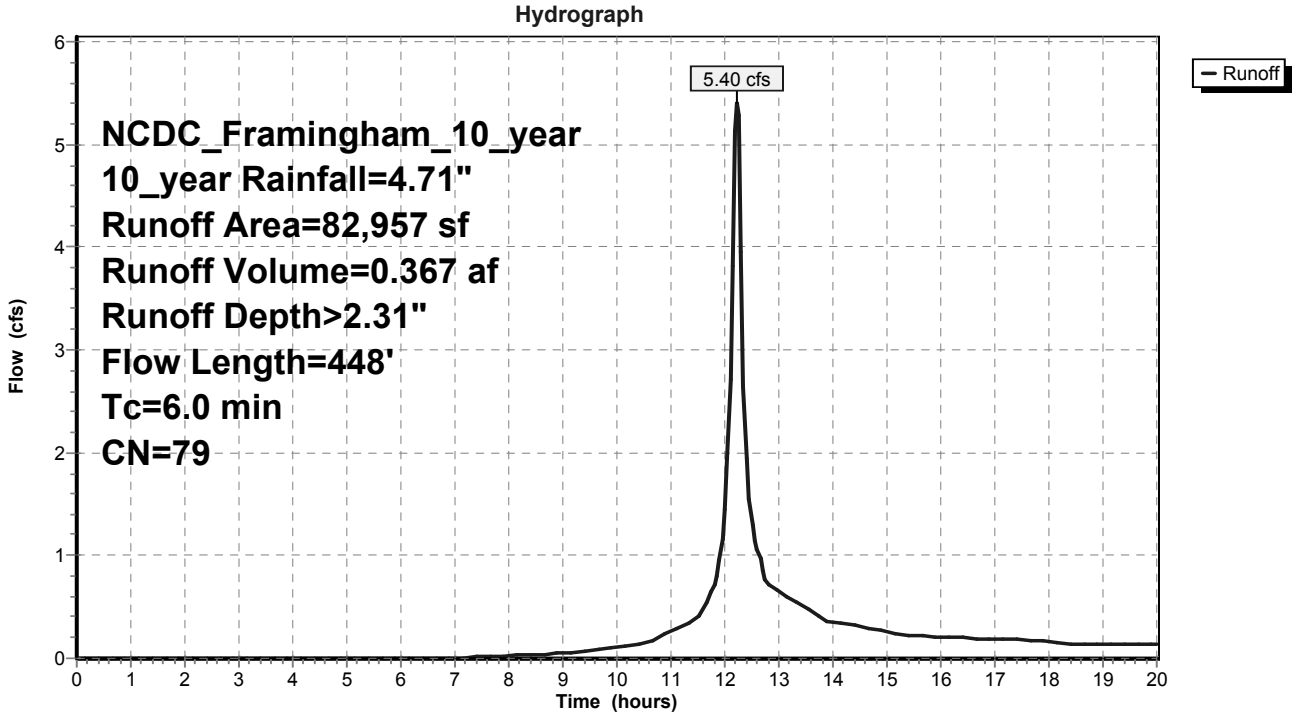
Runoff = 5.40 cfs @ 12.23 hrs, Volume= 0.367 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer

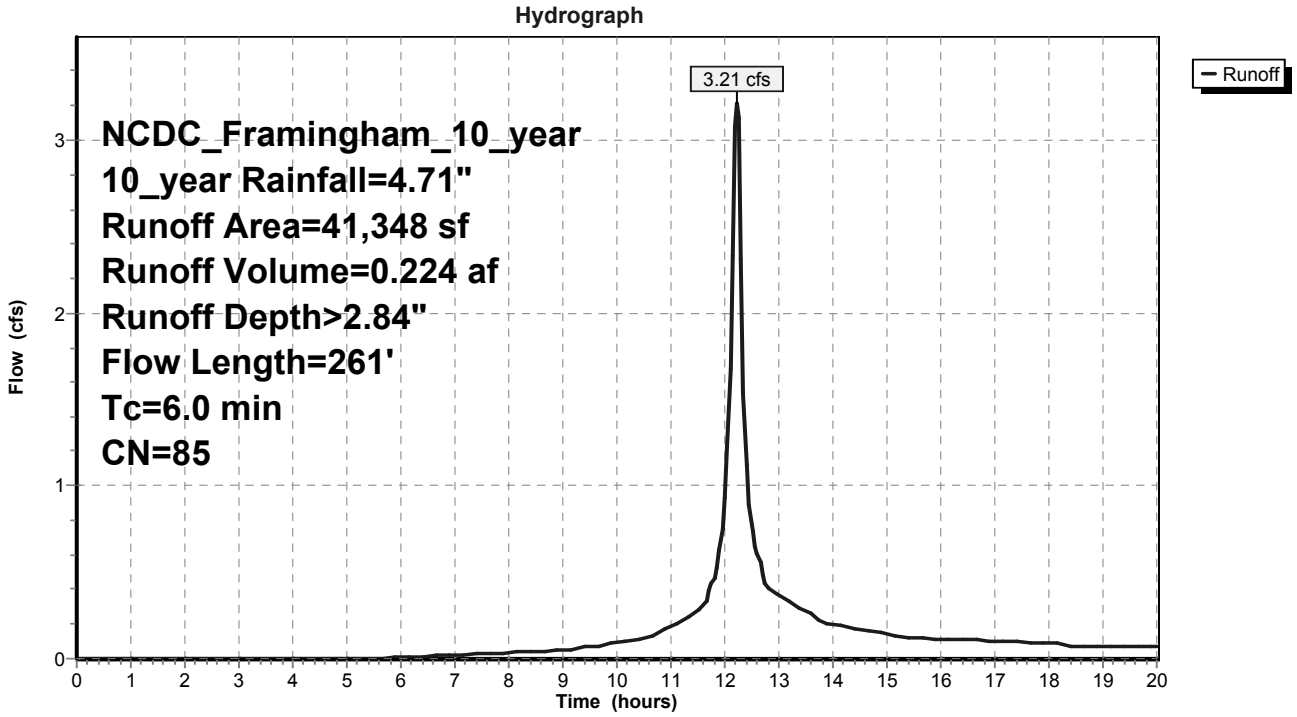
Runoff = 3.21 cfs @ 12.23 hrs, Volume= 0.224 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27 | 55 | WOODS, 0% imperv, HSG B |
| * | 41,322 | 85 | GRAVEL, 65% imperv, HSG B |
| | 41,348 | 85 | Weighted Average |
| | 14,489 | | 35.04% Pervious Area |
| | 26,859 | | 64.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 211 | 0.0326 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.1 | 261 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer

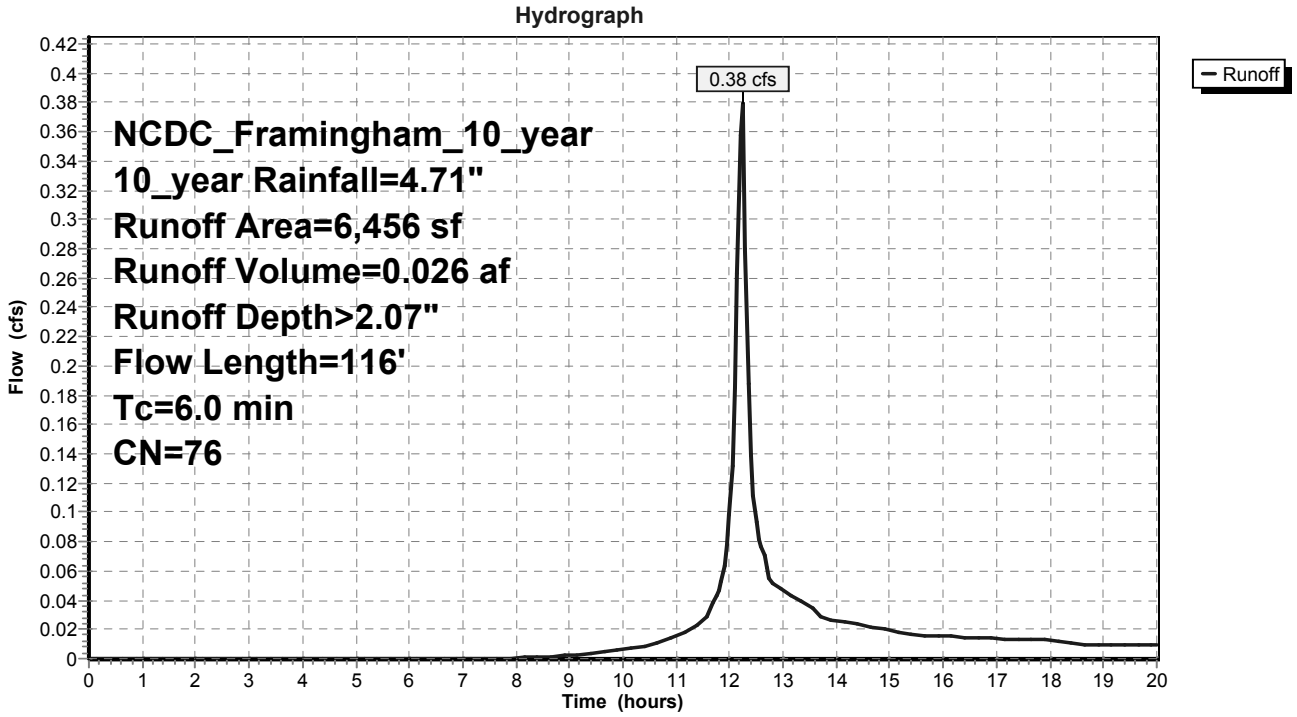
Runoff = 0.38 cfs @ 12.23 hrs, Volume= 0.026 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,035 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,421 | 85 | GRAVEL, 65% imperv, HSG B |
| | 6,456 | 76 | Weighted Average |
| | 3,582 | | 55.49% Pervious Area |
| | 2,874 | | 44.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0740 | 1.71 | | **Sheet Flow,** Range n= 0.013 P2= 3.00" |
| 0.2 | 66 | 0.0982 | 5.05 | | **Shallow Concentrated Flow,** GRAVEL Kv= 16.1 fps |
| 0.7 | 116 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2C: (blank)

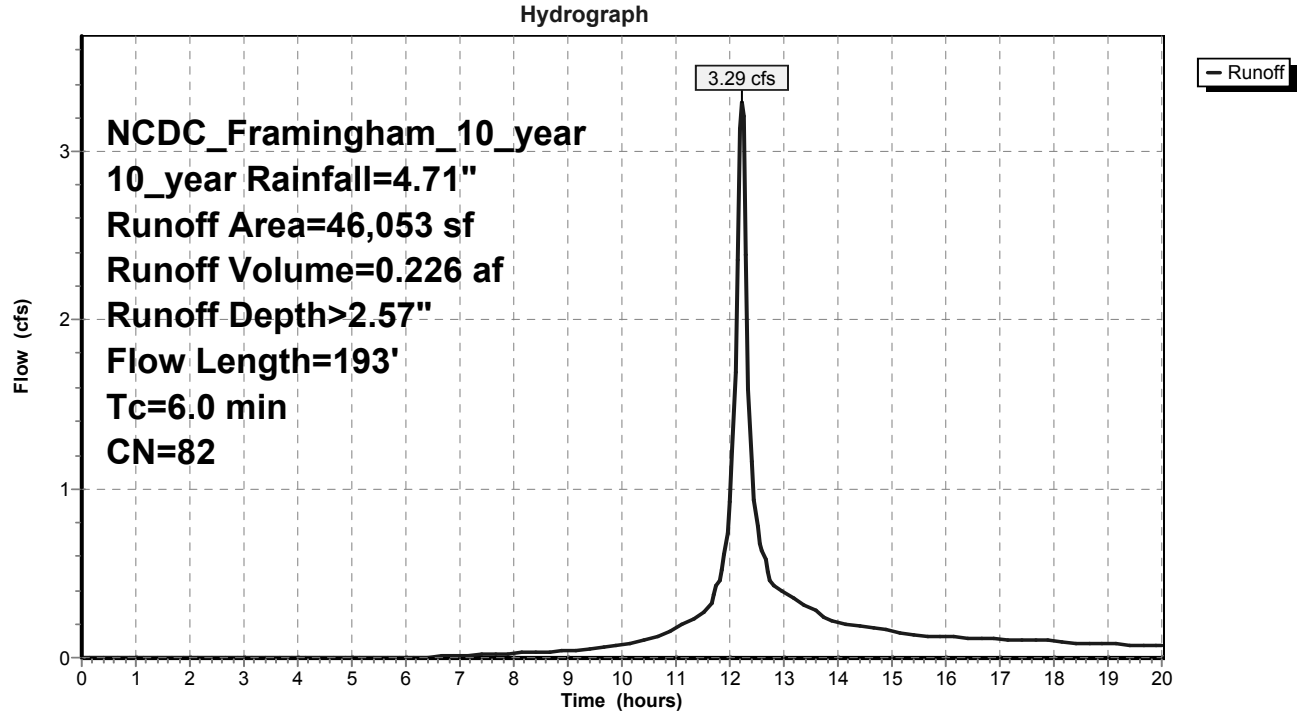
Runoff = 3.29 cfs @ 12.23 hrs, Volume= 0.226 af, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone

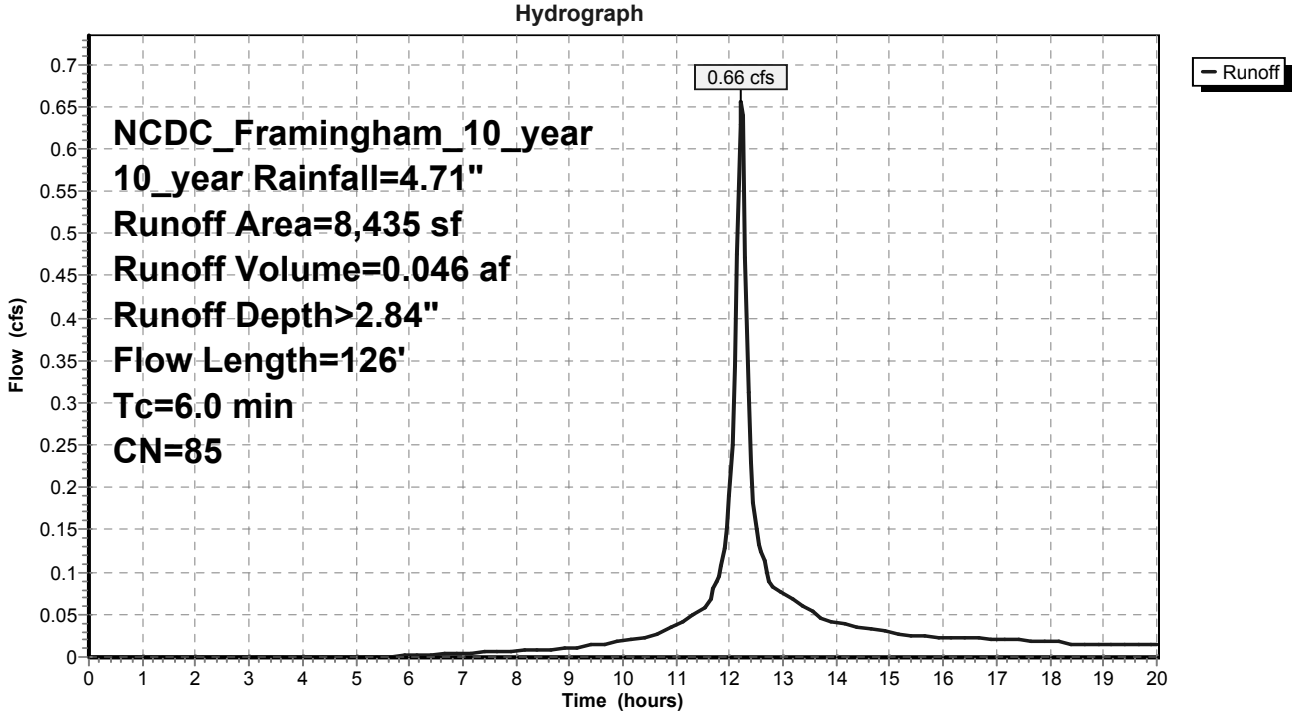
Runoff = 0.66 cfs @ 12.23 hrs, Volume= 0.046 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 8,435 | 85 | GRAVEL, 65% imperv, HSG B |
| | 2,952 | | 35.00% Pervious Area |
| | 5,483 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 76 | 0.1026 | 5.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.6 | 126 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer

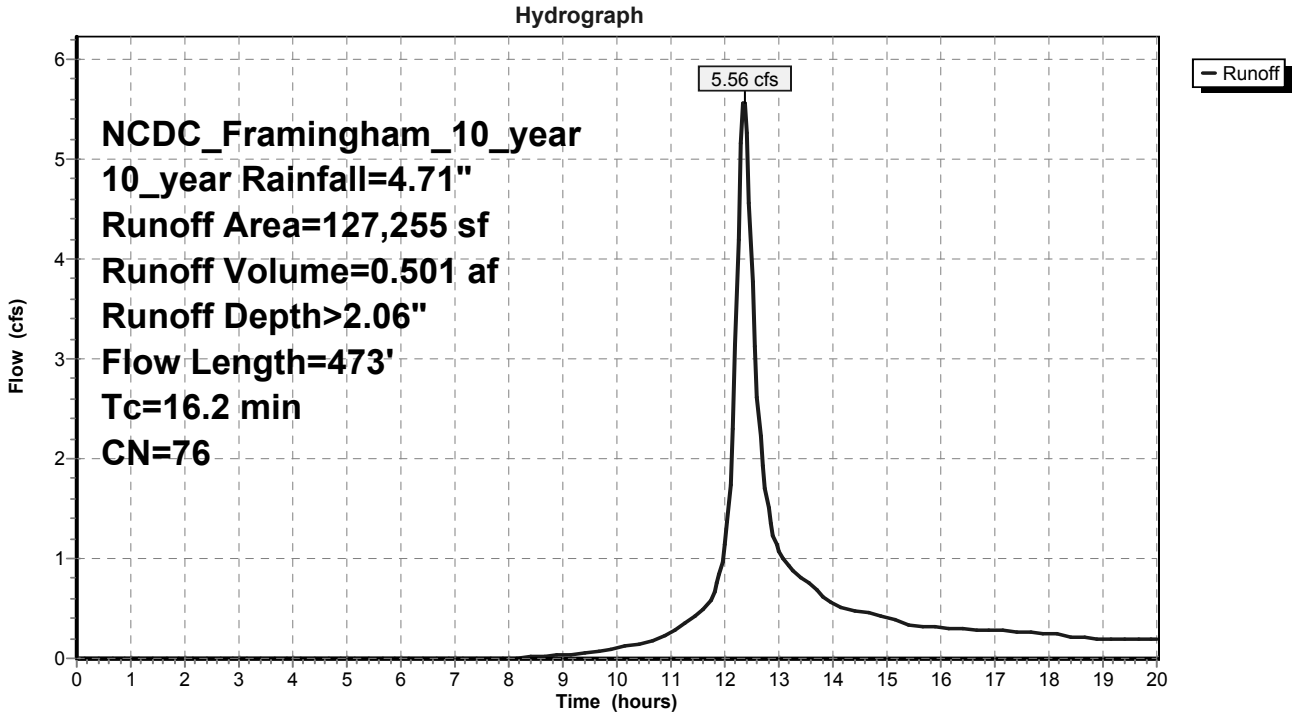
Runoff = 5.56 cfs @ 12.35 hrs, Volume= 0.501 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 36,476 | 55 | WOODS, 0% imperv, HSG B |
| * | 90,779 | 85 | GRAVEL, 65% imperv, HSG B |
| | 127,255 | 76 | Weighted Average |
| | 68,249 | | 53.63% Pervious Area |
| | 59,006 | | 46.37% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | 50 | 0.0137 | 0.14 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 8.0 | 233 | 0.0009 | 0.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.5 | 75 | 0.2333 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 54 | 0.0131 | 1.84 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 19 | 0.0056 | 0.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 41 | 0.0176 | 2.13 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 16.2 | 473 | Total | | | |

## Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2E: Pond E 1.2E

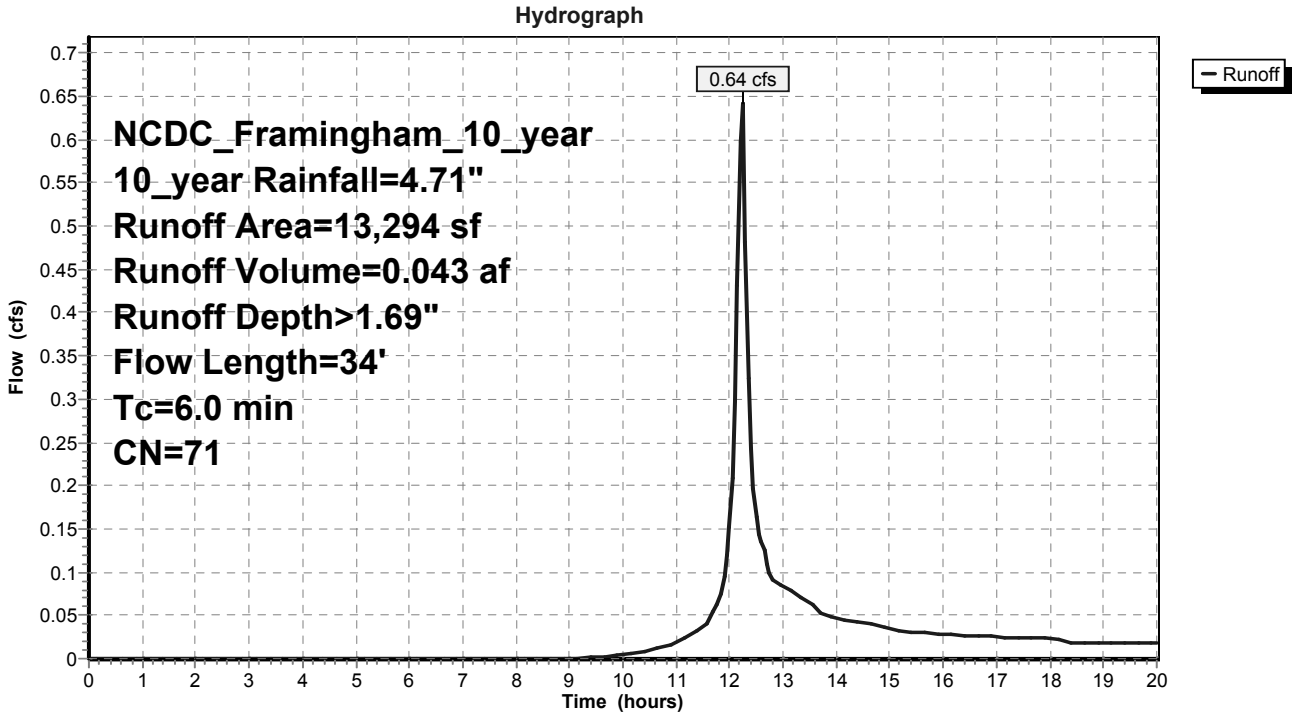
Runoff = 0.64 cfs @ 12.23 hrs, Volume= 0.043 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,218 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,076 | 85 | GRAVEL, 65% imperv, HSG B |
| | 13,294 | 71 | Weighted Average |
| | 8,695 | | 65.40% Pervious Area |
| | 4,600 | | 34.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.9 | 31 | 0.3269 | 0.18 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 2 | 0.3283 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 3.0 | 34 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2E: Pond E 1.2E



## Summary for Subcatchment E 1.3A: Aqueduct onto SITE

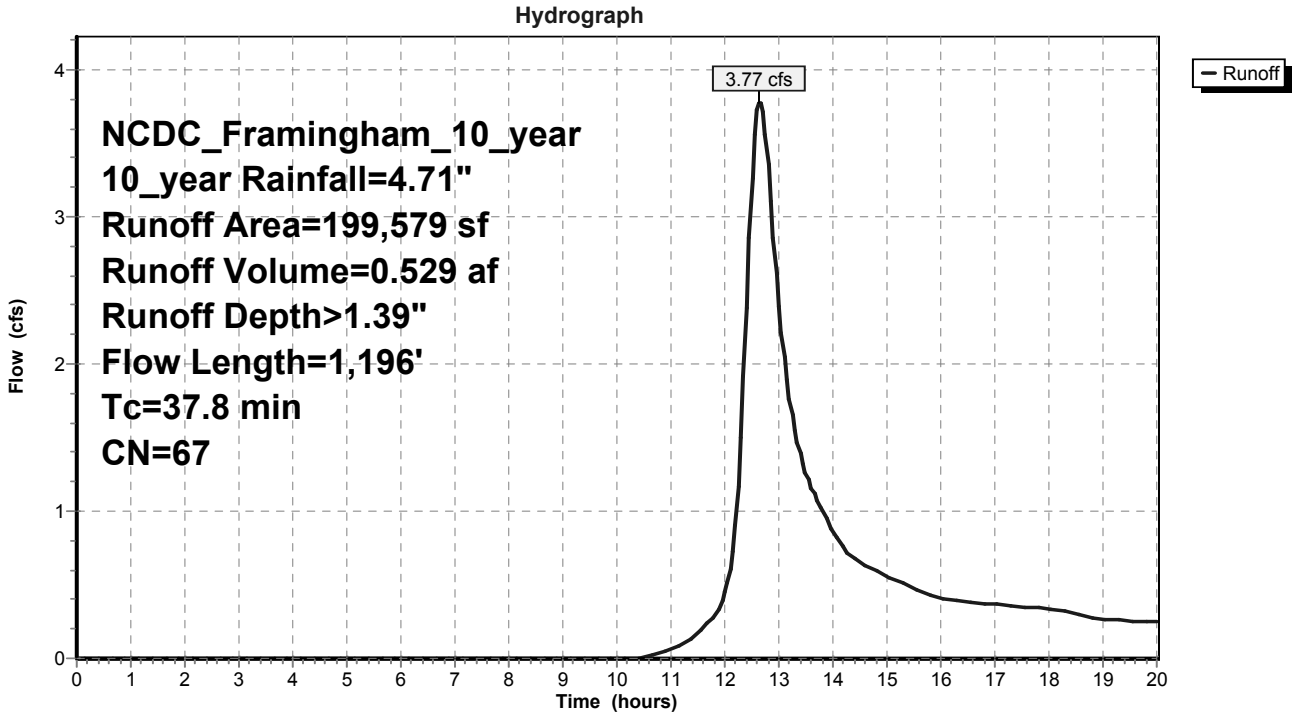
Runoff = 3.77 cfs @ 12.65 hrs, Volume= 0.529 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,883 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 6,497 | 30 | WOODS, 0% imperv, HSG A |
| * | 62,664 | 55 | WOODS, 0% imperv, HSG B |
| * | 94,997 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 199,579 | 67 | Weighted Average |
| | 130,818 | | 65.55% Pervious Area |
| | 68,761 | | 34.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 1 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 12 | 0.0472 | 3.50 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 17.9 | 54 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 37.8 | 1,196 | Total | | | |

## Subcatchment E 1.3A: Aqueduct onto SITE



## Summary for Subcatchment E 4.0: Offsite to Sudbury R

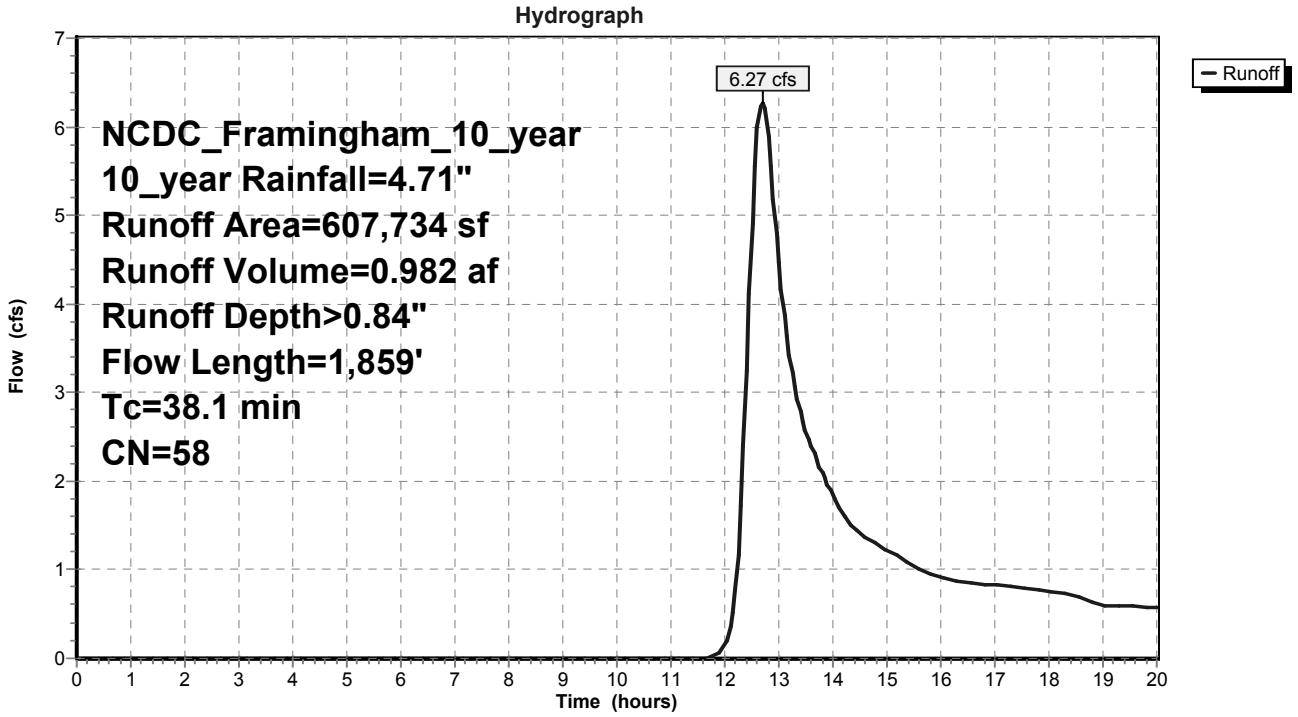
Runoff = 6.27 cfs @ 12.69 hrs, Volume= 0.982 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 78,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 27,532 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,227 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,518 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 0% imperv, HSG A |
| * | 6,326 | 98 | Water, 0% imperv, HSG C |
| * | 12,063 | 98 | Water, 0% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 607,734 | 58 | Weighted Average |
| | 548,979 | | 90.33% Pervious Area |
| | 58,756 | | 9.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.2 | 194 | 0.0399 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 8.7 | 227 | 0.0076 | 0.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 38.1 | 1,859 | Total | | | |

## Subcatchment E 4.0: Offsite to Sudbury R



## Summary for Subcatchment W 10.0: Offsite to Sudbury R

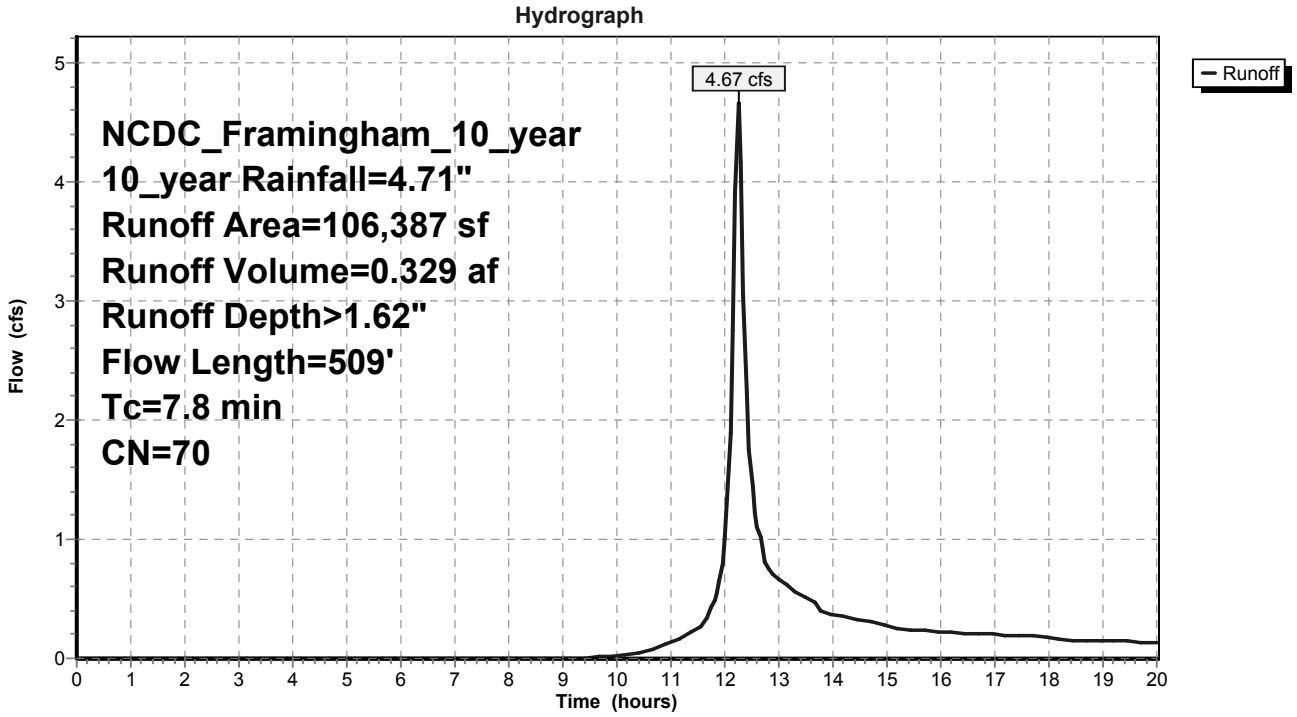
Runoff = 4.67 cfs @ 12.26 hrs, Volume= 0.329 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 0% imperv, HSG C |
| * | 6,541 | 98 | Water, 0% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 41 | 0.0223 | 0.75 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 11 | 0.2240 | 2.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 7.8 | 509 | Total | | | |

## Subcatchment W 10.0: Offsite to Sudbury R



## Summary for Subcatchment W 2.0: Onsite to Sudbury R

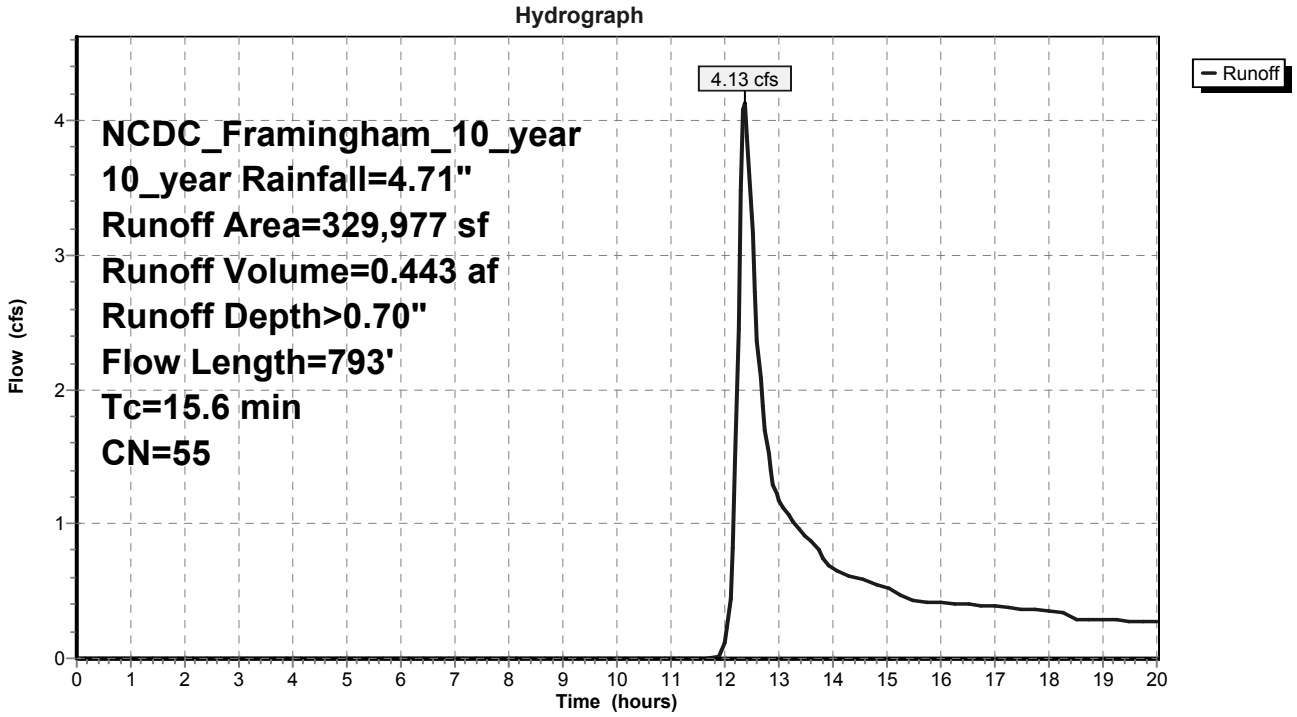
Runoff = 4.13 cfs @ 12.38 hrs, Volume= 0.443 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 160,572 | 30 | WOODS, 0% imperv, HSG A |
| * | 22 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 58,308 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 0 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 19,292 | 98 | Water, 0% imperv, HSG D |
| * | 1,268 | 98 | Water, 0% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 329,977 | 55 | Weighted Average |
| | 292,076 | | 88.51% Pervious Area |
| | 37,900 | | 11.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: Onsite to Sudbury R



## Summary for Subcatchment W 3.1: Pond P W 3.1

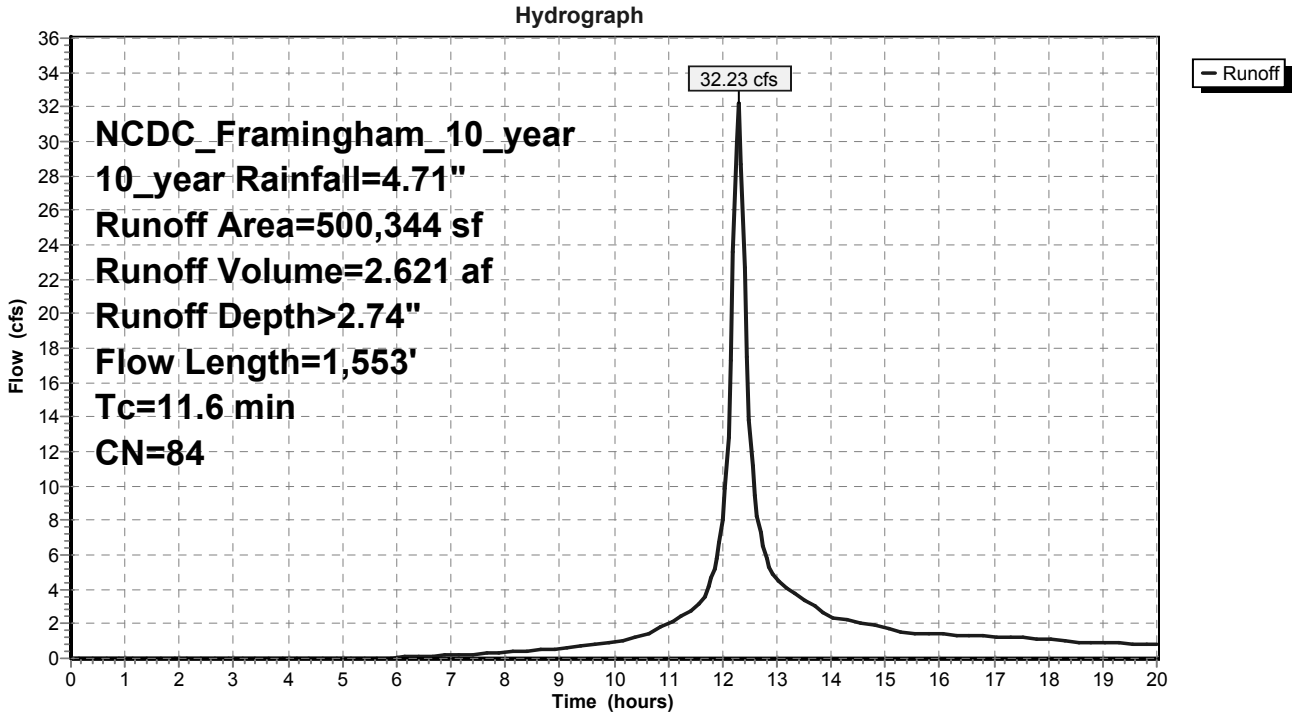
Runoff = 32.23 cfs @ 12.29 hrs, Volume= 2.621 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 149 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 12,067 | 30 | WOODS, 0% imperv, HSG A |
| * | 10,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 137,585 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 197,738 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 22,211 | 98 | IMP, 100% imperv, HSG A |
| * | 118,525 | 98 | IMP, 100% imperv, HSG B |
| | 500,344 | 84 | Weighted Average |
| | 282,384 | | 56.44% Pervious Area |
| | 217,960 | | 43.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 50 | 0.0032 | 0.55 | | **Sheet Flow,** Smooth Surfaces n= 0.011 P2= 3.00" |
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 287 | 0.0109 | 2.12 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.8 | 686 | 0.0355 | 3.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 11.6 | 1,553 | Total | | | |

## Subcatchment W 3.1: Pond P W 3.1



## Summary for Subcatchment W 3.4: Gravel Processing Facility

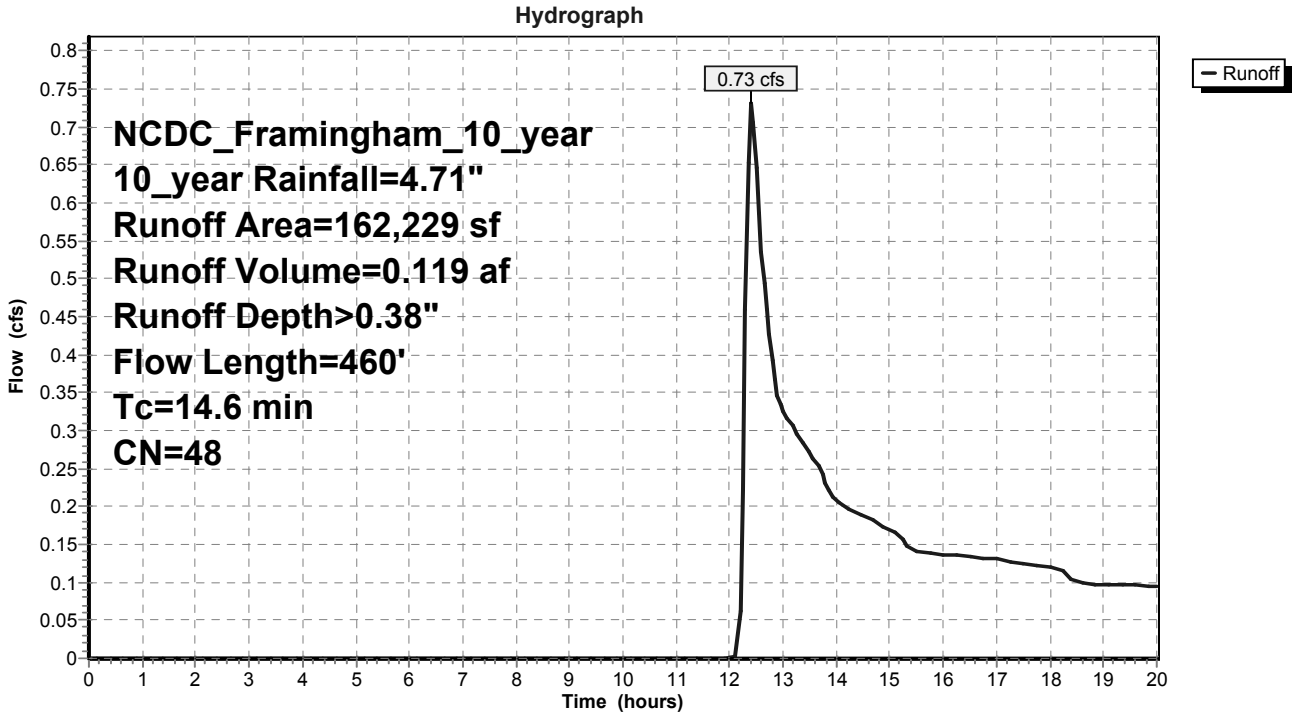
Runoff = 0.73 cfs @ 12.41 hrs, Volume= 0.119 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,975 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,153 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 42,351 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 162,229 | 48 | Weighted Average |
| | 134,701 | | 83.03% Pervious Area |
| | 27,528 | | 16.97% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: Gravel Processing Facility



## Summary for Subcatchment W 3.5: Small Depression to Big Box

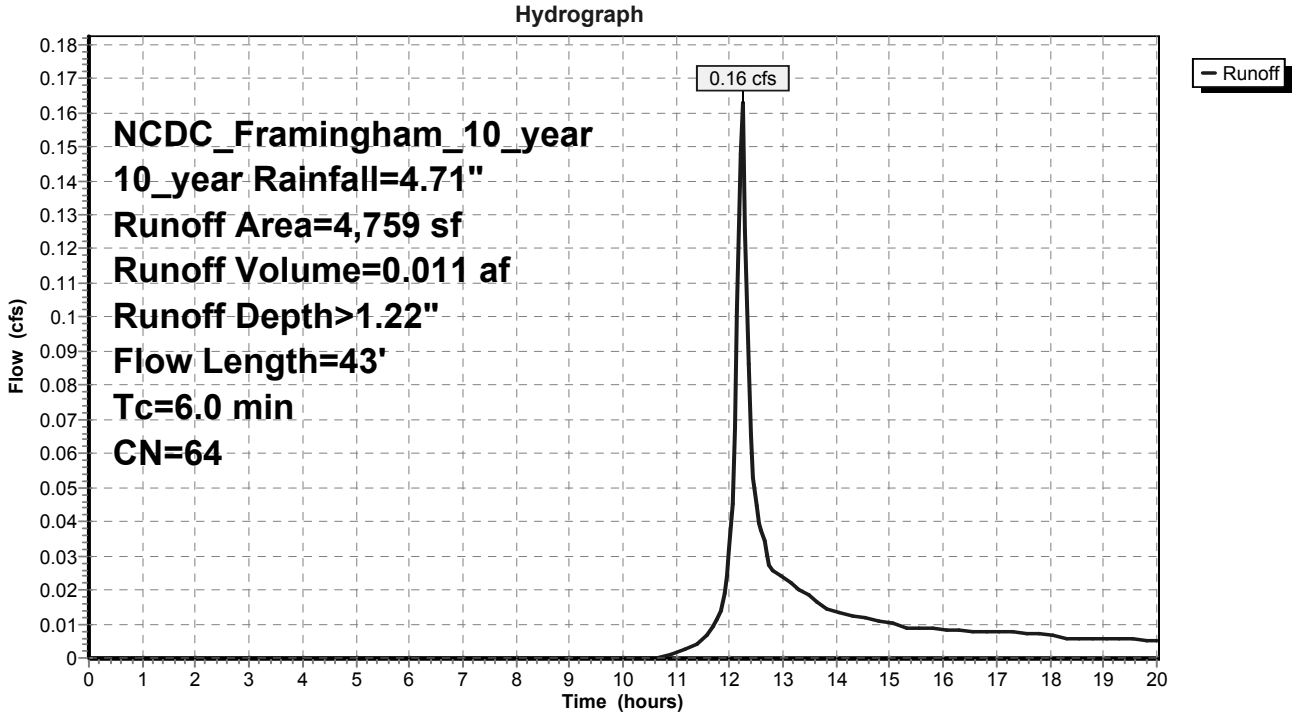
Runoff = 0.16 cfs @ 12.24 hrs, Volume= 0.011 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,714 | 30 | WOODS, 0% imperv, HSG A |
| * | 2,049 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 997 | 98 | IMP, 100% imperv, HSG A |
| | 4,759 | 64 | Weighted Average |
| | 3,427 | | 72.02% Pervious Area |
| | 1,332 | | 27.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 20 | 0.0320 | 1.16 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 12 | 0.1533 | 0.27 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.3 | 12 | 0.3938 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 2.3 | 43 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.5: Small Depression to Big Box



## Summary for Subcatchment W 9.1: Gravel Pit to Big Box Culvert

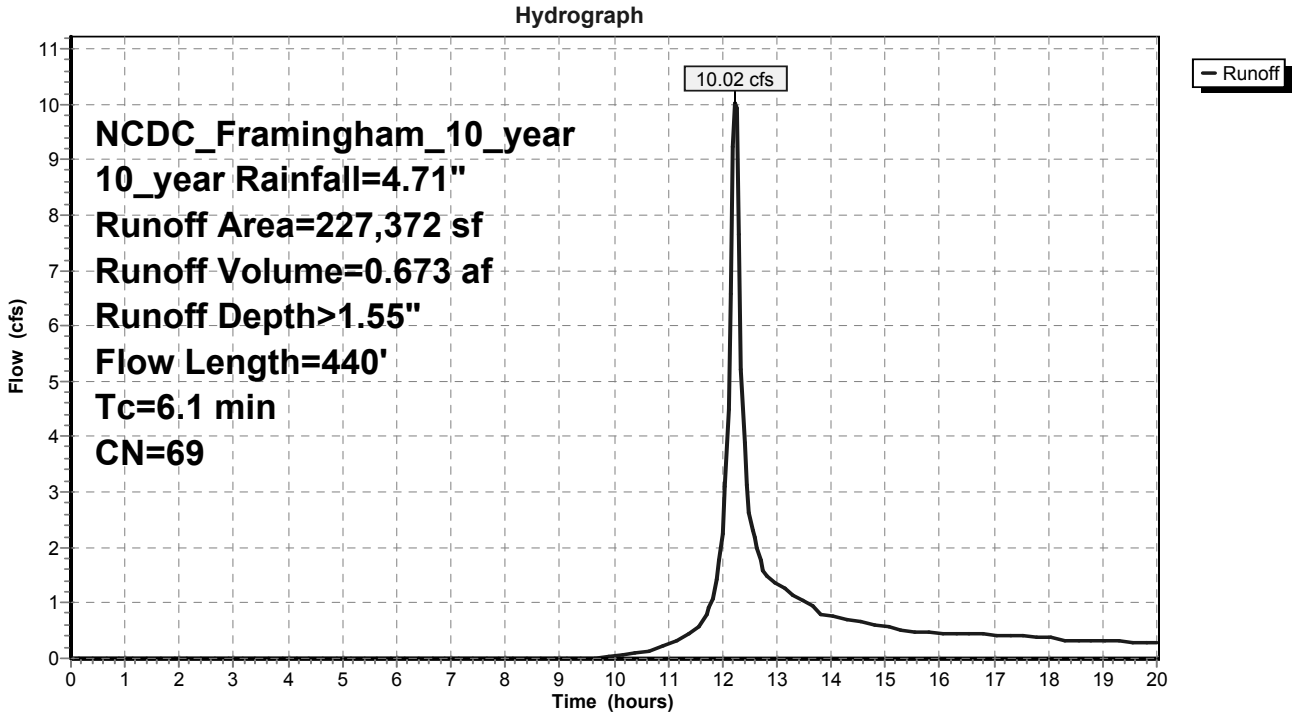
Runoff = 10.02 cfs @ 12.24 hrs, Volume= 0.673 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 55,301 | 30 | WOODS, 0% imperv, HSG A |
| * | 14,585 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,790 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 53,800 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 6,069 | 98 | IMP, 100% imperv, HSG A |
| * | 30,826 | 98 | IMP, 100% imperv, HSG B |
| | 227,372 | 69 | Weighted Average |
| | 148,989 | | 65.53% Pervious Area |
| | 78,384 | | 34.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 206 | 0.0265 | 0.81 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 127 | 0.0402 | 3.23 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.2 | 107 | 0.0880 | 1.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 6.1 | 440 | Total | | | |

## Subcatchment W 9.1: Gravel Pit to Big Box Culvert



## Summary for Subcatchment W 9.1A: Gravel Pit to Roadway

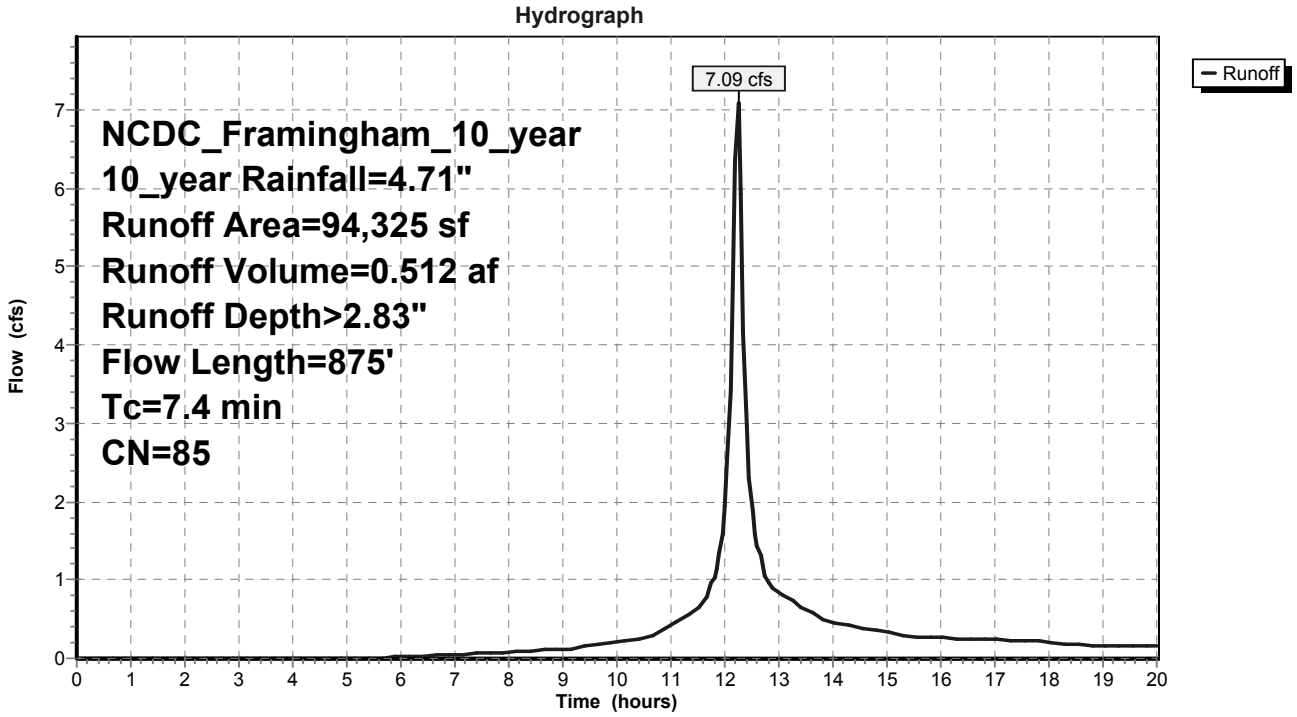
Runoff = 7.09 cfs @ 12.24 hrs, Volume= 0.512 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,124 | 55 | WOODS, 0% imperv, HSG B |
| * | 76,325 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 11,877 | 98 | IMP, 100% imperv, HSG B |
| | 94,325 | 85 | Weighted Average |
| | 44,714 | | 47.40% Pervious Area |
| | 49,611 | | 52.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 116 | 0.0112 | 2.15 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 20 | 0.0178 | 2.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 130 | 0.0176 | 2.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.0327 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 11 | 0.0775 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 2 | 0.0429 | 1.04 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0151 | 0.61 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.4 | 875 | Total | | | |

## Subcatchment W 9.1A: Gravel Pit to Roadway



## Summary for Subcatchment W 9.1B: Aqueduct to Big Box

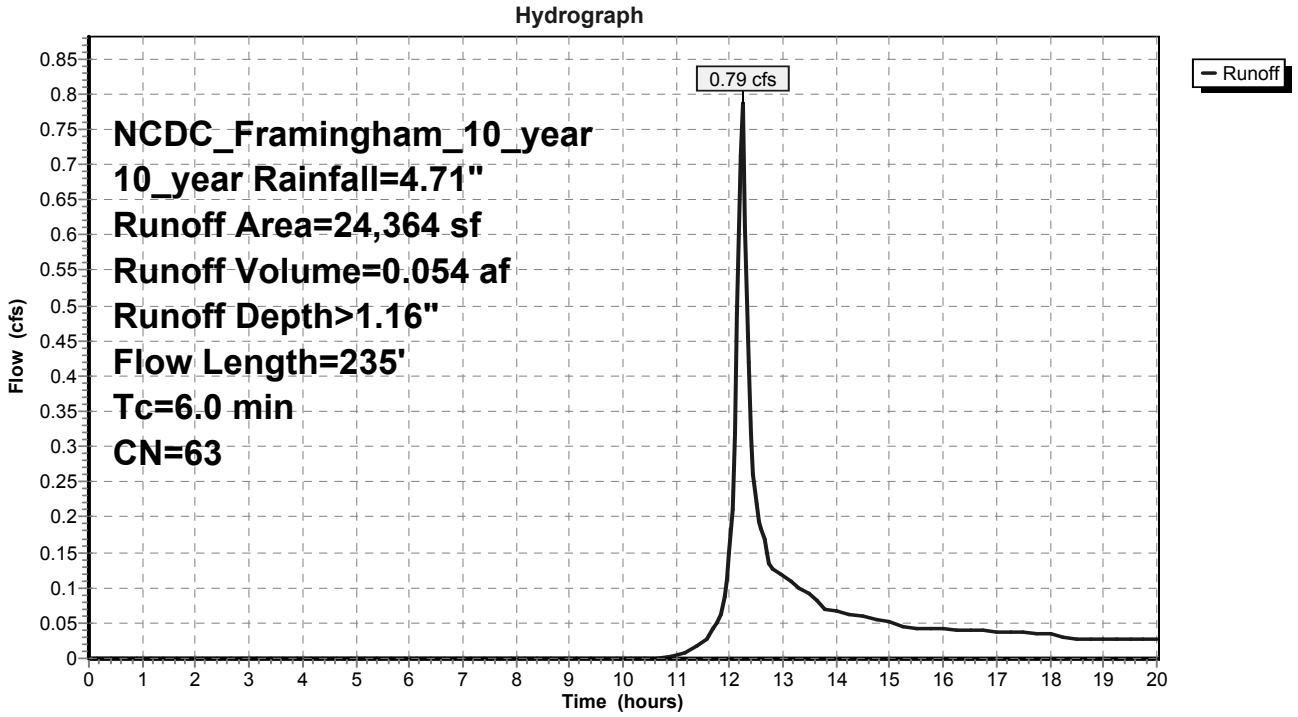
Runoff = 0.79 cfs @ 12.24 hrs, Volume= 0.054 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 123 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 681 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,458 | | 83.97% Pervious Area |
| | 3,905 | | 16.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: Aqueduct to Big Box



## Summary for Subcatchment W 9.1C: Culvert 2

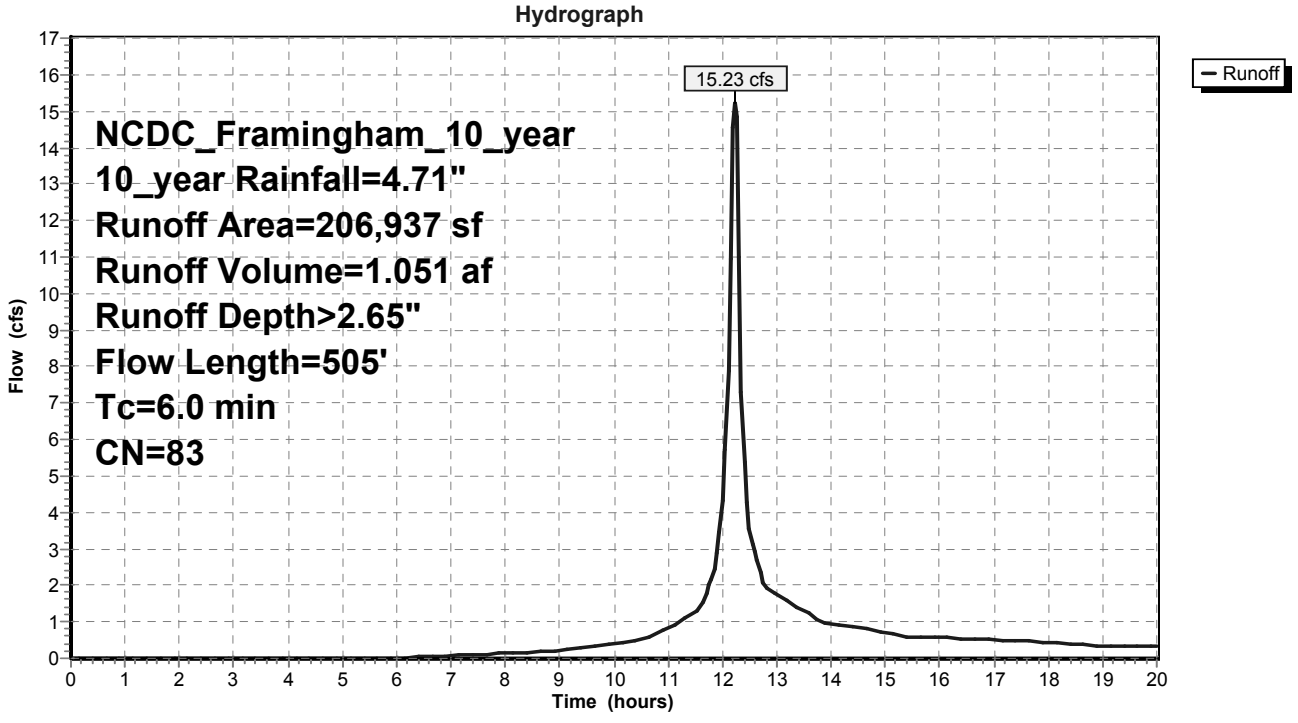
Runoff = 15.23 cfs @ 12.23 hrs, Volume= 1.051 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,598 | 55 | WOODS, 0% imperv, HSG B |
| * | 181,699 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,640 | 98 | IMP, 100% imperv, HSG B |
| | 206,937 | 83 | Weighted Average |
| | 88,833 | | 42.93% Pervious Area |
| | 118,104 | | 57.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 50 | 0.0641 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.3 | 455 | 0.0405 | 3.24 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 505 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1C: Culvert 2



## Summary for Pond MH-NCULV-A: MH-NCULV-A

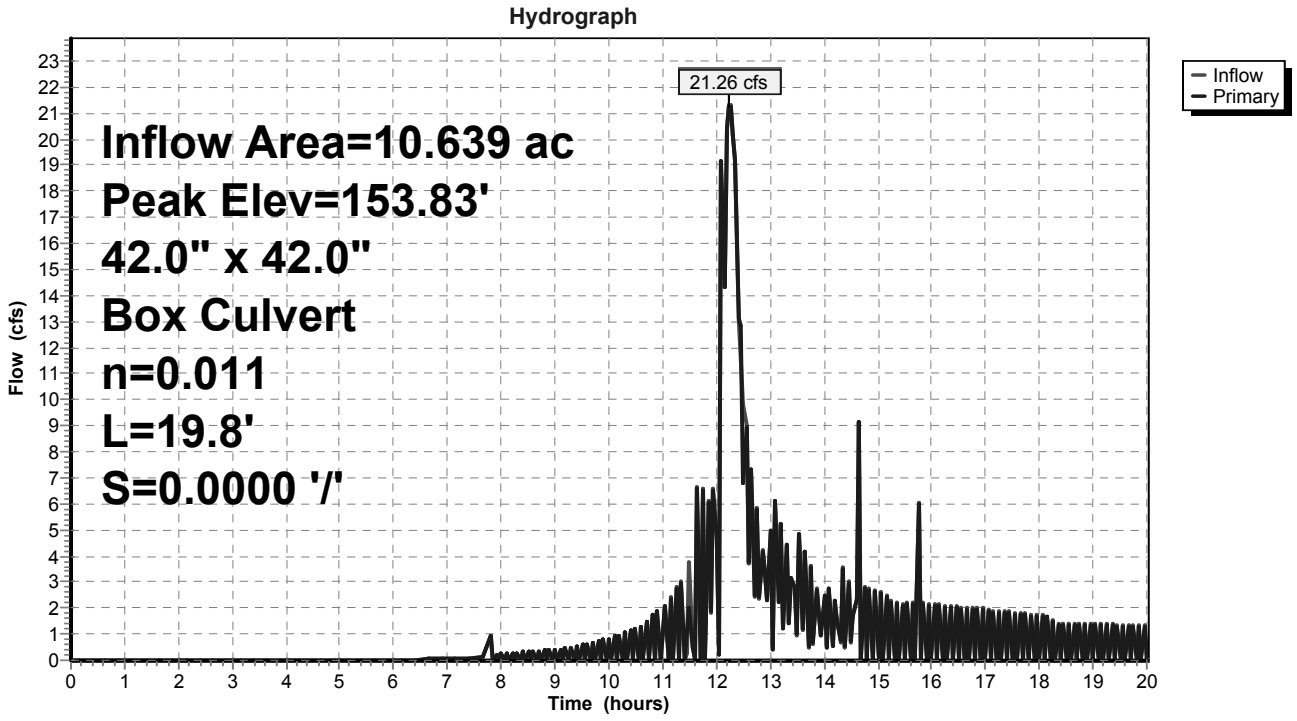
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 2.10" for 10_year event
Inflow = 21.32 cfs @ 12.25 hrs, Volume= 1.861 af
Outflow = 21.26 cfs @ 12.25 hrs, Volume= 1.861 af, Atten= 0%, Lag= 0.0 min
Primary = 21.26 cfs @ 12.25 hrs, Volume= 1.861 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 153.83' @ 12.29 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=13.50 cfs @ 12.25 hrs HW=153.77' TW=153.72' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 13.50 cfs @ 1.10 fps)

## Pond MH-NCULV-A: MH-NCULV-A



## Summary for Pond MH-NCULV-B: MH-NCULV-B

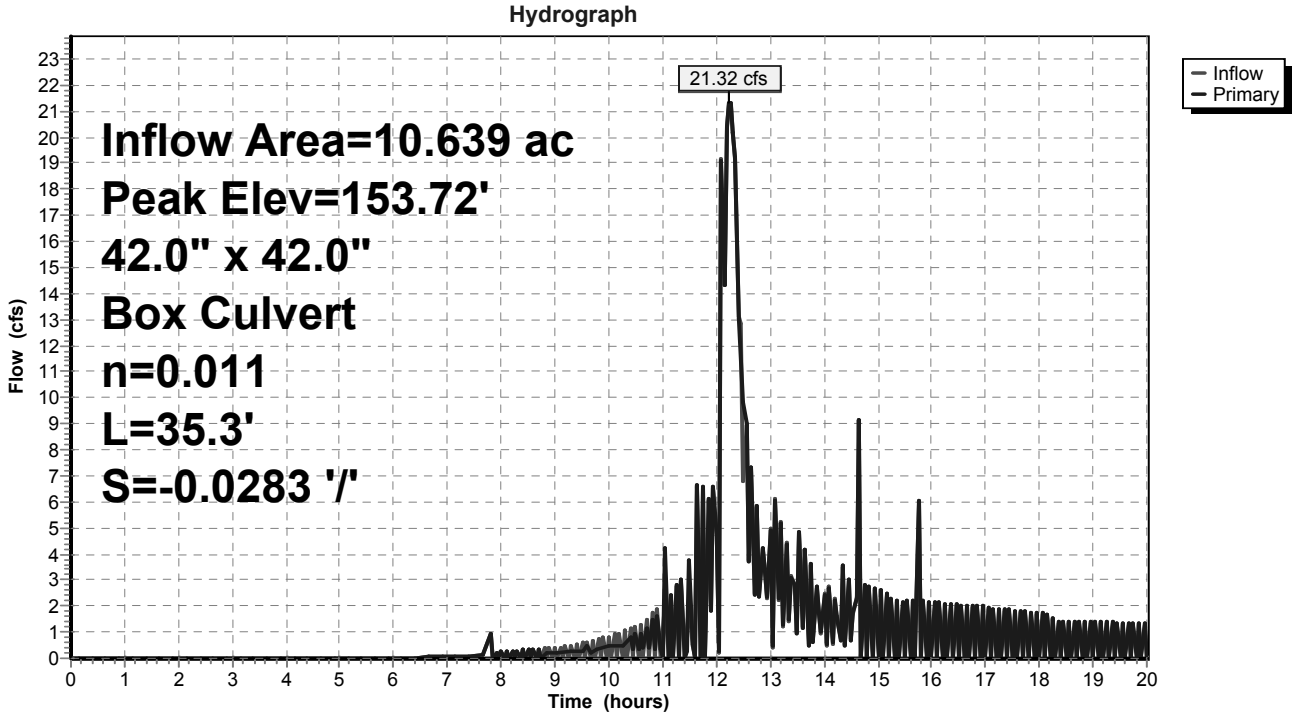
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 2.10" for 10_year event
Inflow = 21.26 cfs @ 12.25 hrs, Volume= 1.861 af
Outflow = 21.32 cfs @ 12.25 hrs, Volume= 1.860 af, Atten= 0%, Lag= 0.0 min
Primary = 21.32 cfs @ 12.25 hrs, Volume= 1.860 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 153.72' @ 12.25 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=22.83 cfs @ 12.25 hrs HW=153.72' TW=153.57' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 22.83 cfs @ 1.86 fps)

## Pond MH-NCULV-B: MH-NCULV-B



## Summary for Pond P E 1.1A: 284

Inflow Area = 35.276 ac, 19.71% Impervious, Inflow Depth > 0.20" for 10_year event
Inflow = 8.42 cfs @ 12.23 hrs, Volume= 0.578 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 133.60' @ 20.00 hrs Surf.Area= 42,403 sf Storage= 25,164 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

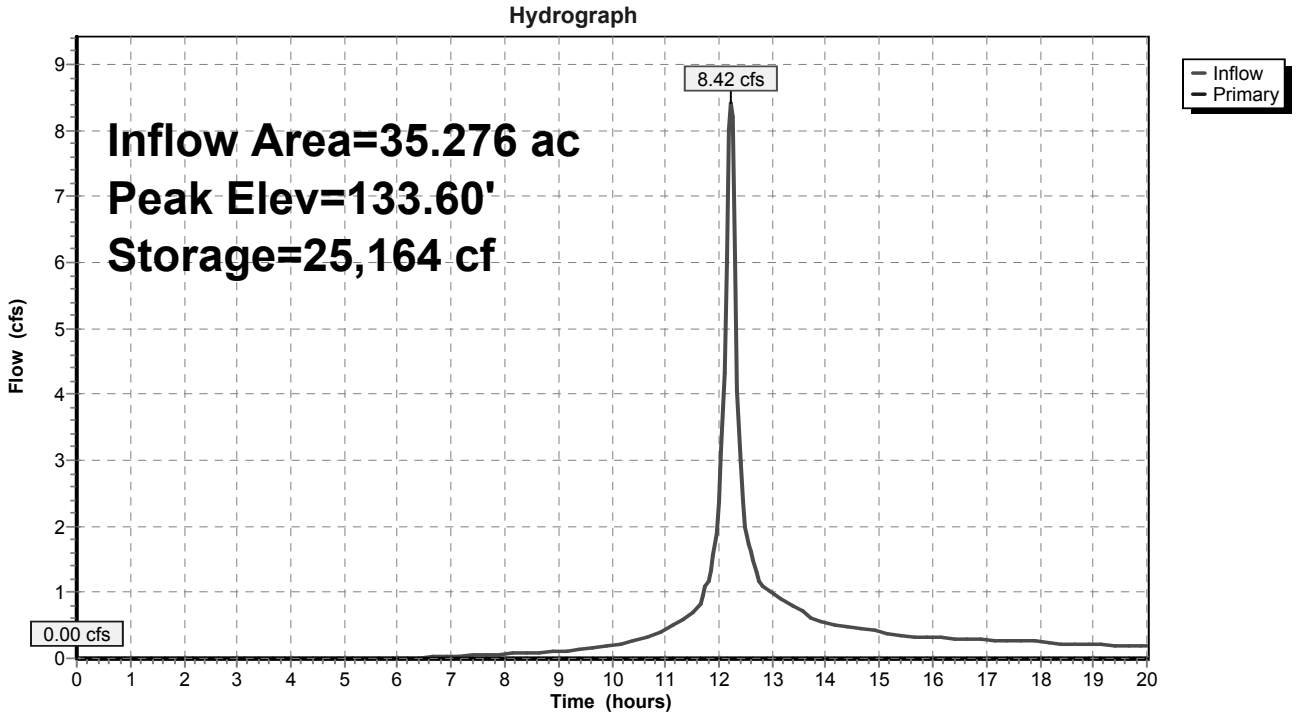
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 32.573 ac, 20.73% Impervious, Inflow Depth > 0.97" for 10_year event
Inflow = 21.82 cfs @ 12.27 hrs, Volume= 2.644 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 146.69' @ 20.00 hrs Surf.Area= 85,614 sf Storage= 115,048 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

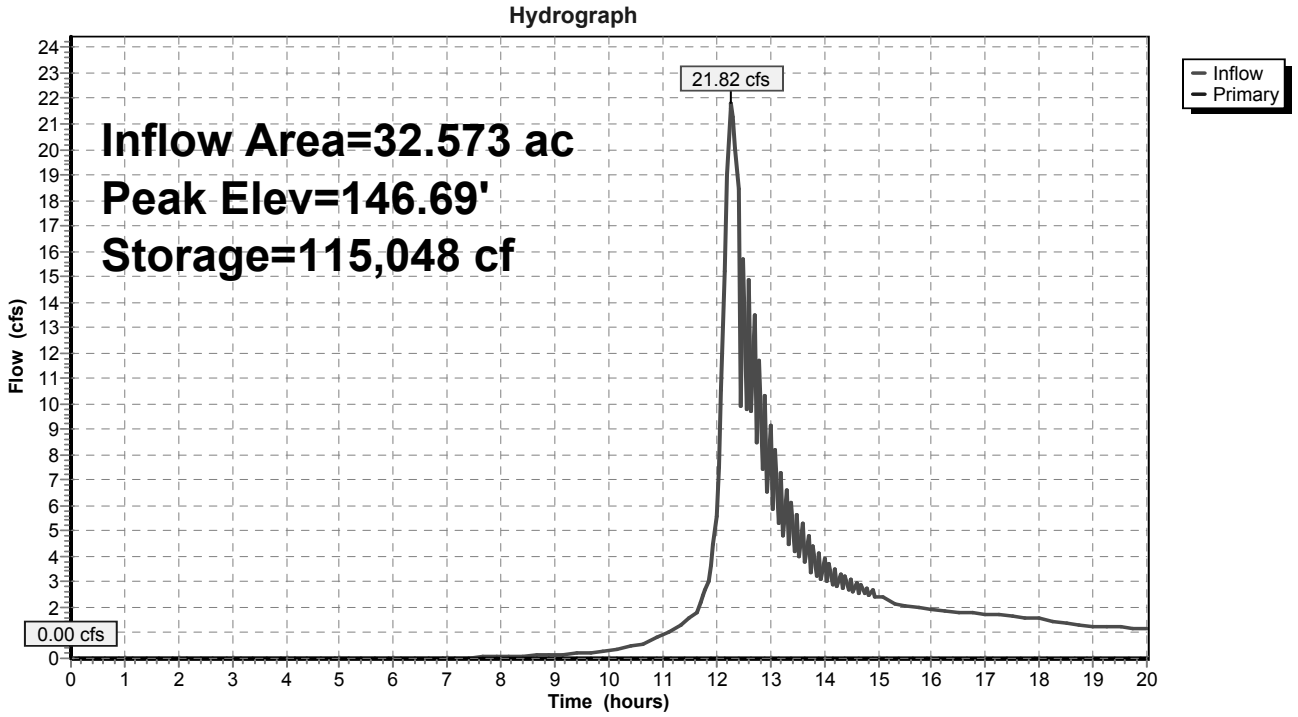
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=142.00' TW=133.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.1B-4: P E 1.1B-4

Inflow Area = 2.081 ac, 0.00% Impervious, Inflow Depth > 1.03" for 10_year event
Inflow = 2.58 cfs @ 12.24 hrs, Volume= 0.179 af
Outflow = 2.54 cfs @ 12.25 hrs, Volume= 0.179 af, Atten= 1%, Lag= 0.7 min
Primary = 2.54 cfs @ 12.25 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 167.80' @ 12.25 hrs Surf.Area= 220 sf Storage= 88 cf
Flood Elev= 170.00' Surf.Area= 2,939 sf Storage= 2,634 cf

Plug-Flow detention time= 0.5 min calculated for 0.179 af (100% of inflow)
Center-of-Mass det. time= 0.4 min ( 845.5 - 845.1 )

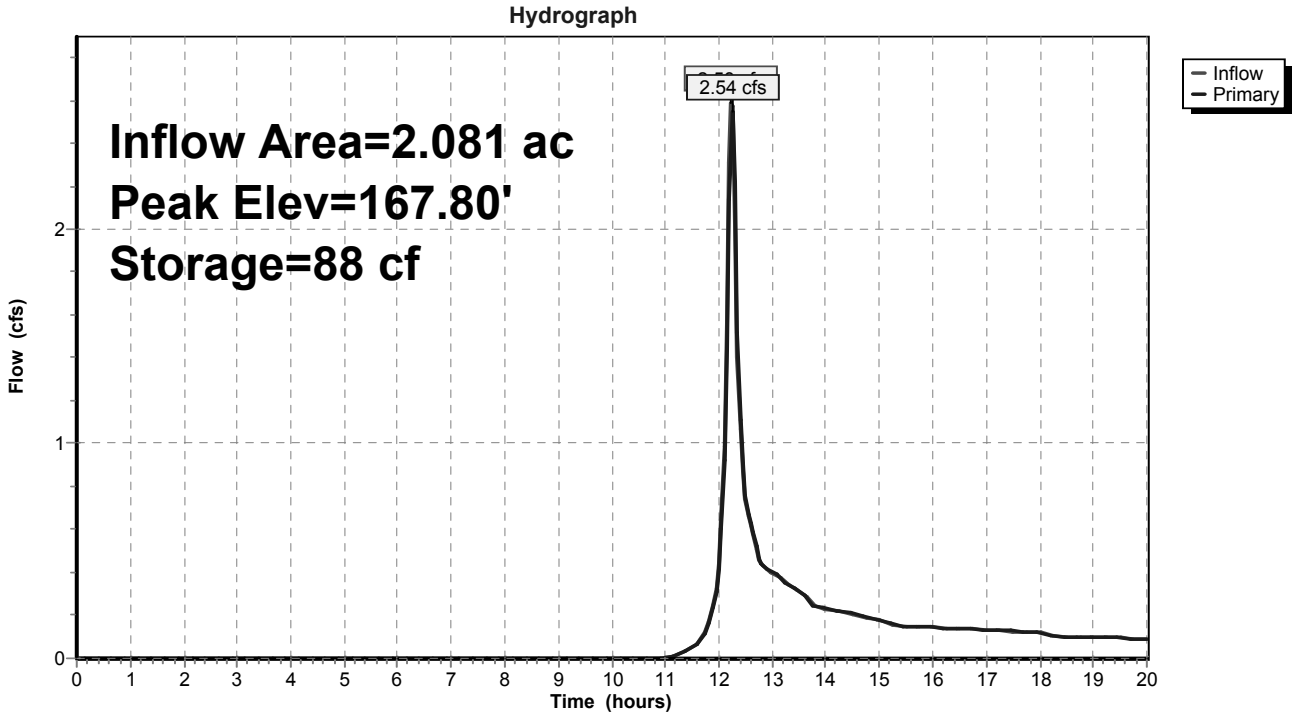
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 2,634 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 2 | 0 | 0 |
| 168.00 | 276 | 139 | 139 |
| 169.00 | 888 | 582 | 721 |
| 170.00 | 2,939 | 1,913 | 2,634 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 167.00' | **12.0" Round RCP_Round 15**<br>L= 69.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.00' / 165.40' S= 0.0230 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 169.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 72.00 148.00 229.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=2.53 cfs @ 12.25 hrs HW=167.79' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Inlet Controls 2.53 cfs @ 3.79 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B-4: P E 1.1B-4



## Summary for Pond P E 1.1C: P E 1.1C

Inflow Area = 13.327 ac, 33.50% Impervious, Inflow Depth > 0.93" for 10_year event
Inflow = 14.95 cfs @ 12.24 hrs, Volume= 1.028 af
Outflow = 11.80 cfs @ 12.30 hrs, Volume= 1.027 af, Atten= 21%, Lag= 3.5 min
Primary = 11.80 cfs @ 12.30 hrs, Volume= 1.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 2 sf Storage= 0 cf
Peak Elev= 170.20' @ 12.30 hrs Surf.Area= 3,709 sf Storage= 1,166 cf
Flood Elev= 171.00' Surf.Area= 14,037 sf Storage= 8,304 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min ( 801.6 - 801.3 )

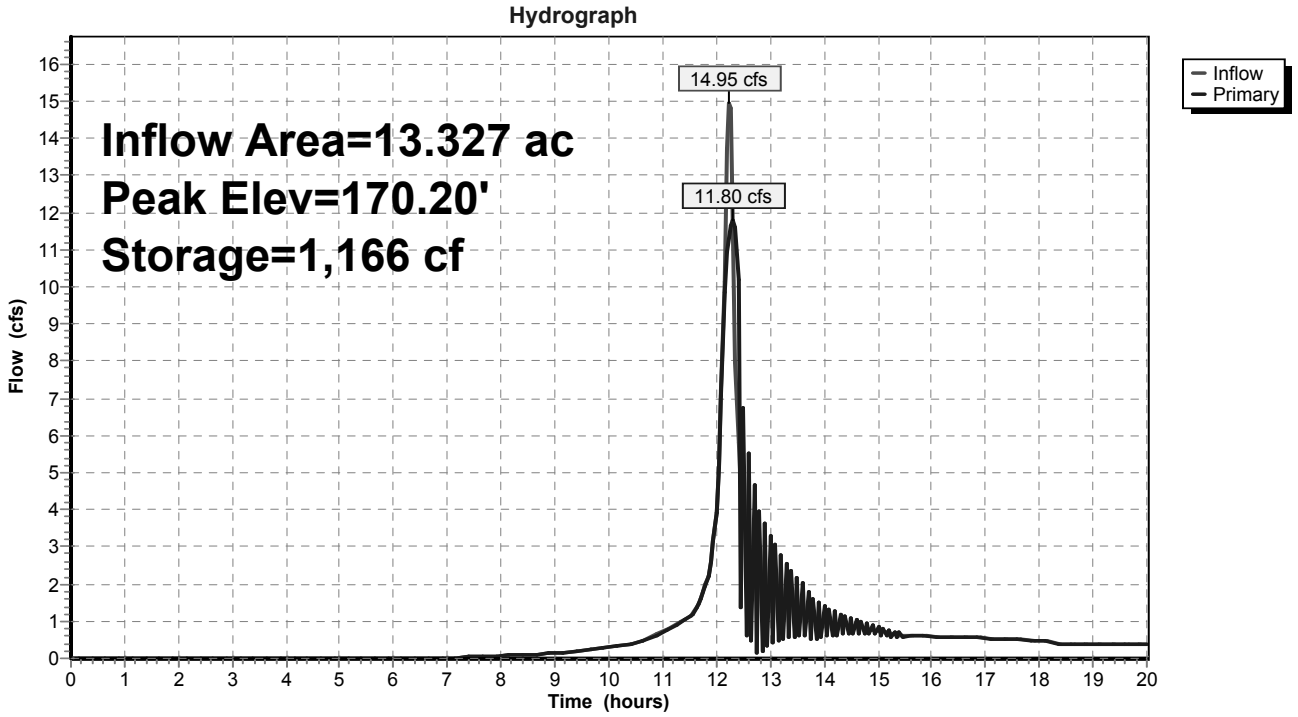
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 33,139 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 2 | 0 | 0 |
| 169.00 | 34 | 71 | 71 |
| 170.00 | 1,198 | 616 | 687 |
| 171.00 | 14,037 | 7,618 | 8,304 |
| 172.00 | 35,633 | 24,835 | 33,139 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.64' | **15.0" Round RCP_Round 15**<br>L= 85.2' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.64' / 165.18' S= 0.0054 '/' Cc= 0.900<br>n= 0.011, Flow Area= 1.23 sf |
| #2 | Primary | 171.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 200.00 333.00 436.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=11.79 cfs @ 12.30 hrs HW=170.19' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Barrel Controls 11.79 cfs @ 9.61 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1C: P E 1.1C



## Summary for Pond P E 1.1D: P E 1.1D

Inflow Area = 7.986 ac, 39.80% Impervious, Inflow Depth > 2.45" for 10_year event
Inflow = 23.55 cfs @ 12.23 hrs, Volume= 1.632 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 169.00' Surf.Area= 25 sf Storage= 0 cf
Peak Elev= 171.74' @ 20.00 hrs Surf.Area= 55,306 sf Storage= 71,026 cf
Flood Elev= 172.00' Surf.Area= 58,231 sf Storage= 86,010 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

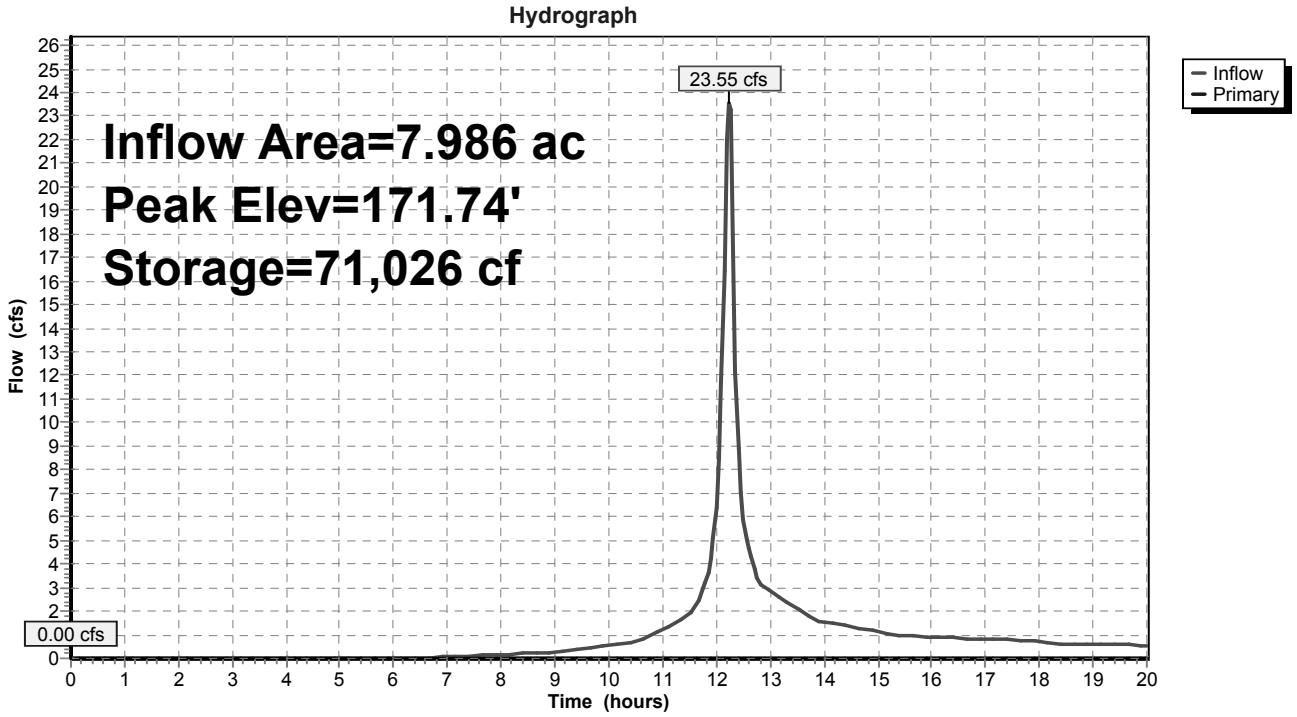
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 146,356 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 25 | 0 | 0 |
| 170.00 | 9,735 | 4,880 | 4,880 |
| 171.00 | 47,147 | 28,441 | 33,321 |
| 172.00 | 58,231 | 52,689 | 86,010 |
| 173.00 | 62,461 | 60,346 | 146,356 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 172.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 56.00 69.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=169.00' TW=165.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1D: P E 1.1D



## Summary for Pond P E 1.2A: 282

Inflow Area = 18.820 ac, 26.22% Impervious, Inflow Depth > 1.12" for 10_year event
Inflow = 18.62 cfs @ 12.25 hrs, Volume= 1.756 af
Outflow = 1.60 cfs @ 14.92 hrs, Volume= 0.561 af, Atten= 91%, Lag= 160.0 min
Primary = 1.60 cfs @ 14.92 hrs, Volume= 0.561 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 135.05' @ 14.92 hrs Surf.Area= 59,548 sf Storage= 53,067 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= 297.9 min calculated for 0.561 af (32% of inflow)
Center-of-Mass det. time= 179.1 min ( 1,004.3 - 825.2 )

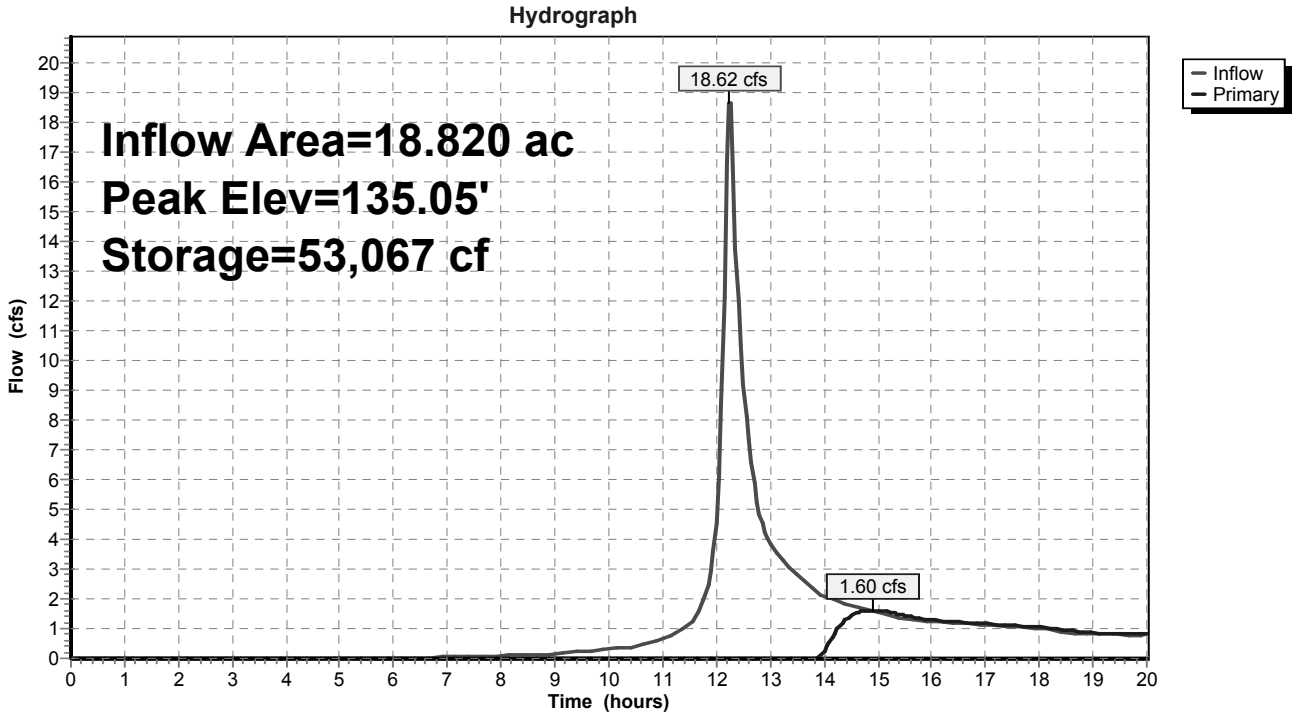
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=1.60 cfs @ 14.92 hrs HW=135.05' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 1.60 cfs @ 0.70 fps)

## Pond P E 1.2A: 282



## Summary for Pond P E 1.2D: P E 1.2D

Inflow Area = 3.227 ac, 45.26% Impervious, Inflow Depth > 1.86" for 10_year event
Inflow = 5.56 cfs @ 12.35 hrs, Volume= 0.501 af
Outflow = 0.03 cfs @ 20.00 hrs, Volume= 0.001 af, Atten= 99%, Lag= 458.8 min
Primary = 0.03 cfs @ 20.00 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 10,809 sf Storage= 15,981 cf
Peak Elev= 158.01' @ 20.00 hrs Surf.Area= 32,074 sf Storage= 37,742 cf (21,761 cf above start)
Flood Elev= 159.00' Surf.Area= 39,090 sf Storage= 72,926 cf (56,945 cf above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= 375.0 min ( 1,191.2 - 816.1 )

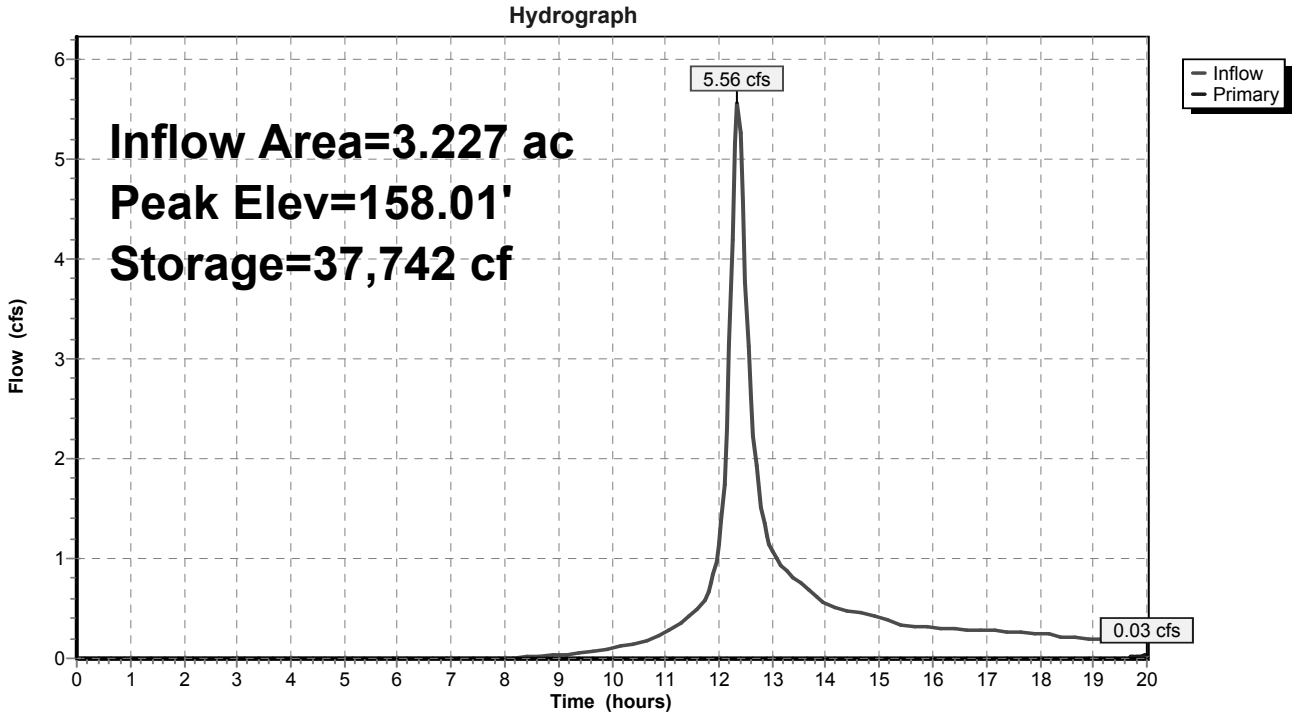
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 154.00' | 72,926 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 154.00 | 288 | 0 | 0 |
| 155.00 | 3,513 | 1,900 | 1,900 |
| 156.00 | 6,920 | 5,216 | 7,117 |
| 157.00 | 10,809 | 8,865 | 15,981 |
| 158.00 | 31,995 | 21,402 | 37,383 |
| 159.00 | 39,090 | 35,542 | 72,926 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 5.00 13.00 18.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.03 cfs @ 20.00 hrs HW=158.01' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 0.03 cfs @ 0.34 fps)

## Pond P E 1.2D: P E 1.2D



## Summary for Pond P E 1.2E: P E 1.2E

Inflow Area = 0.305 ac, 34.60% Impervious, Inflow Depth > 1.69" for 10_year event
Inflow = 0.64 cfs @ 12.23 hrs, Volume= 0.043 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 413 sf Storage= 0 cf
Peak Elev= 172.05' @ 20.00 hrs Surf.Area= 3,171 sf Storage= 1,869 cf
Flood Elev= 173.00' Surf.Area= 6,101 sf Storage= 6,273 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 21,312 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

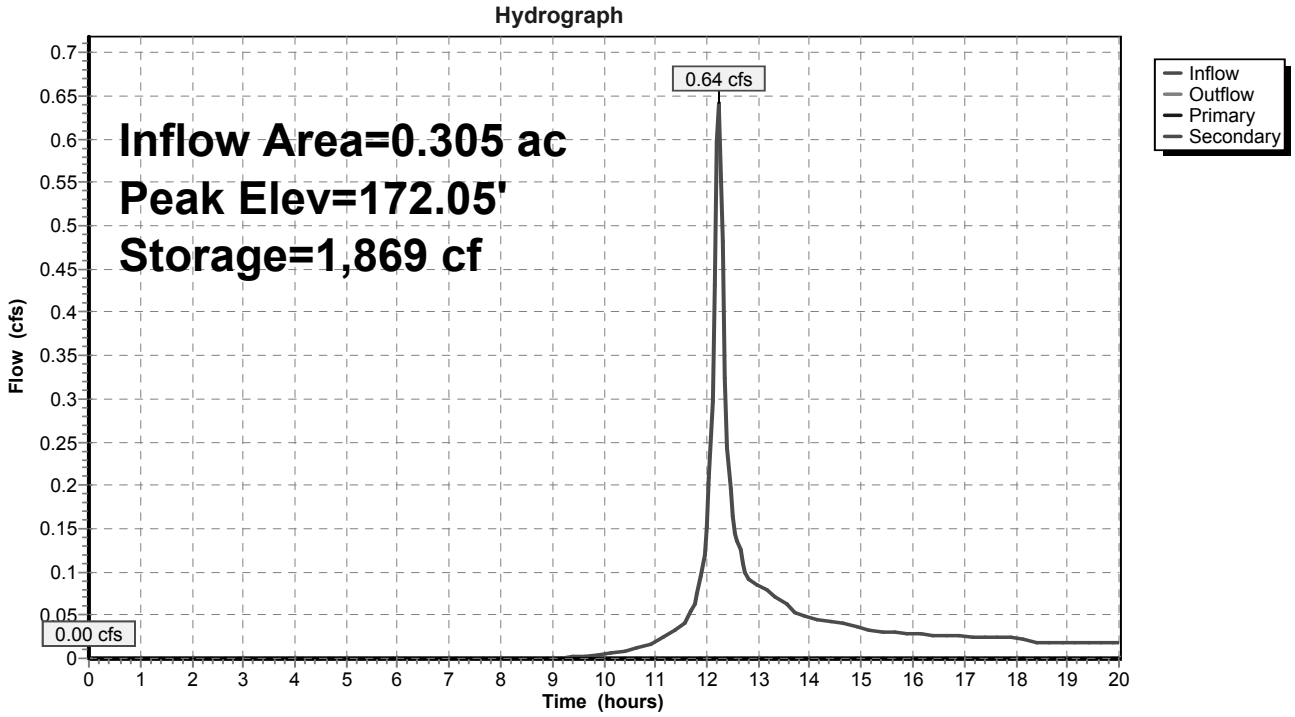
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 413 | 0 | 0 |
| 172.00 | 3,016 | 1,715 | 1,715 |
| 173.00 | 6,101 | 4,559 | 6,273 |
| 174.00 | 7,653 | 6,877 | 13,150 |
| 175.00 | 8,670 | 8,161 | 21,312 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 6.00 20.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Secondary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 20.00 25.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=157.00' (Dynamic Tailwater)
**1=Asymmetrical Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=0.00' (Dynamic Tailwater)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2E: P E 1.2E



## Summary for Pond P W 3.1: P W 3.1

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 2.07" for 10_year event
Inflow = 32.23 cfs @ 12.29 hrs, Volume= 2.621 af
Outflow = 32.20 cfs @ 12.30 hrs, Volume= 2.453 af, Atten= 0%, Lag= 0.4 min
Primary = 32.20 cfs @ 12.30 hrs, Volume= 2.453 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.22' @ 12.30 hrs Surf.Area= 5,030 sf Storage= 8,271 cf
Flood Elev= 157.00' Surf.Area= 7,260 sf Storage= 13,079 cf

Plug-Flow detention time= 40.4 min calculated for 2.447 af (93% of inflow)
Center-of-Mass det. time= 17.6 min ( 808.5 - 790.9 )

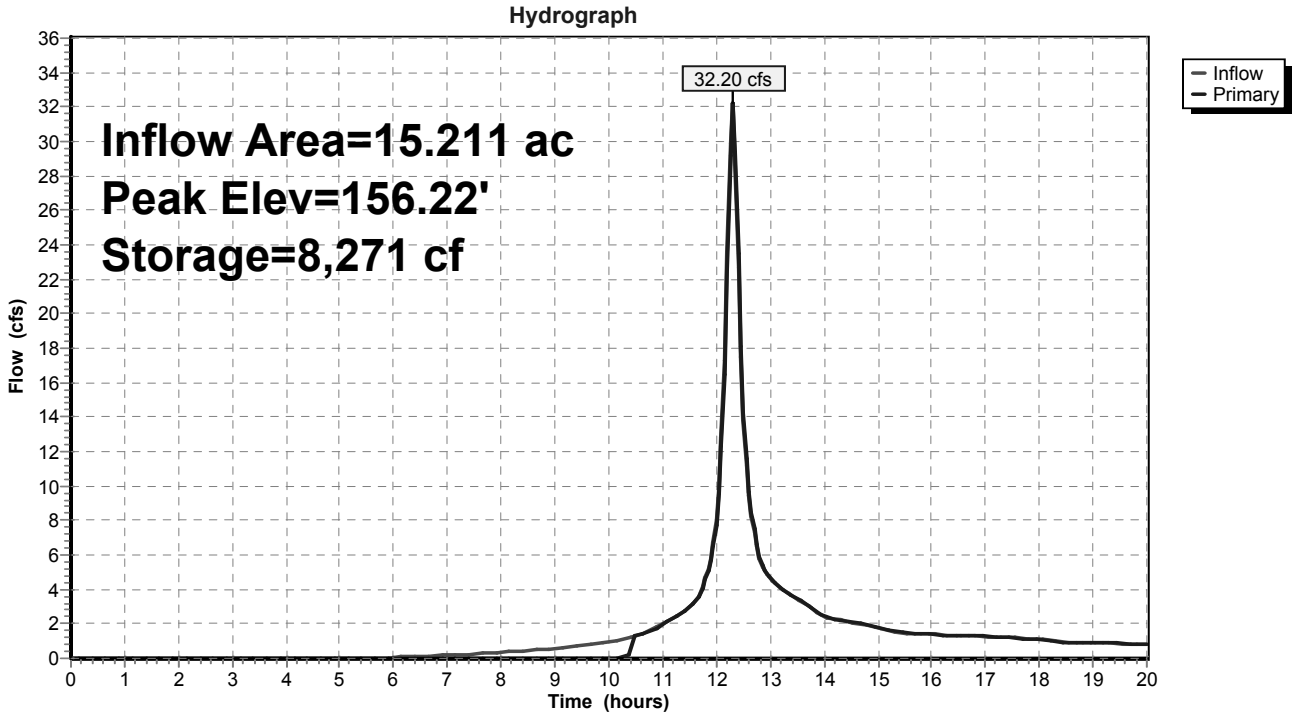
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 13,079 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,411 | 3,837 | 7,244 |
| 157.00 | 7,260 | 5,835 | 13,079 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=32.15 cfs @ 12.30 hrs HW=156.22' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 32.15 cfs @ 1.43 fps)

## Pond P W 3.1: P W 3.1



## Summary for Pond P W 3.4: P W 3.4

Inflow Area = 3.724 ac, 16.97% Impervious, Inflow Depth > 0.38" for 10_year event
Inflow = 0.73 cfs @ 12.41 hrs, Volume= 0.119 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 182.22' @ 20.00 hrs Surf.Area= 4,365 sf Storage= 5,191 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

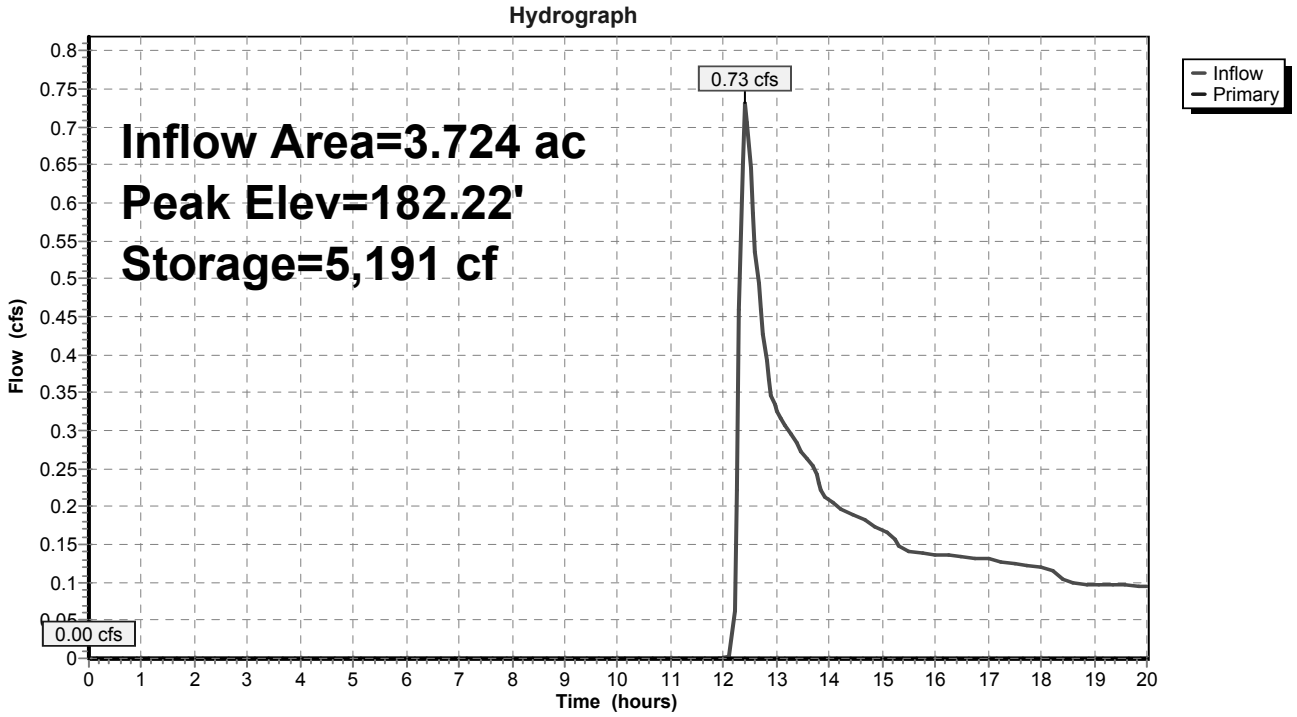
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=180.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 3.4: P W 3.4



## Summary for Pond P W 3.5: P W 3.5

Inflow Area = 0.109 ac, 27.98% Impervious, Inflow Depth > 1.22" for 10_year event
Inflow = 0.16 cfs @ 12.24 hrs, Volume= 0.011 af
Outflow = 0.16 cfs @ 12.24 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.24 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 9 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 9 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,452 sf Storage= 2,460 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 837.4 - 837.4 )

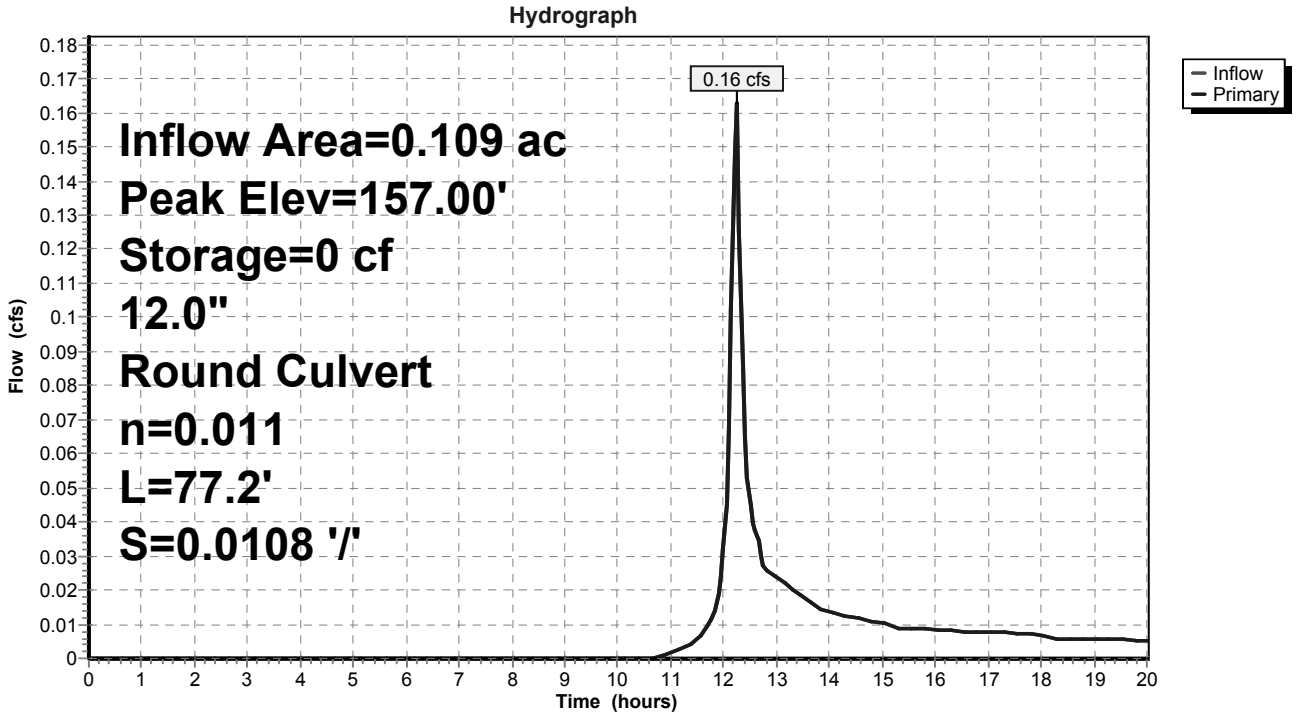
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 2,460 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 9 | 0 | 0 |
| 158.00 | 277 | 143 | 143 |
| 159.00 | 560 | 419 | 562 |
| 160.00 | 892 | 726 | 1,288 |
| 161.00 | 1,452 | 1,172 | 2,460 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Culvert**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.24 hrs HW=157.00' TW=154.03' (Dynamic Tailwater)
**1=Culvert** (Passes 0.00 cfs of 1.85 cfs potential flow)

## Pond P W 3.5: P W 3.5



## Summary for Pond P W 9.1: P W 9.1

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 1.97" for 10_year event
Inflow = 25.45 cfs @ 12.23 hrs, Volume= 1.747 af
Outflow = 21.32 cfs @ 12.25 hrs, Volume= 1.768 af, Atten= 16%, Lag= 0.8 min
Primary = 21.32 cfs @ 12.25 hrs, Volume= 1.861 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 154.11' @ 12.29 hrs Surf.Area= 5,434 sf Storage= 4,951 cf
Flood Elev= 157.00' Surf.Area= 13,136 sf Storage= 31,231 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.4 min ( 809.8 - 806.3 )

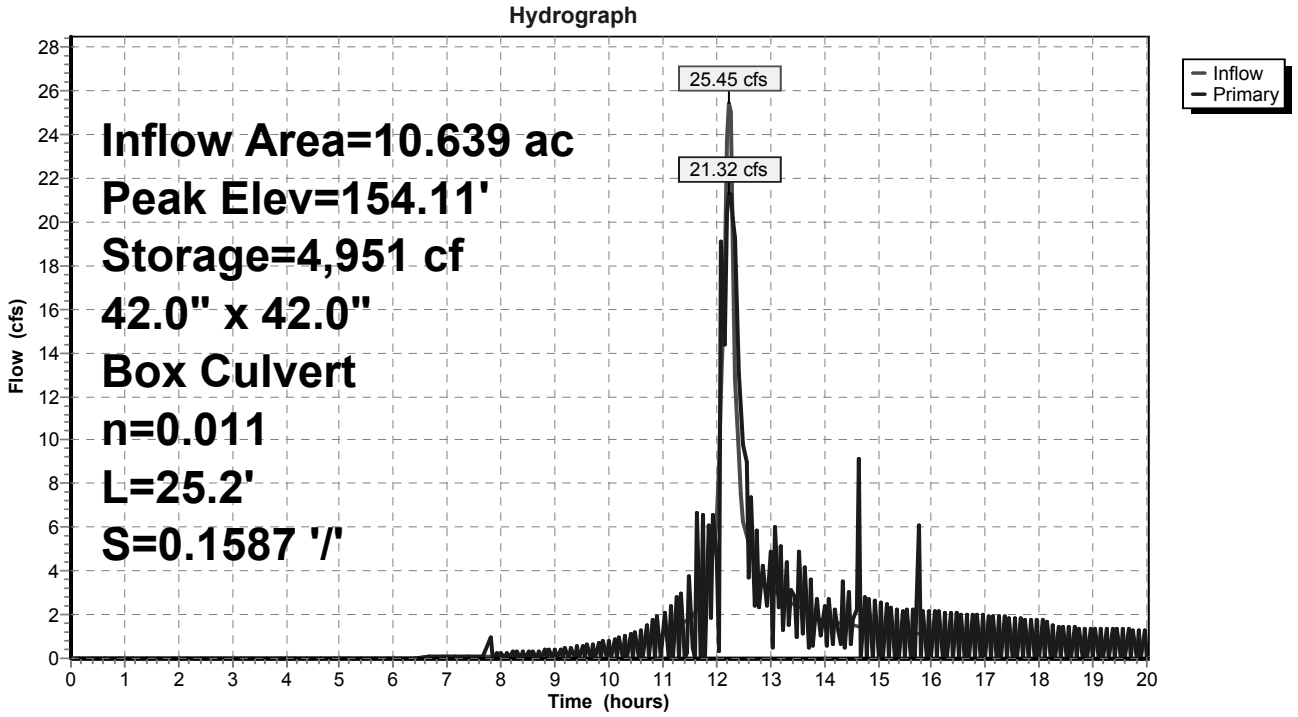
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 152.00' | 48,001 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 152.00 | 13 | 0 | 0 |
| 153.00 | 1,797 | 905 | 905 |
| 154.00 | 5,163 | 3,480 | 4,385 |
| 155.00 | 7,699 | 6,431 | 10,816 |
| 156.00 | 9,997 | 8,848 | 19,665 |
| 157.00 | 13,136 | 11,566 | 31,231 |
| 158.00 | 20,405 | 16,770 | 48,001 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=21.30 cfs @ 12.25 hrs HW=154.05' TW=153.77' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 21.30 cfs @ 2.46 fps)

## Pond P W 9.1: P W 9.1



## Summary for Pond P W 9.1B: P W 9.1B

Inflow Area = 0.559 ac, 16.03% Impervious, Inflow Depth > 1.16" for 10_year event
Inflow = 0.79 cfs @ 12.24 hrs, Volume= 0.054 af
Outflow = 0.04 cfs @ 15.72 hrs, Volume= 0.013 af, Atten= 95%, Lag= 208.7 min
Primary = 0.04 cfs @ 15.72 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 158.00' @ 15.72 hrs Surf.Area= 2,838 sf Storage= 1,791 cf
Flood Elev= 158.00' Surf.Area= 2,833 sf Storage= 1,783 cf

Plug-Flow detention time= 327.9 min calculated for 0.013 af (24% of inflow)
Center-of-Mass det. time= 212.5 min ( 1,052.4 - 839.9 )

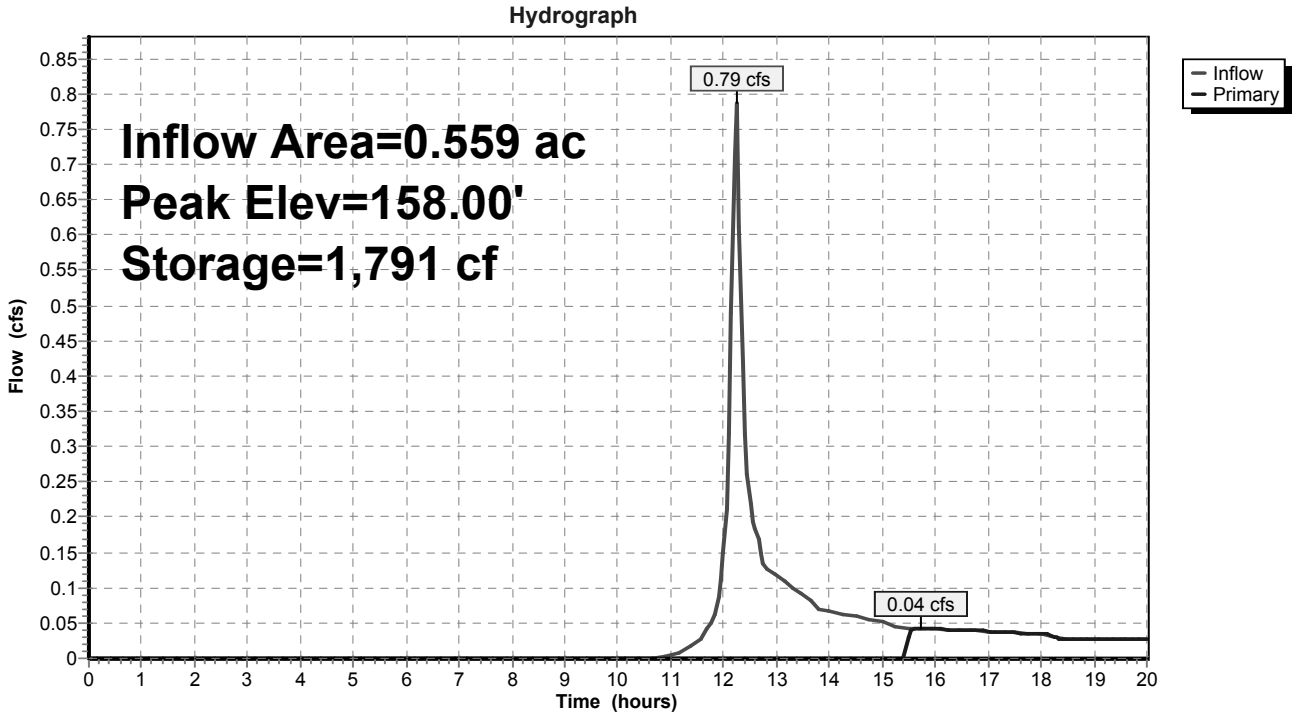
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.04 cfs @ 15.72 hrs HW=158.00' TW=152.51' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 0.04 cfs @ 0.17 fps)

## Pond P W 9.1B: P W 9.1B



## Summary for Pond P W 9.1C: P W 9.1C

Inflow Area = 4.751 ac, 57.07% Impervious, Inflow Depth > 2.65" for 10_year event
Inflow = 15.23 cfs @ 12.23 hrs, Volume= 1.051 af
Outflow = 15.27 cfs @ 12.23 hrs, Volume= 1.050 af, Atten= 0%, Lag= 0.2 min
Primary = 15.27 cfs @ 12.23 hrs, Volume= 1.050 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 139 sf Storage= 0 cf
Peak Elev= 166.21' @ 12.23 hrs Surf.Area= 606 sf Storage= 438 cf
Flood Elev= 167.00' Surf.Area= 989 sf Storage= 1,067 cf

Plug-Flow detention time= 1.5 min calculated for 1.047 af (100% of inflow)
Center-of-Mass det. time= 1.0 min ( 790.7 - 789.7 )

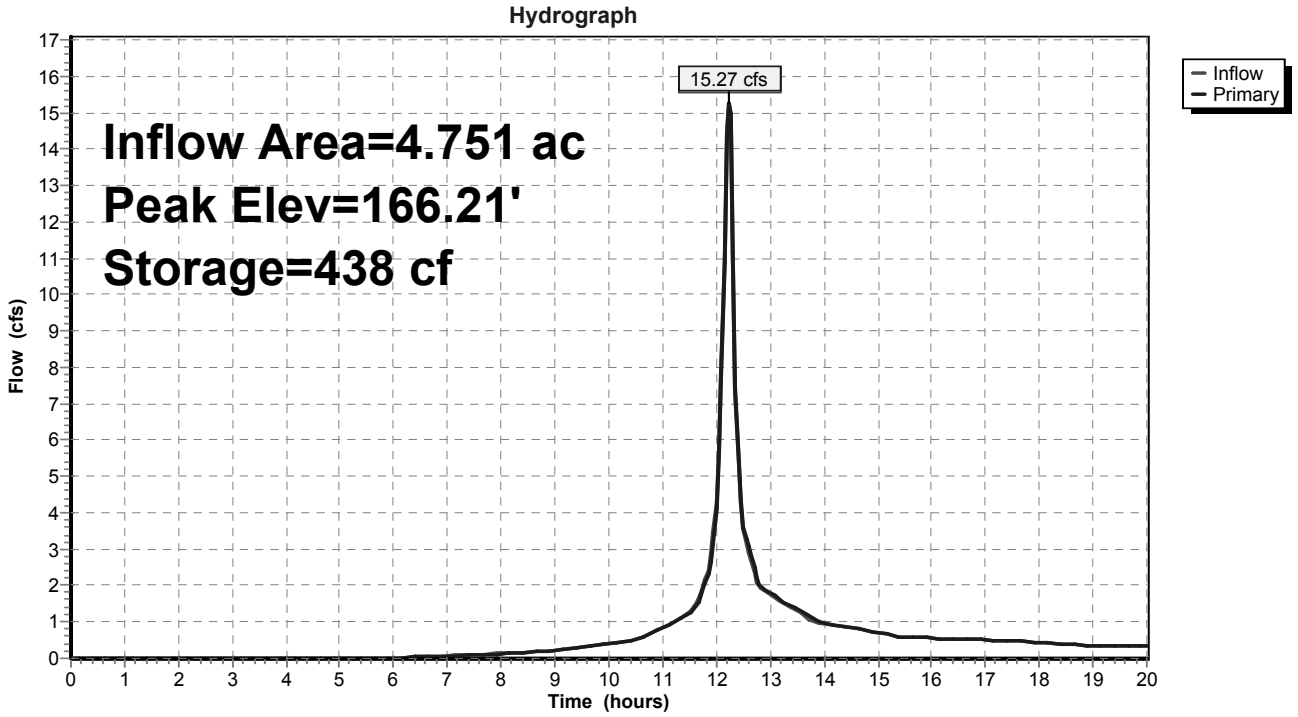
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 3,394 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 139 | 0 | 0 |
| 166.00 | 503 | 321 | 321 |
| 167.00 | 989 | 746 | 1,067 |
| 168.00 | 3,665 | 2,327 | 3,394 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.00' | **12.0" Round Culvert**<br>L= 49.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.00' / 164.00' S= 0.0202 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 166.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 15.00 46.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=14.76 cfs @ 12.23 hrs HW=166.21' TW=154.01' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 3.97 cfs @ 5.05 fps)
**2=Asymmetrical Weir** (Weir Controls 10.79 cfs @ 1.24 fps)

## Pond P W 9.1C: P W 9.1C



## Summary for Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 2.10" for 10_year event
Inflow = 21.32 cfs @ 12.25 hrs, Volume= 1.860 af
Outflow = 23.09 cfs @ 12.25 hrs, Volume= 1.852 af, Atten= 0%, Lag= 0.2 min
Primary = 23.09 cfs @ 12.25 hrs, Volume= 1.852 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 150.00' Surf.Area= 101 sf Storage= 0 cf
Peak Elev= 153.57' @ 12.25 hrs Surf.Area= 186 sf Storage= 513 cf
Flood Elev= 154.00' Surf.Area= 197 sf Storage= 595 cf

Plug-Flow detention time= 3.9 min calculated for 1.852 af (100% of inflow)
Center-of-Mass det. time= 2.3 min ( 809.3 - 807.0 )

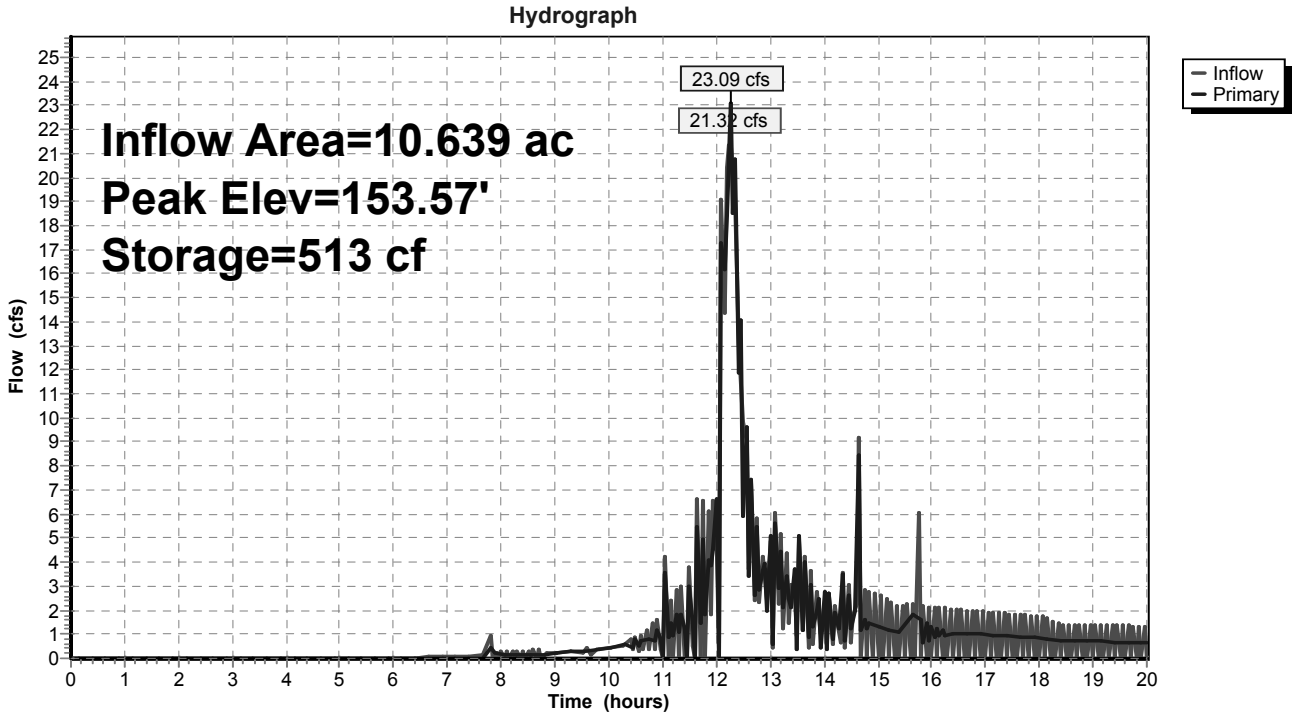
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 150.00' | 595 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 150.00 | 101 | 0 | 0 |
| 154.00 | 197 | 595 | 595 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 153.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 18.00 21.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=23.07 cfs @ 12.25 hrs HW=153.57' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 23.07 cfs @ 2.19 fps)

## Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

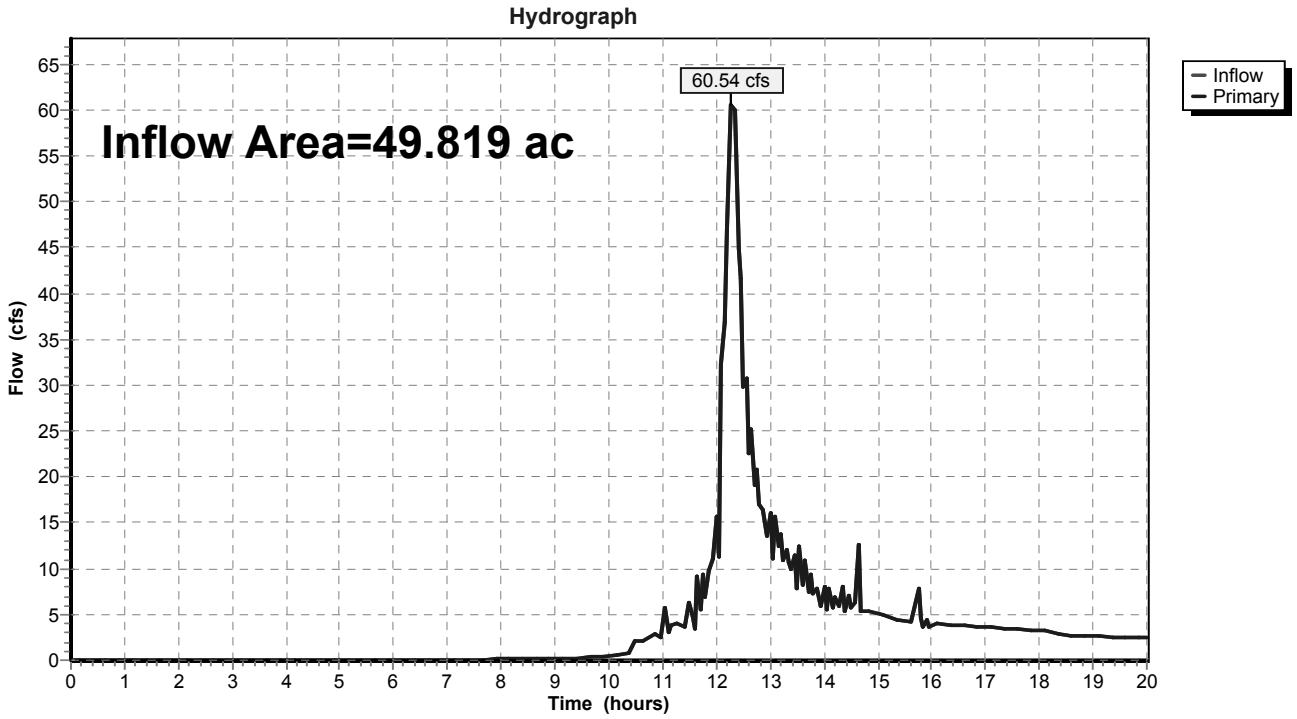


## Summary for Link DP North: DP North

Inflow Area = 49.819 ac, 26.12% Impervious, Inflow Depth > 1.46" for 10_year event
Inflow = 60.54 cfs @ 12.25 hrs, Volume= 6.059 af
Primary = 60.54 cfs @ 12.25 hrs, Volume= 6.059 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

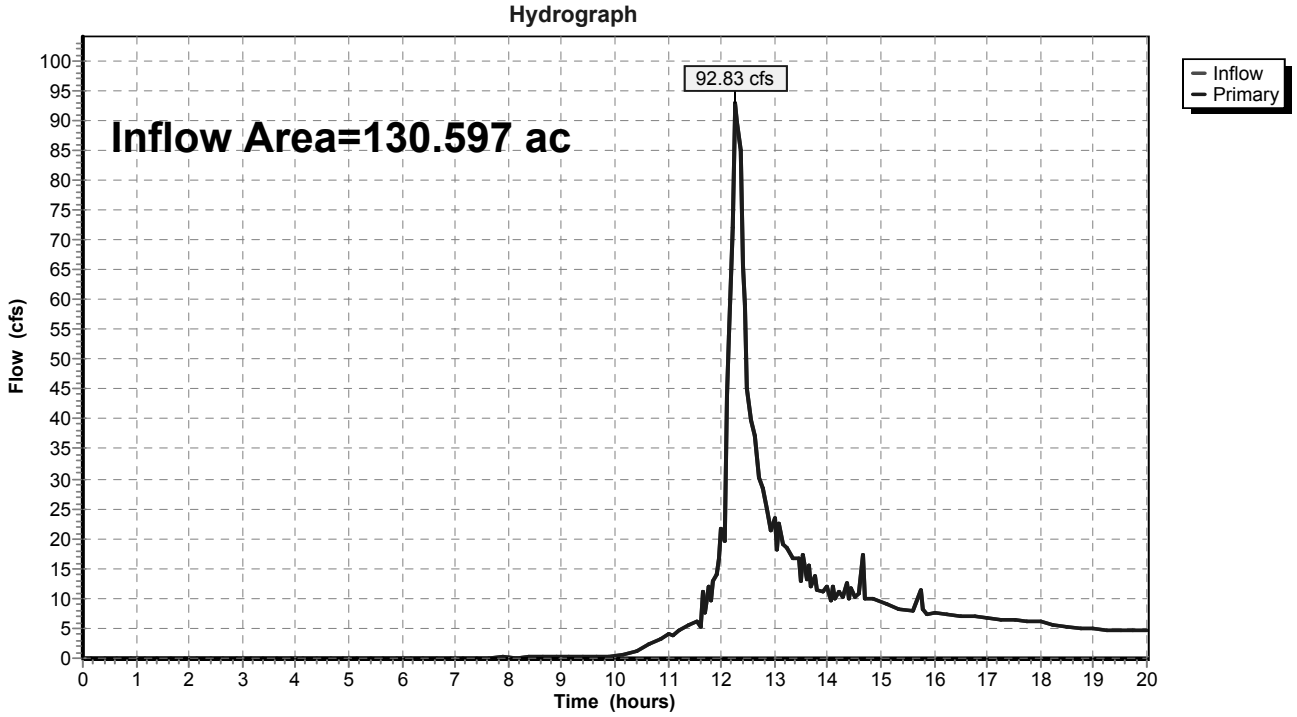


## Summary for Link DP Sudbury: (new Link)

Inflow Area = 130.597 ac, 21.29% Impervious, Inflow Depth > 0.87" for 10_year event
Inflow = 92.83 cfs @ 12.27 hrs, Volume= 9.489 af
Primary = 92.83 cfs @ 12.27 hrs, Volume= 9.489 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: (new Link)

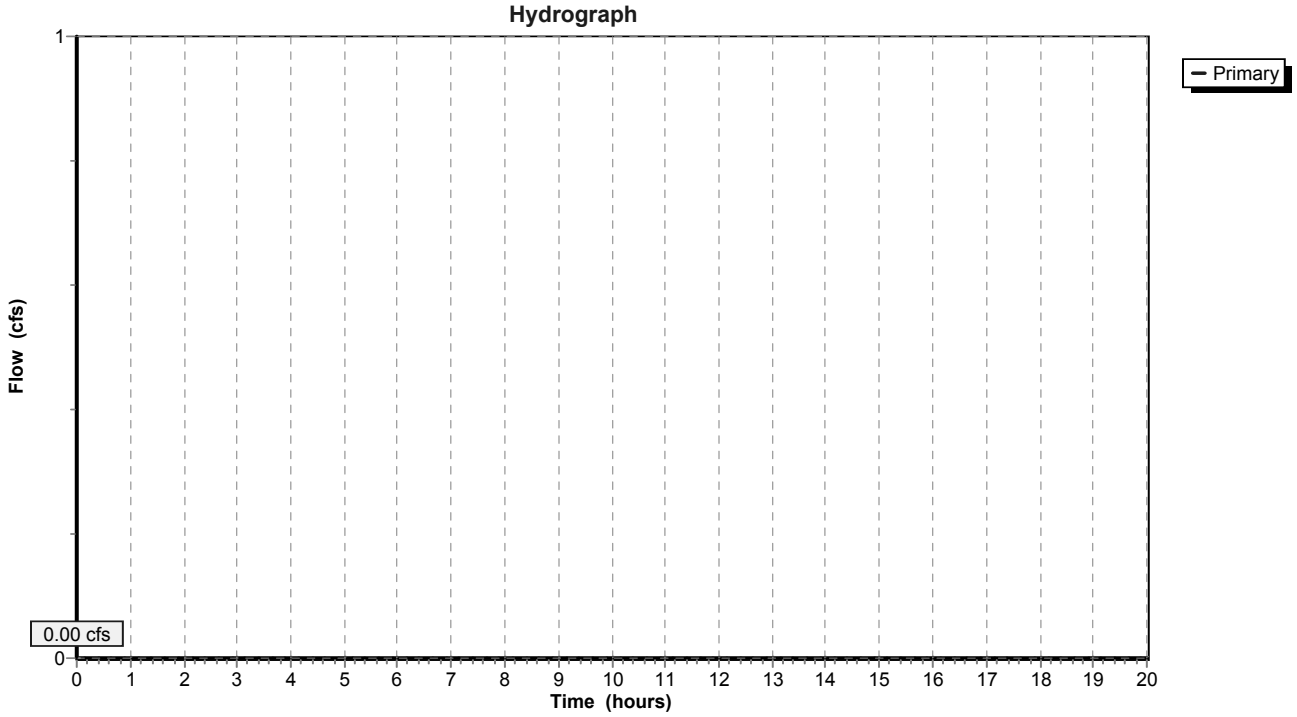


## Summary for Link DP Wellhead: DP Wellhead

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

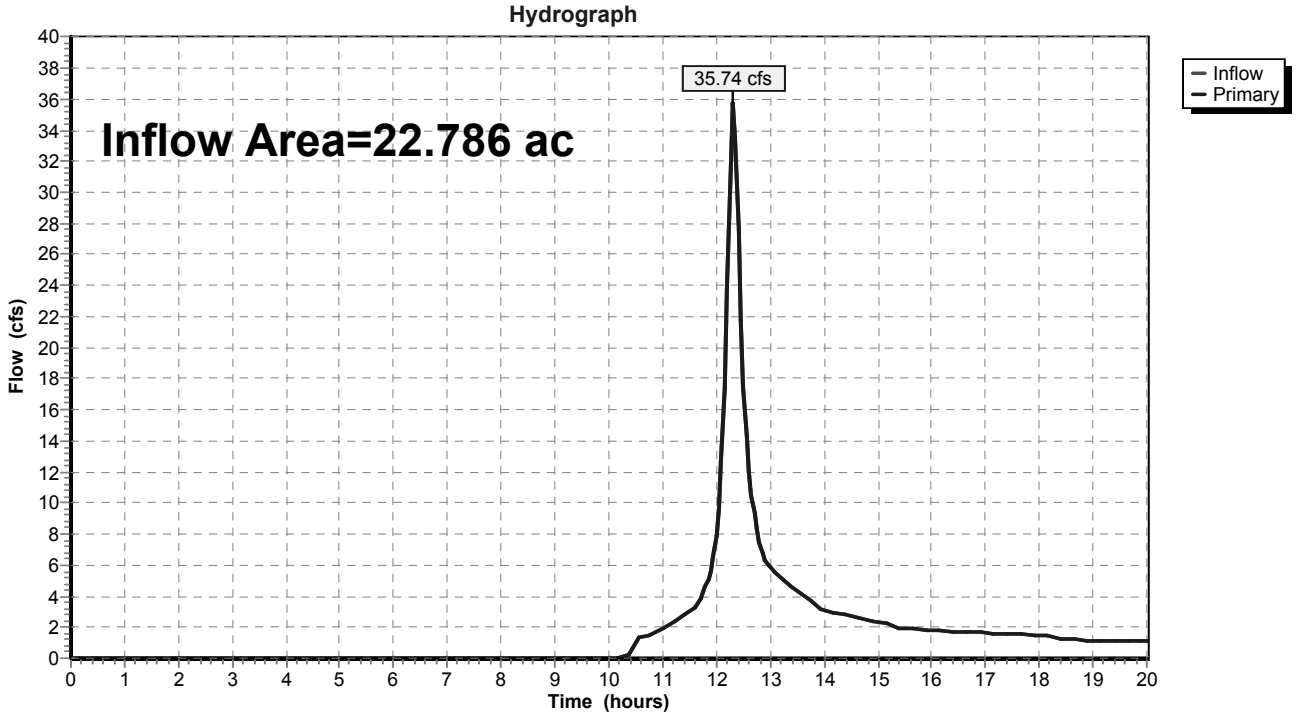


## Summary for Link DP West: DP West

Inflow Area = 22.786 ac, 28.55% Impervious, Inflow Depth > 1.52" for 10_year event
Inflow = 35.74 cfs @ 12.31 hrs, Volume= 2.896 af
Primary = 35.74 cfs @ 12.31 hrs, Volume= 2.896 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

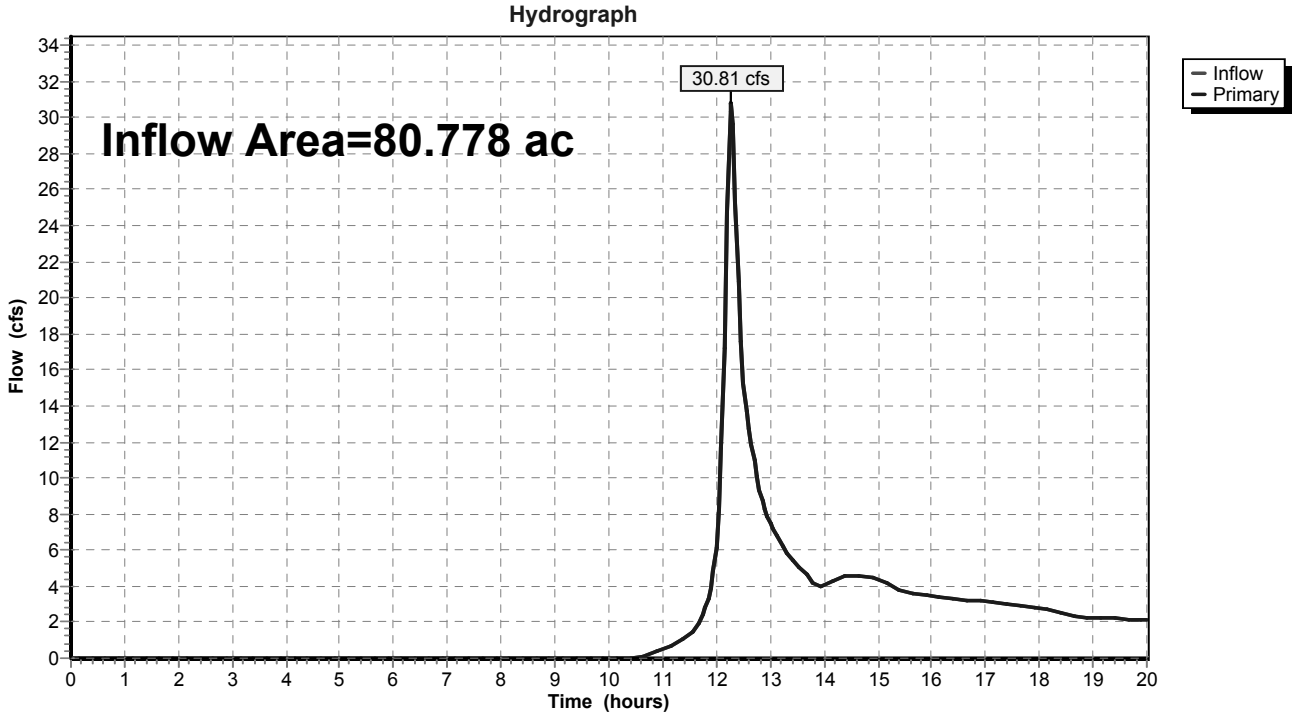


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 80.778 ac, 18.32% Impervious, Inflow Depth > 0.51" for 10_year event
Inflow = 30.81 cfs @ 12.27 hrs, Volume= 3.430 af
Primary = 30.81 cfs @ 12.27 hrs, Volume= 3.430 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

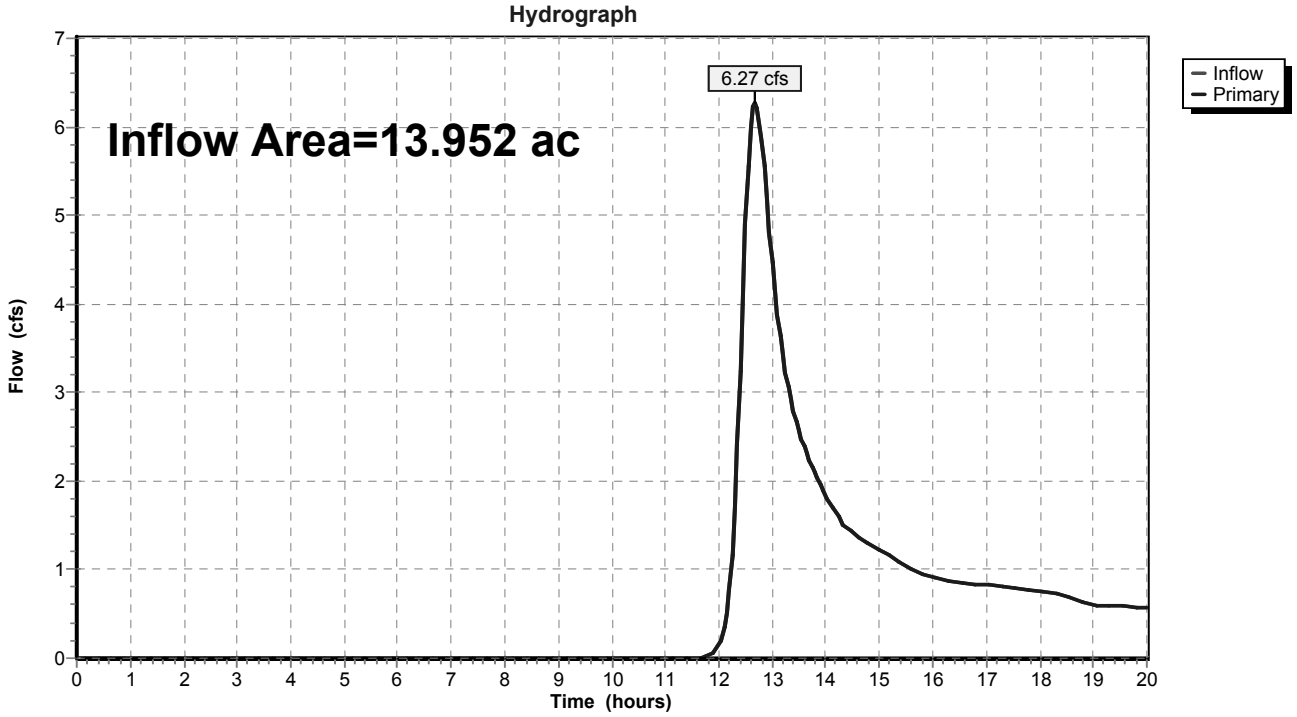


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.952 ac, 9.67% Impervious, Inflow Depth > 0.84" for 10_year event
Inflow = 6.27 cfs @ 12.69 hrs, Volume= 0.982 af
Primary = 6.27 cfs @ 12.69 hrs, Volume= 0.982 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

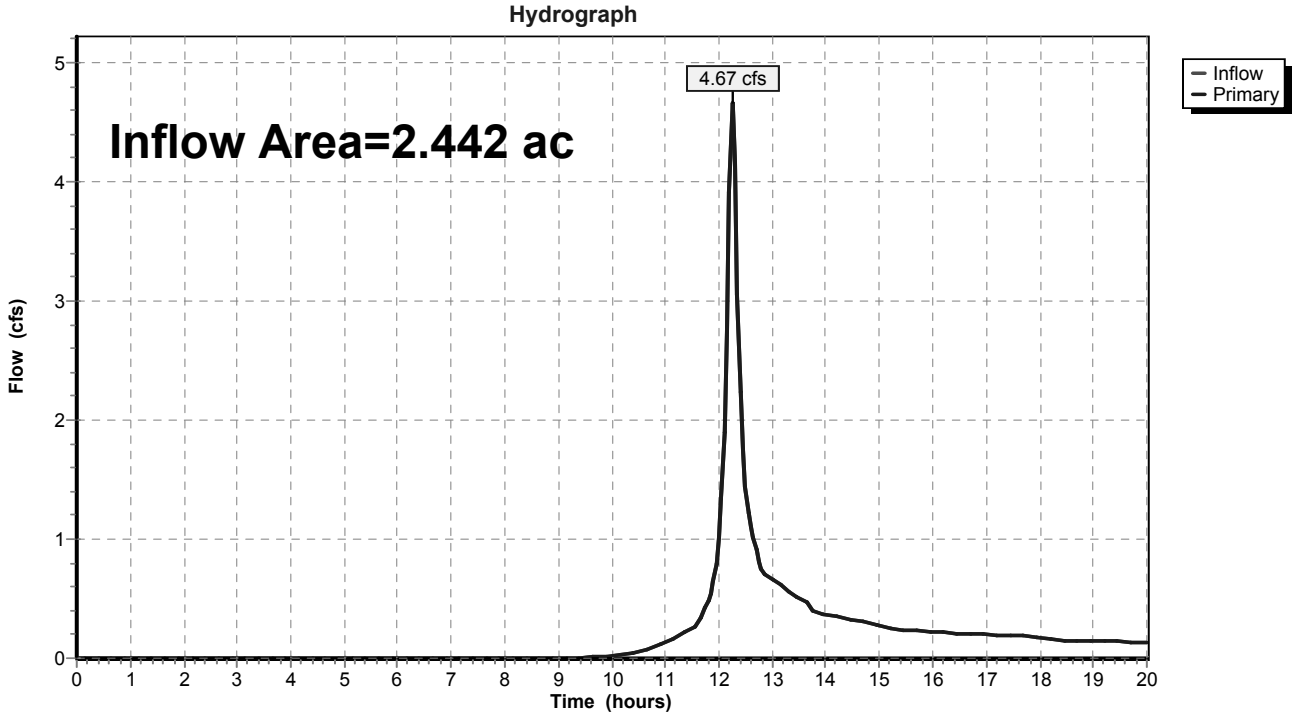


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 1.62" for 10_year event
Inflow = 4.67 cfs @ 12.26 hrs, Volume= 0.329 af
Primary = 4.67 cfs @ 12.26 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 10.0: L W 10.0

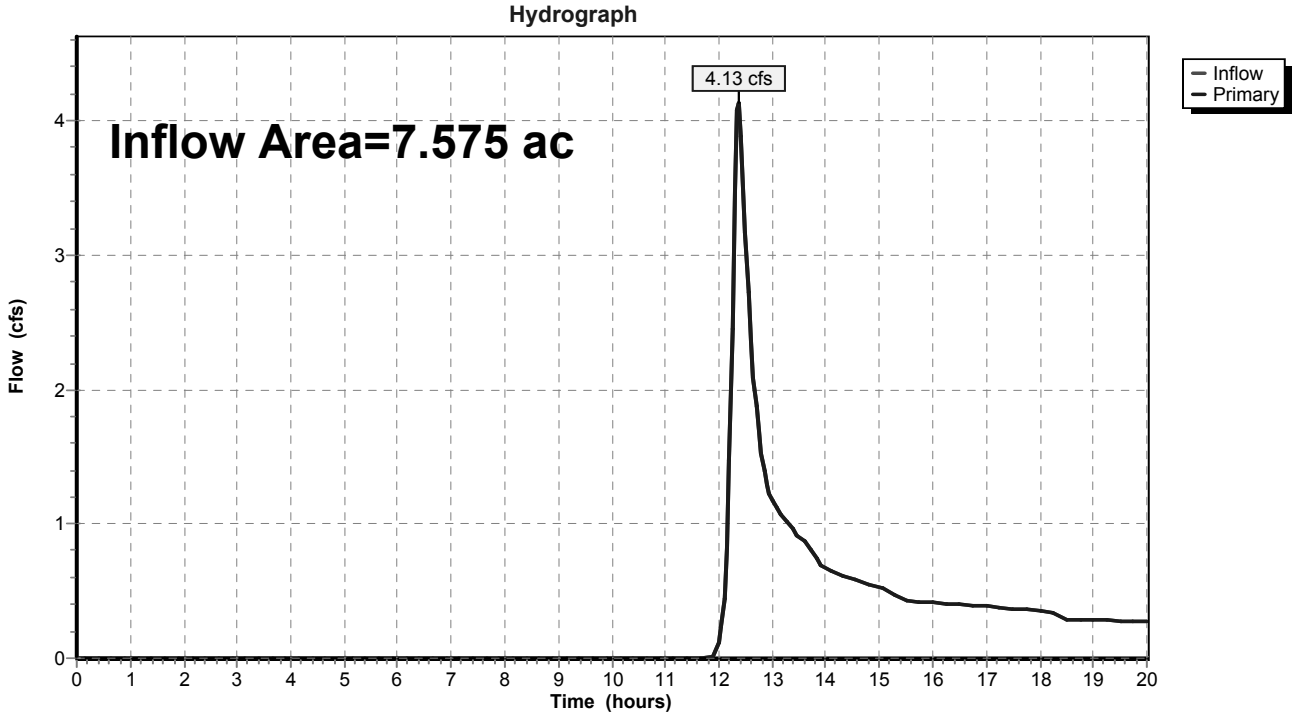


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 7.575 ac, 11.49% Impervious, Inflow Depth > 0.70" for 10_year event
Inflow = 4.13 cfs @ 12.38 hrs, Volume= 0.443 af
Primary = 4.13 cfs @ 12.38 hrs, Volume= 0.443 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 2.0: L W 2.0

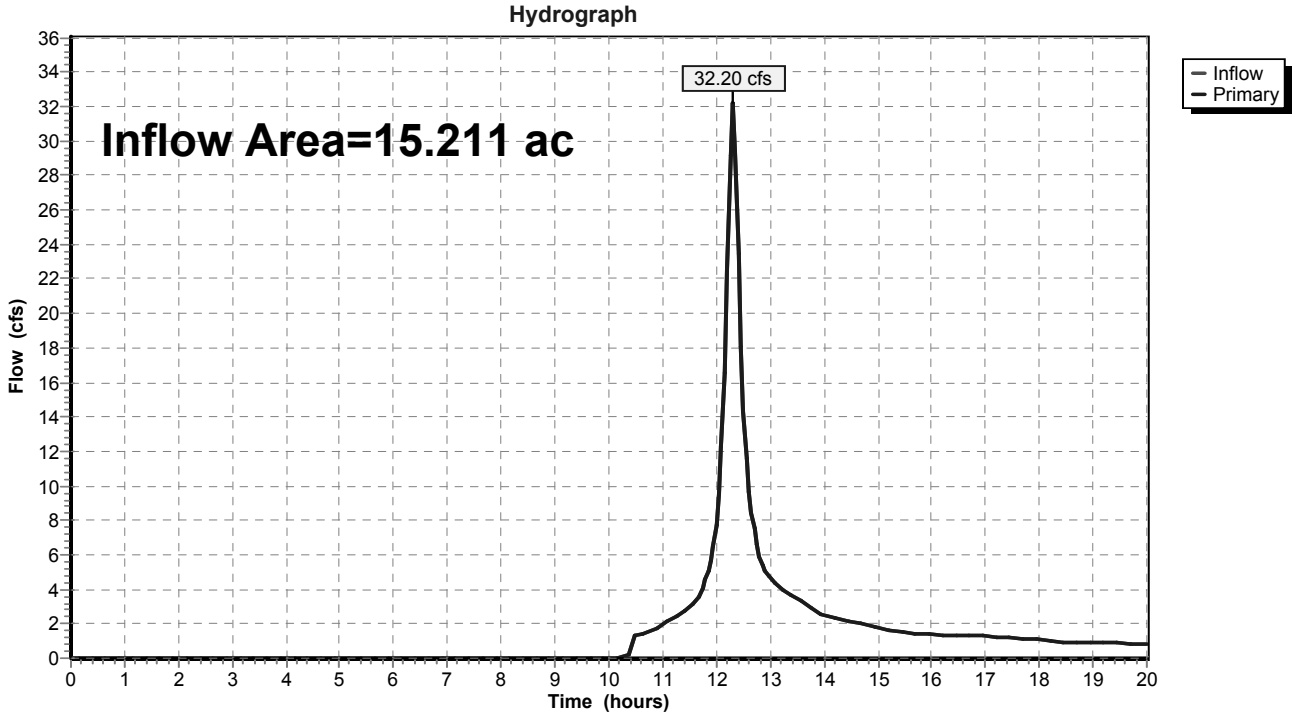


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 1.94" for 10_year event
Inflow = 32.20 cfs @ 12.30 hrs, Volume= 2.453 af
Primary = 32.20 cfs @ 12.30 hrs, Volume= 2.453 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 3.0: L W 3.0

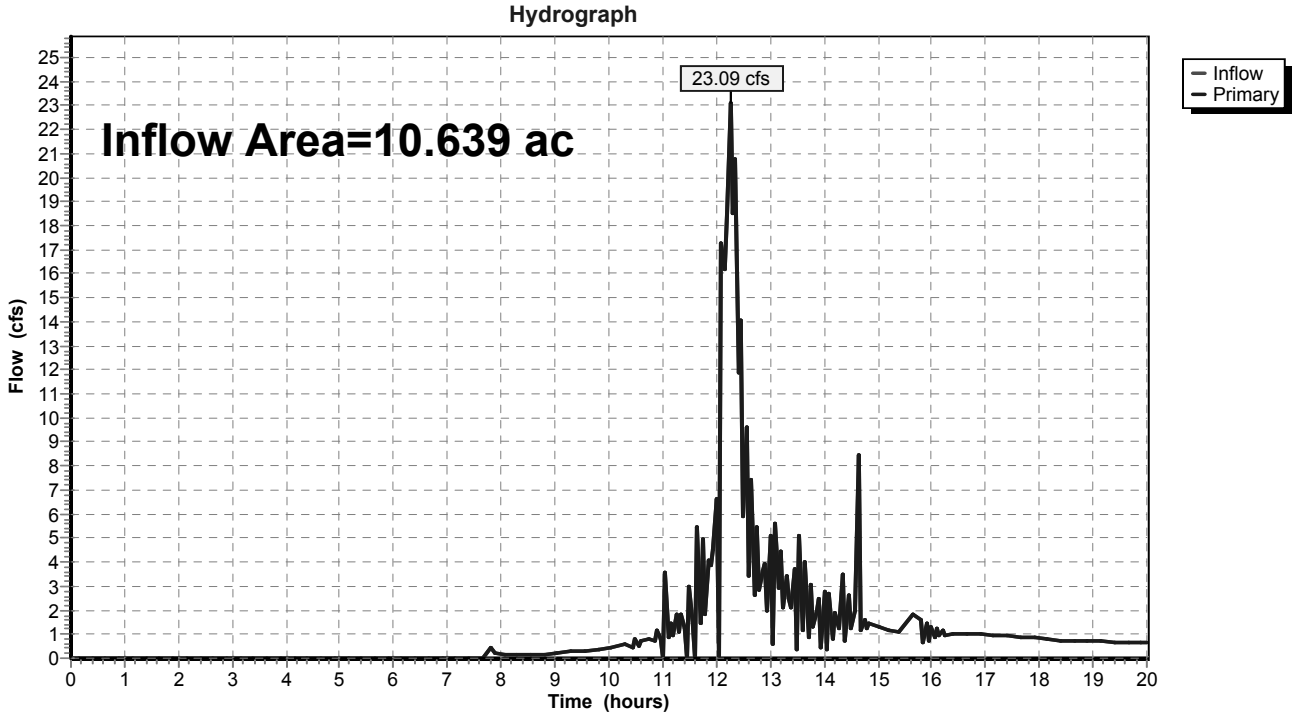


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 2.09" for 10_year event
Inflow = 23.09 cfs @ 12.25 hrs, Volume= 1.852 af
Primary = 23.09 cfs @ 12.25 hrs, Volume= 1.852 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

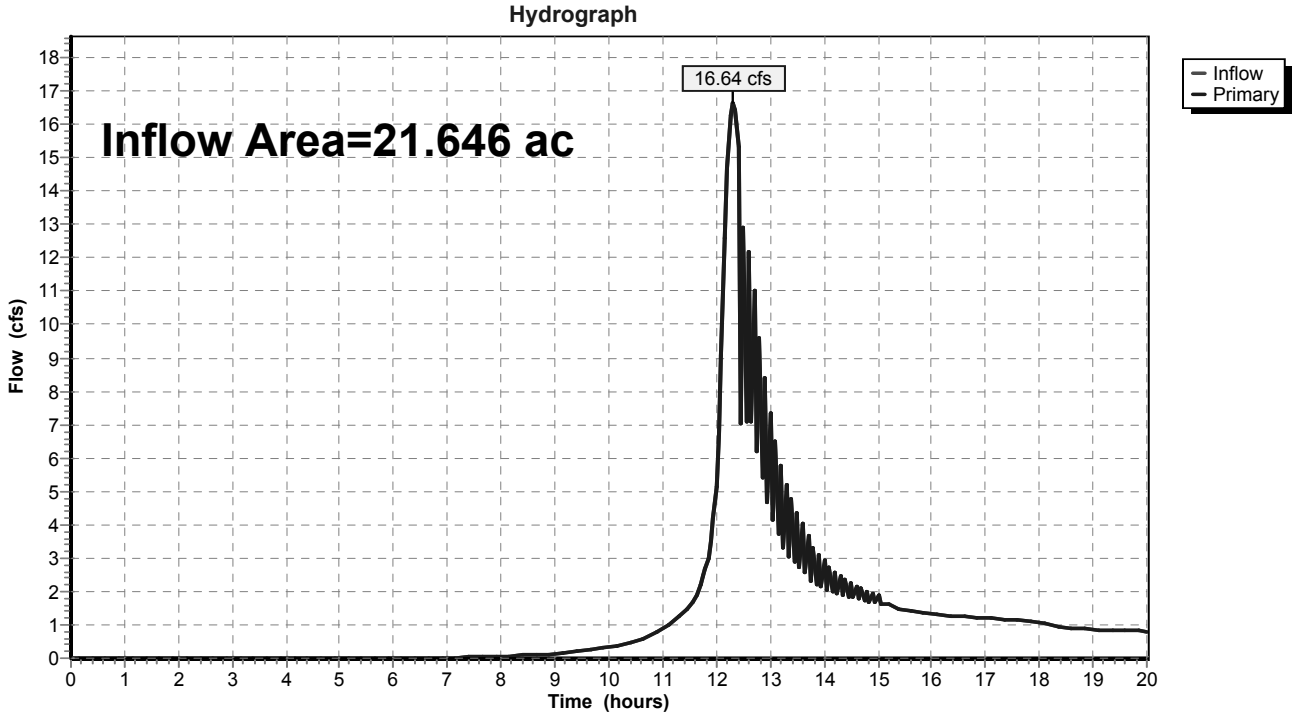


## Summary for Link Well E 1.1B: Well E 1.1B

Inflow Area = 21.646 ac, 30.46% Impervious, Inflow Depth > 1.13" for 10_year event
Inflow = 16.64 cfs @ 12.31 hrs, Volume= 2.034 af
Primary = 16.64 cfs @ 12.31 hrs, Volume= 2.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.1B: Well E 1.1B

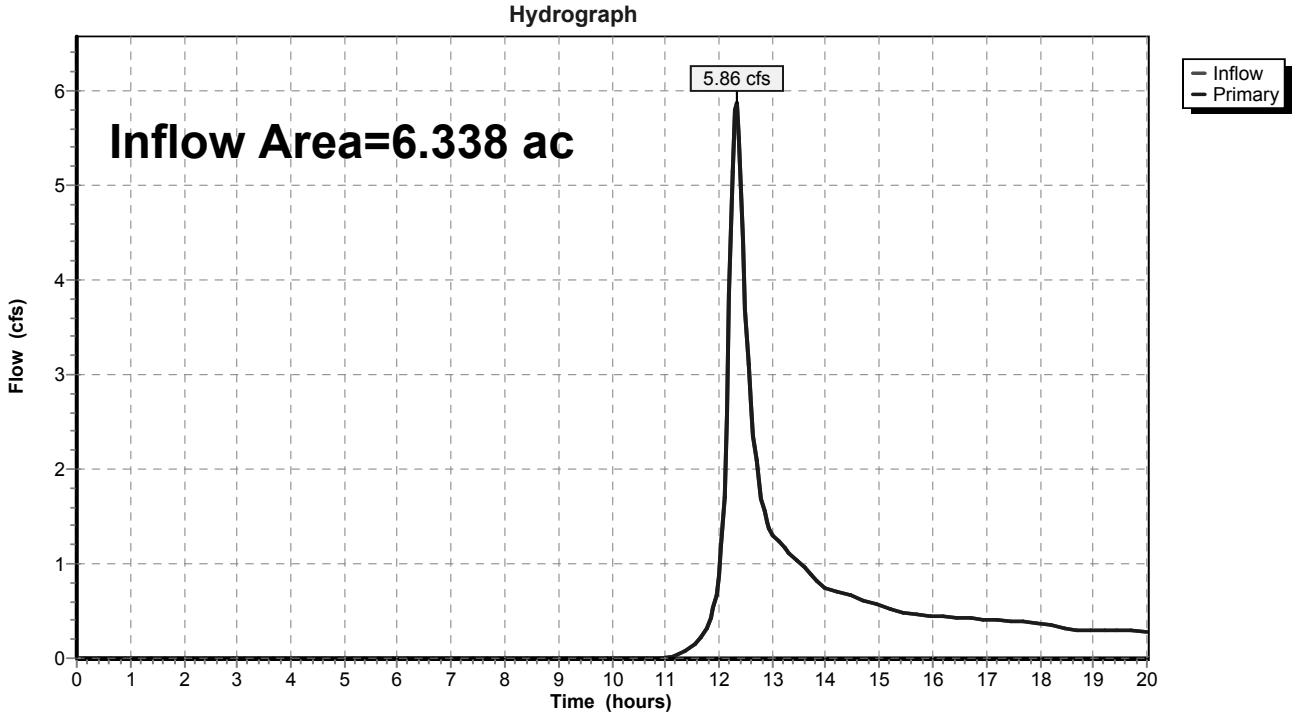


## Summary for Link Well E 1.2A: Well E 1.2A

Inflow Area = 6.338 ac, 22.15% Impervious, Inflow Depth > 1.05" for 10_year event
Inflow = 5.86 cfs @ 12.32 hrs, Volume= 0.555 af
Primary = 5.86 cfs @ 12.32 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2A: Well E 1.2A

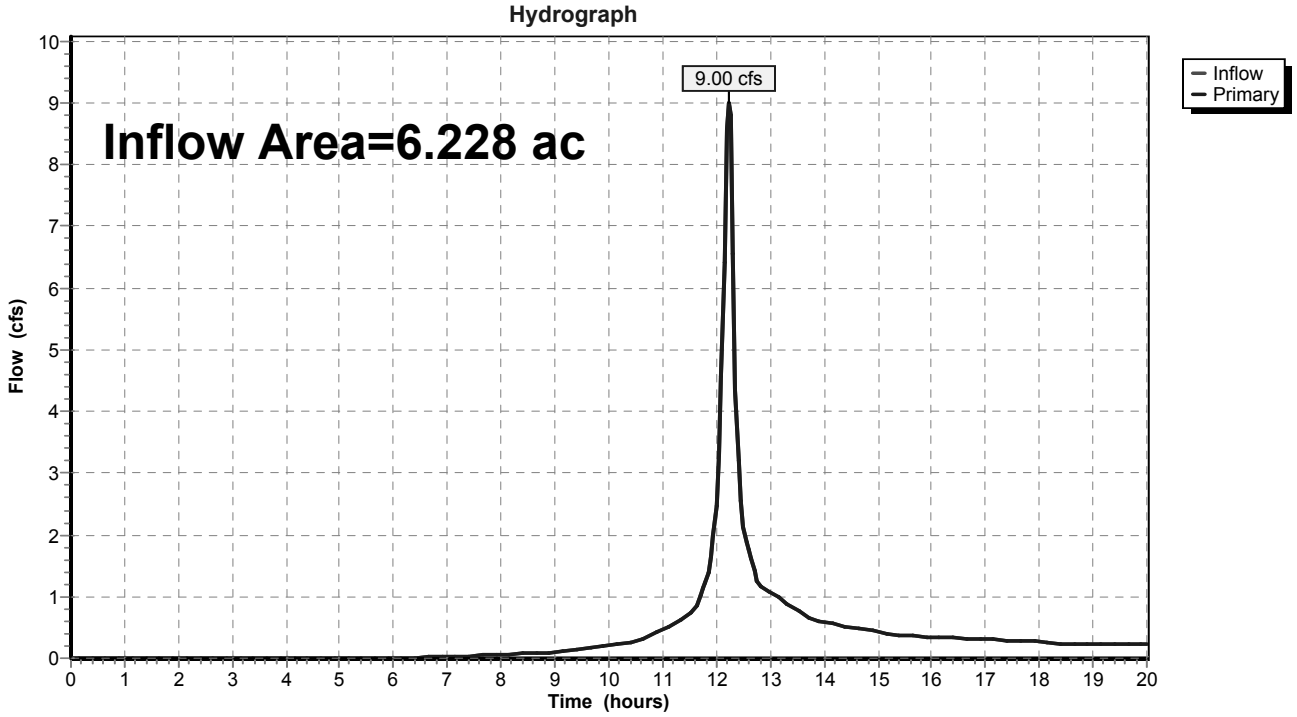


## Summary for Link Well E 1.2B: Well E 1.2B

Inflow Area = 6.228 ac, 50.45% Impervious, Inflow Depth > 1.19" for 10_year event
Inflow = 9.00 cfs @ 12.23 hrs, Volume= 0.617 af
Primary = 9.00 cfs @ 12.23 hrs, Volume= 0.617 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2B: Well E 1.2B

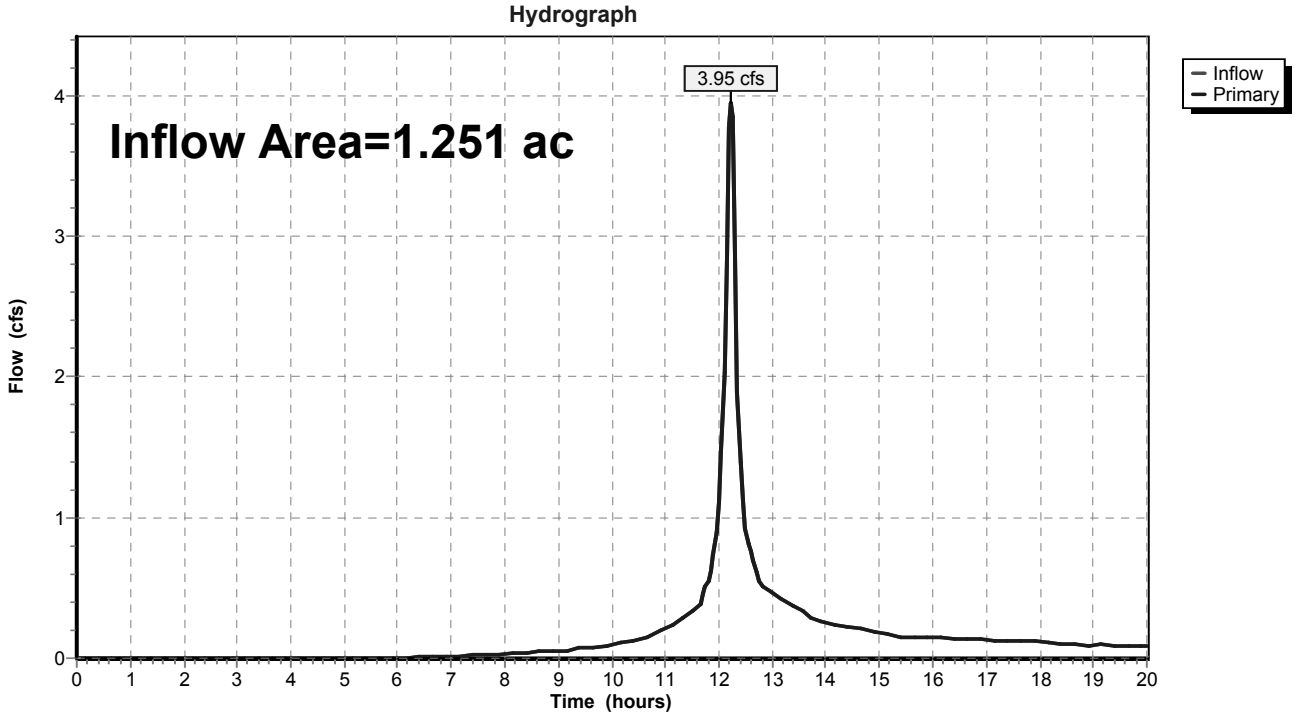


## Summary for Link Well E 1.2C: Well E 1.2C

Inflow Area = 1.251 ac, 18.55% Impervious, Inflow Depth > 2.61" for 10_year event
Inflow = 3.95 cfs @ 12.23 hrs, Volume= 0.272 af
Primary = 3.95 cfs @ 12.23 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2C: Well E 1.2C



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment E 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>2.03"
Flow Length=583' Tc=11.3 min CN=65 Runoff=27.86 cfs 2.288 af

**Subcatchment E 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>3.10"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.33 cfs 0.023 af

**Subcatchment E 1.0B: Onsite East South** Runoff Area=33,969 sf 55.29% Impervious Runoff Depth>2.46"
Flow Length=152' Tc=6.0 min CN=70 Runoff=2.27 cfs 0.160 af

**Subcatchment E 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>2.04"
Flow Length=277' Tc=6.0 min CN=65 Runoff=15.73 cfs 1.106 af

**Subcatchment E 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>1.49"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=2.10 cfs 0.151 af

**Subcatchment E 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>3.59"
Flow Length=346' Tc=6.0 min CN=82 Runoff=11.02 cfs 0.808 af

**Subcatchment E 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>1.11"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=2.67 cfs 0.389 af

**Subcatchment E 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>1.34"
Flow Length=252' Tc=7.5 min CN=56 Runoff=1.99 cfs 0.152 af

**Subcatchment E 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>1.27"
Flow Length=139' Tc=6.0 min CN=55 Runoff=7.77 cfs 0.570 af

**Subcatchment E 1.1B-3: Pond E 1.1B -** Runoff Area=271,752 sf 34.13% Impervious Runoff Depth>2.43"
Flow Length=1,410' Tc=36.9 min CN=70 Runoff=9.10 cfs 1.261 af

**Subcatchment E 1.1B-4: Pond E 1.1B -** Runoff Area=90,649 sf 0.00% Impervious Runoff Depth>1.72"
Flow Length=106' Tc=6.0 min CN=61 Runoff=4.21 cfs 0.298 af

**Subcatchment E 1.1C: Culvert 1** Runoff Area=232,650 sf 24.09% Impervious Runoff Depth>3.29"
Flow Length=663' Tc=6.6 min CN=79 Runoff=20.02 cfs 1.465 af

**Subcatchment E 1.1D: Pond E 1.1D** Runoff Area=253,534 sf 35.03% Impervious Runoff Depth>3.29"
Flow Length=600' Tc=6.0 min CN=79 Runoff=22.10 cfs 1.597 af

**Subcatchment E 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>1.33"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=4.69 cfs 0.554 af

**Subcatchment E 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>1.57"
Flow Length=344' Tc=6.0 min CN=59 Runoff=2.59 cfs 0.185 af

**Subcatchment E 1.2A-2: Pond E 1.2A -** Runoff Area=214,415 sf 23.56% Impervious Runoff Depth>1.79"
Flow Length=434' Tc=14.7 min CN=62 Runoff=8.04 cfs 0.734 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>3.29"
Flow Length=448' Tc=6.0 min CN=79 Runoff=7.23 cfs 0.522 af

**SubcatchmentE 1.2B-1: Pond E 1.2B -** Runoff Area=41,348 sf 64.96% Impervious Runoff Depth>3.89"
Flow Length=261' Tc=6.0 min CN=85 Runoff=4.12 cfs 0.308 af

**SubcatchmentE 1.2B-2: Pond E 1.2B -** Runoff Area=6,456 sf 44.51% Impervious Runoff Depth>3.01"
Flow Length=116' Tc=6.0 min CN=76 Runoff=0.52 cfs 0.037 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>3.59"
Flow Length=193' Tc=6.0 min CN=82 Runoff=4.31 cfs 0.316 af

**SubcatchmentE 1.2C-1: Pond E 1.2C -** Runoff Area=8,435 sf 65.00% Impervious Runoff Depth>3.89"
Flow Length=126' Tc=6.0 min CN=85 Runoff=0.84 cfs 0.063 af

**SubcatchmentE 1.2D: Pond E 1.2D -** Runoff Area=127,255 sf 46.37% Impervious Runoff Depth>2.99"
Flow Length=473' Tc=16.2 min CN=76 Runoff=7.74 cfs 0.729 af

**SubcatchmentE 1.2E: Pond E 1.2E** Runoff Area=13,294 sf 34.60% Impervious Runoff Depth>2.55"
Flow Length=34' Tc=6.0 min CN=71 Runoff=0.92 cfs 0.065 af

**SubcatchmentE 1.3A: Aqueduct onto** Runoff Area=199,579 sf 34.45% Impervious Runoff Depth>2.17"
Flow Length=1,196' Tc=37.8 min CN=67 Runoff=5.88 cfs 0.828 af

**SubcatchmentE 4.0: Offsite to Sudbury R** Runoff Area=607,734 sf 9.67% Impervious Runoff Depth>1.46"
Flow Length=1,859' Tc=38.1 min CN=58 Runoff=11.51 cfs 1.699 af

**SubcatchmentW 10.0: Offsite to Sudbury** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>2.46"
Flow Length=509' Tc=7.8 min CN=70 Runoff=6.78 cfs 0.501 af

**SubcatchmentW 2.0: Onsite to Sudbury R** Runoff Area=329,977 sf 11.49% Impervious Runoff Depth>1.27"
Flow Length=793' Tc=15.6 min CN=55 Runoff=8.12 cfs 0.799 af

**SubcatchmentW 3.1: Pond P W 3.1** Runoff Area=500,344 sf 43.56% Impervious Runoff Depth>3.78"
Flow Length=1,553' Tc=11.6 min CN=84 Runoff=41.96 cfs 3.619 af

**SubcatchmentW 3.4: Gravel Processing** Runoff Area=162,229 sf 16.97% Impervious Runoff Depth>0.81"
Flow Length=460' Tc=14.6 min CN=48 Runoff=2.22 cfs 0.250 af

**SubcatchmentW 3.5: Small Depression to** Runoff Area=4,759 sf 27.98% Impervious Runoff Depth>1.96"
Flow Length=43' Tc=6.0 min CN=64 Runoff=0.25 cfs 0.018 af

**SubcatchmentW 9.1: Gravel Pit to Big** Runoff Area=227,372 sf 34.47% Impervious Runoff Depth>2.38"
Flow Length=440' Tc=6.1 min CN=69 Runoff=14.65 cfs 1.033 af

**SubcatchmentW 9.1A: Gravel Pit to** Runoff Area=94,325 sf 52.60% Impervious Runoff Depth>3.89"
Flow Length=875' Tc=7.4 min CN=85 Runoff=9.11 cfs 0.702 af

**SubcatchmentW 9.1B: Aqueduct to Big** Runoff Area=24,364 sf 16.03% Impervious Runoff Depth>1.88"
Flow Length=235' Tc=6.0 min CN=63 Runoff=1.24 cfs 0.087 af

**SubcatchmentW 9.1C: Culvert 2** Runoff Area=206,937 sf 57.07% Impervious Runoff Depth>3.69"
Flow Length=505' Tc=6.0 min CN=83 Runoff=19.80 cfs 1.460 af

**Pond MH-NCULV-A: MH-NCULV-A** Peak Elev=154.12' Inflow=29.70 cfs 2.708 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=29.70 cfs 2.708 af

**Pond MH-NCULV-B: MH-NCULV-B** Peak Elev=153.95' Inflow=29.70 cfs 2.732 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=29.71 cfs 2.732 af

**Pond P E 1.1A: 284** Peak Elev=134.85' Storage=79,795 cf Inflow=11.02 cfs 1.837 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B: 283** Peak Elev=147.04' Storage=148,835 cf Inflow=30.24 cfs 4.424 af
Outflow=3.53 cfs 1.029 af

**Pond P E 1.1B-4: P E 1.1B-4** Peak Elev=168.20' Storage=208 cf Inflow=4.21 cfs 0.298 af
Outflow=3.97 cfs 0.298 af

**Pond P E 1.1C: P E 1.1C** Peak Elev=170.60' Storage=3,739 cf Inflow=20.02 cfs 1.754 af
Outflow=12.42 cfs 1.753 af

**Pond P E 1.1D: P E 1.1D** Peak Elev=172.03' Storage=87,978 cf Inflow=31.13 cfs 2.298 af
Outflow=1.06 cfs 0.289 af

**Pond P E 1.2A: 282** Peak Elev=135.12' Storage=57,621 cf Inflow=27.57 cfs 2.921 af
Outflow=6.74 cfs 1.709 af

**Pond P E 1.2D: P E 1.2D** Peak Elev=158.07' Storage=39,665 cf Inflow=7.74 cfs 0.729 af
Outflow=0.51 cfs 0.202 af

**Pond P E 1.2E: P E 1.2E** Peak Elev=172.32' Storage=2,824 cf Inflow=0.92 cfs 0.065 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond P W 3.1: P W 3.1** Peak Elev=156.26' Storage=8,477 cf Inflow=41.96 cfs 3.619 af
Outflow=41.94 cfs 3.451 af

**Pond P W 3.4: P W 3.4** Peak Elev=183.24' Storage=10,869 cf Inflow=2.22 cfs 0.250 af
Outflow=0.00 cfs 0.000 af

**Pond P W 3.5: P W 3.5** Peak Elev=157.00' Storage=0 cf Inflow=0.25 cfs 0.018 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.25 cfs 0.018 af

**Pond P W 9.1: P W 9.1** Peak Elev=154.49' Storage=7,236 cf Inflow=34.69 cfs 2.556 af
42.0" x 42.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=29.70 cfs 2.591 af

**Pond P W 9.1B: P W 9.1B** Peak Elev=158.01' Storage=1,810 cf Inflow=1.24 cfs 0.087 af
Outflow=0.28 cfs 0.046 af

**Pond P W 9.1C: P W 9.1C** Peak Elev=166.26' Storage=467 cf Inflow=19.80 cfs 1.460 af
Outflow=19.80 cfs 1.459 af

**Pond P-CULV-N-OUTLET:P-CULV-N-OUTLET** Peak Elev=153.69' Storage=536 cf Inflow=29.71 cfs 2.732 af
Outflow=31.38 cfs 2.721 af

**Link DP North: DP North** Inflow=90.84 cfs 9.178 af
Primary=90.84 cfs 9.178 af

**Link DP Sudbury: (new Link)** Inflow=137.16 cfs 15.443 af
Primary=137.16 cfs 15.443 af

**Link DP Wellhead: DP Wellhead**
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=49.29 cfs 4.249 af
Primary=49.29 cfs 4.249 af

**Link L E 1.0: L E 1.0** Inflow=48.16 cfs 6.266 af
Primary=48.16 cfs 6.266 af

**Link L E 4.0: L E 4.0** Inflow=11.51 cfs 1.699 af
Primary=11.51 cfs 1.699 af

**Link L W 10.0: L W 10.0** Inflow=6.78 cfs 0.501 af
Primary=6.78 cfs 0.501 af

**Link L W 2.0: L W 2.0** Inflow=8.12 cfs 0.799 af
Primary=8.12 cfs 0.799 af

**Link L W 3.0: L W 3.0** Inflow=41.94 cfs 3.451 af
Primary=41.94 cfs 3.451 af

**Link L W 9.0: L W 9.0** Inflow=31.38 cfs 2.729 af
Primary=31.38 cfs 2.729 af

**Link Well E 1.1B: Well E 1.1B** Inflow=21.38 cfs 3.312 af
Primary=21.38 cfs 3.312 af

**Link Well E 1.2A: Well E 1.2A** Inflow=9.71 cfs 0.918 af
Primary=9.71 cfs 0.918 af

**Link Well E 1.2B: Well E 1.2B** Inflow=11.87 cfs 1.070 af
Primary=11.87 cfs 1.070 af

**Link Well E 1.2C: Well E 1.2C** Inflow=5.15 cfs 0.379 af
Primary=5.15 cfs 0.379 af

**Total Runoff Area = 130.597 ac Runoff Volume = 24.776 af Average Runoff Depth = 2.28"**
**78.71% Pervious = 102.789 ac 21.29% Impervious = 27.808 ac**

## Summary for Subcatchment E 1.0: (blank)

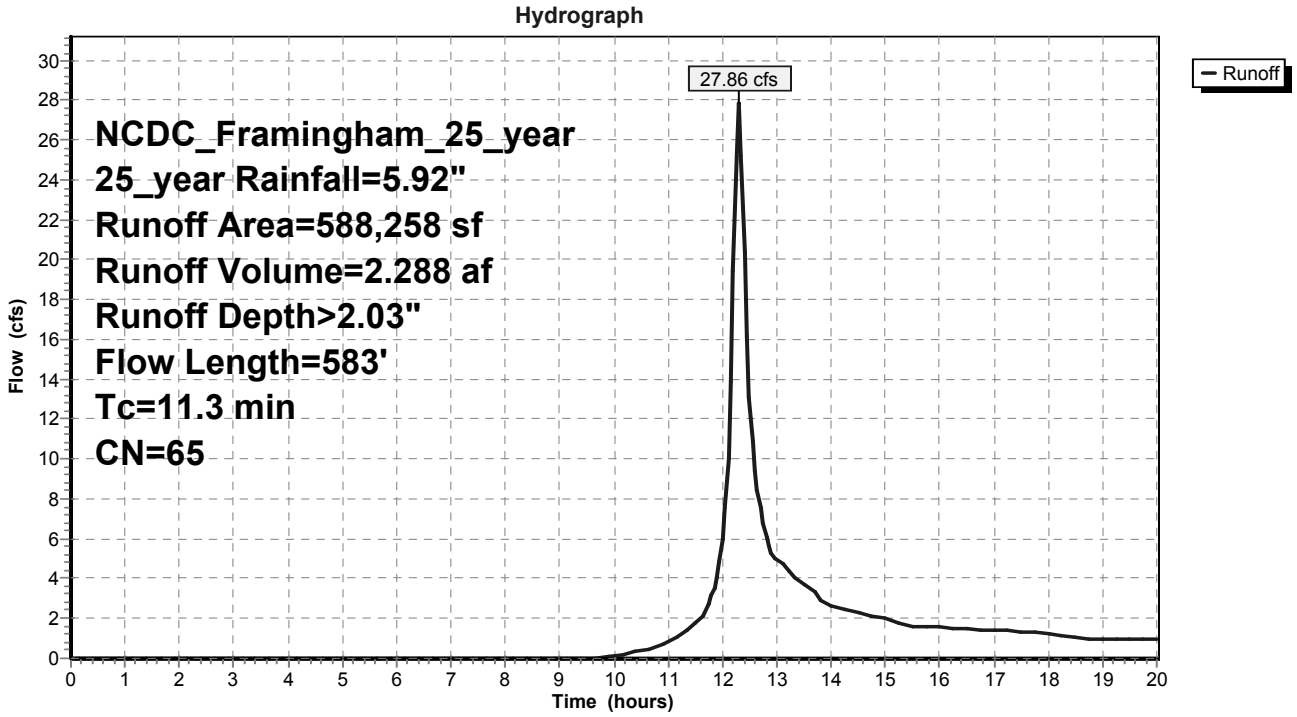
Runoff = 27.86 cfs @ 12.30 hrs, Volume= 2.288 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

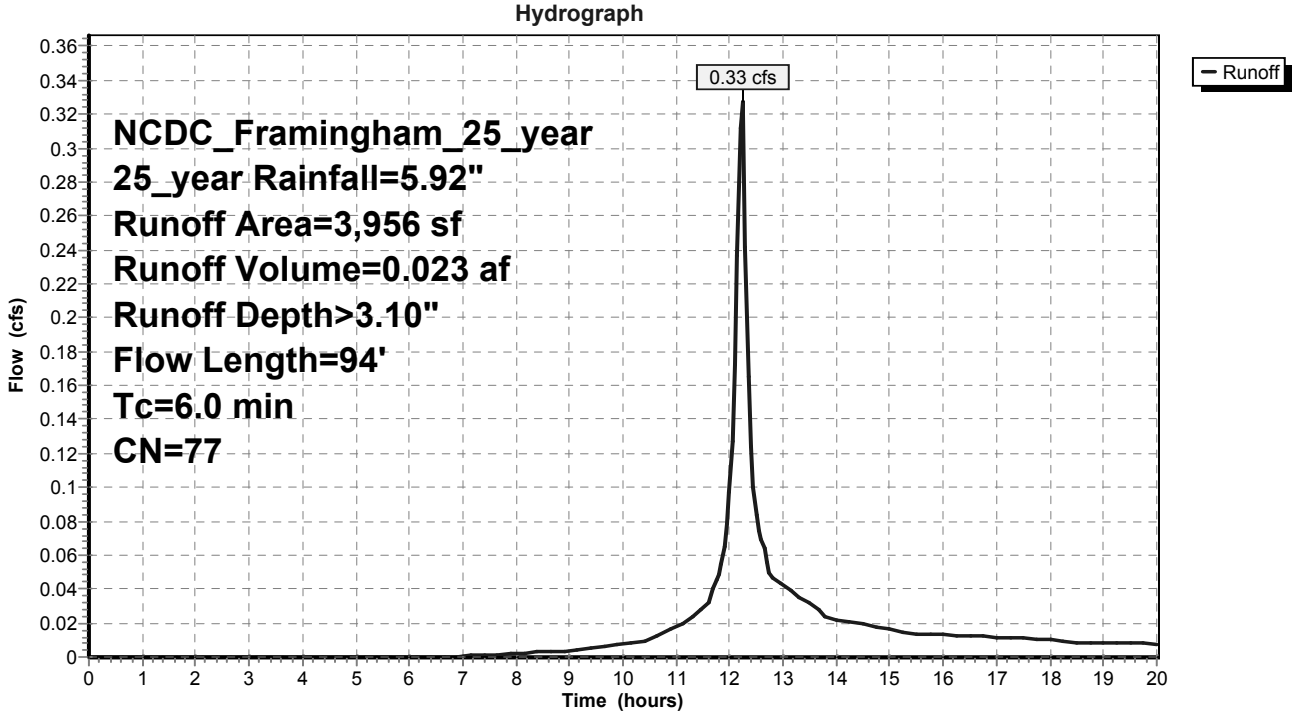
Runoff = 0.33 cfs @ 12.23 hrs, Volume= 0.023 af, Depth> 3.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: Onsite East South of Aqueduct

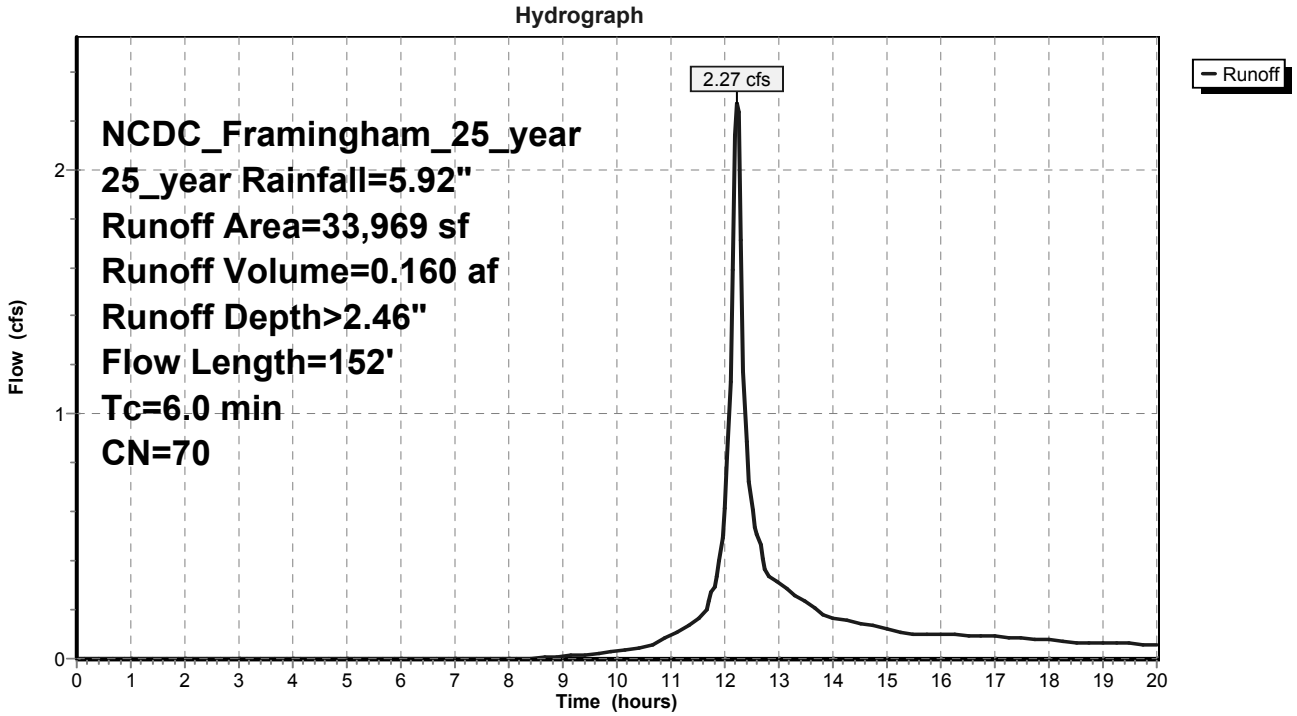
Runoff = 2.27 cfs @ 12.23 hrs, Volume= 0.160 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 28,892 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,969 | 70 | Weighted Average |
| | 15,189 | | 44.71% Pervious Area |
| | 18,780 | | 55.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 152 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: Onsite East South of Aqueduct



## Summary for Subcatchment E 1.0C: (blank)

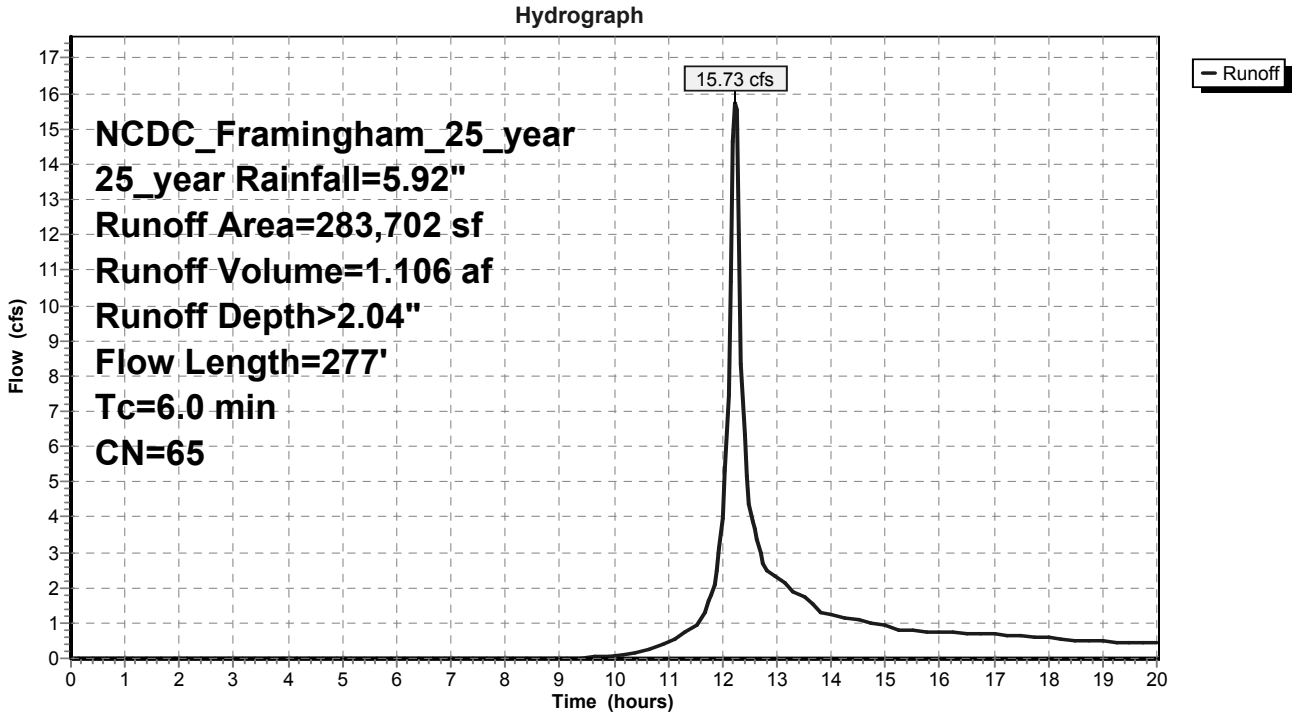
Runoff = 15.73 cfs @ 12.23 hrs, Volume= 1.106 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

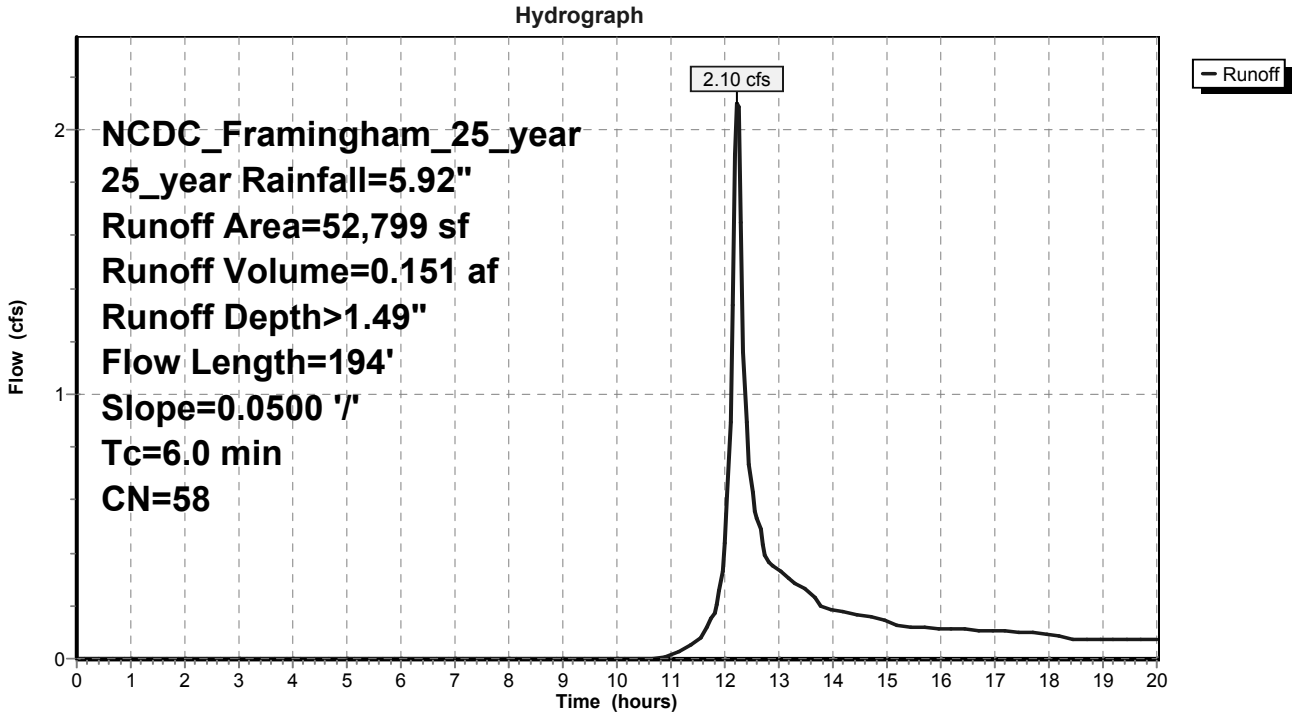
Runoff = 2.10 cfs @ 12.24 hrs, Volume= 0.151 af, Depth> 1.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

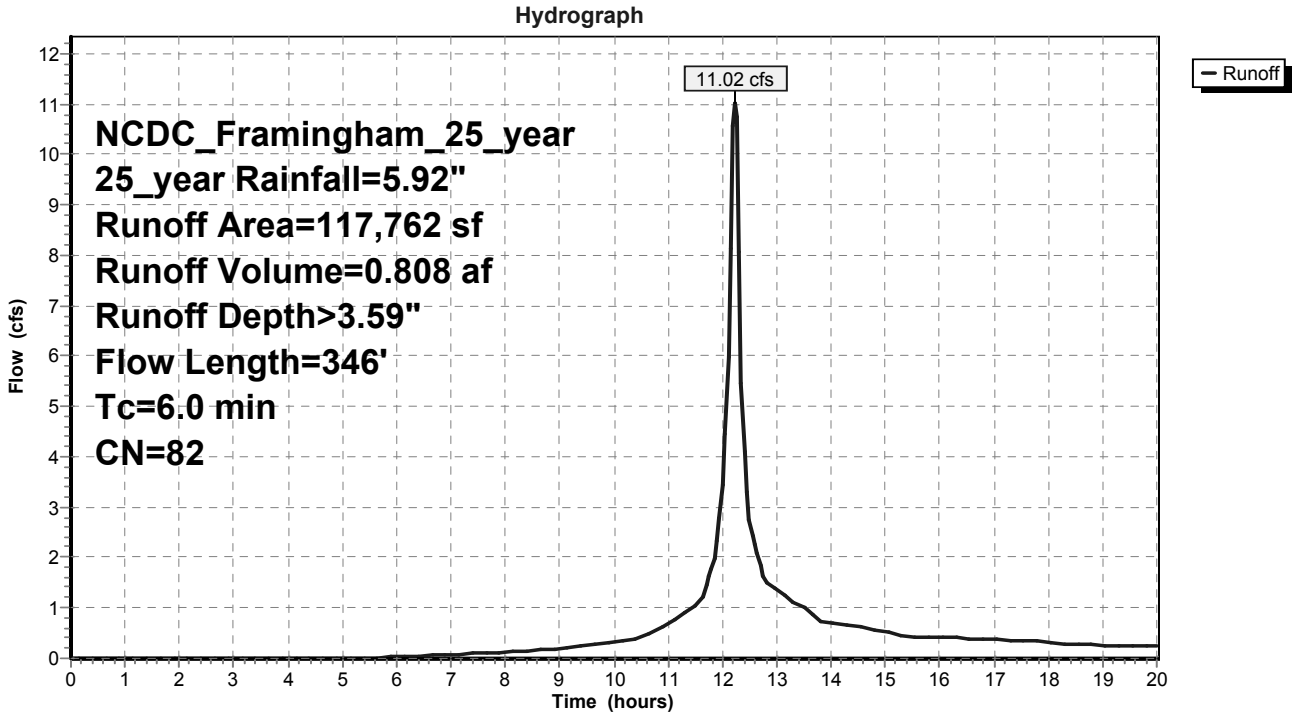
Runoff = 11.02 cfs @ 12.23 hrs, Volume= 0.808 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

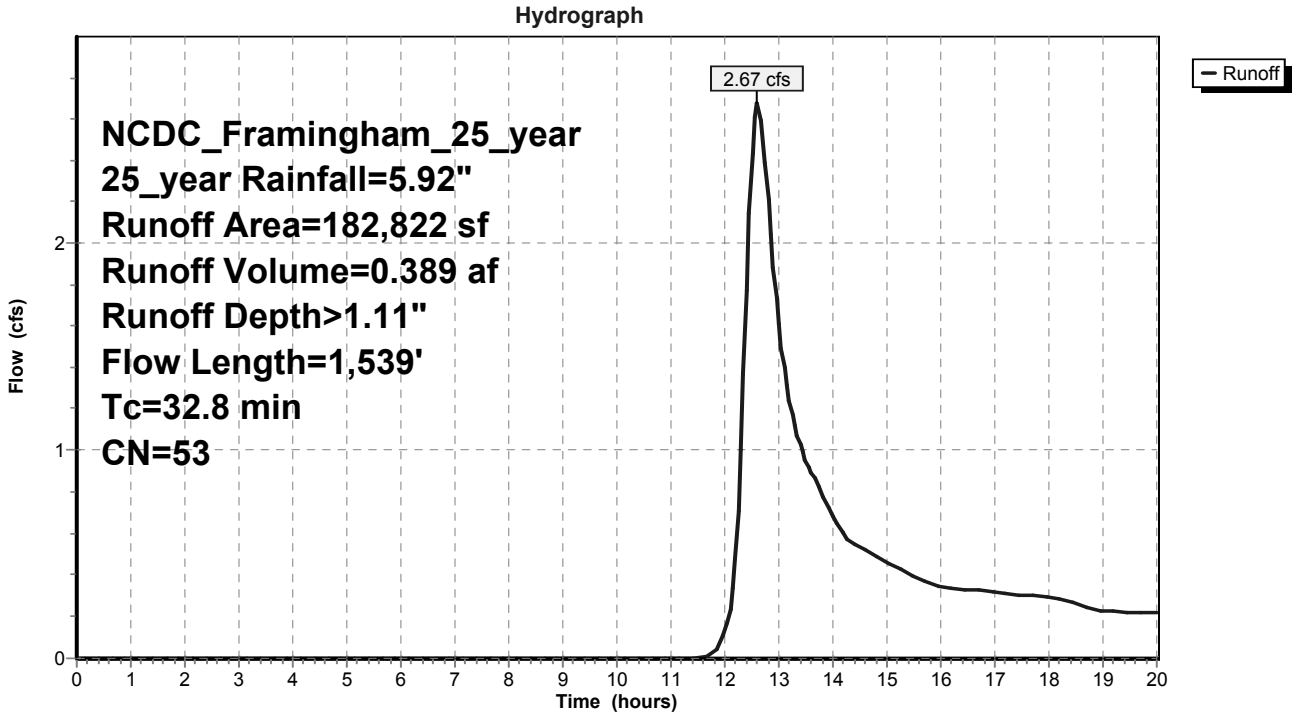
Runoff = 2.67 cfs @ 12.61 hrs, Volume= 0.389 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

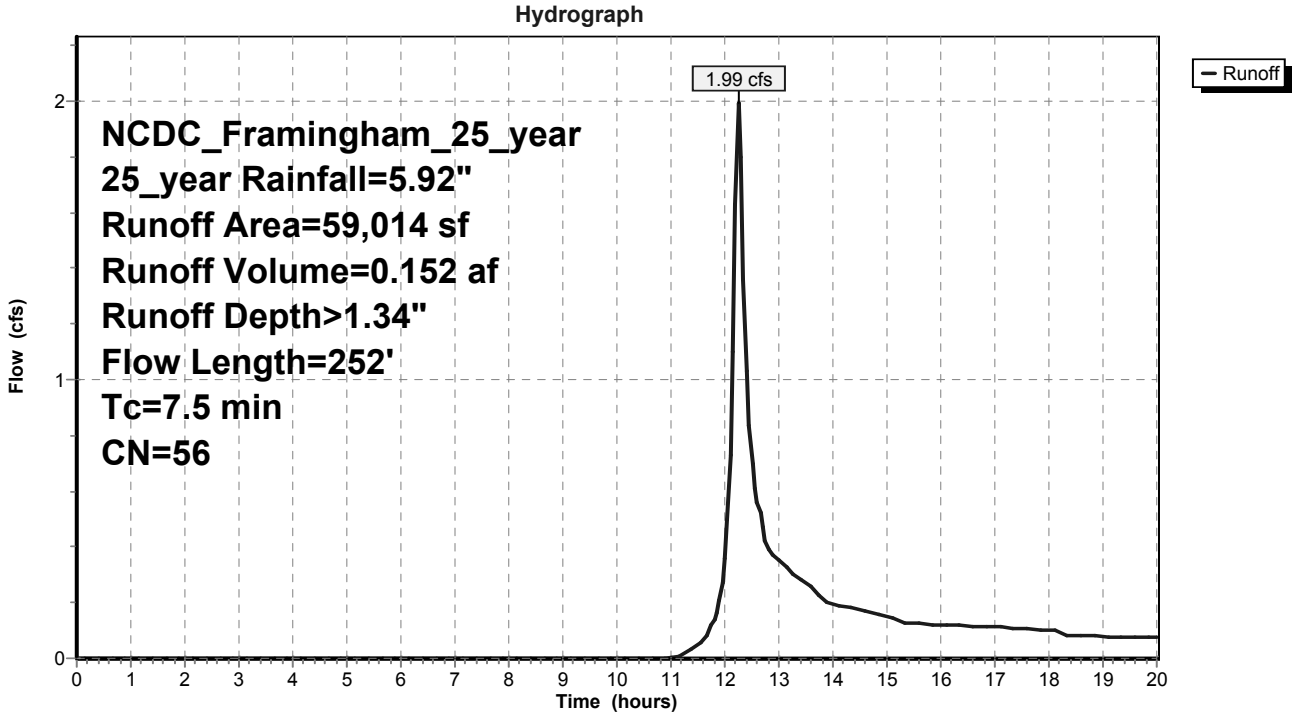
Runoff = 1.99 cfs @ 12.26 hrs, Volume= 0.152 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

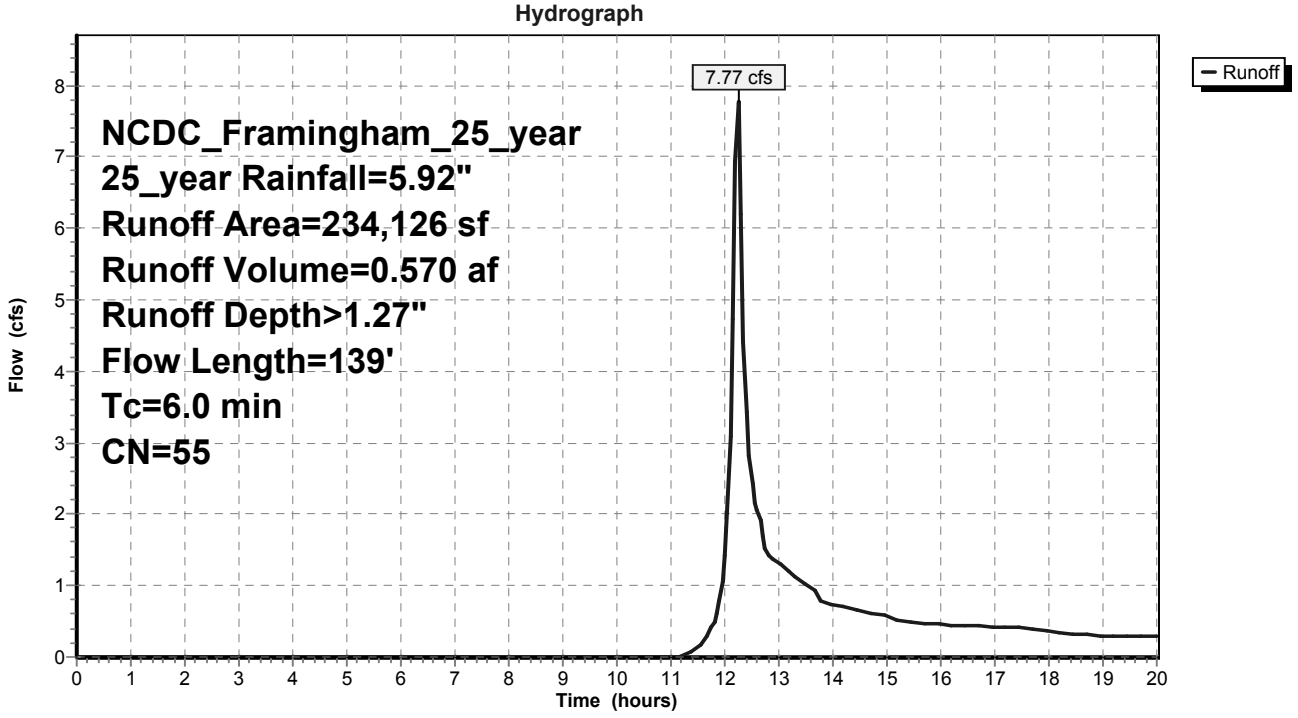
Runoff = 7.77 cfs @ 12.24 hrs, Volume= 0.570 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



## Summary for Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer

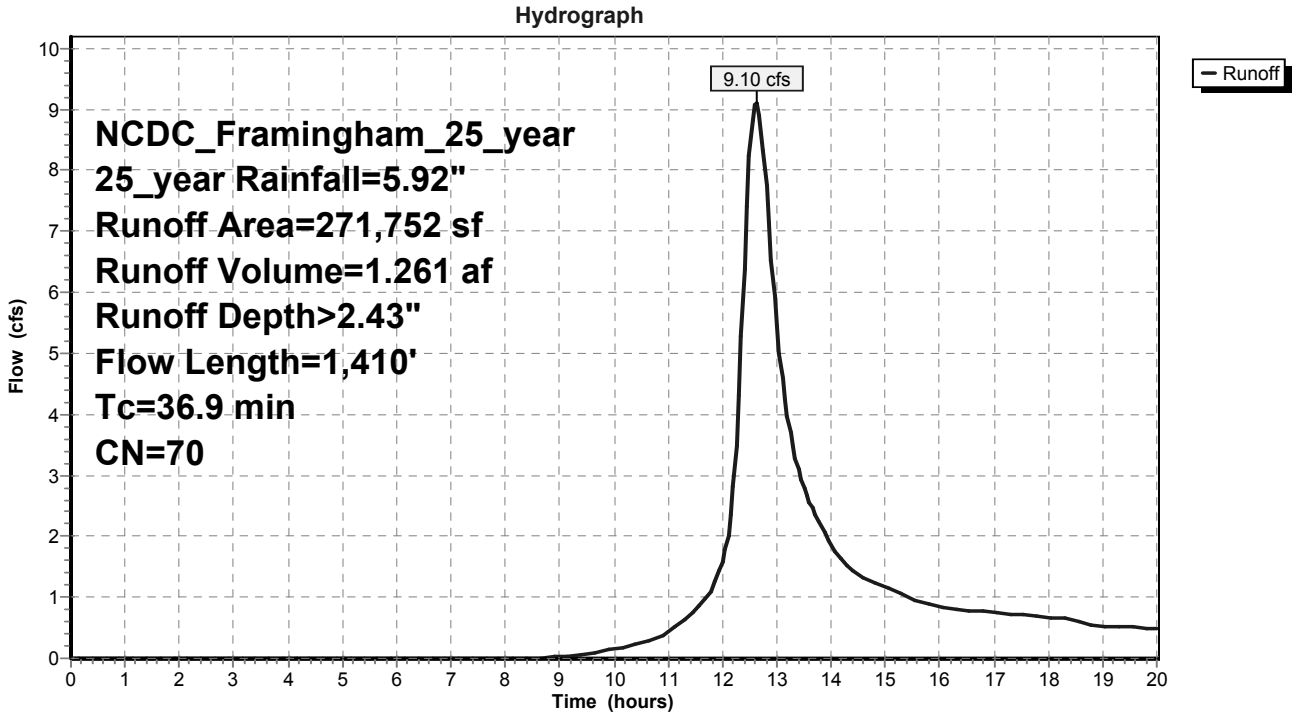
Runoff = 9.10 cfs @ 12.62 hrs, Volume= 1.261 af, Depth> 2.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 39 | GRASS, 0% imperv, HSG A |
| * | 149 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,802 | 30 | WOODS, 0% imperv, HSG A |
| * | 87,233 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,883 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 138,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,521 | 98 | IMP, 100% imperv, HSG A |
| * | 8,368 | 98 | IMP, 100% imperv, HSG B |
| | 271,752 | 70 | Weighted Average |
| | 179,014 | | 65.87% Pervious Area |
| | 92,738 | | 34.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.2 | 50 | 0.0010 | 0.05 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.3 | 256 | 0.0659 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 36.9 | 1,410 | Total | | | |

## Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer

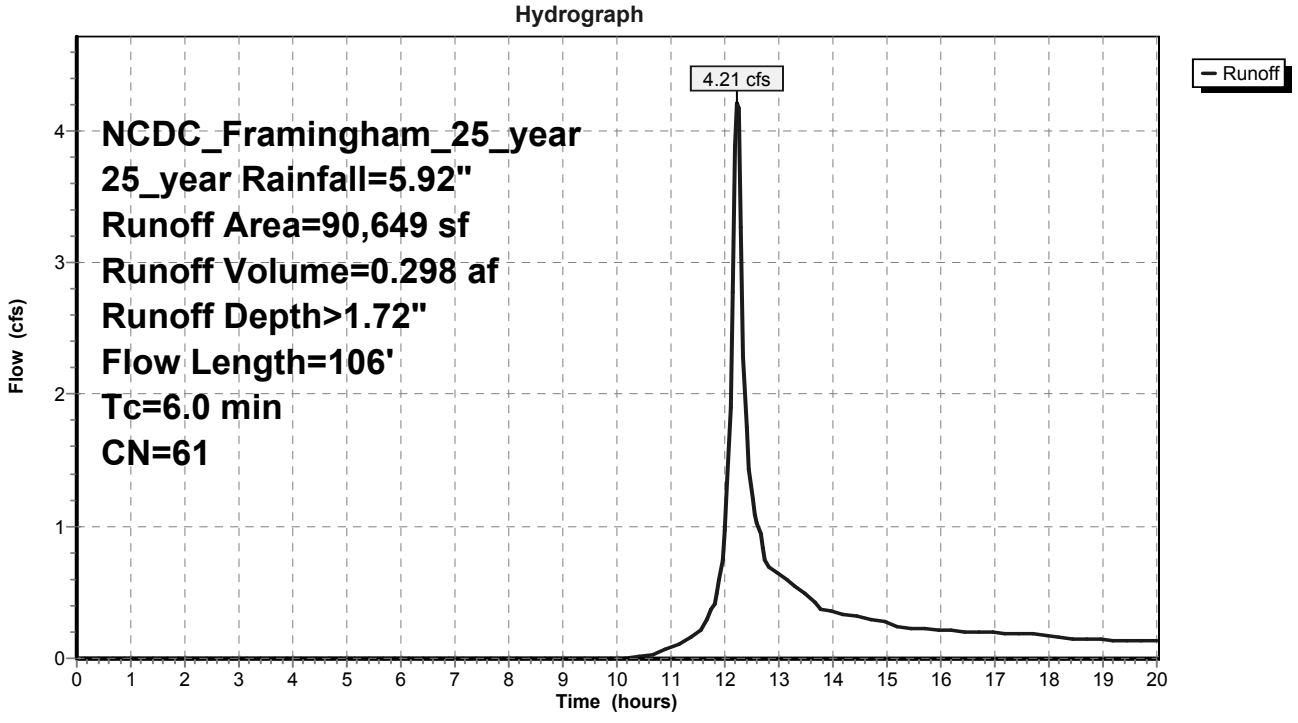
Runoff = 4.21 cfs @ 12.24 hrs, Volume= 0.298 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 66,969 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 3,863 | 98 | IMP, 100% imperv, HSG B |
| | 90,649 | 61 | Weighted Average |
| | 90,649 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.0 | 50 | 0.1057 | 0.28 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 56 | 0.3343 | 4.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.2 | 106 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer



## Summary for Subcatchment E 1.1C: Culvert 1

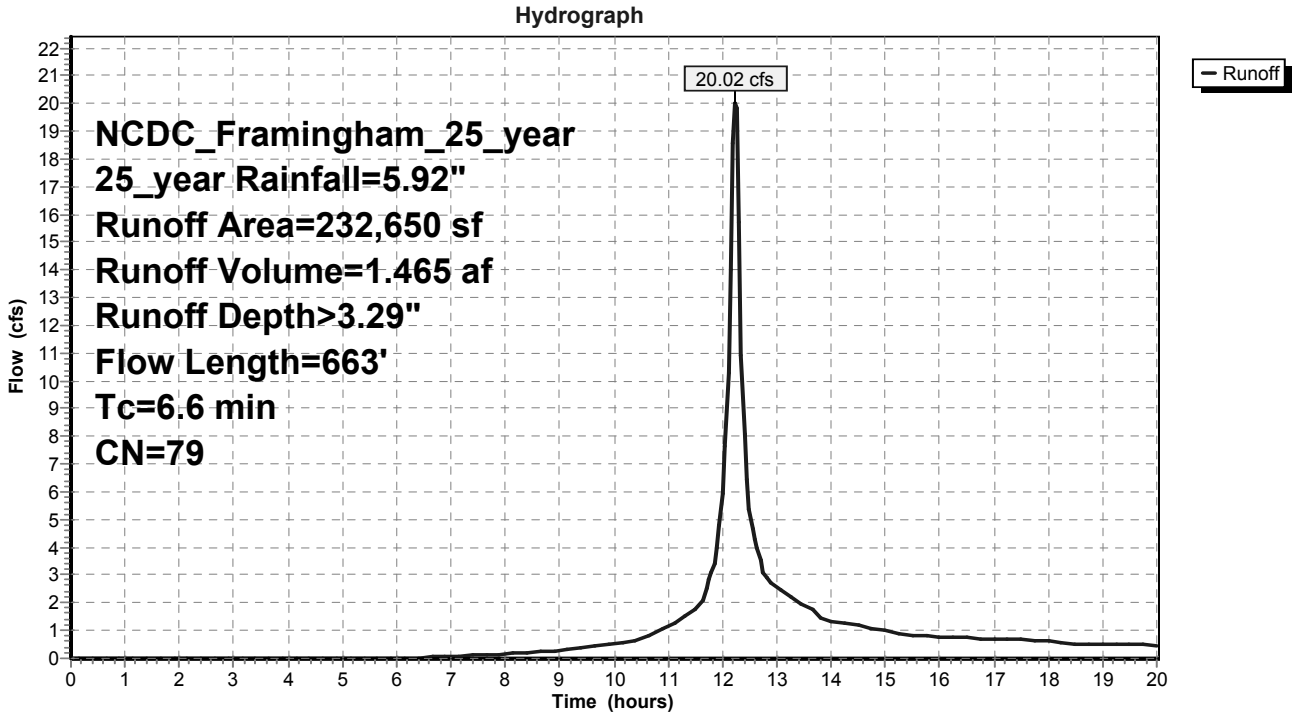
Runoff = 20.02 cfs @ 12.24 hrs, Volume= 1.465 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 70,758 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,422 | 55 | WOODS, 0% imperv, HSG B |
| * | 420 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 85,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 64 | 98 | IMP, 100% imperv, HSG A |
| * | 61,196 | 98 | IMP, 100% imperv, HSG B |
| | 232,650 | 79 | Weighted Average |
| | 176,613 | | 75.91% Pervious Area |
| | 56,037 | | 24.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0104 | 0.89 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 91 | 0.0095 | 1.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 4 | 0.0148 | 1.96 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 125 | 0.0252 | 3.22 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.8 | 7 | 0.0001 | 0.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 166 | 0.0832 | 5.85 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0531 | 4.68 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 49 | 0.0163 | 2.06 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.4 | 134 | 0.0064 | 1.62 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 34 | 0.0414 | 3.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.6 | 663 | Total | | | |

## Subcatchment E 1.1C: Culvert 1



## Summary for Subcatchment E 1.1D: Pond E 1.1D

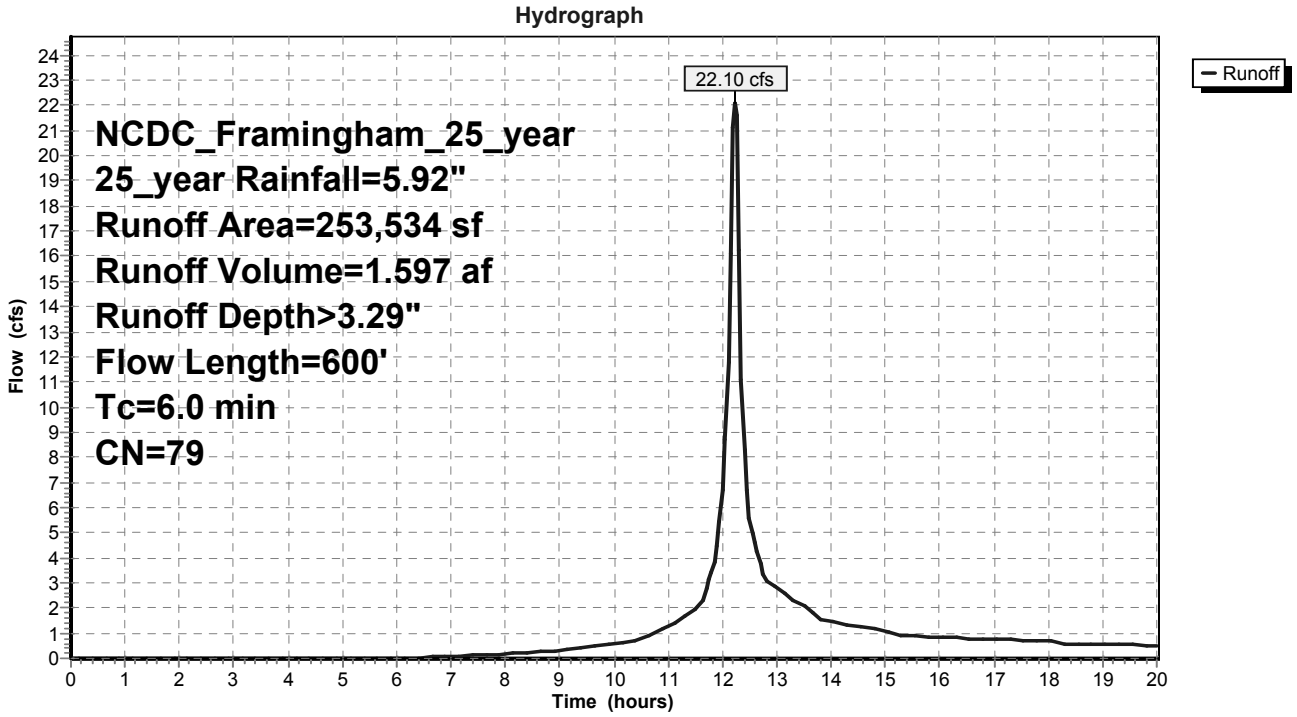
Runoff = 22.10 cfs @ 12.23 hrs, Volume= 1.597 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 41,894 | 61 | GRASS, 0% imperv, HSG B |
| * | 33,714 | 55 | WOODS, 0% imperv, HSG B |
| * | 136,649 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 41,277 | 98 | IMP, 100% imperv, HSG B |
| | 253,534 | 79 | Weighted Average |
| | 164,713 | | 64.97% Pervious Area |
| | 88,822 | | 35.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.7 | 50 | 0.3362 | 0.50 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 13 | 0.3558 | 9.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 163 | 0.0873 | 2.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.7 | 374 | 0.0540 | 3.74 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.7 | 600 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1D: Pond E 1.1D



## Summary for Subcatchment E 1.2A: (blank)

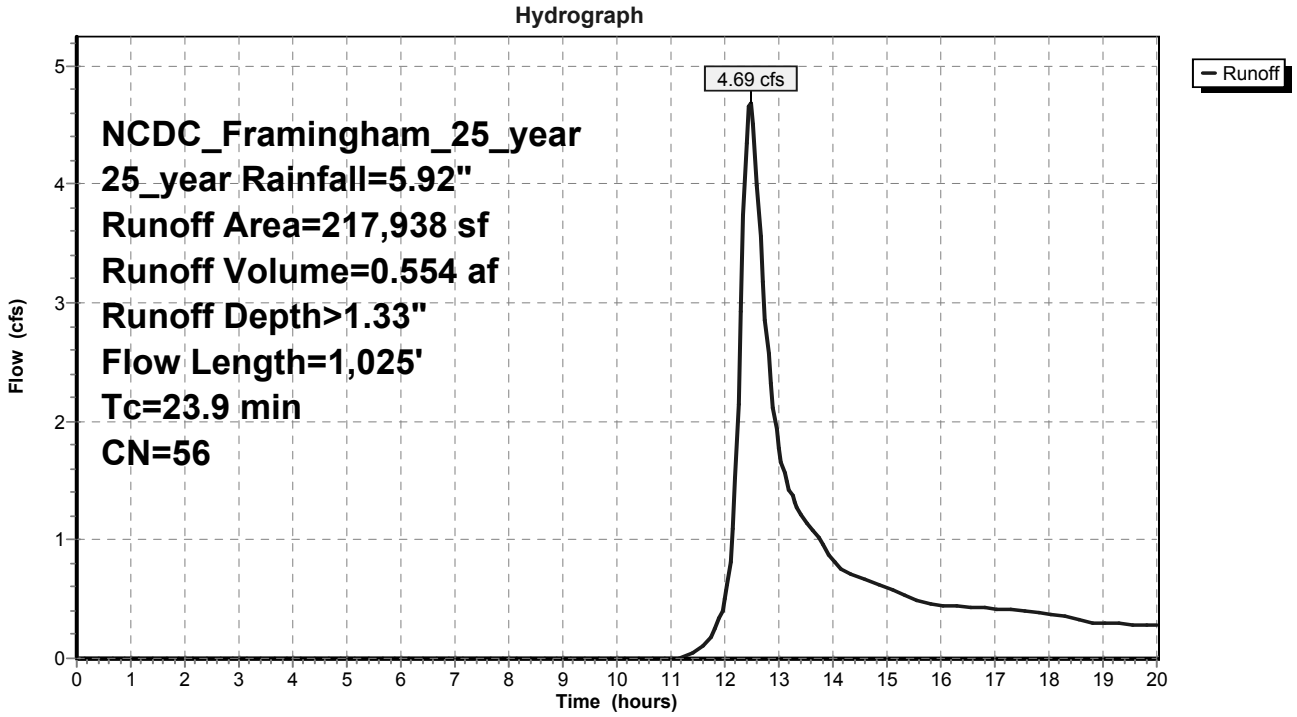
Runoff = 4.69 cfs @ 12.47 hrs, Volume= 0.554 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

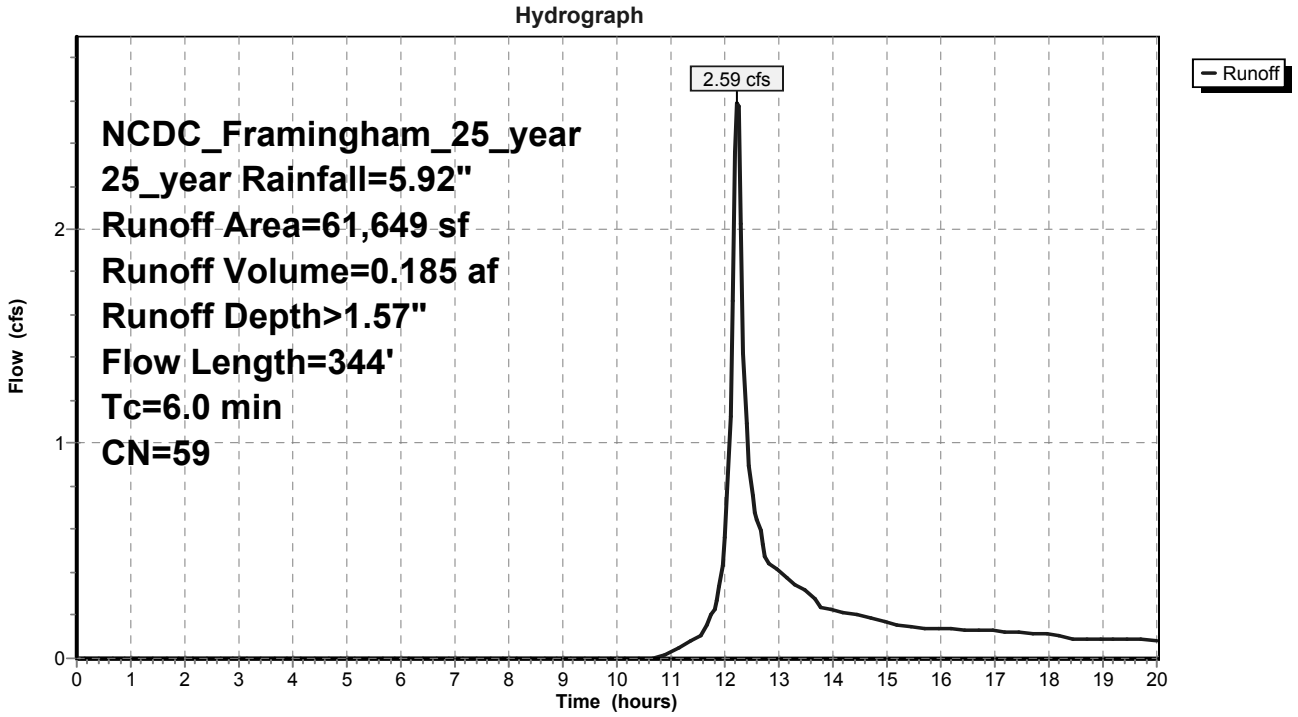
Runoff = 2.59 cfs @ 12.24 hrs, Volume= 0.185 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone

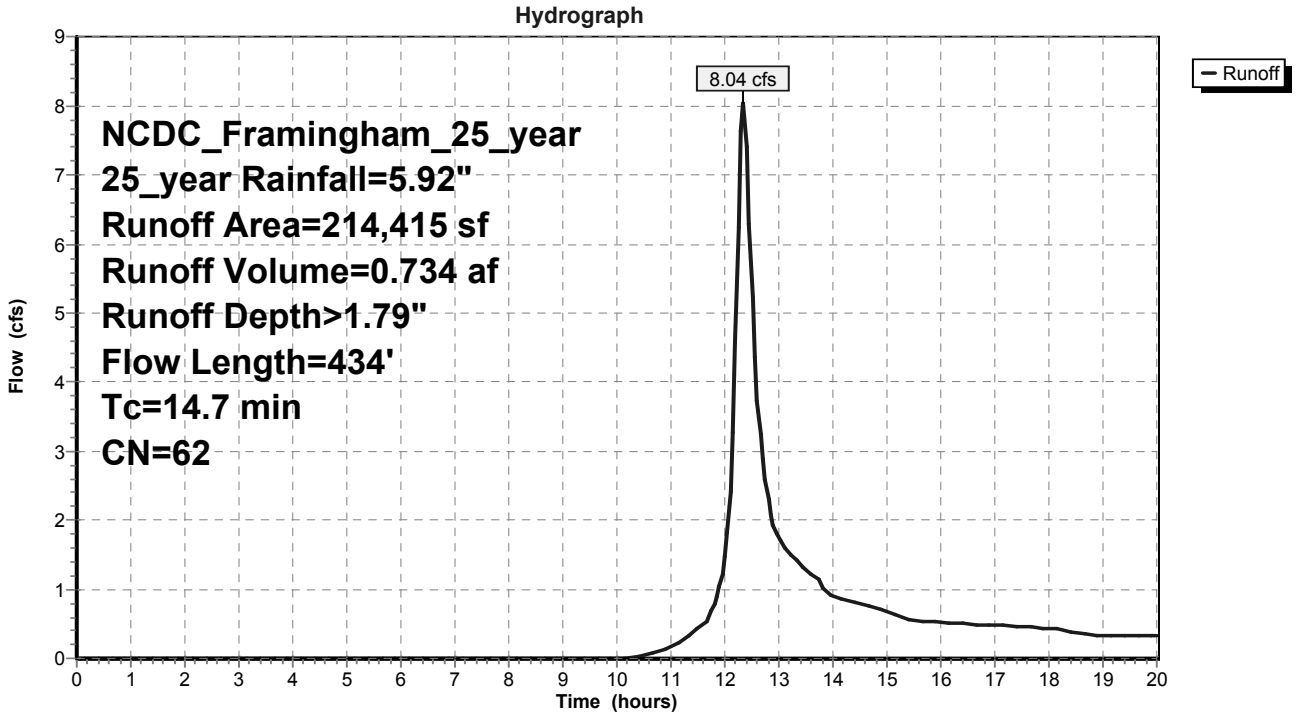
Runoff = 8.04 cfs @ 12.34 hrs, Volume= 0.734 af, Depth> 1.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 24,009 | 30 | WOODS, 0% imperv, HSG A |
| * | 112,703 | 55 | WOODS, 0% imperv, HSG B |
| * | 20,960 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 56,743 | 85 | GRAVEL, 65% imperv, HSG B |
| | 214,415 | 62 | Weighted Average |
| | 163,908 | | 76.44% Pervious Area |
| | 50,507 | | 23.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0161 | 0.63 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 63 | 0.0993 | 5.07 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.7 | 434 | Total | | | |

## Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2B: (blank)

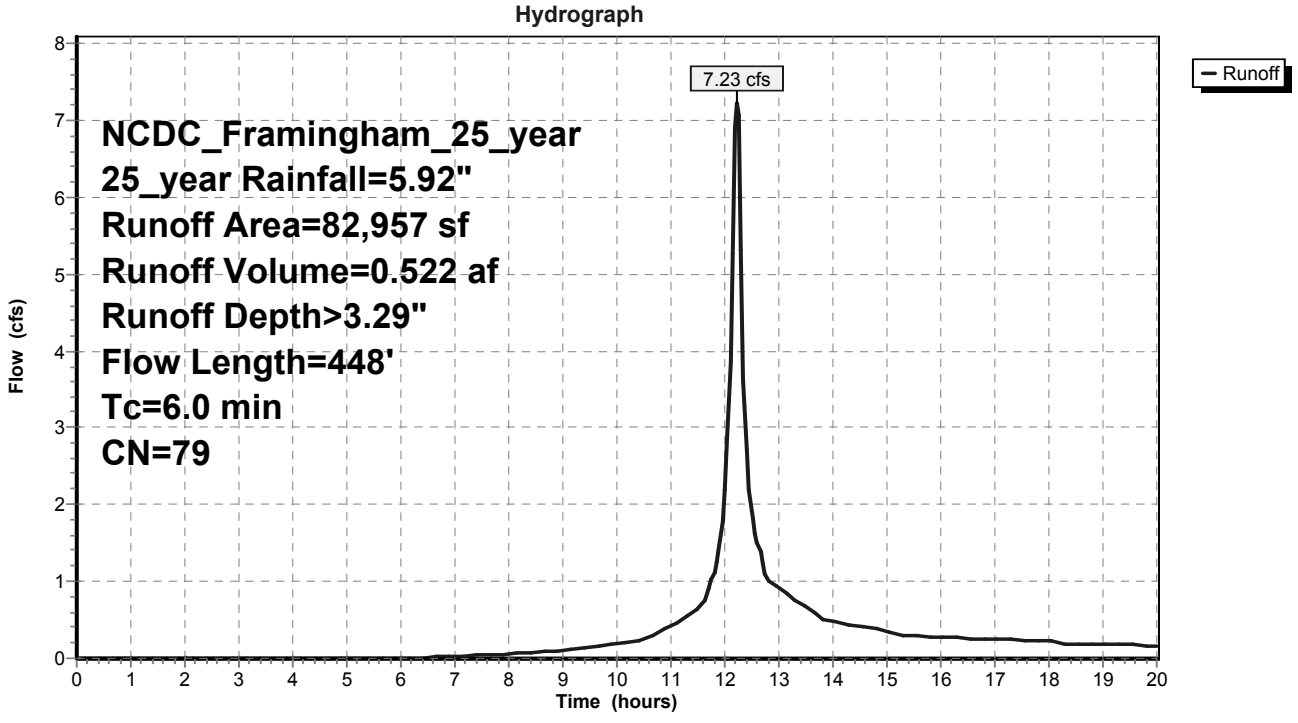
Runoff = 7.23 cfs @ 12.23 hrs, Volume= 0.522 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer

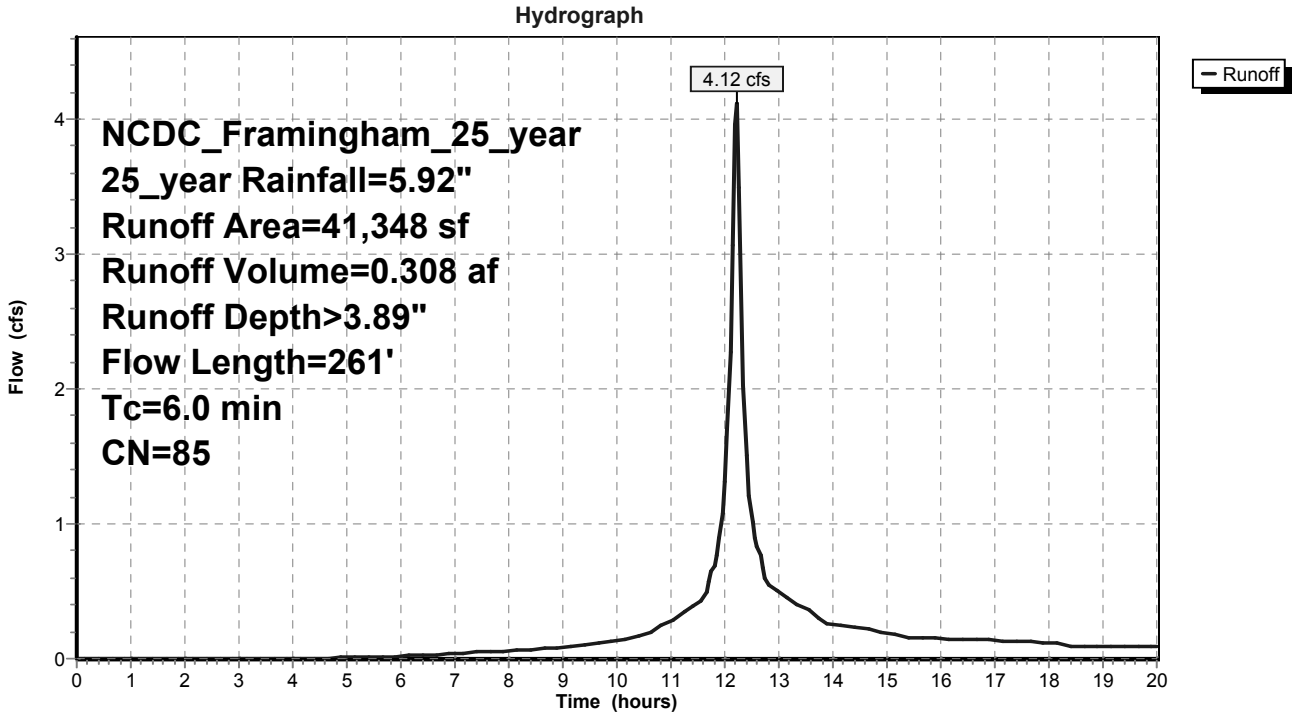
Runoff = 4.12 cfs @ 12.23 hrs, Volume= 0.308 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27 | 55 | WOODS, 0% imperv, HSG B |
| * | 41,322 | 85 | GRAVEL, 65% imperv, HSG B |
| | 41,348 | 85 | Weighted Average |
| | 14,489 | | 35.04% Pervious Area |
| | 26,859 | | 64.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 211 | 0.0326 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.1 | 261 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer

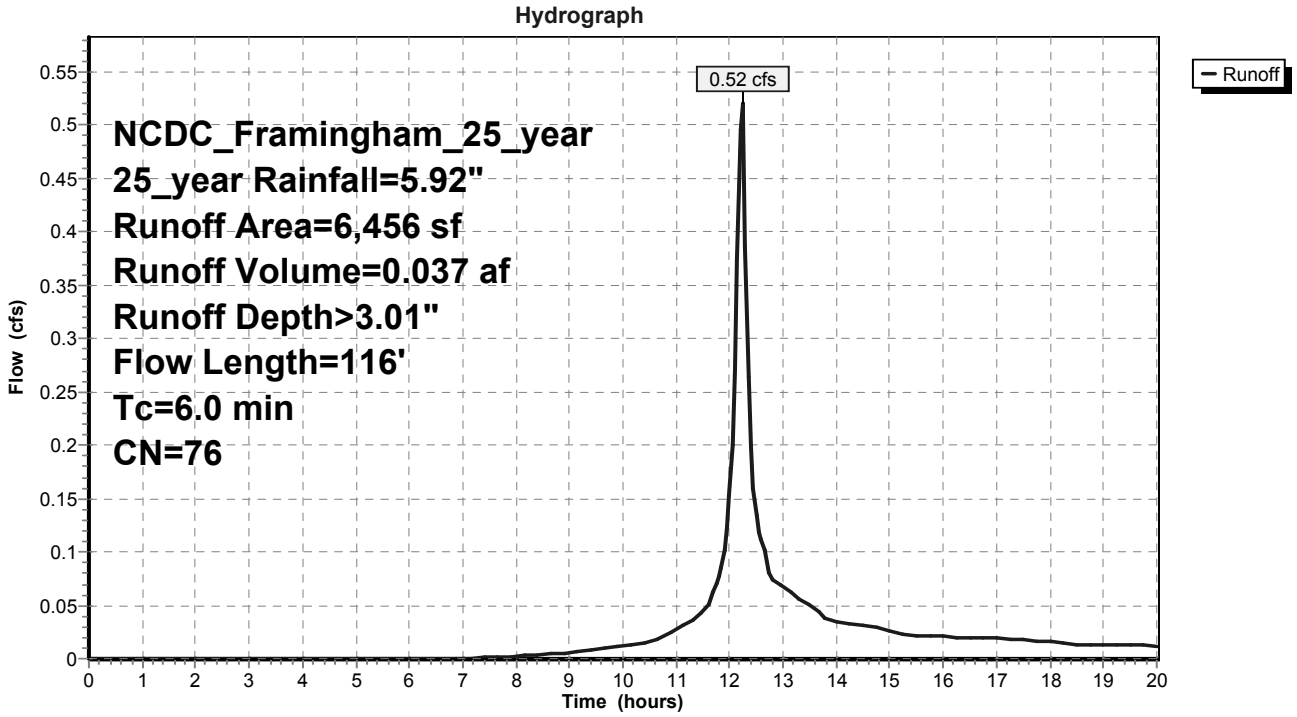
Runoff = 0.52 cfs @ 12.23 hrs, Volume= 0.037 af, Depth> 3.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,035 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,421 | 85 | GRAVEL, 65% imperv, HSG B |
| | 6,456 | 76 | Weighted Average |
| | 3,582 | | 55.49% Pervious Area |
| | 2,874 | | 44.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0740 | 1.71 | | **Sheet Flow,** Range n= 0.013 P2= 3.00" |
| 0.2 | 66 | 0.0982 | 5.05 | | **Shallow Concentrated Flow,** GRAVEL Kv= 16.1 fps |
| 0.7 | 116 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2C: (blank)

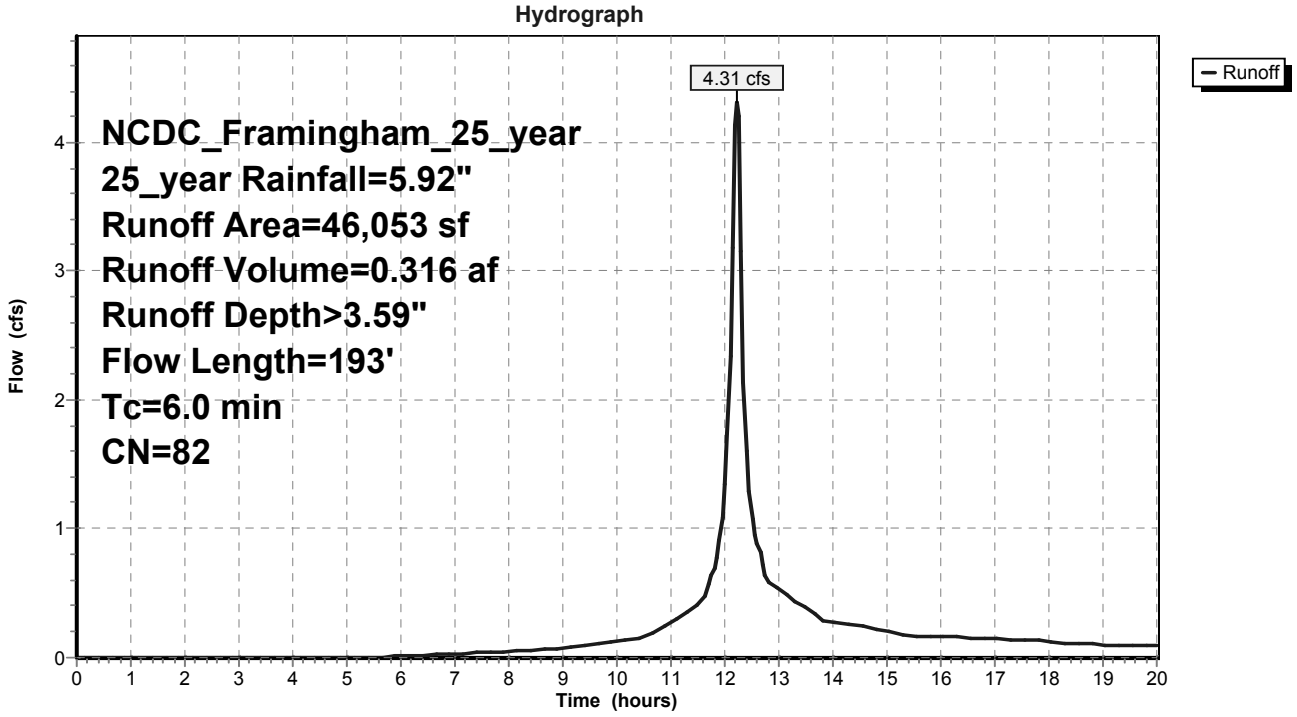
Runoff = 4.31 cfs @ 12.23 hrs, Volume= 0.316 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone

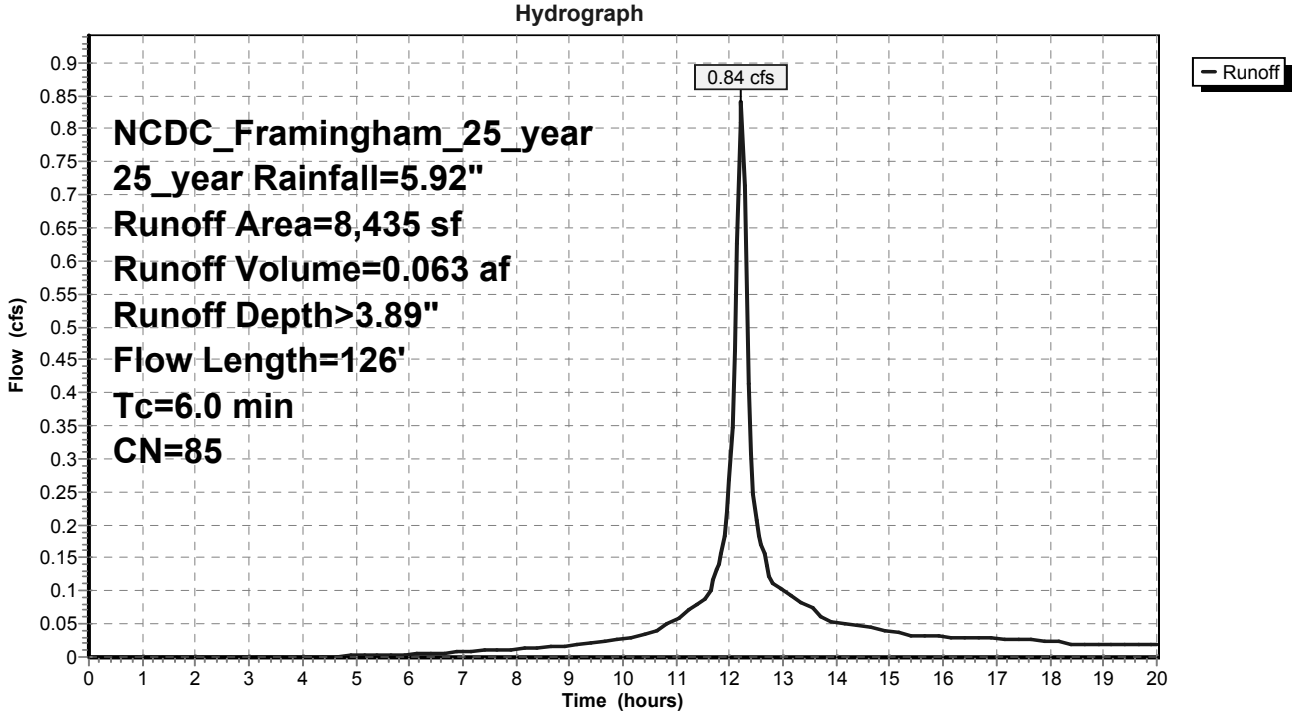
Runoff = 0.84 cfs @ 12.23 hrs, Volume= 0.063 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 8,435 | 85 | GRAVEL, 65% imperv, HSG B |
| | 2,952 | | 35.00% Pervious Area |
| | 5,483 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 76 | 0.1026 | 5.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.6 | 126 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer

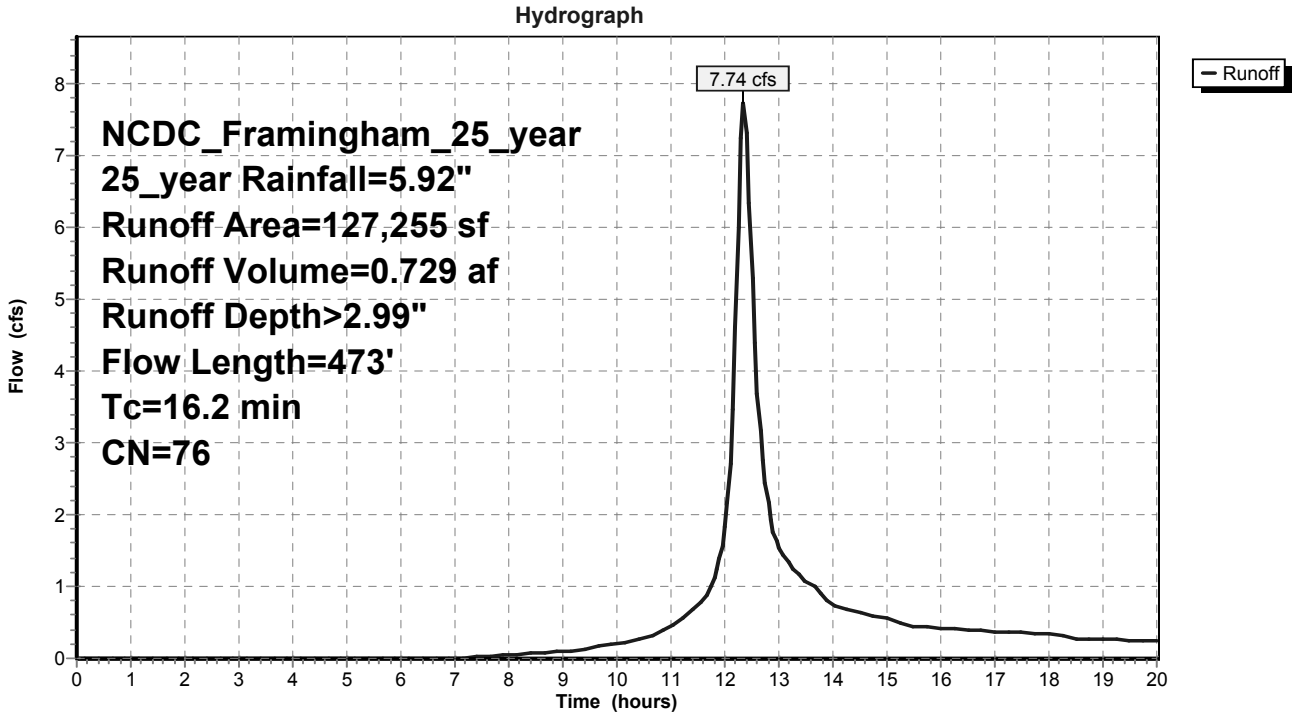
Runoff = 7.74 cfs @ 12.35 hrs, Volume= 0.729 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 36,476 | 55 | WOODS, 0% imperv, HSG B |
| * | 90,779 | 85 | GRAVEL, 65% imperv, HSG B |
| | 127,255 | 76 | Weighted Average |
| | 68,249 | | 53.63% Pervious Area |
| | 59,006 | | 46.37% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | 50 | 0.0137 | 0.14 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 8.0 | 233 | 0.0009 | 0.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.5 | 75 | 0.2333 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 54 | 0.0131 | 1.84 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 19 | 0.0056 | 0.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 41 | 0.0176 | 2.13 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 16.2 | 473 | Total | | | |

## Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2E: Pond E 1.2E

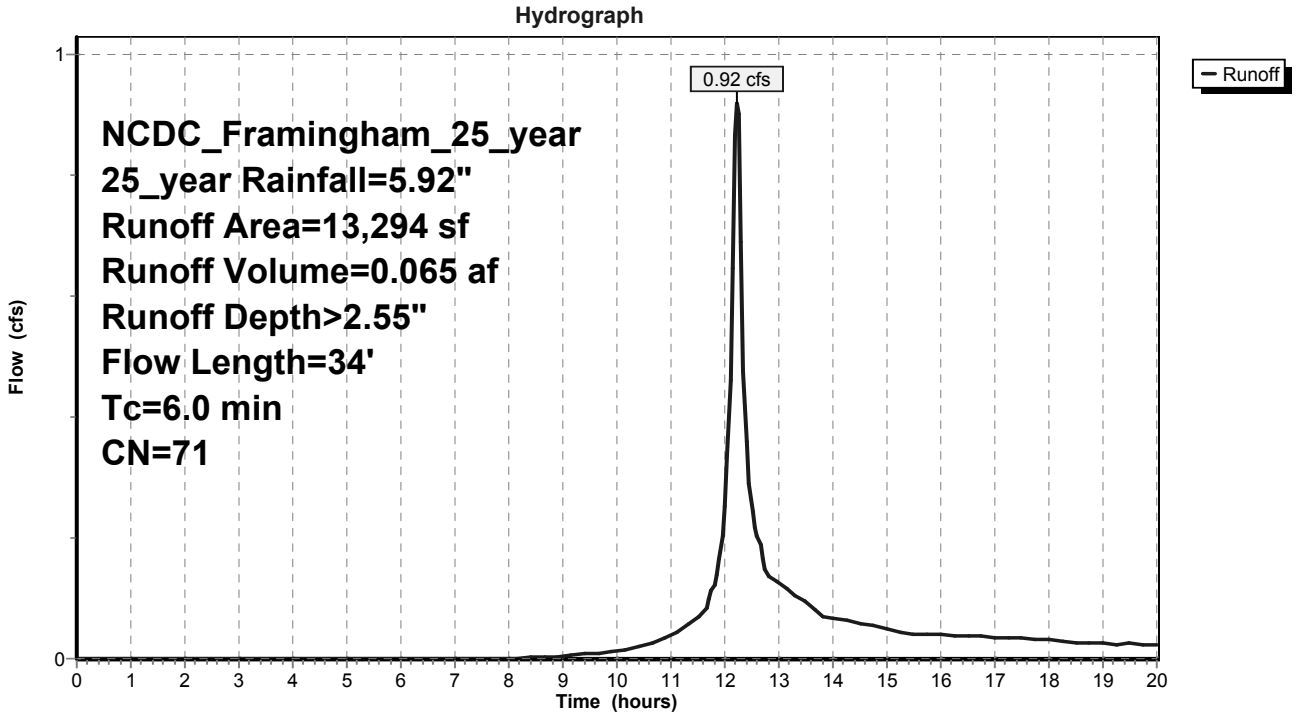
Runoff = 0.92 cfs @ 12.23 hrs, Volume= 0.065 af, Depth> 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,218 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,076 | 85 | GRAVEL, 65% imperv, HSG B |
| | 13,294 | 71 | Weighted Average |
| | 8,695 | | 65.40% Pervious Area |
| | 4,600 | | 34.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.9 | 31 | 0.3269 | 0.18 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 2 | 0.3283 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 3.0 | 34 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2E: Pond E 1.2E



## Summary for Subcatchment E 1.3A: Aqueduct onto SITE

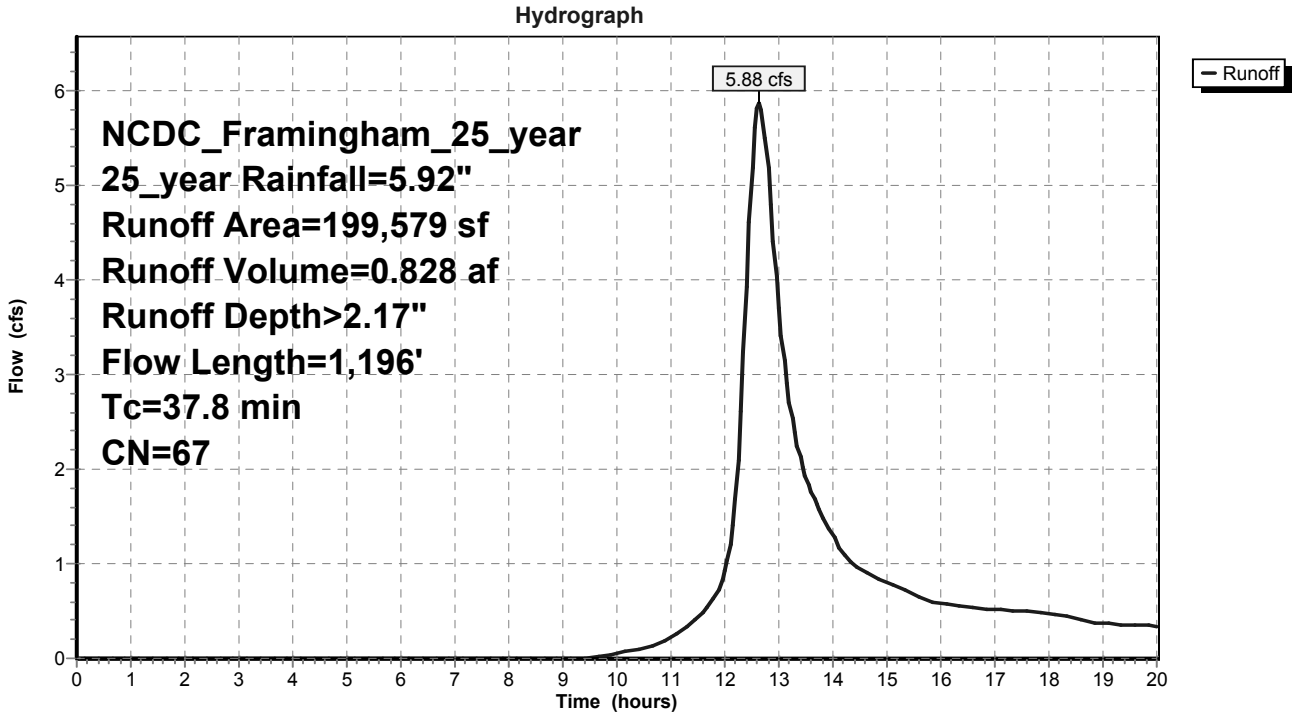
Runoff = 5.88 cfs @ 12.64 hrs, Volume= 0.828 af, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,883 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 6,497 | 30 | WOODS, 0% imperv, HSG A |
| * | 62,664 | 55 | WOODS, 0% imperv, HSG B |
| * | 94,997 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 199,579 | 67 | Weighted Average |
| | 130,818 | | 65.55% Pervious Area |
| | 68,761 | | 34.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 1 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 12 | 0.0472 | 3.50 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 17.9 | 54 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 37.8 | 1,196 | Total | | | |

## Subcatchment E 1.3A: Aqueduct onto SITE



## Summary for Subcatchment E 4.0: Offsite to Sudbury R

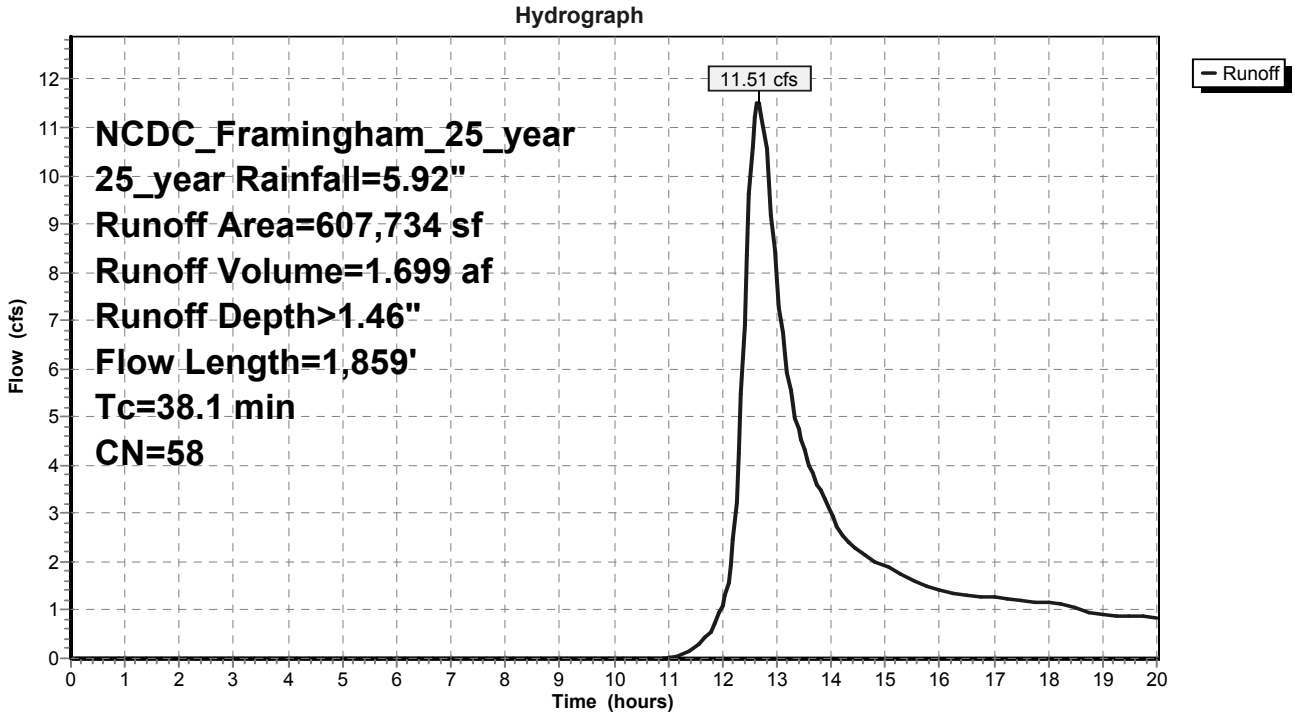
Runoff = 11.51 cfs @ 12.66 hrs, Volume= 1.699 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 78,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 27,532 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,227 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,518 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 0% imperv, HSG A |
| * | 6,326 | 98 | Water, 0% imperv, HSG C |
| * | 12,063 | 98 | Water, 0% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 607,734 | 58 | Weighted Average |
| | 548,979 | | 90.33% Pervious Area |
| | 58,756 | | 9.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.2 | 194 | 0.0399 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 8.7 | 227 | 0.0076 | 0.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 38.1 | 1,859 | Total | | | |

## Subcatchment E 4.0: Offsite to Sudbury R



## Summary for Subcatchment W 10.0: Offsite to Sudbury R

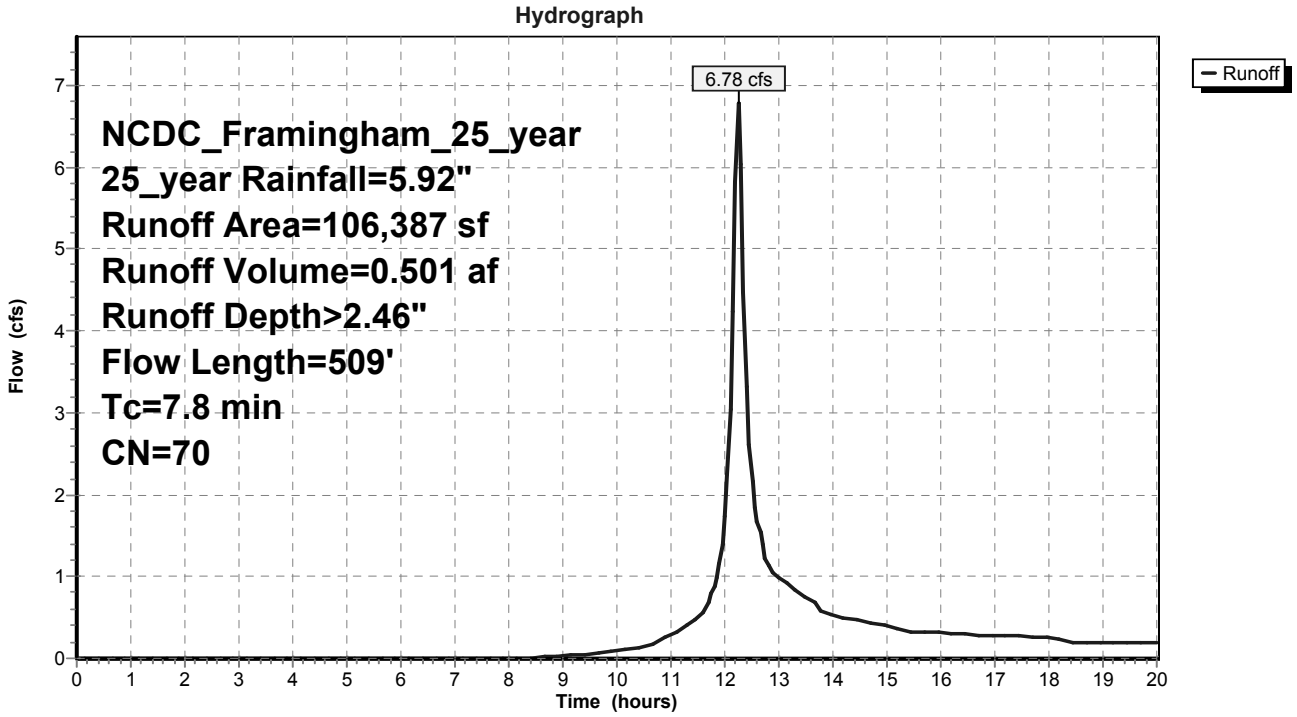
Runoff = 6.78 cfs @ 12.25 hrs, Volume= 0.501 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 0% imperv, HSG C |
| * | 6,541 | 98 | Water, 0% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 41 | 0.0223 | 0.75 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 11 | 0.2240 | 2.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 7.8 | 509 | Total | | | |

## Subcatchment W 10.0: Offsite to Sudbury R



## Summary for Subcatchment W 2.0: Onsite to Sudbury R

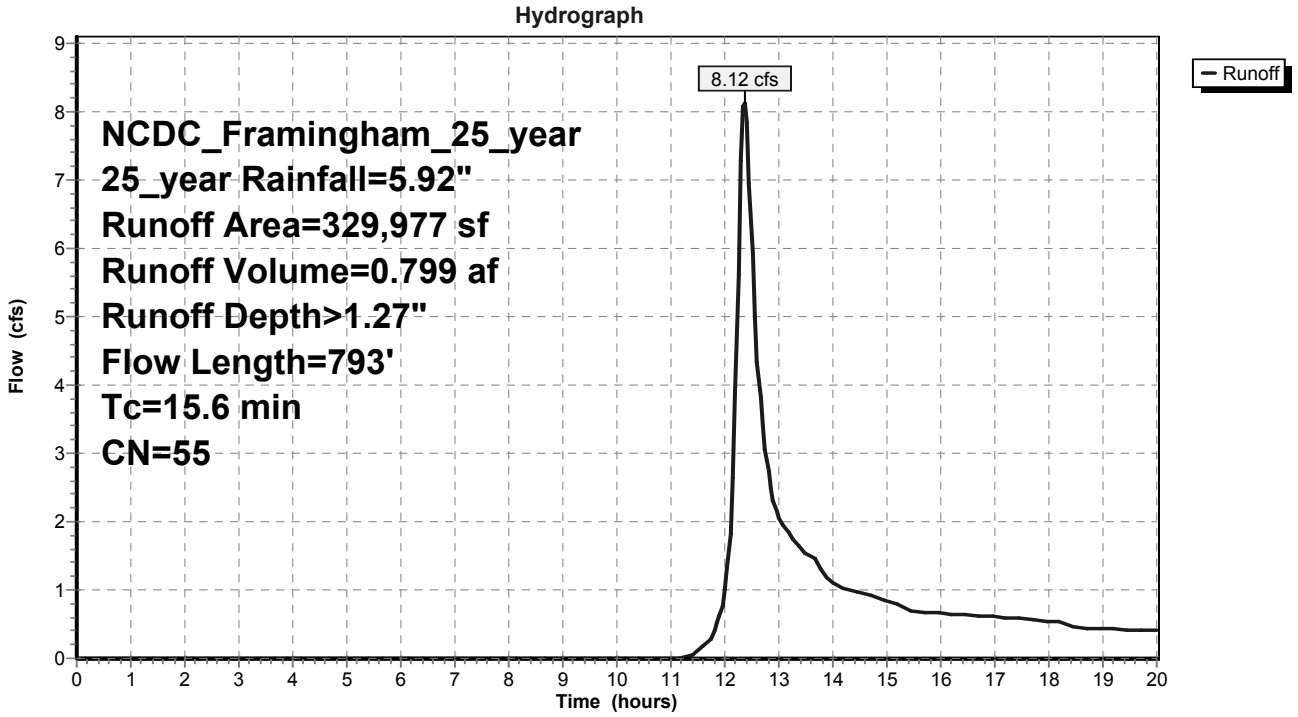
Runoff = 8.12 cfs @ 12.36 hrs, Volume= 0.799 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 160,572 | 30 | WOODS, 0% imperv, HSG A |
| * | 22 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 58,308 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 0 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 19,292 | 98 | Water, 0% imperv, HSG D |
| * | 1,268 | 98 | Water, 0% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 329,977 | 55 | Weighted Average |
| | 292,076 | | 88.51% Pervious Area |
| | 37,900 | | 11.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: Onsite to Sudbury R



## Summary for Subcatchment W 3.1: Pond P W 3.1

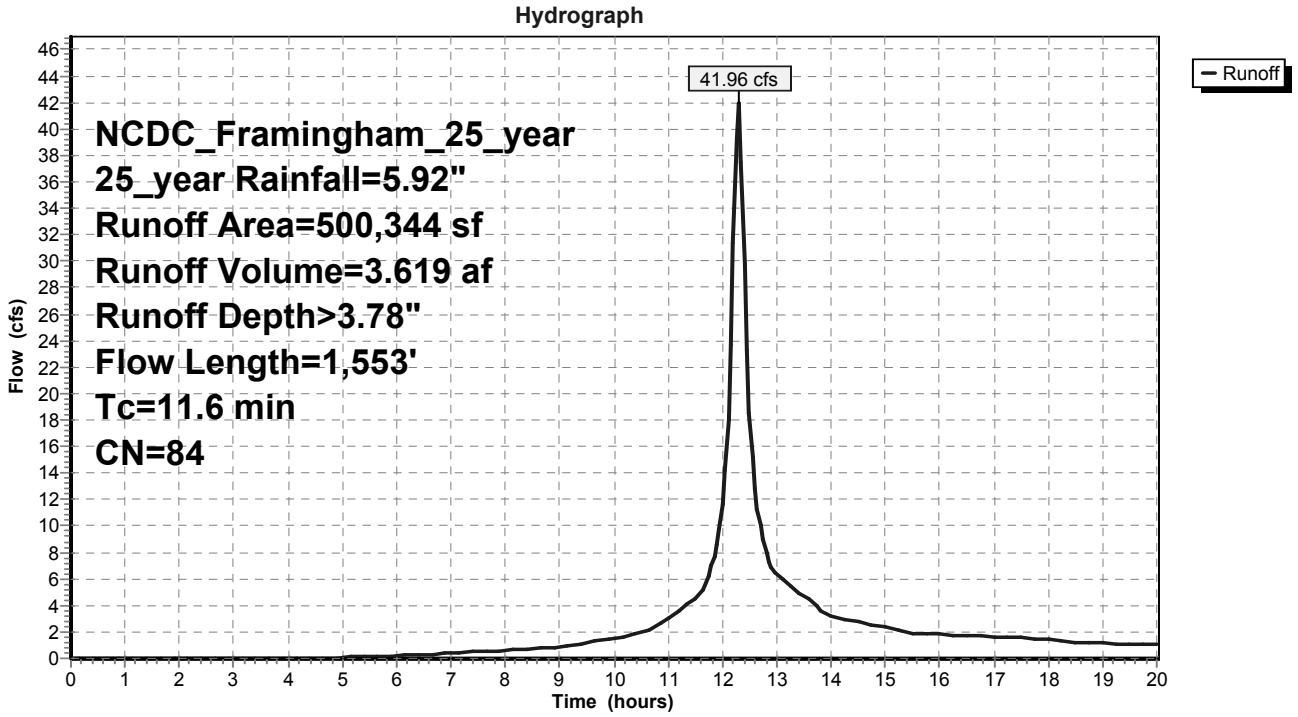
Runoff = 41.96 cfs @ 12.29 hrs, Volume= 3.619 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 149 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 12,067 | 30 | WOODS, 0% imperv, HSG A |
| * | 10,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 137,585 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 197,738 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 22,211 | 98 | IMP, 100% imperv, HSG A |
| * | 118,525 | 98 | IMP, 100% imperv, HSG B |
| | 500,344 | 84 | Weighted Average |
| | 282,384 | | 56.44% Pervious Area |
| | 217,960 | | 43.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 50 | 0.0032 | 0.55 | | **Sheet Flow,** Smooth Surfaces n= 0.011 P2= 3.00" |
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 287 | 0.0109 | 2.12 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.8 | 686 | 0.0355 | 3.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 11.6 | 1,553 | Total | | | |

## Subcatchment W 3.1: Pond P W 3.1



## Summary for Subcatchment W 3.4: Gravel Processing Facility

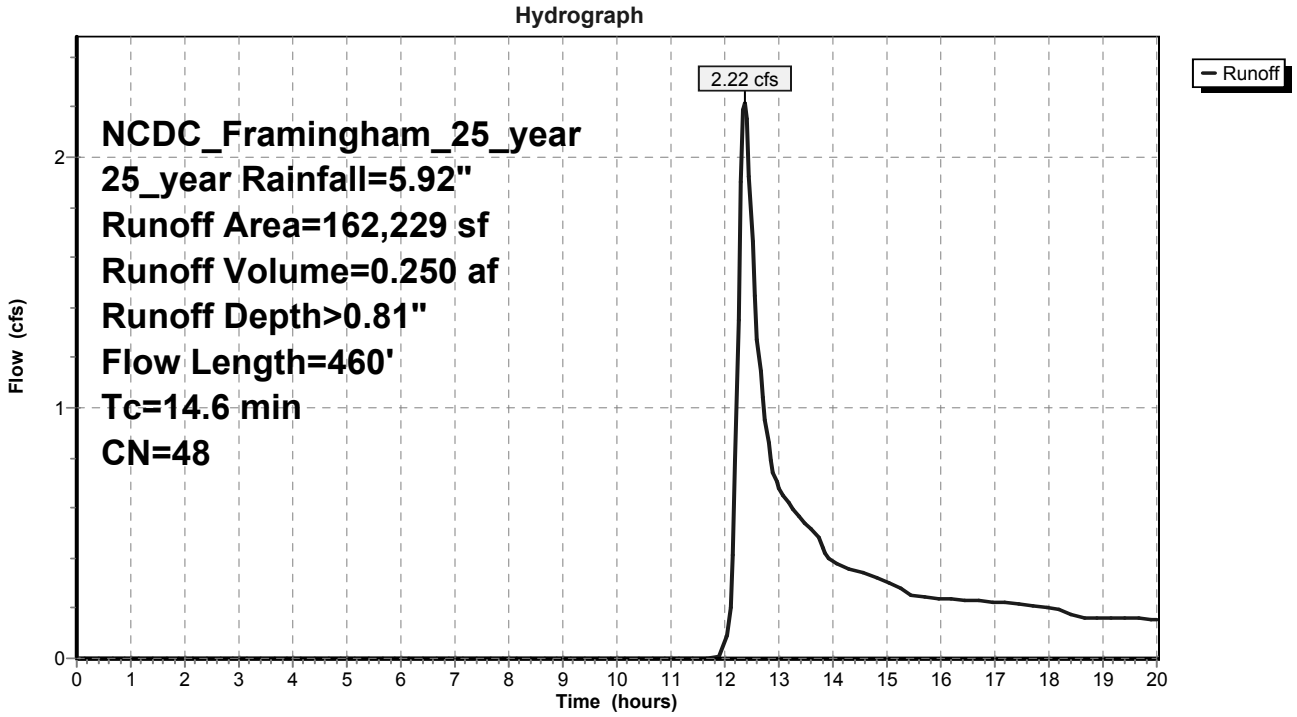
Runoff = 2.22 cfs @ 12.37 hrs, Volume= 0.250 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,975 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,153 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 42,351 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 162,229 | 48 | Weighted Average |
| | 134,701 | | 83.03% Pervious Area |
| | 27,528 | | 16.97% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: Gravel Processing Facility



## Summary for Subcatchment W 3.5: Small Depression to Big Box

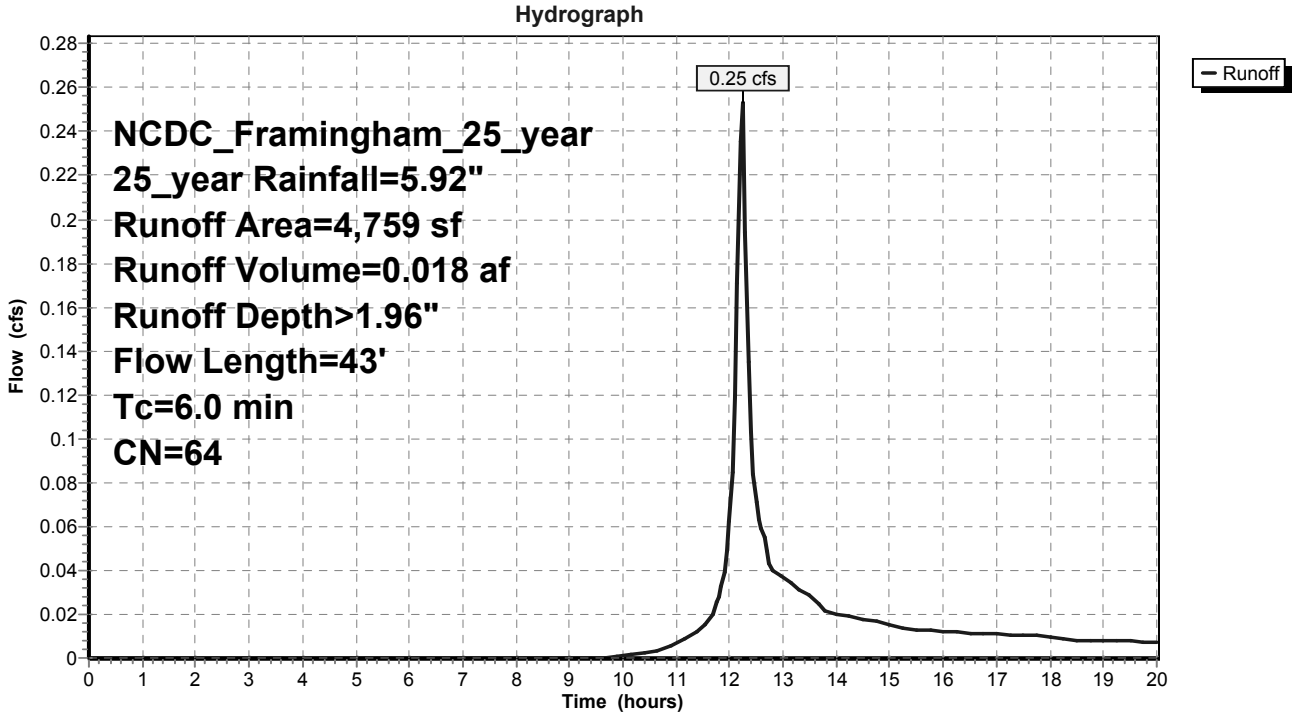
Runoff = 0.25 cfs @ 12.24 hrs, Volume= 0.018 af, Depth> 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,714 | 30 | WOODS, 0% imperv, HSG A |
| * | 2,049 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 997 | 98 | IMP, 100% imperv, HSG A |
| | 4,759 | 64 | Weighted Average |
| | 3,427 | | 72.02% Pervious Area |
| | 1,332 | | 27.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 20 | 0.0320 | 1.16 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 12 | 0.1533 | 0.27 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.3 | 12 | 0.3938 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 2.3 | 43 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.5: Small Depression to Big Box



## Summary for Subcatchment W 9.1: Gravel Pit to Big Box Culvert

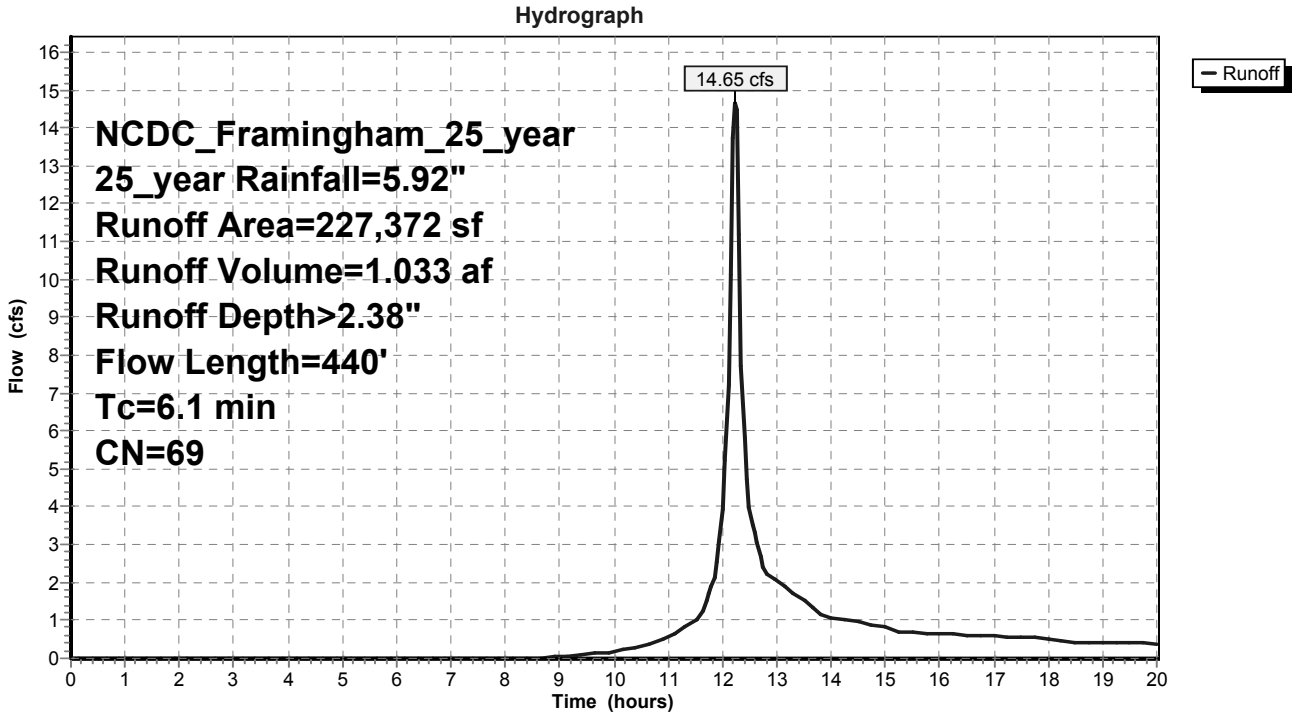
Runoff = 14.65 cfs @ 12.23 hrs, Volume= 1.033 af, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 55,301 | 30 | WOODS, 0% imperv, HSG A |
| * | 14,585 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,790 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 53,800 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 6,069 | 98 | IMP, 100% imperv, HSG A |
| * | 30,826 | 98 | IMP, 100% imperv, HSG B |
| | 227,372 | 69 | Weighted Average |
| | 148,989 | | 65.53% Pervious Area |
| | 78,384 | | 34.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 206 | 0.0265 | 0.81 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 127 | 0.0402 | 3.23 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.2 | 107 | 0.0880 | 1.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 6.1 | 440 | Total | | | |

## Subcatchment W 9.1: Gravel Pit to Big Box Culvert



## Summary for Subcatchment W 9.1A: Gravel Pit to Roadway

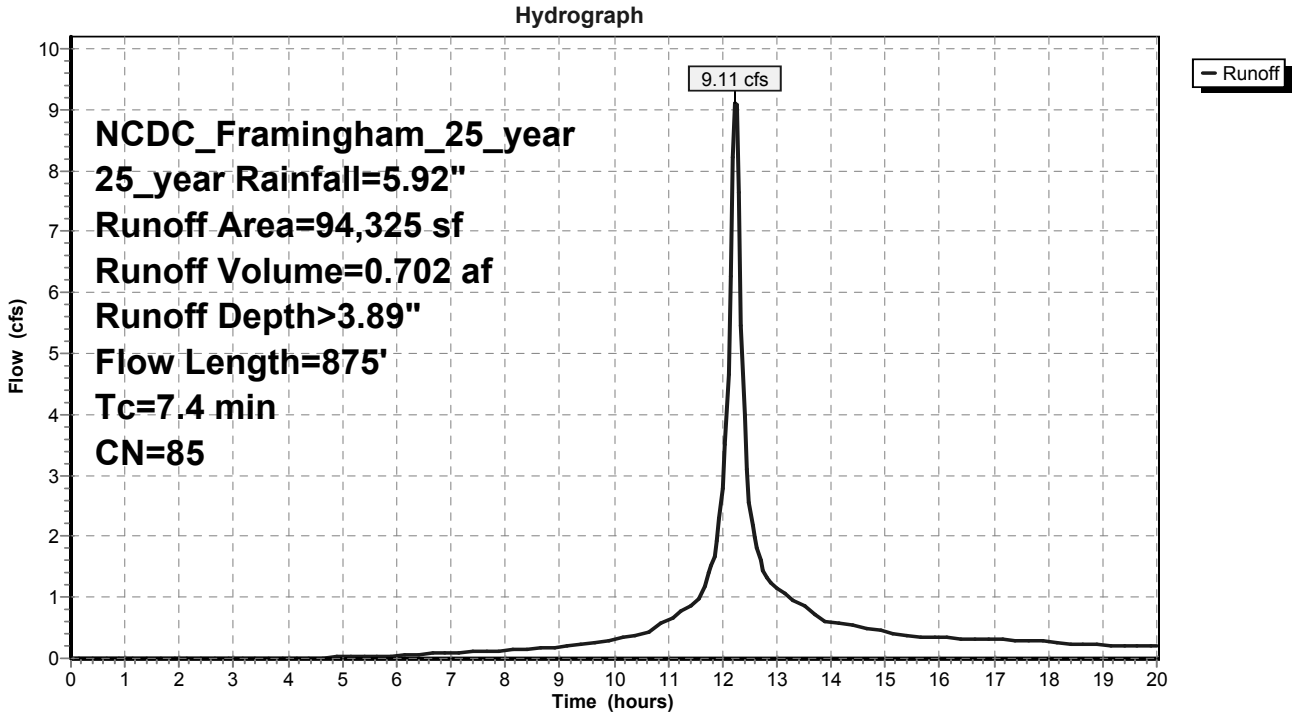
Runoff = 9.11 cfs @ 12.24 hrs, Volume= 0.702 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,124 | 55 | WOODS, 0% imperv, HSG B |
| * | 76,325 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 11,877 | 98 | IMP, 100% imperv, HSG B |
| | 94,325 | 85 | Weighted Average |
| | 44,714 | | 47.40% Pervious Area |
| | 49,611 | | 52.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 116 | 0.0112 | 2.15 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 20 | 0.0178 | 2.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 130 | 0.0176 | 2.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.0327 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 11 | 0.0775 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 2 | 0.0429 | 1.04 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0151 | 0.61 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.4 | 875 | Total | | | |

## Subcatchment W 9.1A: Gravel Pit to Roadway



## Summary for Subcatchment W 9.1B: Aqueduct to Big Box

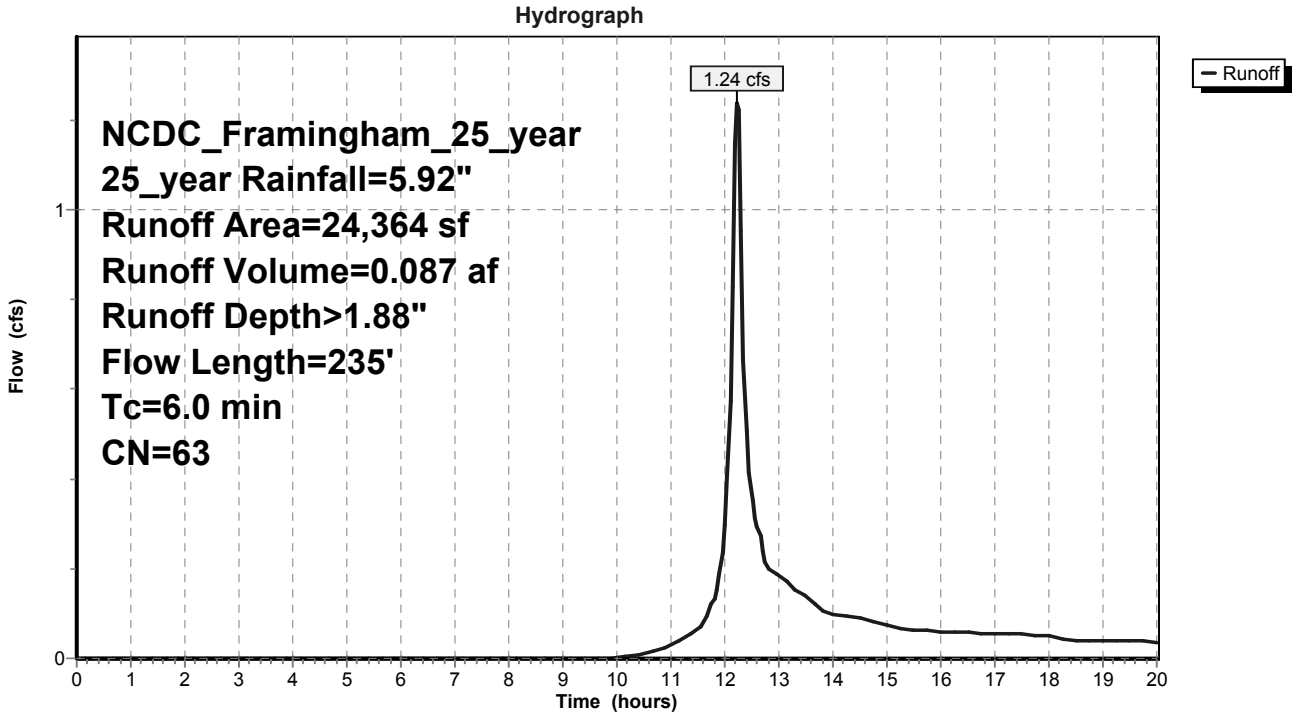
Runoff = 1.24 cfs @ 12.24 hrs, Volume= 0.087 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 123 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 681 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,458 | | 83.97% Pervious Area |
| | 3,905 | | 16.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: Aqueduct to Big Box



## Summary for Subcatchment W 9.1C: Culvert 2

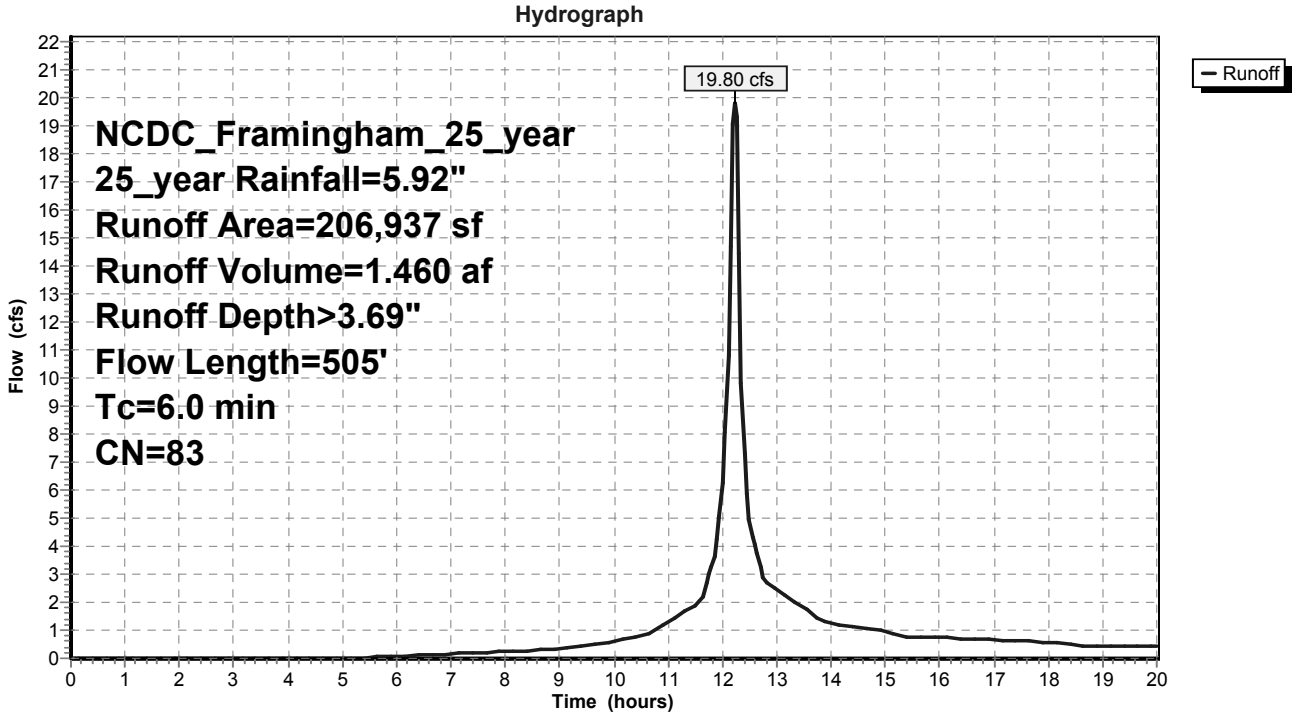
Runoff = 19.80 cfs @ 12.23 hrs, Volume= 1.460 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,598 | 55 | WOODS, 0% imperv, HSG B |
| * | 181,699 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,640 | 98 | IMP, 100% imperv, HSG B |
| | 206,937 | 83 | Weighted Average |
| | 88,833 | | 42.93% Pervious Area |
| | 118,104 | | 57.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 50 | 0.0641 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.3 | 455 | 0.0405 | 3.24 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 505 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1C: Culvert 2



## Summary for Pond MH-NCULV-A: MH-NCULV-A

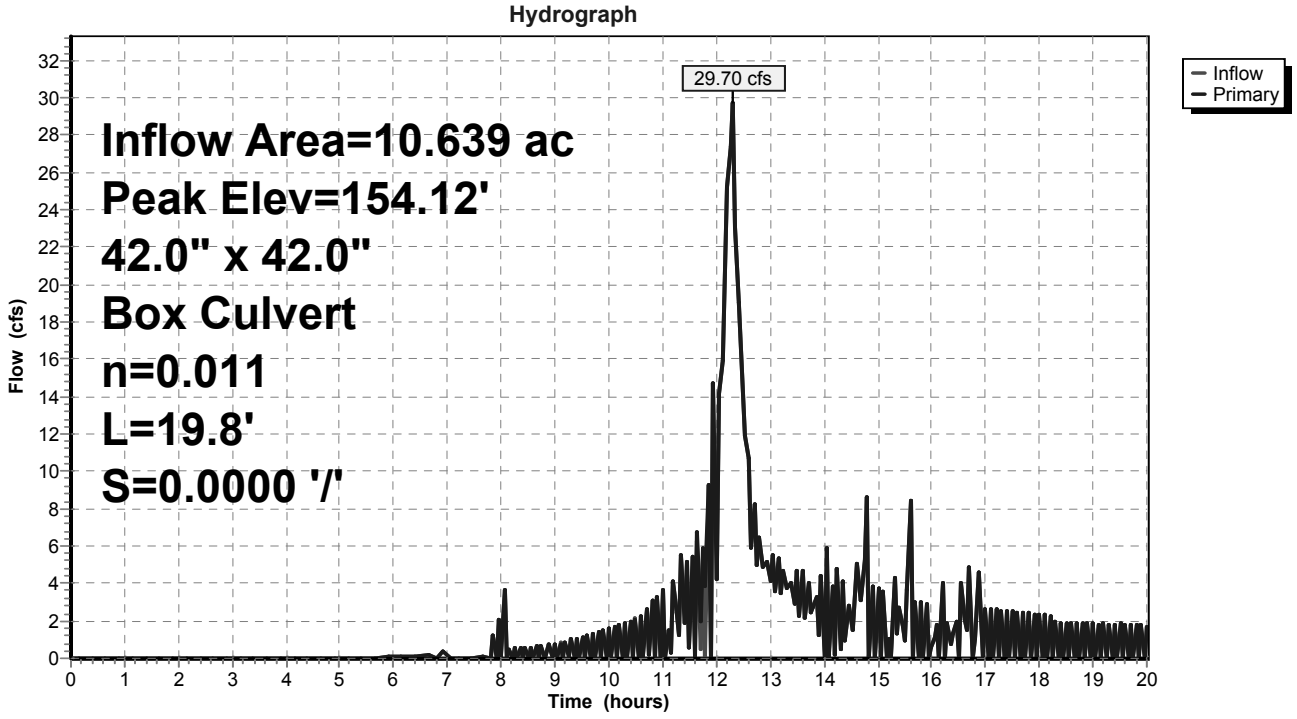
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 3.05" for 25_year event
Inflow = 29.70 cfs @ 12.30 hrs, Volume= 2.708 af
Outflow = 29.70 cfs @ 12.30 hrs, Volume= 2.708 af, Atten= 0%, Lag= 0.0 min
Primary = 29.70 cfs @ 12.30 hrs, Volume= 2.732 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 154.12' @ 12.27 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=22.40 cfs @ 12.30 hrs HW=154.08' TW=153.93' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 22.40 cfs @ 1.83 fps)

## Pond MH-NCULV-A: MH-NCULV-A



## Summary for Pond MH-NCULV-B: MH-NCULV-B

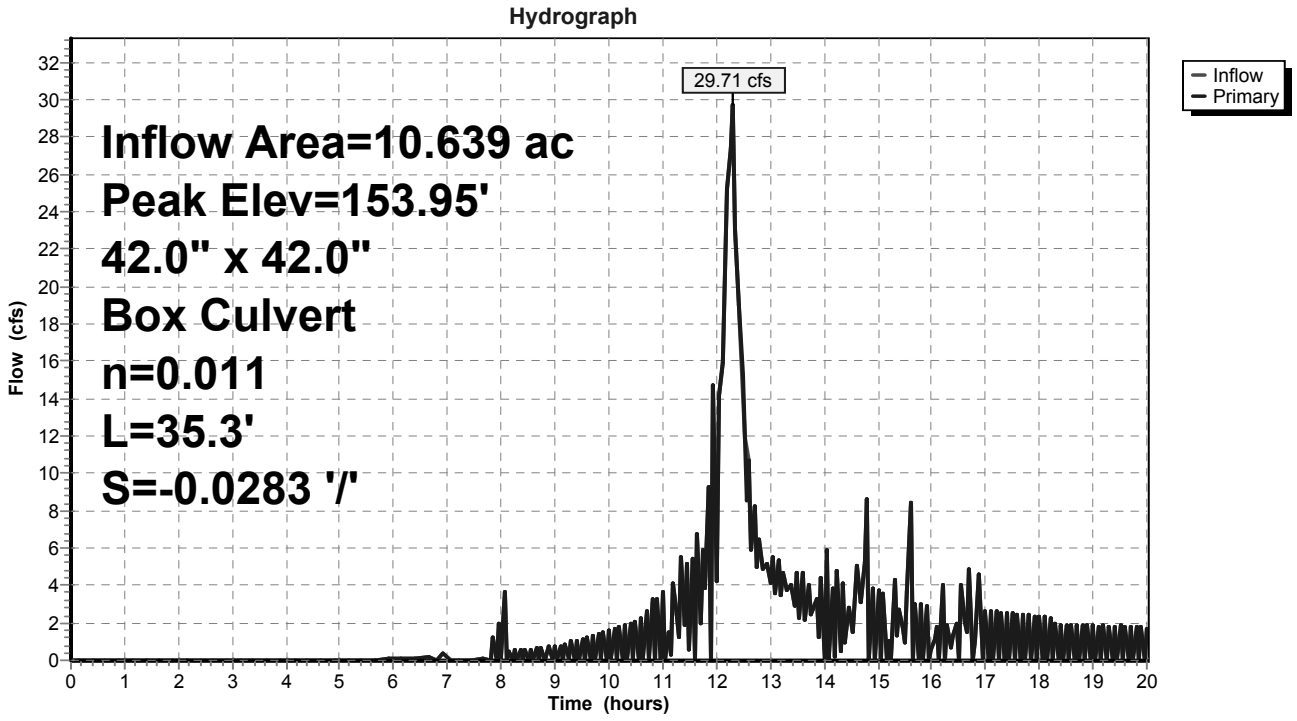
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 3.08" for 25_year event
Inflow = 29.70 cfs @ 12.30 hrs, Volume= 2.732 af
Outflow = 29.71 cfs @ 12.30 hrs, Volume= 2.732 af, Atten= 0%, Lag= 0.0 min
Primary = 29.71 cfs @ 12.30 hrs, Volume= 2.732 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 153.95' @ 12.29 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=29.72 cfs @ 12.30 hrs HW=153.93' TW=153.68' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 29.72 cfs @ 2.43 fps)

## Pond MH-NCULV-B: MH-NCULV-B



## Summary for Pond P E 1.1A: 284

Inflow Area = 35.276 ac, 19.71% Impervious, Inflow Depth > 0.63" for 25_year event
Inflow = 11.02 cfs @ 12.23 hrs, Volume= 1.837 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 134.85' @ 20.00 hrs Surf.Area= 44,862 sf Storage= 79,795 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

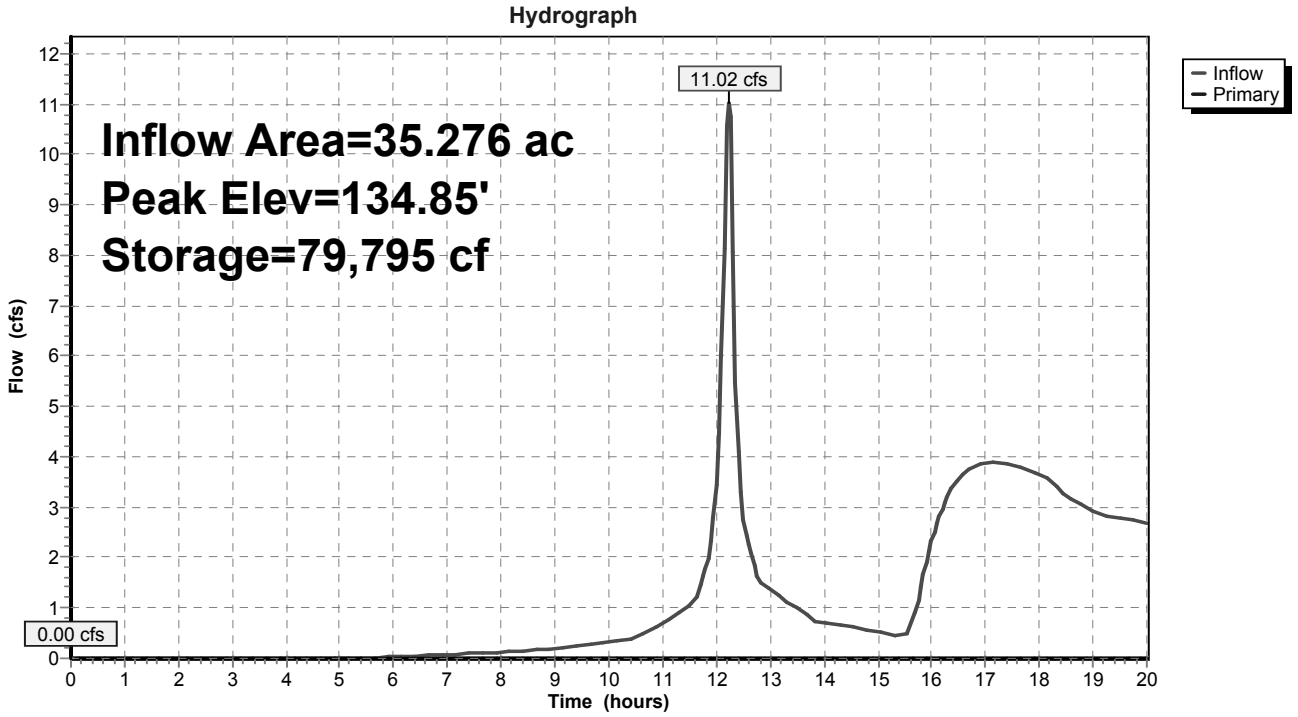
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 32.573 ac, 20.73% Impervious, Inflow Depth > 1.63" for 25_year event
Inflow = 30.24 cfs @ 12.27 hrs, Volume= 4.424 af
Outflow = 3.53 cfs @ 17.16 hrs, Volume= 1.029 af, Atten= 88%, Lag= 293.8 min
Primary = 3.53 cfs @ 17.16 hrs, Volume= 1.029 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 147.04' @ 17.16 hrs Surf.Area= 104,038 sf Storage= 148,835 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= 371.3 min calculated for 1.027 af (23% of inflow)
Center-of-Mass det. time= 230.9 min ( 1,072.1 - 841.2 )

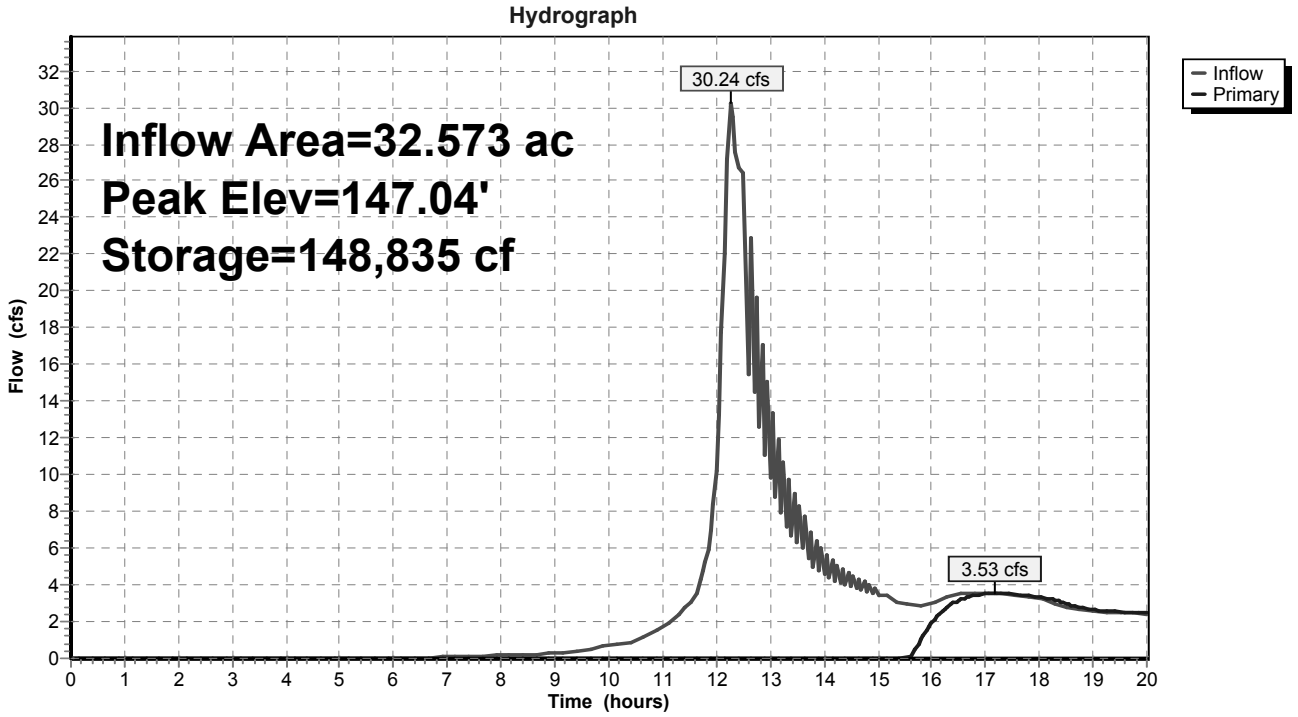
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=3.53 cfs @ 17.16 hrs HW=147.04' TW=134.10' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 3.53 cfs @ 0.67 fps)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.1B-4: P E 1.1B-4

Inflow Area = 2.081 ac, 0.00% Impervious, Inflow Depth > 1.72" for 25_year event
Inflow = 4.21 cfs @ 12.24 hrs, Volume= 0.298 af
Outflow = 3.97 cfs @ 12.26 hrs, Volume= 0.298 af, Atten= 6%, Lag= 1.4 min
Primary = 3.97 cfs @ 12.26 hrs, Volume= 0.298 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 168.20' @ 12.26 hrs Surf.Area= 401 sf Storage= 208 cf
Flood Elev= 170.00' Surf.Area= 2,939 sf Storage= 2,634 cf

Plug-Flow detention time= 0.5 min calculated for 0.297 af (100% of inflow)
Center-of-Mass det. time= 0.4 min ( 831.8 - 831.4 )

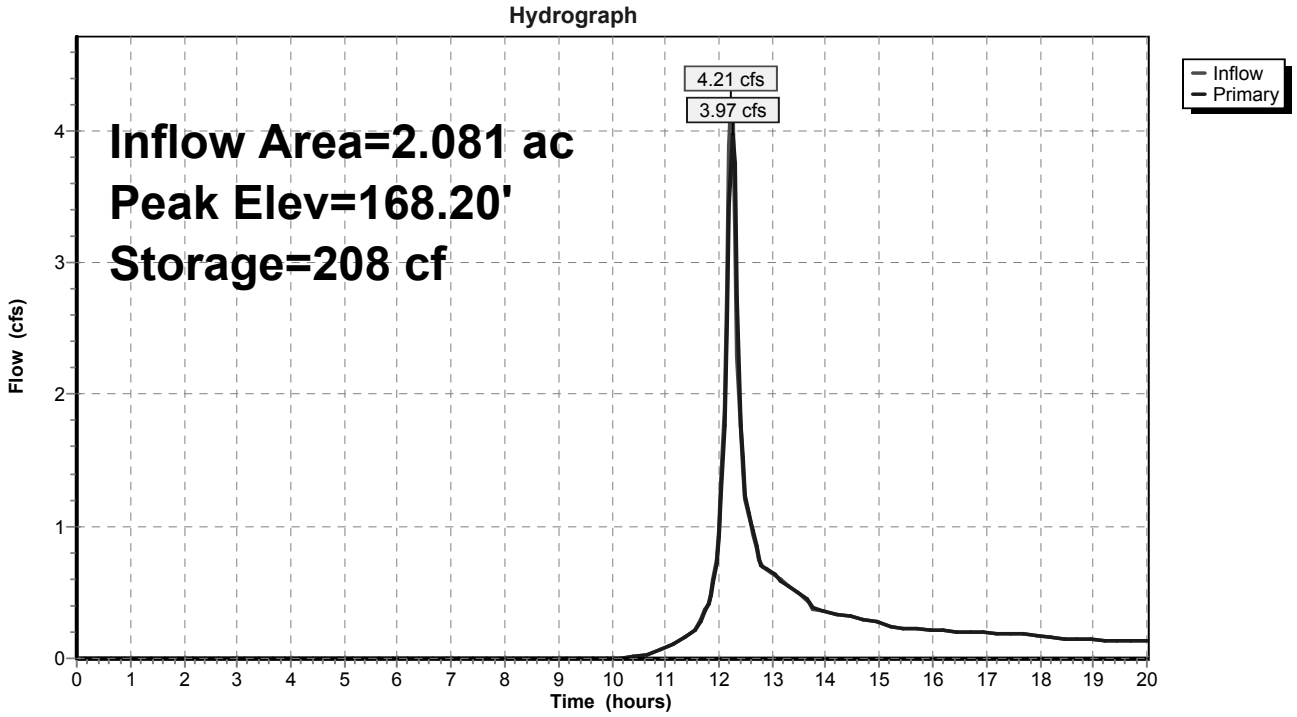
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 2,634 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 2 | 0 | 0 |
| 168.00 | 276 | 139 | 139 |
| 169.00 | 888 | 582 | 721 |
| 170.00 | 2,939 | 1,913 | 2,634 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 167.00' | **12.0" Round RCP_Round 15**<br>L= 69.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.00' / 165.40' S= 0.0230 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 169.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 72.00 148.00 229.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=3.91 cfs @ 12.26 hrs HW=168.18' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Inlet Controls 3.91 cfs @ 4.98 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B-4: P E 1.1B-4



## Summary for Pond P E 1.1C: P E 1.1C

Inflow Area = 13.327 ac, 33.50% Impervious, Inflow Depth > 1.58" for 25_year event
Inflow = 20.02 cfs @ 12.24 hrs, Volume= 1.754 af
Outflow = 12.42 cfs @ 12.34 hrs, Volume= 1.753 af, Atten= 38%, Lag= 6.0 min
Primary = 12.42 cfs @ 12.34 hrs, Volume= 1.753 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 2 sf Storage= 0 cf
Peak Elev= 170.60' @ 12.34 hrs Surf.Area= 8,934 sf Storage= 3,739 cf
Flood Elev= 171.00' Surf.Area= 14,037 sf Storage= 8,304 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.8 min ( 839.5 - 838.7 )

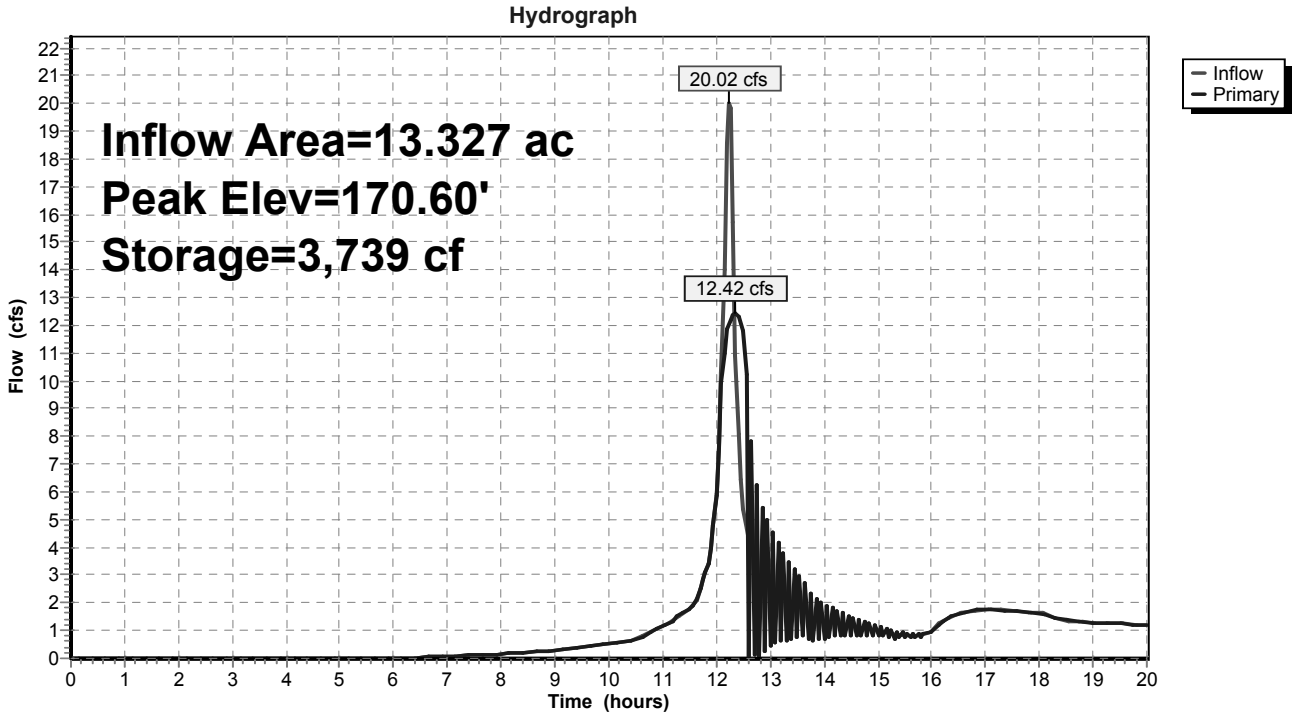
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 33,139 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 2 | 0 | 0 |
| 169.00 | 34 | 71 | 71 |
| 170.00 | 1,198 | 616 | 687 |
| 171.00 | 14,037 | 7,618 | 8,304 |
| 172.00 | 35,633 | 24,835 | 33,139 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.64' | **15.0" Round RCP_Round 15**<br>L= 85.2' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.64' / 165.18' S= 0.0054 '/' Cc= 0.900<br>n= 0.011, Flow Area= 1.23 sf |
| #2 | Primary | 171.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 200.00 333.00 436.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=12.41 cfs @ 12.34 hrs HW=170.59' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Barrel Controls 12.41 cfs @ 10.11 fps)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1C: P E 1.1C



## Summary for Pond P E 1.1D: P E 1.1D

Inflow Area = 7.986 ac, 39.80% Impervious, Inflow Depth > 3.45" for 25_year event
Inflow = 31.13 cfs @ 12.23 hrs, Volume= 2.298 af
Outflow = 1.06 cfs @ 17.19 hrs, Volume= 0.289 af, Atten= 97%, Lag= 297.3 min
Primary = 1.06 cfs @ 17.19 hrs, Volume= 0.289 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 169.00' Surf.Area= 25 sf Storage= 0 cf
Peak Elev= 172.03' @ 17.19 hrs Surf.Area= 58,374 sf Storage= 87,978 cf
Flood Elev= 172.00' Surf.Area= 58,231 sf Storage= 86,010 cf

Plug-Flow detention time= 483.2 min calculated for 0.289 af (13% of inflow)
Center-of-Mass det. time= 292.2 min ( 1,078.4 - 786.3 )

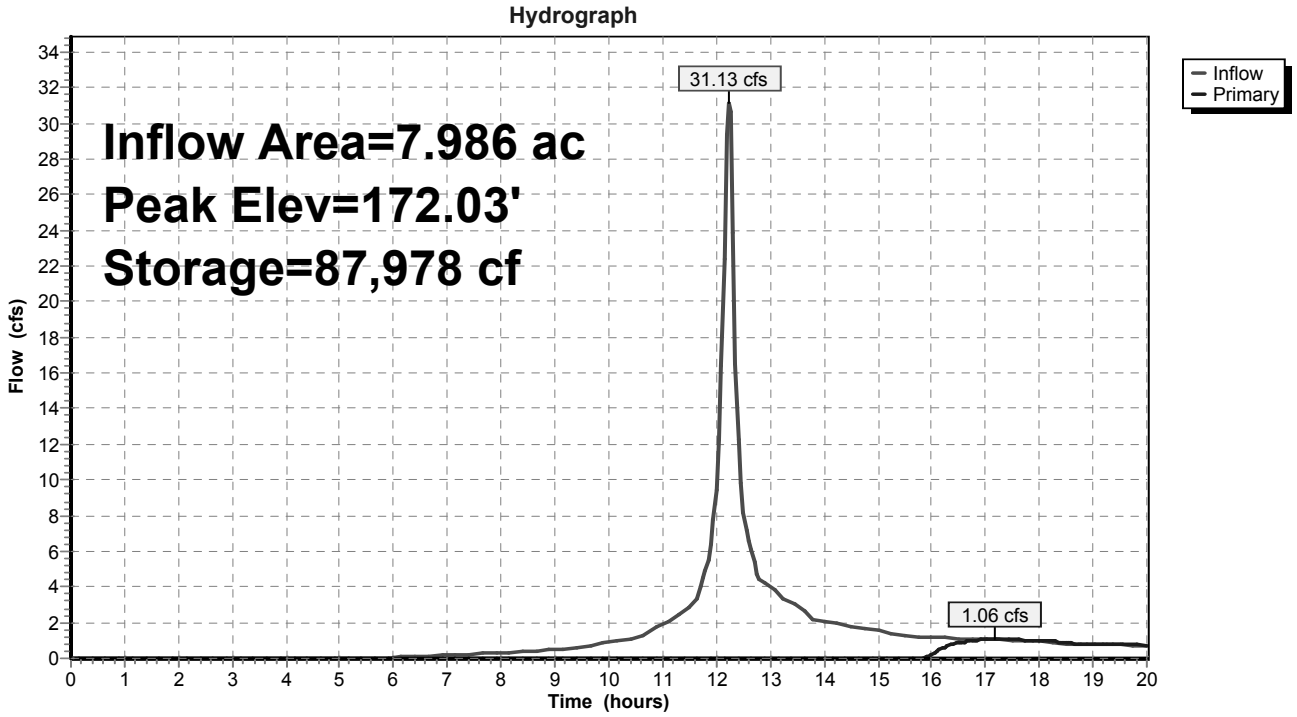
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 146,356 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 25 | 0 | 0 |
| 170.00 | 9,735 | 4,880 | 4,880 |
| 171.00 | 47,147 | 28,441 | 33,321 |
| 172.00 | 58,231 | 52,689 | 86,010 |
| 173.00 | 62,461 | 60,346 | 146,356 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 172.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 56.00 69.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=1.06 cfs @ 17.19 hrs HW=172.03' TW=166.32' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 1.06 cfs @ 0.60 fps)

## Pond P E 1.1D: P E 1.1D



## Summary for Pond P E 1.2A: 282

Inflow Area = 18.820 ac, 26.22% Impervious, Inflow Depth > 1.86" for 25_year event
Inflow = 27.57 cfs @ 12.25 hrs, Volume= 2.921 af
Outflow = 6.74 cfs @ 12.90 hrs, Volume= 1.709 af, Atten= 76%, Lag= 39.0 min
Primary = 6.74 cfs @ 12.90 hrs, Volume= 1.709 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 135.12' @ 12.90 hrs Surf.Area= 62,336 sf Storage= 57,621 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= 189.0 min calculated for 1.705 af (58% of inflow)
Center-of-Mass det. time= 91.5 min ( 920.5 - 829.0 )

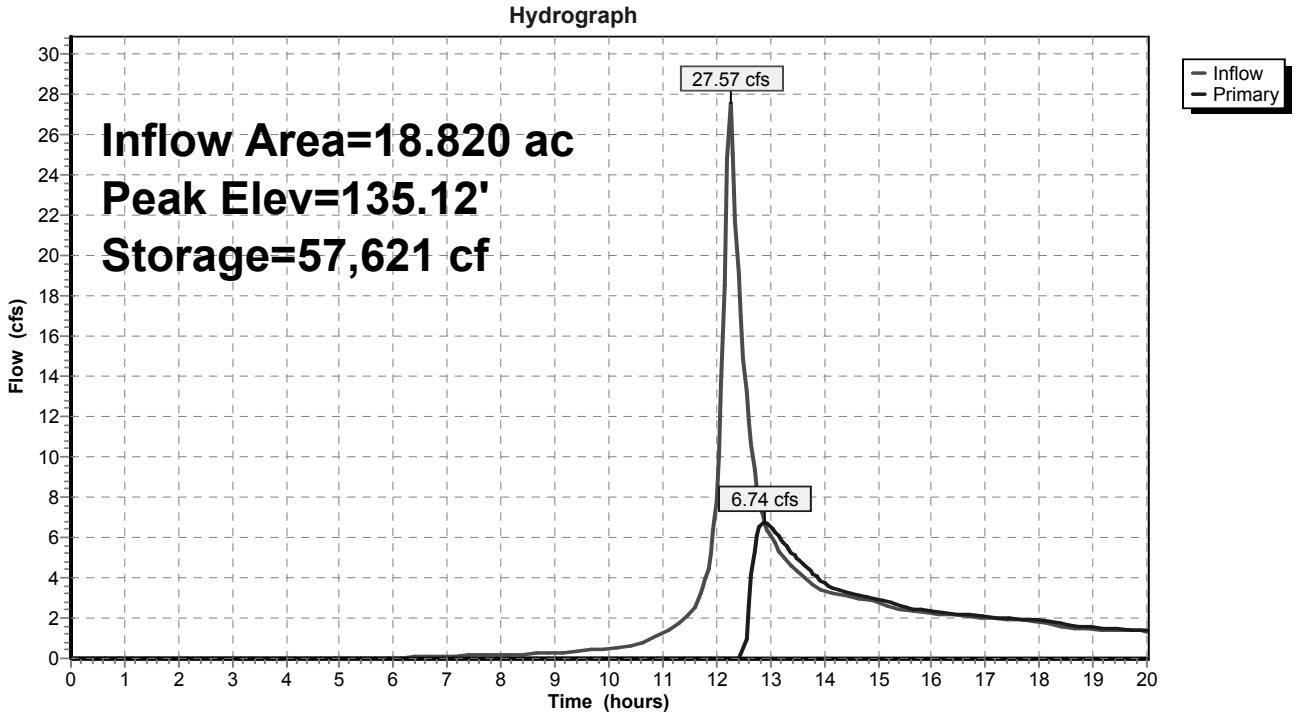
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=6.74 cfs @ 12.90 hrs HW=135.12' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 6.74 cfs @ 1.08 fps)

## Pond P E 1.2A: 282



## Summary for Pond P E 1.2D: P E 1.2D

Inflow Area = 3.227 ac, 45.26% Impervious, Inflow Depth > 2.71" for 25_year event
Inflow = 7.74 cfs @ 12.35 hrs, Volume= 0.729 af
Outflow = 0.51 cfs @ 15.21 hrs, Volume= 0.202 af, Atten= 93%, Lag= 171.6 min
Primary = 0.51 cfs @ 15.21 hrs, Volume= 0.202 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 10,809 sf Storage= 15,981 cf
Peak Elev= 158.07' @ 15.21 hrs Surf.Area= 32,497 sf Storage= 39,665 cf (23,683 cf above start)
Flood Elev= 159.00' Surf.Area= 39,090 sf Storage= 72,926 cf (56,945 cf above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= 196.4 min ( 1,002.4 - 806.0 )

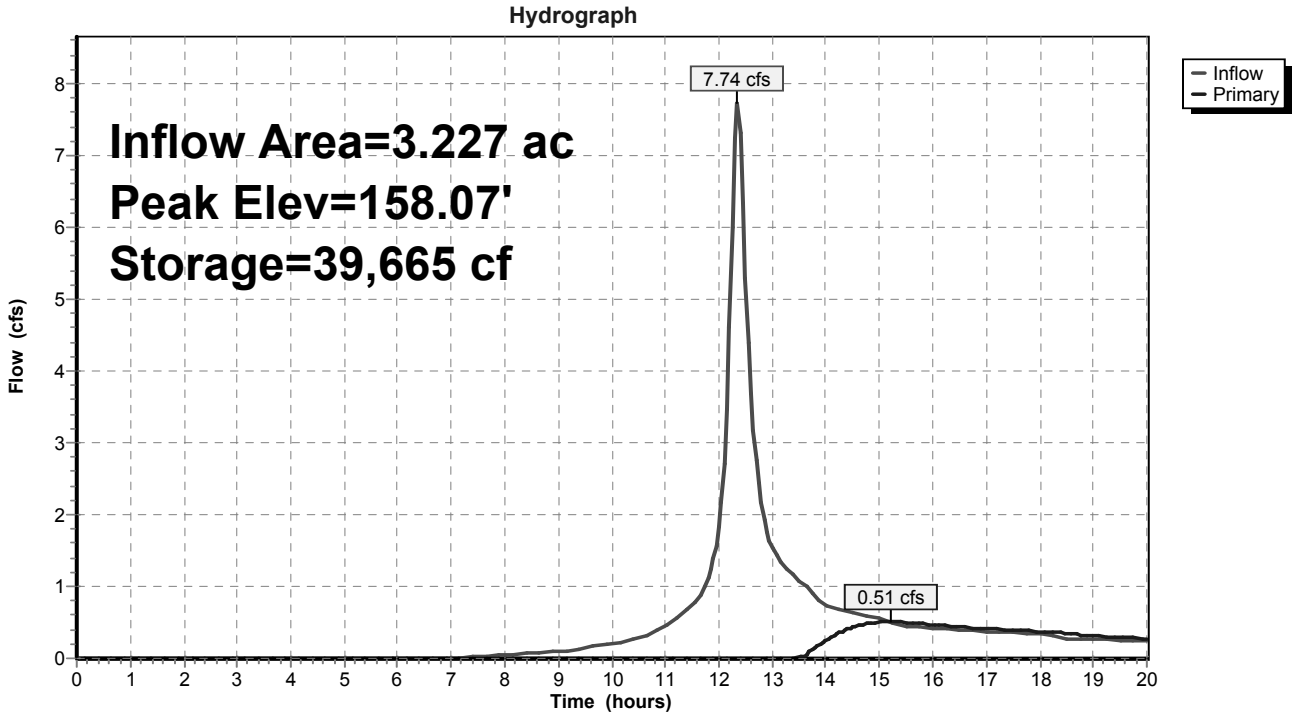
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 154.00' | 72,926 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 154.00 | 288 | 0 | 0 |
| 155.00 | 3,513 | 1,900 | 1,900 |
| 156.00 | 6,920 | 5,216 | 7,117 |
| 157.00 | 10,809 | 8,865 | 15,981 |
| 158.00 | 31,995 | 21,402 | 37,383 |
| 159.00 | 39,090 | 35,542 | 72,926 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 5.00 13.00 18.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.51 cfs @ 15.21 hrs HW=158.07' TW=0.00' (Dynamic Tailwater)
↑└**1=Asymmetrical Weir** (Weir Controls 0.51 cfs @ 0.83 fps)

## Pond P E 1.2D: P E 1.2D



## Summary for Pond P E 1.2E: P E 1.2E

Inflow Area = 0.305 ac, 34.60% Impervious, Inflow Depth > 2.55" for 25_year event
Inflow = 0.92 cfs @ 12.23 hrs, Volume= 0.065 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 413 sf Storage= 0 cf
Peak Elev= 172.32' @ 20.00 hrs Surf.Area= 3,993 sf Storage= 2,824 cf
Flood Elev= 173.00' Surf.Area= 6,101 sf Storage= 6,273 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 21,312 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

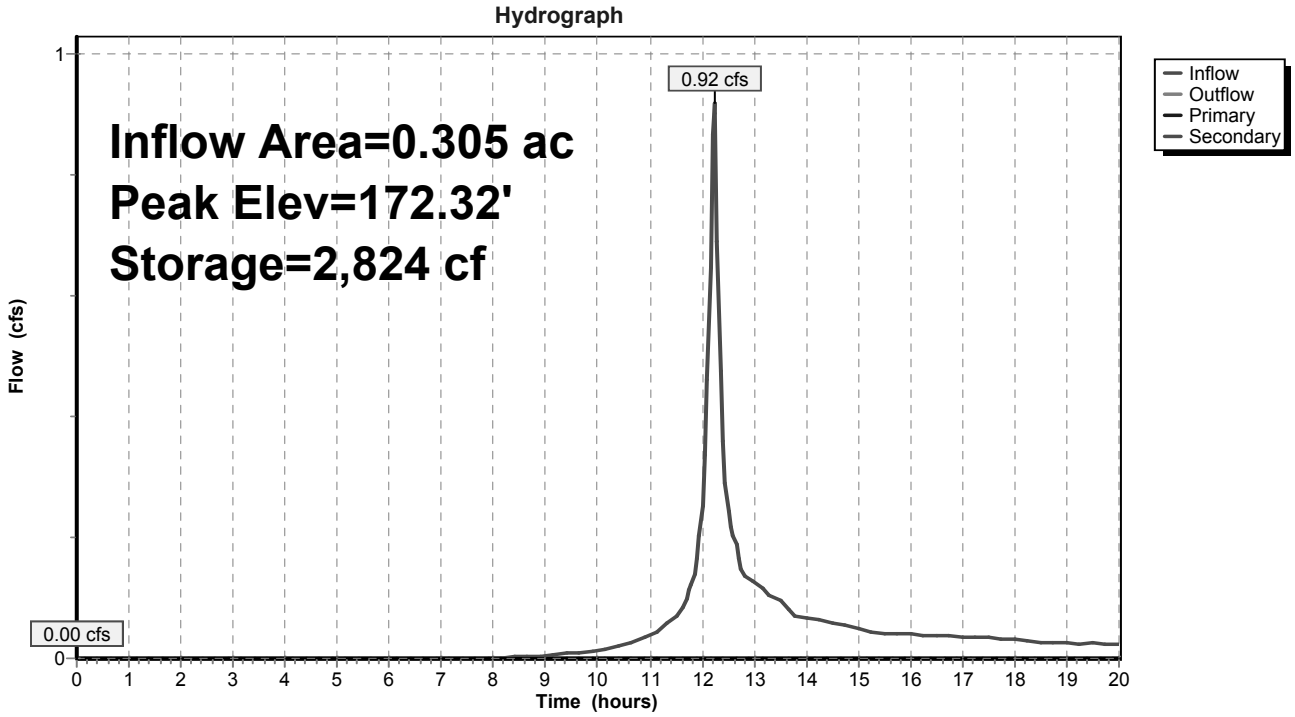
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 413 | 0 | 0 |
| 172.00 | 3,016 | 1,715 | 1,715 |
| 173.00 | 6,101 | 4,559 | 6,273 |
| 174.00 | 7,653 | 6,877 | 13,150 |
| 175.00 | 8,670 | 8,161 | 21,312 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 6.00 20.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Secondary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 20.00 25.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=157.00' (Dynamic Tailwater)
**1=Asymmetrical Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=0.00' (Dynamic Tailwater)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2E: P E 1.2E



## Summary for Pond P W 3.1: P W 3.1

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 2.86" for 25_year event
Inflow = 41.96 cfs @ 12.29 hrs, Volume= 3.619 af
Outflow = 41.94 cfs @ 12.30 hrs, Volume= 3.451 af, Atten= 0%, Lag= 0.4 min
Primary = 41.94 cfs @ 12.30 hrs, Volume= 3.451 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.26' @ 12.30 hrs Surf.Area= 5,146 sf Storage= 8,477 cf
Flood Elev= 157.00' Surf.Area= 7,260 sf Storage= 13,079 cf

Plug-Flow detention time= 32.7 min calculated for 3.442 af (95% of inflow)
Center-of-Mass det. time= 15.4 min ( 797.2 - 781.8 )

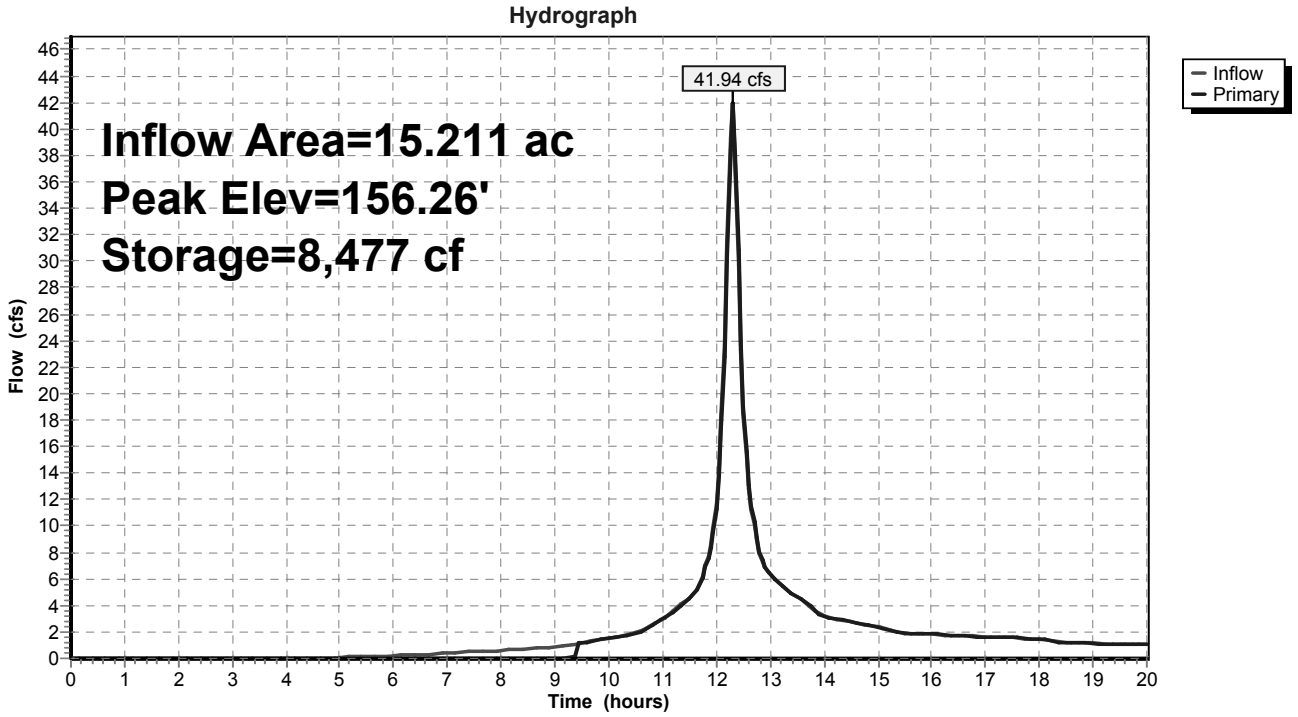
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 13,079 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,411 | 3,837 | 7,244 |
| 157.00 | 7,260 | 5,835 | 13,079 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=41.90 cfs @ 12.30 hrs HW=156.26' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 41.90 cfs @ 1.55 fps)

## Pond P W 3.1: P W 3.1



## Summary for Pond P W 3.4: P W 3.4

Inflow Area = 3.724 ac, 16.97% Impervious, Inflow Depth > 0.81" for 25_year event
Inflow = 2.22 cfs @ 12.37 hrs, Volume= 0.250 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 183.24' @ 20.00 hrs Surf.Area= 7,125 sf Storage= 10,869 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

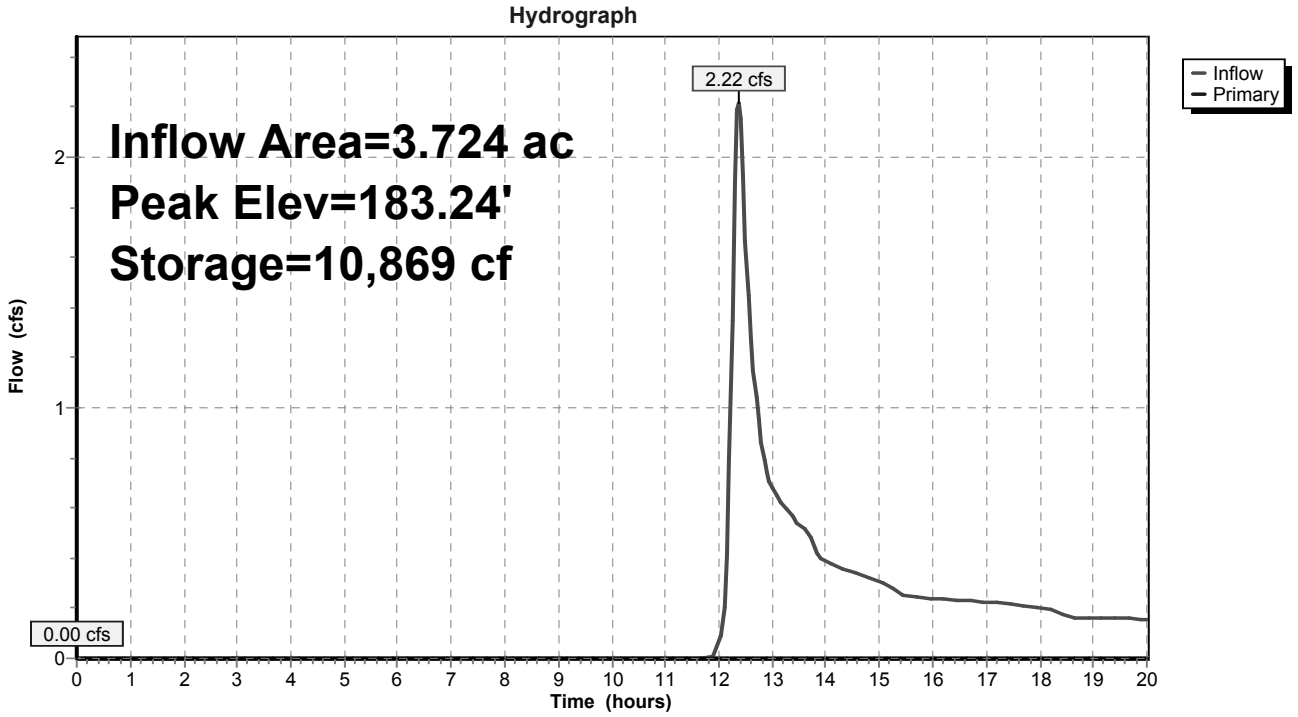
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=180.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 3.4: P W 3.4



## Summary for Pond P W 3.5: P W 3.5

Inflow Area = 0.109 ac, 27.98% Impervious, Inflow Depth > 1.96" for 25_year event
Inflow = 0.25 cfs @ 12.24 hrs, Volume= 0.018 af
Outflow = 0.25 cfs @ 12.24 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min
Primary = 0.25 cfs @ 12.24 hrs, Volume= 0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 9 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 9 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,452 sf Storage= 2,460 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 824.7 - 824.7 )

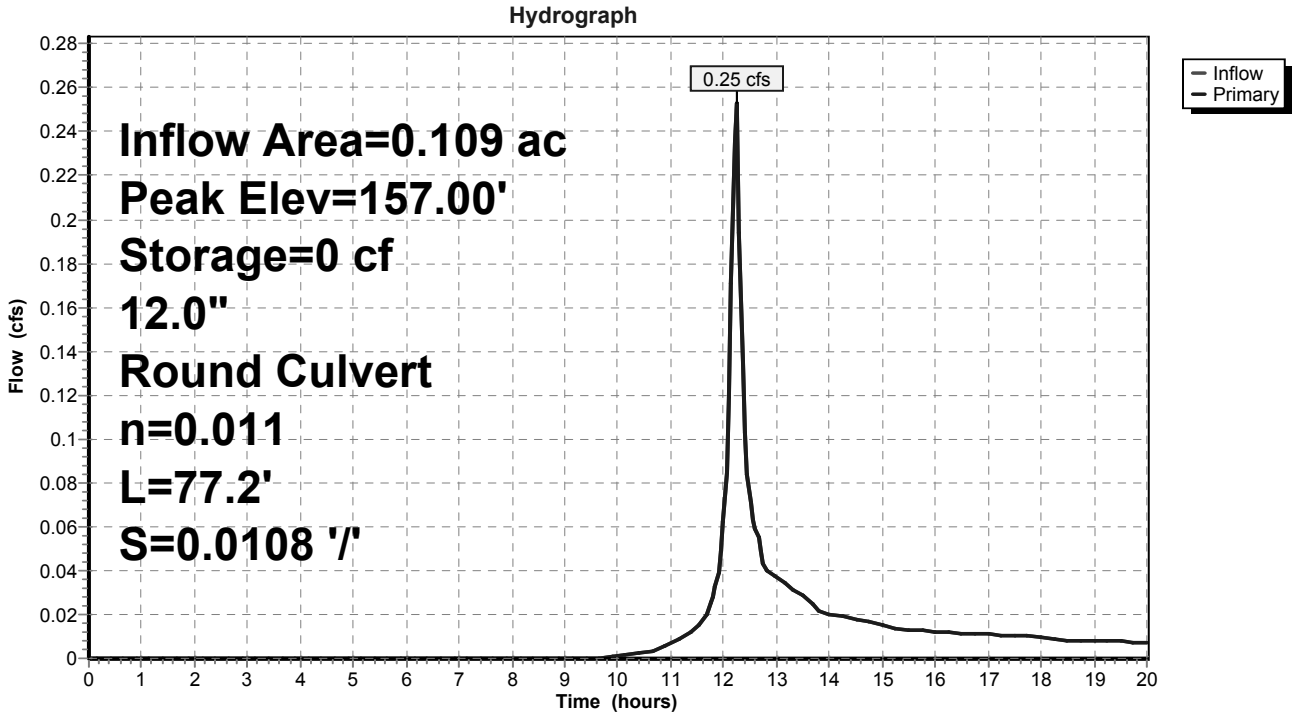
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 2,460 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 9 | 0 | 0 |
| 158.00 | 277 | 143 | 143 |
| 159.00 | 560 | 419 | 562 |
| 160.00 | 892 | 726 | 1,288 |
| 161.00 | 1,452 | 1,172 | 2,460 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Culvert**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.24 hrs HW=157.00' TW=154.34' (Dynamic Tailwater)
**1=Culvert** (Passes 0.00 cfs of 1.85 cfs potential flow)

## Pond P W 3.5: P W 3.5



## Summary for Pond P W 9.1: P W 9.1

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 2.88" for 25_year event
Inflow = 34.69 cfs @ 12.23 hrs, Volume= 2.556 af
Outflow = 29.70 cfs @ 12.30 hrs, Volume= 2.591 af, Atten= 14%, Lag= 3.8 min
Primary = 29.70 cfs @ 12.30 hrs, Volume= 2.708 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 154.49' @ 12.29 hrs Surf.Area= 6,412 sf Storage= 7,236 cf
Flood Elev= 157.00' Surf.Area= 13,136 sf Storage= 31,231 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.8 min ( 802.0 - 797.3 )

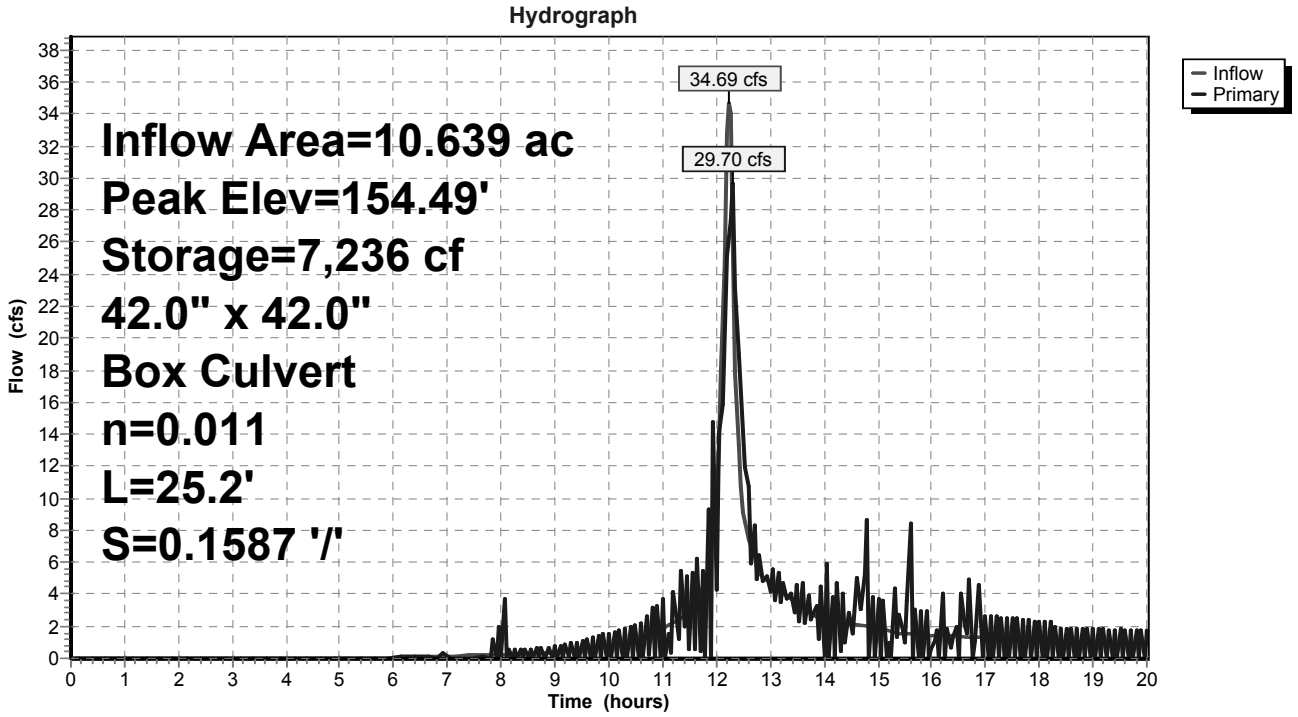
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 152.00' | 48,001 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 152.00 | 13 | 0 | 0 |
| 153.00 | 1,797 | 905 | 905 |
| 154.00 | 5,163 | 3,480 | 4,385 |
| 155.00 | 7,699 | 6,431 | 10,816 |
| 156.00 | 9,997 | 8,848 | 19,665 |
| 157.00 | 13,136 | 11,566 | 31,231 |
| 158.00 | 20,405 | 16,770 | 48,001 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=29.69 cfs @ 12.30 hrs HW=154.48' TW=154.08' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 29.69 cfs @ 2.92 fps)

## Pond P W 9.1: P W 9.1



## Summary for Pond P W 9.1B: P W 9.1B

Inflow Area = 0.559 ac, 16.03% Impervious, Inflow Depth > 1.88" for 25_year event
Inflow = 1.24 cfs @ 12.24 hrs, Volume= 0.087 af
Outflow = 0.28 cfs @ 12.71 hrs, Volume= 0.046 af, Atten= 78%, Lag= 28.7 min
Primary = 0.28 cfs @ 12.71 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 158.01' @ 12.71 hrs Surf.Area= 2,850 sf Storage= 1,810 cf
Flood Elev= 158.00' Surf.Area= 2,833 sf Storage= 1,783 cf

Plug-Flow detention time= 183.4 min calculated for 0.046 af (53% of inflow)
Center-of-Mass det. time= 88.8 min ( 915.7 - 826.9 )

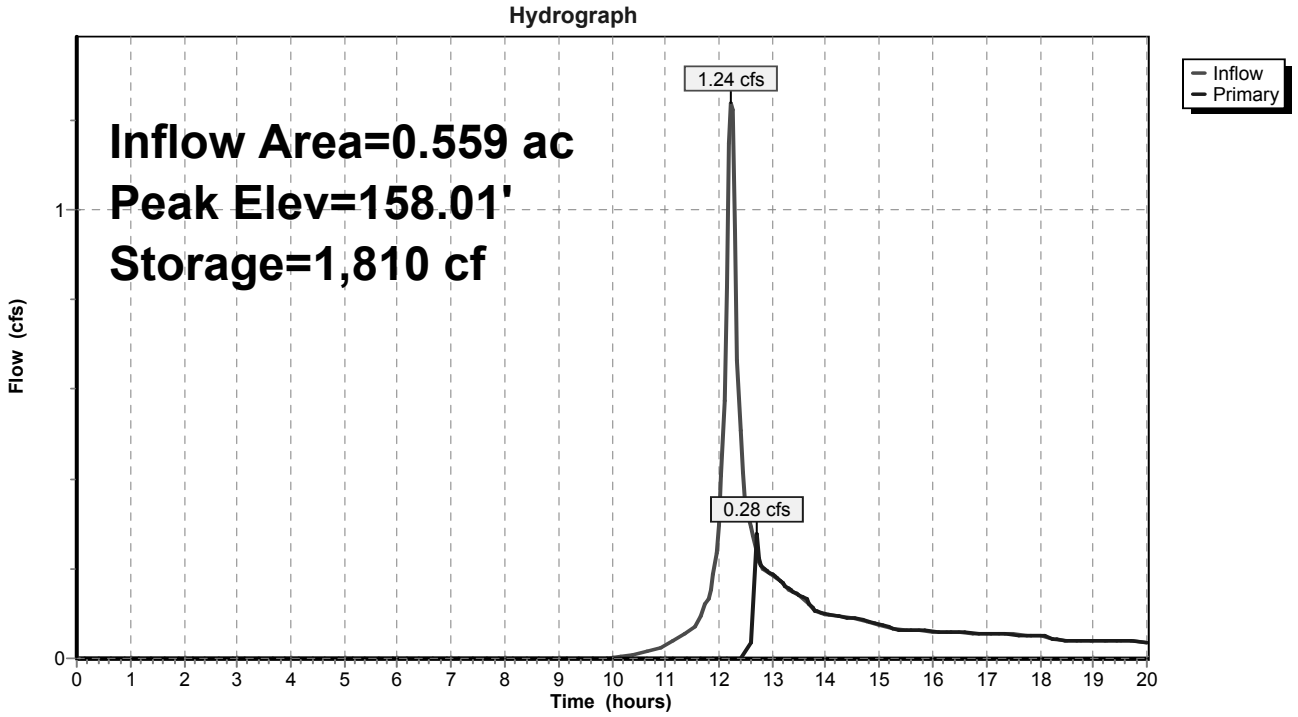
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.26 cfs @ 12.71 hrs HW=158.01' TW=153.31' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 0.26 cfs @ 0.31 fps)

## Pond P W 9.1B: P W 9.1B



## Summary for Pond P W 9.1C: P W 9.1C

Inflow Area = 4.751 ac, 57.07% Impervious, Inflow Depth > 3.69" for 25_year event
Inflow = 19.80 cfs @ 12.23 hrs, Volume= 1.460 af
Outflow = 19.80 cfs @ 12.23 hrs, Volume= 1.459 af, Atten= 0%, Lag= 0.1 min
Primary = 19.80 cfs @ 12.23 hrs, Volume= 1.459 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 139 sf Storage= 0 cf
Peak Elev= 166.26' @ 12.23 hrs Surf.Area= 629 sf Storage= 467 cf
Flood Elev= 167.00' Surf.Area= 989 sf Storage= 1,067 cf

Plug-Flow detention time= 1.3 min calculated for 1.455 af (100% of inflow)
Center-of-Mass det. time= 1.0 min ( 781.3 - 780.3 )

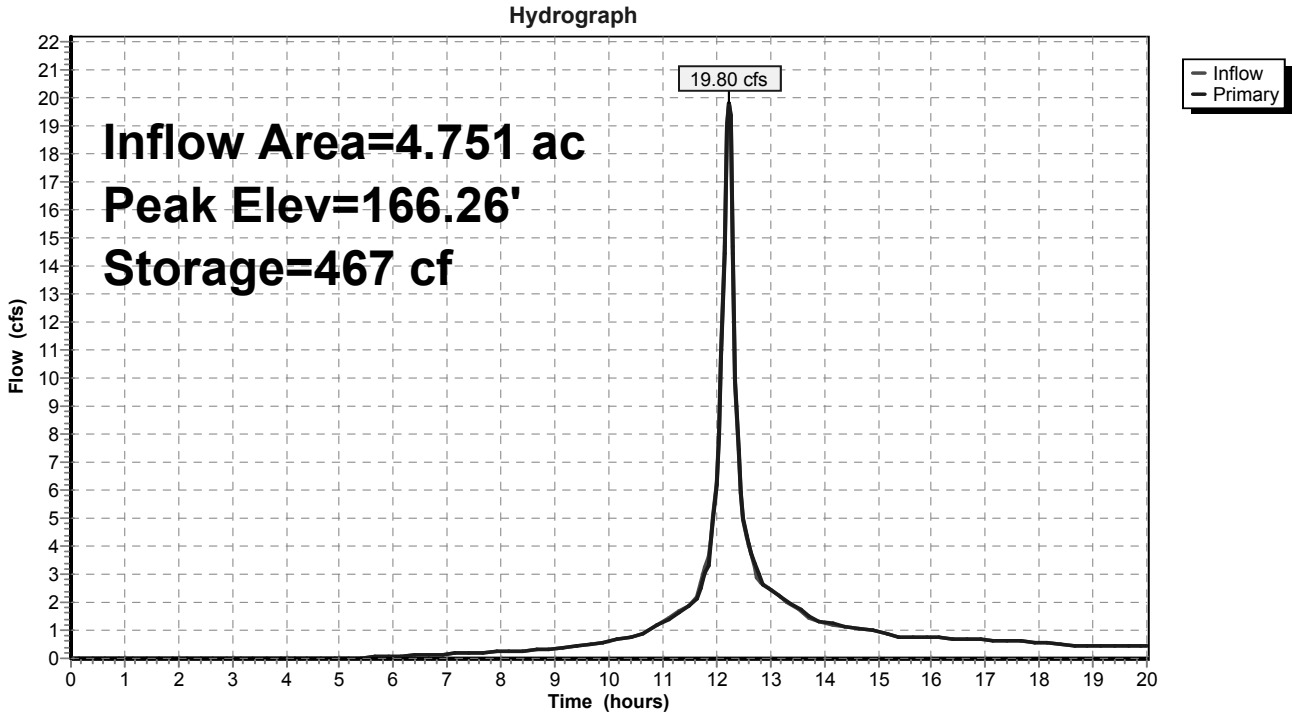
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 3,394 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 139 | 0 | 0 |
| 166.00 | 503 | 321 | 321 |
| 167.00 | 989 | 746 | 1,067 |
| 168.00 | 3,665 | 2,327 | 3,394 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.00' | **12.0" Round Culvert**<br>L= 49.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.00' / 164.00' S= 0.0202 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 166.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 15.00 46.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=19.18 cfs @ 12.23 hrs HW=166.25' TW=154.31' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 4.10 cfs @ 5.22 fps)
**2=Asymmetrical Weir** (Weir Controls 15.08 cfs @ 1.34 fps)

## Pond P W 9.1C: P W 9.1C



## Summary for Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 3.08" for 25_year event
Inflow = 29.71 cfs @ 12.30 hrs, Volume= 2.732 af
Outflow = 31.38 cfs @ 12.30 hrs, Volume= 2.721 af, Atten= 0%, Lag= 0.2 min
Primary = 31.38 cfs @ 12.30 hrs, Volume= 2.729 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 150.00' Surf.Area= 101 sf Storage= 0 cf
Peak Elev= 153.69' @ 12.30 hrs Surf.Area= 189 sf Storage= 536 cf
Flood Elev= 154.00' Surf.Area= 197 sf Storage= 595 cf

Plug-Flow detention time= 2.9 min calculated for 2.721 af (100% of inflow)
Center-of-Mass det. time= 1.3 min ( 803.3 - 802.0 )

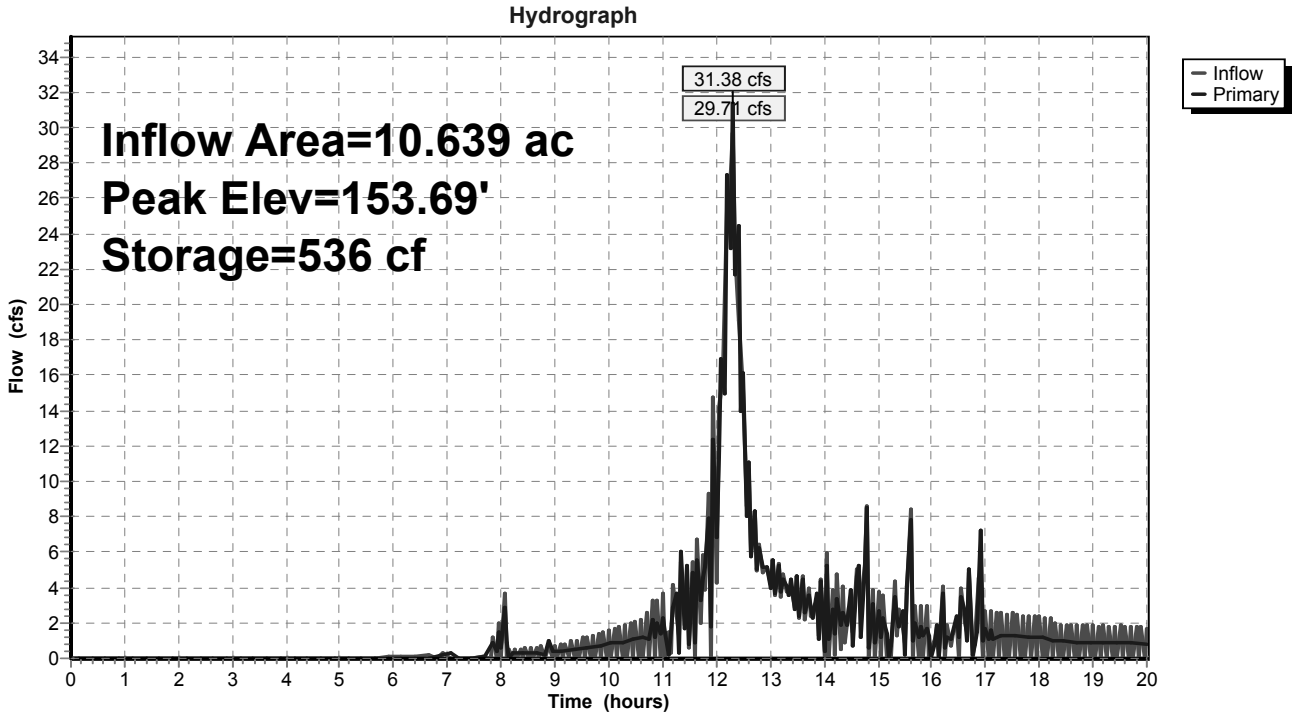
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 150.00' | 595 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 150.00 | 101 | 0 | 0 |
| 154.00 | 197 | 595 | 595 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 153.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 18.00 21.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=30.99 cfs @ 12.30 hrs HW=153.69' TW=0.00' (Dynamic Tailwater)
↑**1=Asymmetrical Weir** (Weir Controls 30.99 cfs @ 2.36 fps)

## Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

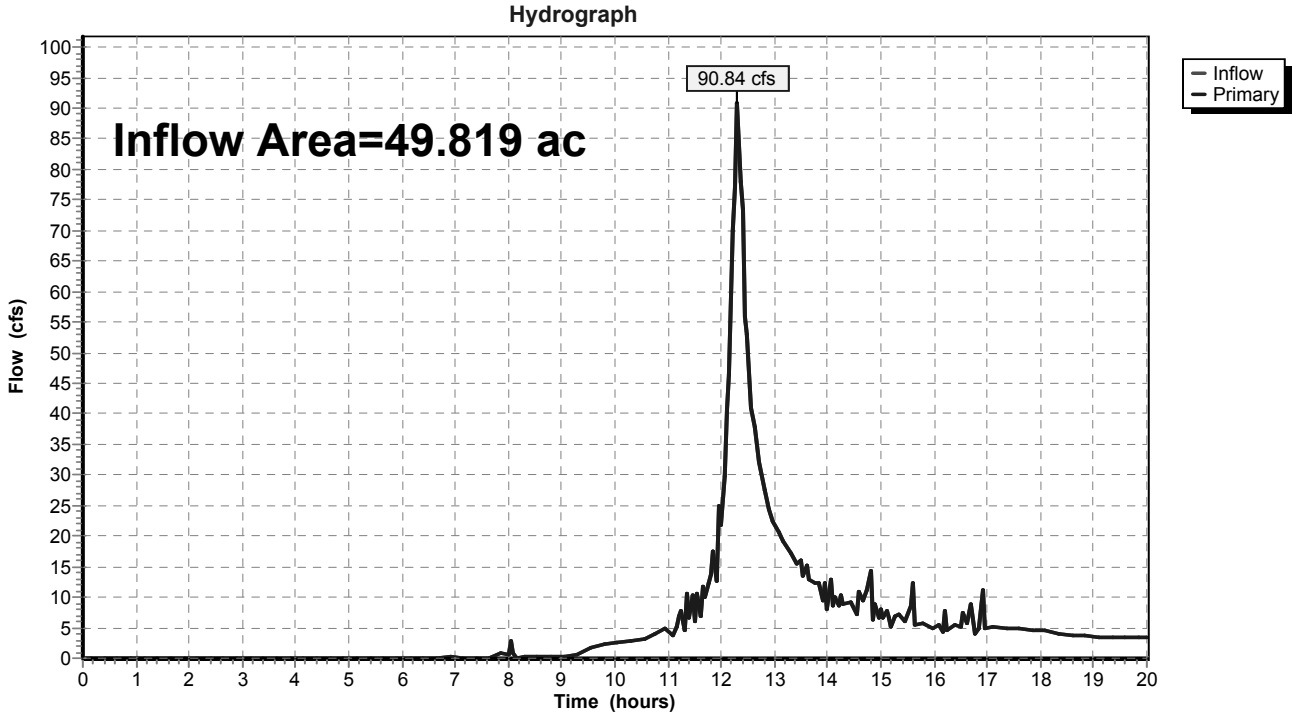


## Summary for Link DP North: DP North

Inflow Area = 49.819 ac, 26.12% Impervious, Inflow Depth > 2.21" for 25_year event
Inflow = 90.84 cfs @ 12.30 hrs, Volume= 9.178 af
Primary = 90.84 cfs @ 12.30 hrs, Volume= 9.178 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

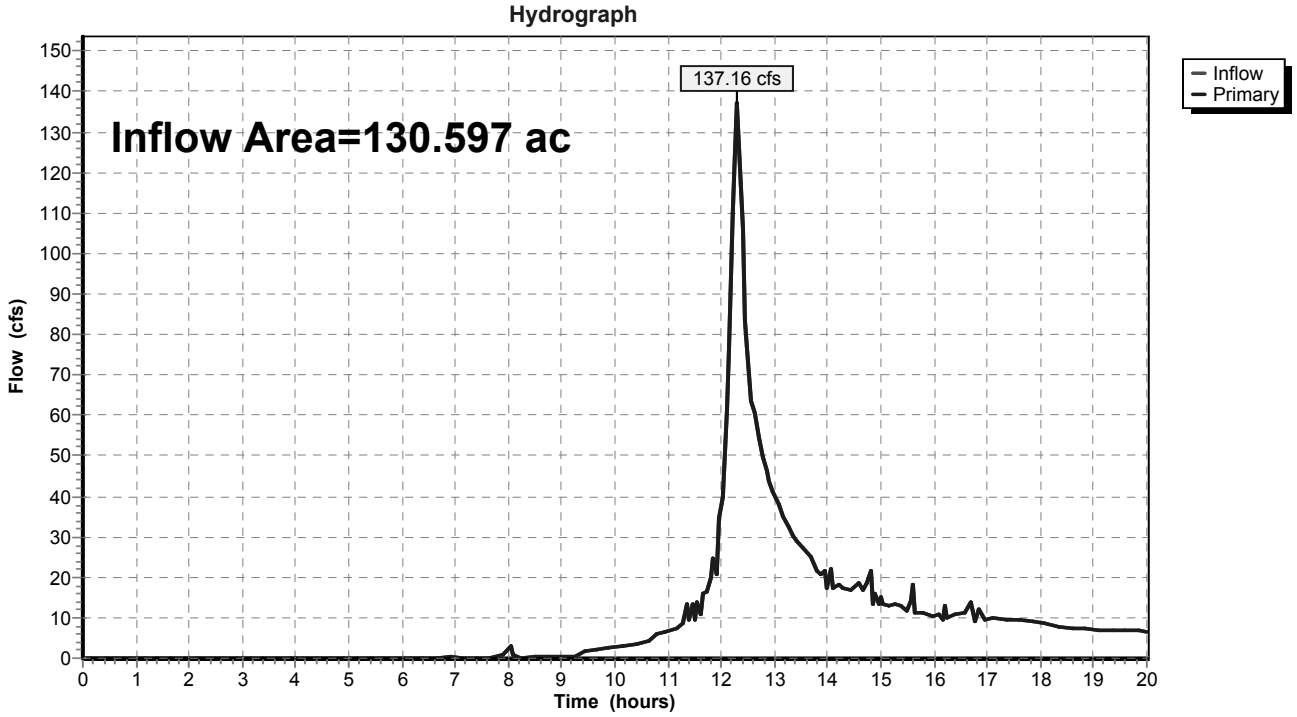


## Summary for Link DP Sudbury: (new Link)

Inflow Area = 130.597 ac, 21.29% Impervious, Inflow Depth > 1.42" for 25_year event
Inflow = 137.16 cfs @ 12.29 hrs, Volume= 15.443 af
Primary = 137.16 cfs @ 12.29 hrs, Volume= 15.443 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: (new Link)

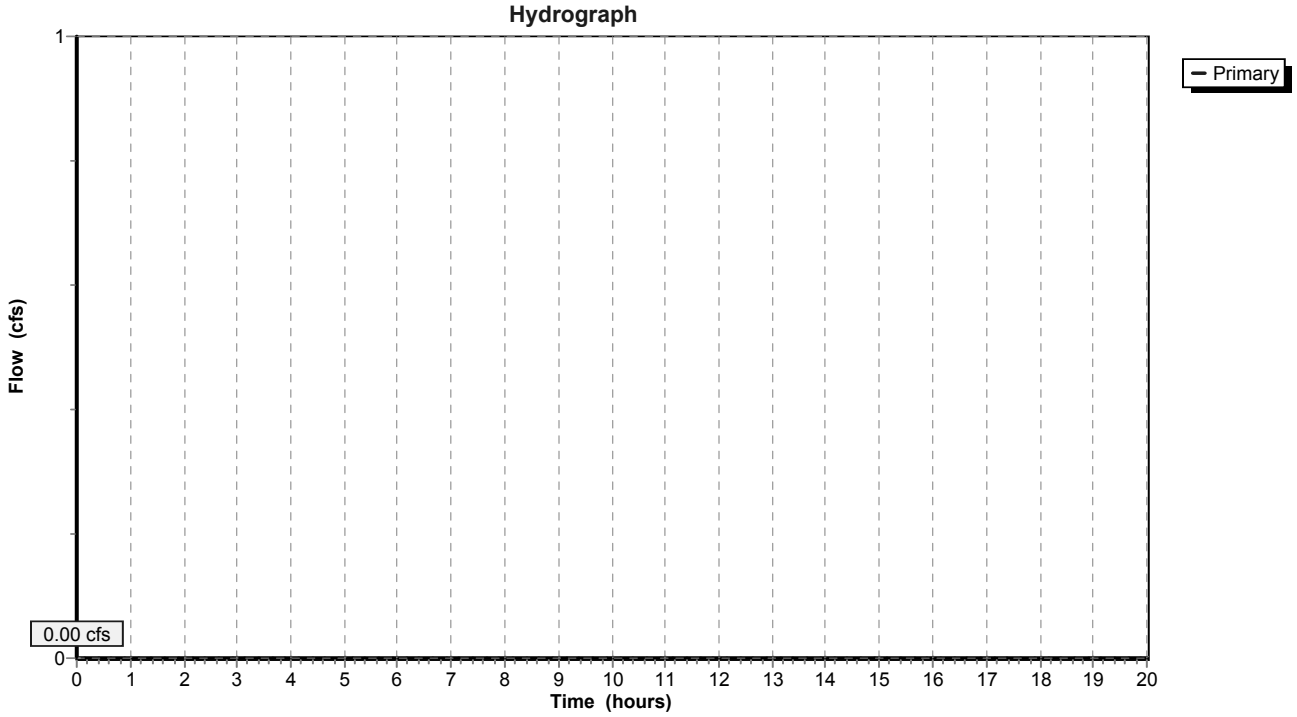


## Summary for Link DP Wellhead: DP Wellhead

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

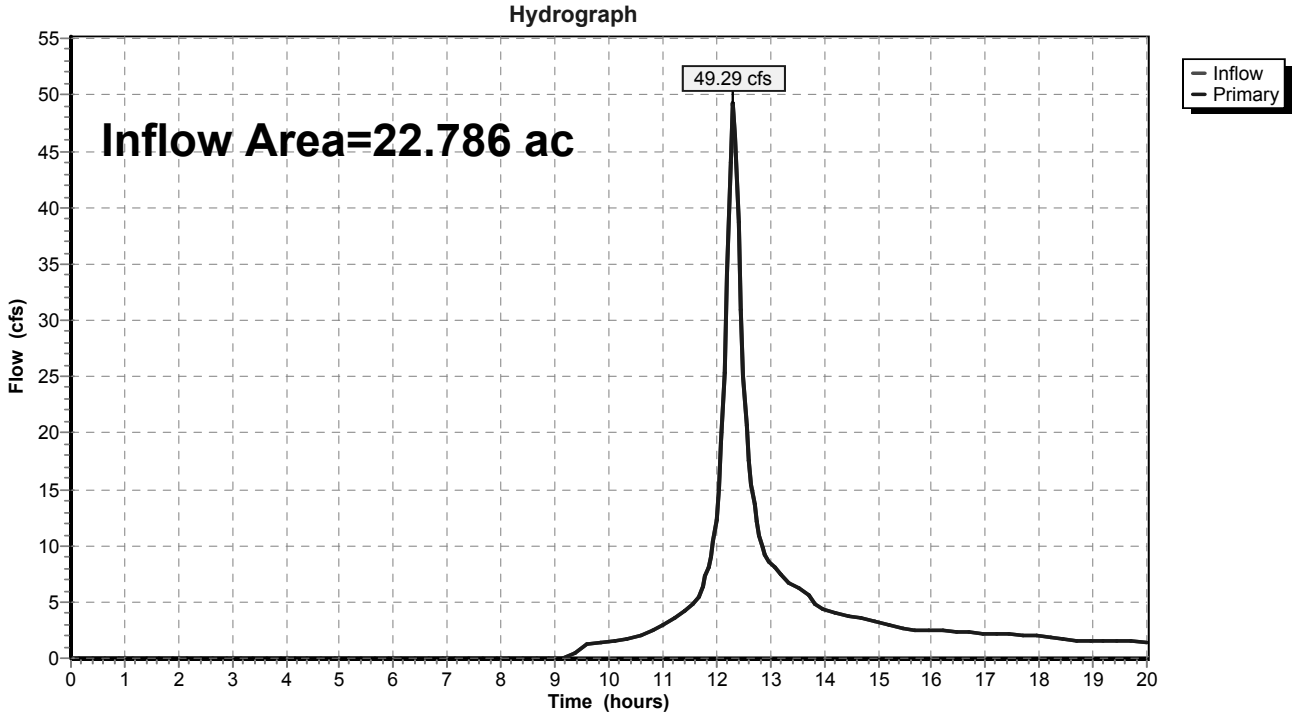


## Summary for Link DP West: DP West

Inflow Area = 22.786 ac, 28.55% Impervious, Inflow Depth > 2.24" for 25_year event
Inflow = 49.29 cfs @ 12.31 hrs, Volume= 4.249 af
Primary = 49.29 cfs @ 12.31 hrs, Volume= 4.249 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

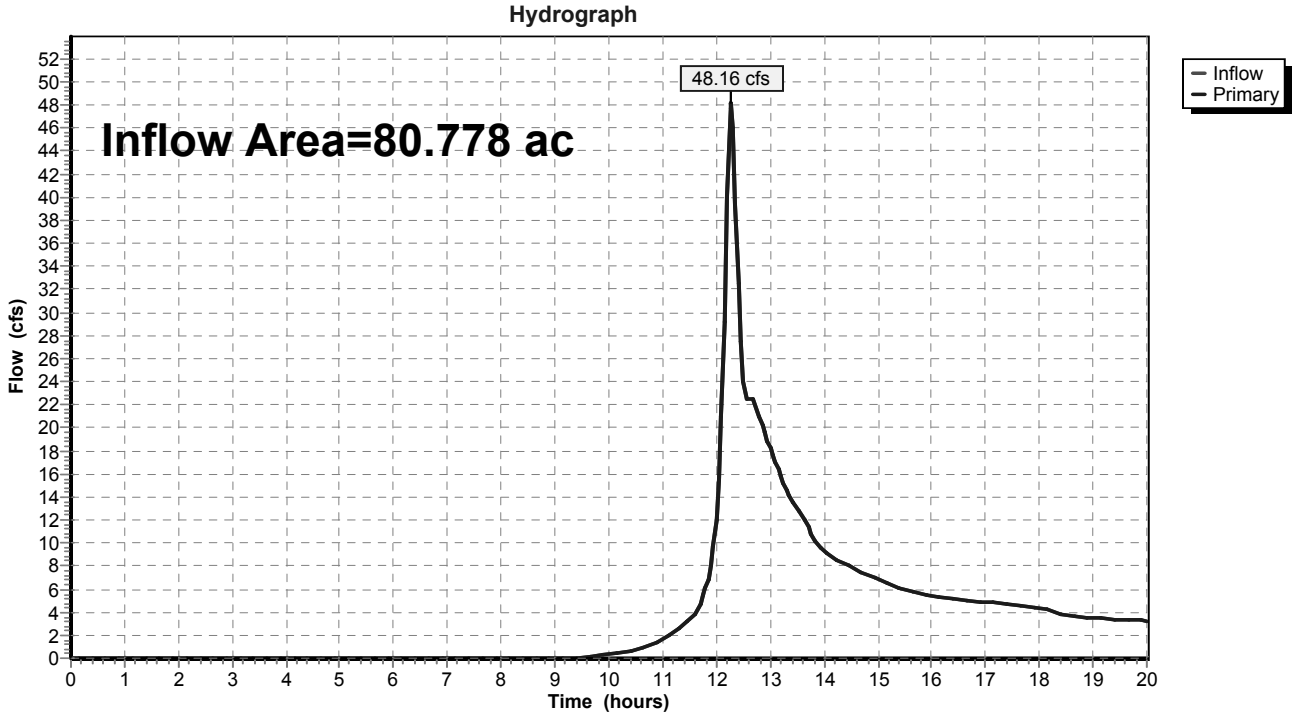


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 80.778 ac, 18.32% Impervious, Inflow Depth > 0.93" for 25_year event
Inflow = 48.16 cfs @ 12.27 hrs, Volume= 6.266 af
Primary = 48.16 cfs @ 12.27 hrs, Volume= 6.266 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

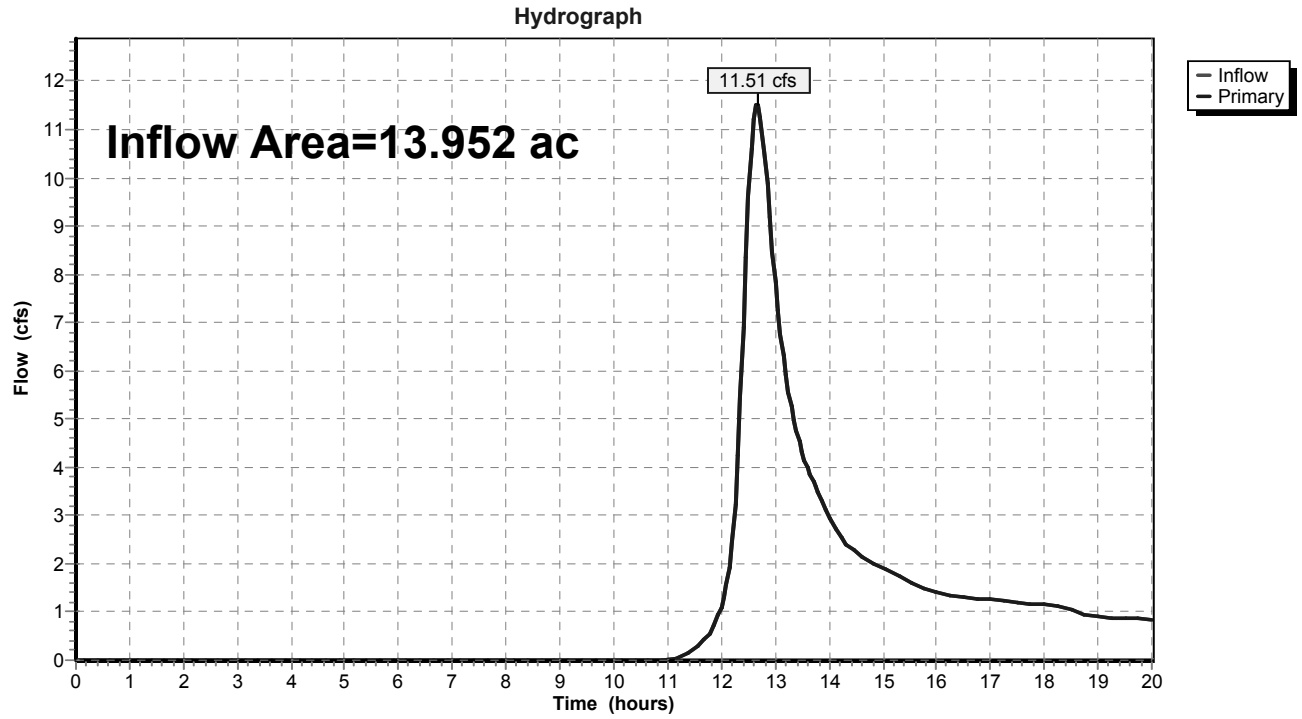


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.952 ac, 9.67% Impervious, Inflow Depth > 1.46" for 25_year event
Inflow = 11.51 cfs @ 12.66 hrs, Volume= 1.699 af
Primary = 11.51 cfs @ 12.66 hrs, Volume= 1.699 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

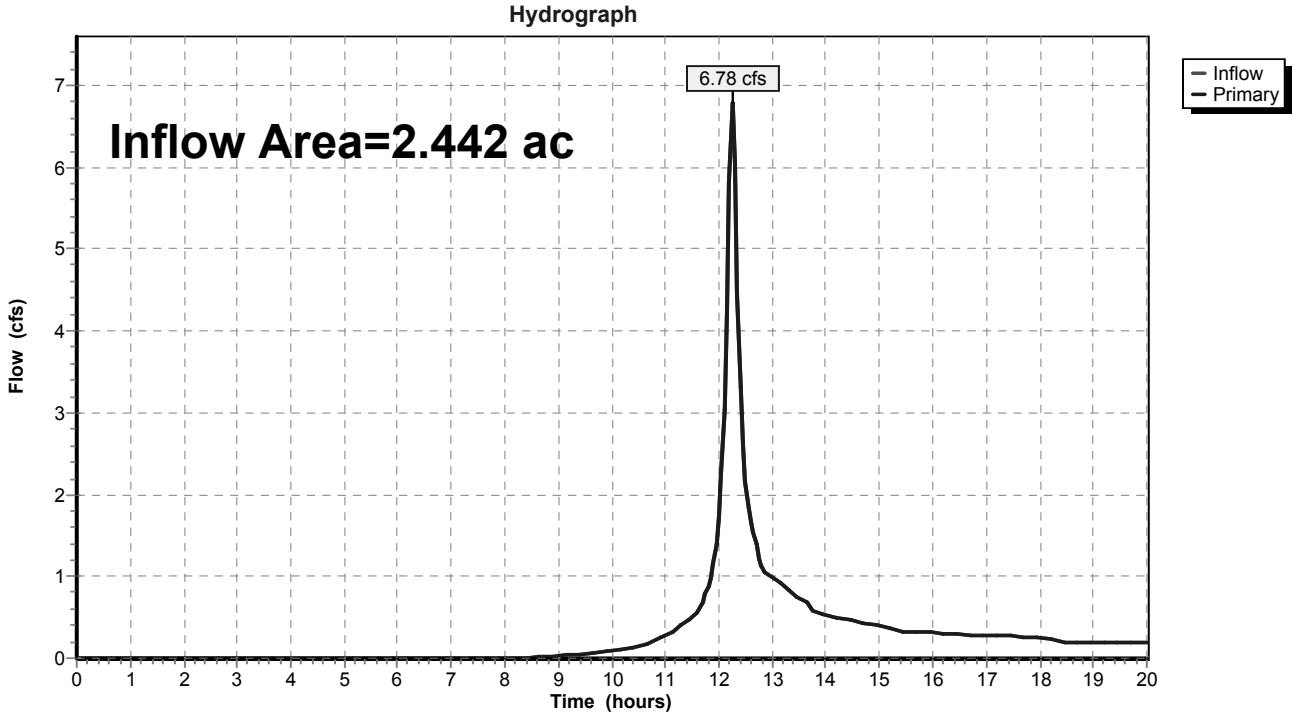


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 2.46" for 25_year event
Inflow = 6.78 cfs @ 12.25 hrs, Volume= 0.501 af
Primary = 6.78 cfs @ 12.25 hrs, Volume= 0.501 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 10.0: L W 10.0

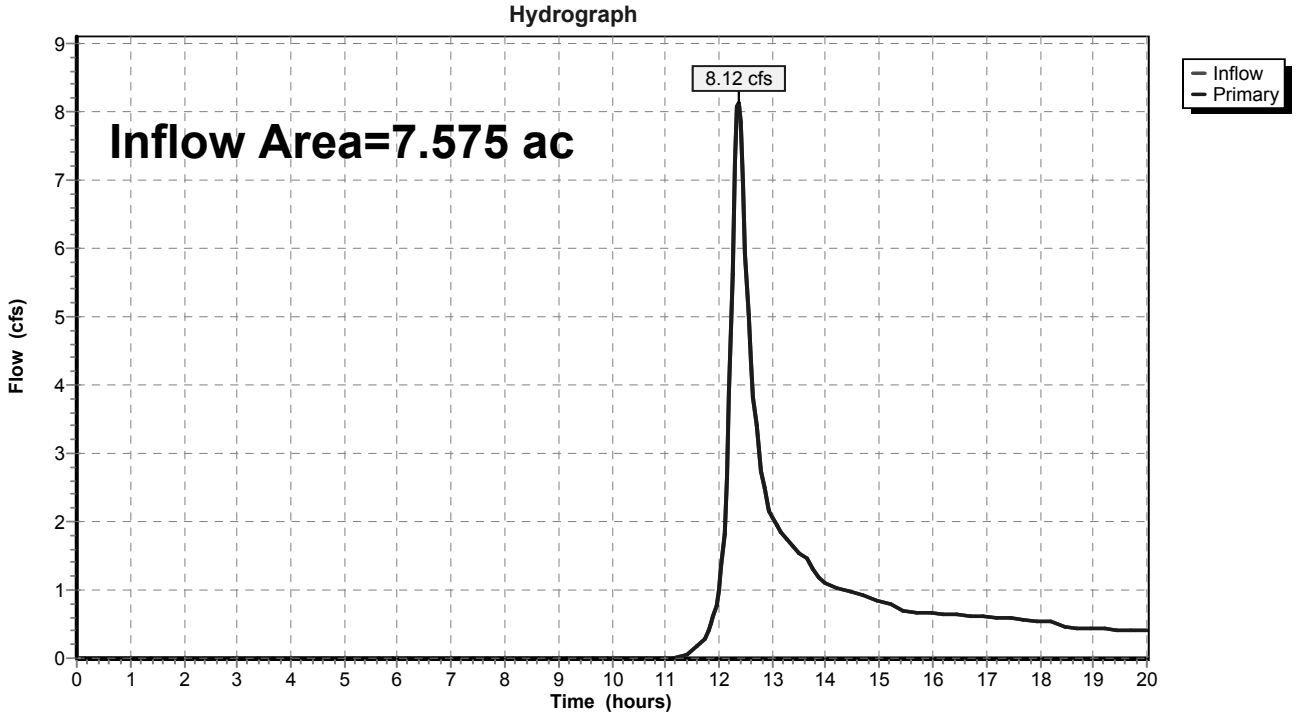


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 7.575 ac, 11.49% Impervious, Inflow Depth > 1.27" for 25_year event
Inflow = 8.12 cfs @ 12.36 hrs, Volume= 0.799 af
Primary = 8.12 cfs @ 12.36 hrs, Volume= 0.799 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 2.0: L W 2.0

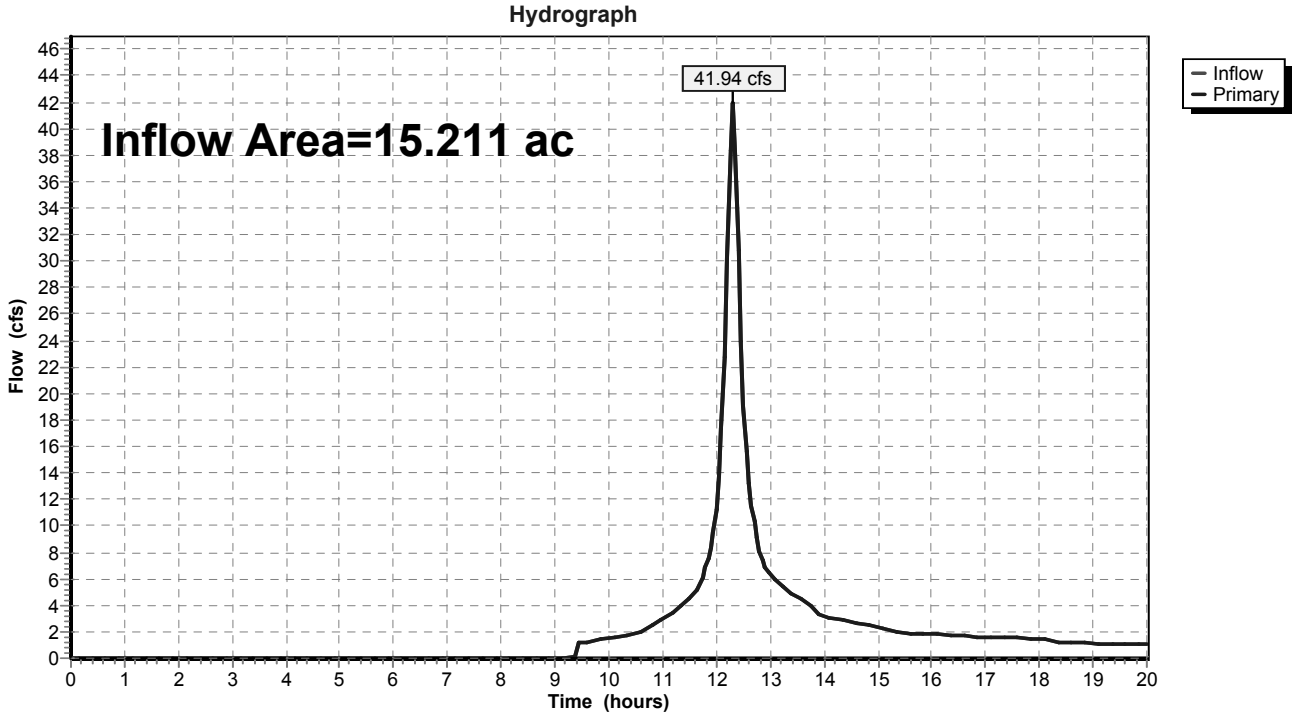


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 2.72" for 25_year event
Inflow = 41.94 cfs @ 12.30 hrs, Volume= 3.451 af
Primary = 41.94 cfs @ 12.30 hrs, Volume= 3.451 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 3.0: L W 3.0

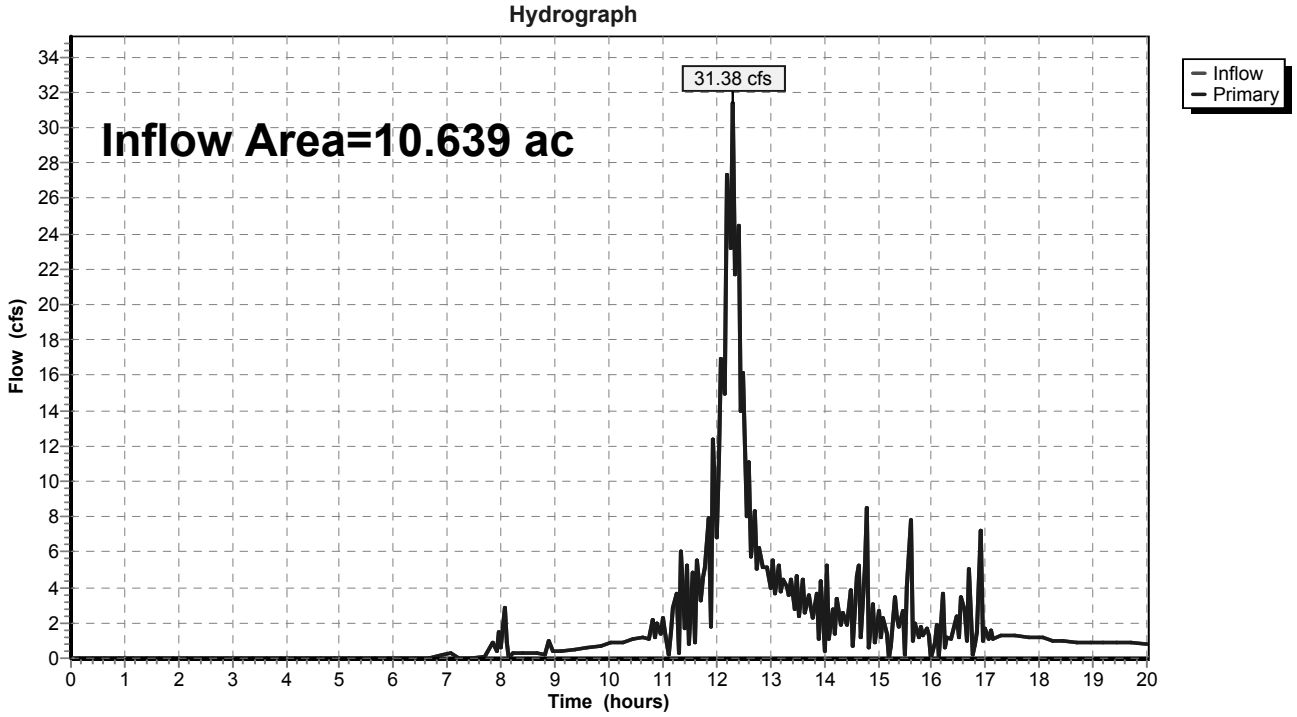


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 3.08" for 25_year event
Inflow = 31.38 cfs @ 12.30 hrs, Volume= 2.729 af
Primary = 31.38 cfs @ 12.30 hrs, Volume= 2.729 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

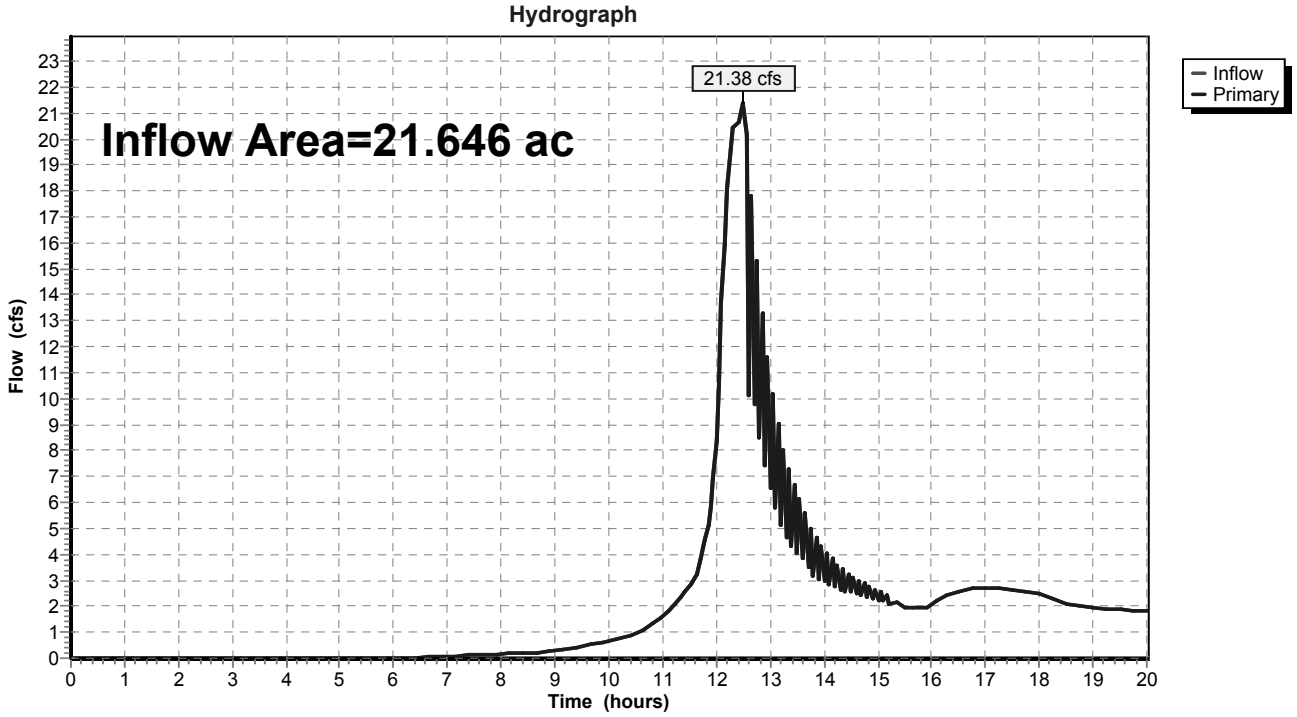


## Summary for Link Well E 1.1B: Well E 1.1B

Inflow Area = 21.646 ac, 30.46% Impervious, Inflow Depth > 1.84" for 25_year event
Inflow = 21.38 cfs @ 12.48 hrs, Volume= 3.312 af
Primary = 21.38 cfs @ 12.48 hrs, Volume= 3.312 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.1B: Well E 1.1B

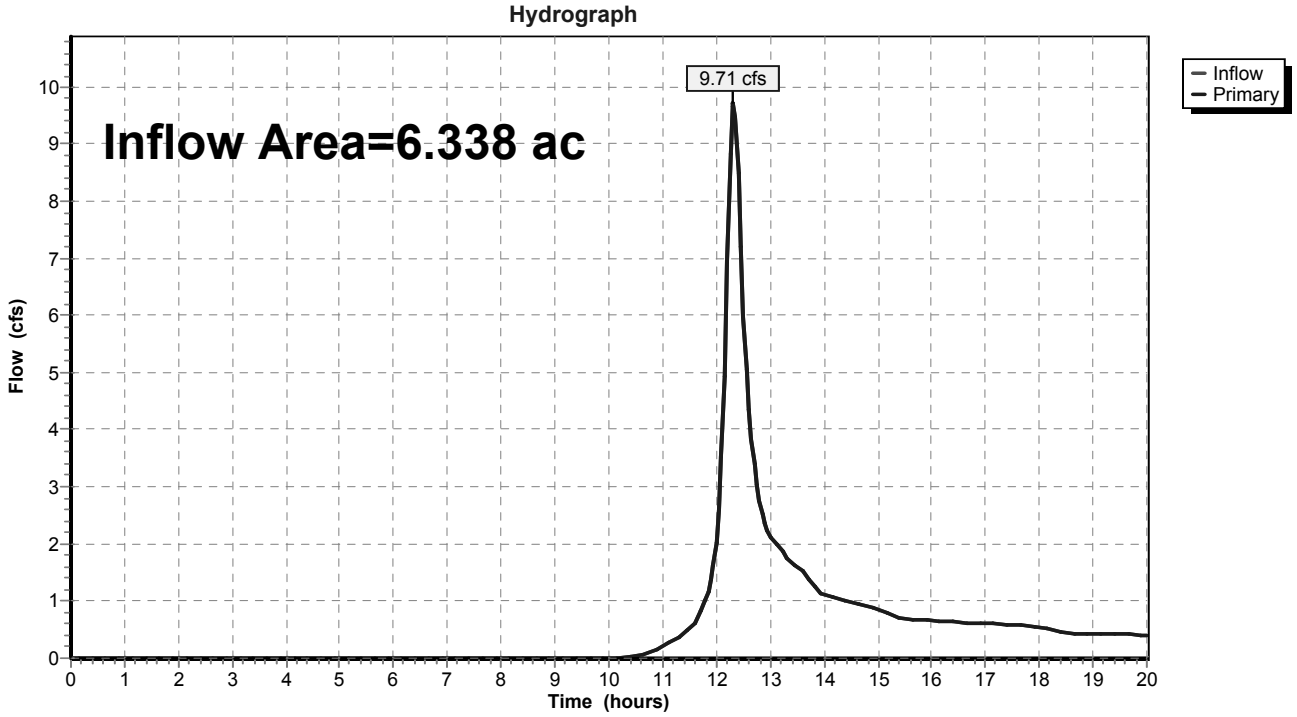


## Summary for Link Well E 1.2A: Well E 1.2A

Inflow Area = 6.338 ac, 22.15% Impervious, Inflow Depth > 1.74" for 25_year event
Inflow = 9.71 cfs @ 12.32 hrs, Volume= 0.918 af
Primary = 9.71 cfs @ 12.32 hrs, Volume= 0.918 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2A: Well E 1.2A

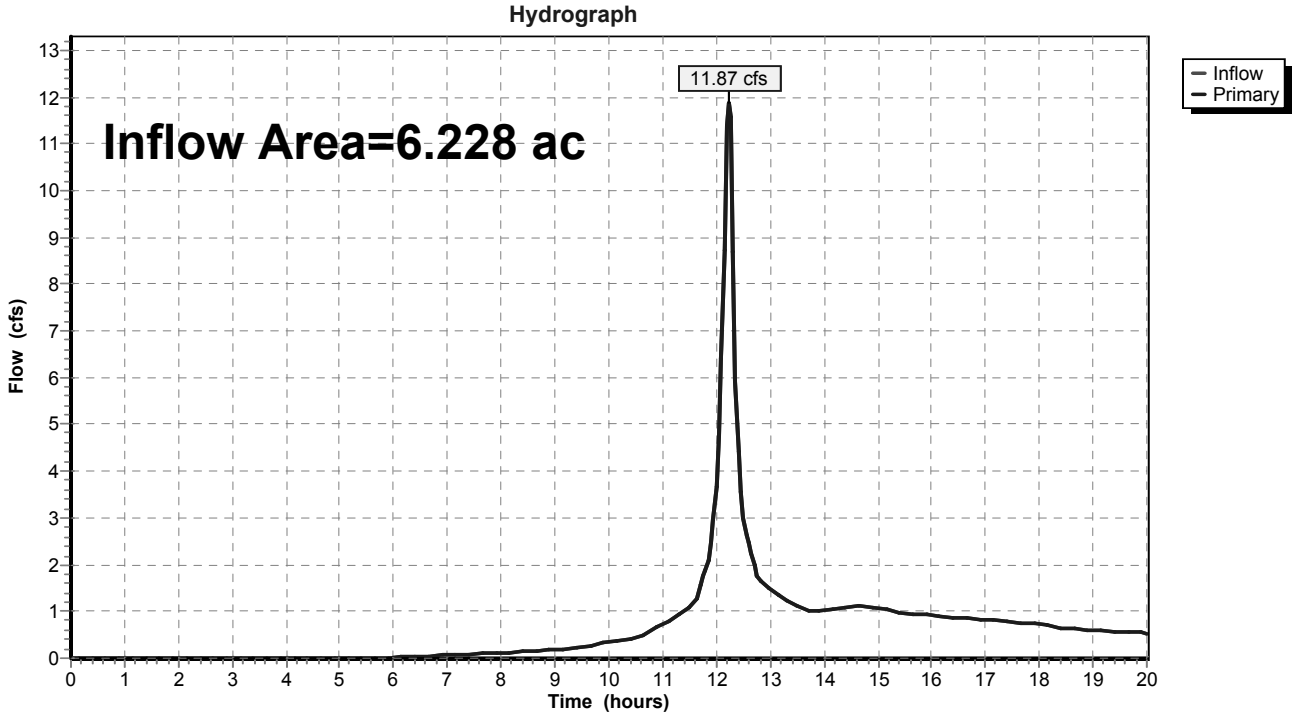


## Summary for Link Well E 1.2B: Well E 1.2B

Inflow Area = 6.228 ac, 50.45% Impervious, Inflow Depth > 2.06" for 25_year event
Inflow = 11.87 cfs @ 12.23 hrs, Volume= 1.070 af
Primary = 11.87 cfs @ 12.23 hrs, Volume= 1.070 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2B: Well E 1.2B

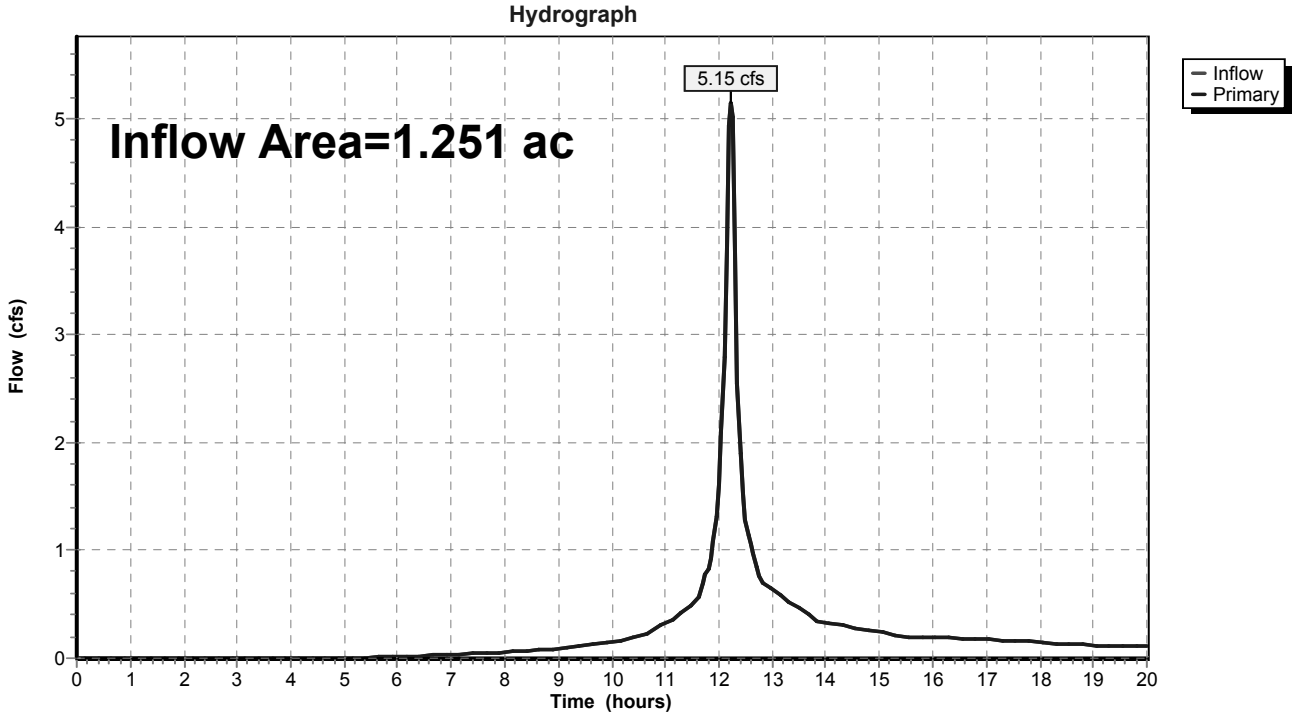


## Summary for Link Well E 1.2C: Well E 1.2C

Inflow Area = 1.251 ac, 18.55% Impervious, Inflow Depth > 3.63" for 25_year event
Inflow = 5.15 cfs @ 12.23 hrs, Volume= 0.379 af
Primary = 5.15 cfs @ 12.23 hrs, Volume= 0.379 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2C: Well E 1.2C



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>3.81"
Flow Length=583' Tc=11.3 min CN=65 Runoff=49.03 cfs 4.285 af

**SubcatchmentE 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>5.19"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.50 cfs 0.039 af

**SubcatchmentE 1.0B: Onsite East South** Runoff Area=33,969 sf 55.29% Impervious Runoff Depth>4.38"
Flow Length=152' Tc=6.0 min CN=70 Runoff=3.70 cfs 0.285 af

**SubcatchmentE 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>3.82"
Flow Length=277' Tc=6.0 min CN=65 Runoff=27.27 cfs 2.071 af

**SubcatchmentE 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>3.04"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=4.07 cfs 0.307 af

**SubcatchmentE 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>5.77"
Flow Length=346' Tc=6.0 min CN=82 Runoff=16.05 cfs 1.300 af

**SubcatchmentE 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>2.47"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=6.28 cfs 0.864 af

**SubcatchmentE 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>2.82"
Flow Length=252' Tc=7.5 min CN=56 Runoff=4.06 cfs 0.319 af

**SubcatchmentE 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>2.72"
Flow Length=139' Tc=6.0 min CN=55 Runoff=16.07 cfs 1.218 af

**SubcatchmentE 1.1B-3: Pond E 1.1B -** Runoff Area=271,752 sf 34.13% Impervious Runoff Depth>4.33"
Flow Length=1,410' Tc=36.9 min CN=70 Runoff=15.70 cfs 2.249 af

**SubcatchmentE 1.1B-4: Pond E 1.1B -** Runoff Area=90,649 sf 0.00% Impervious Runoff Depth>3.37"
Flow Length=106' Tc=6.0 min CN=61 Runoff=7.74 cfs 0.585 af

**SubcatchmentE 1.1C: Culvert 1** Runoff Area=232,650 sf 24.09% Impervious Runoff Depth>5.42"
Flow Length=663' Tc=6.6 min CN=79 Runoff=29.92 cfs 2.411 af

**SubcatchmentE 1.1D: Pond E 1.1D** Runoff Area=253,534 sf 35.03% Impervious Runoff Depth>5.42"
Flow Length=600' Tc=6.0 min CN=79 Runoff=32.99 cfs 2.628 af

**SubcatchmentE 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>2.80"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=9.98 cfs 1.167 af

**SubcatchmentE 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>3.15"
Flow Length=344' Tc=6.0 min CN=59 Runoff=4.92 cfs 0.372 af

**SubcatchmentE 1.2A-2: Pond E 1.2A -** Runoff Area=214,415 sf 23.56% Impervious Runoff Depth>3.47"
Flow Length=434' Tc=14.7 min CN=62 Runoff=14.93 cfs 1.423 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>5.42"
Flow Length=448' Tc=6.0 min CN=79 Runoff=10.79 cfs 0.860 af

**SubcatchmentE 1.2B-1: Pond E 1.2B -** Runoff Area=41,348 sf 64.96% Impervious Runoff Depth>6.12"
Flow Length=261' Tc=6.0 min CN=85 Runoff=5.86 cfs 0.484 af

**SubcatchmentE 1.2B-2: Pond E 1.2B -** Runoff Area=6,456 sf 44.51% Impervious Runoff Depth>5.07"
Flow Length=116' Tc=6.0 min CN=76 Runoff=0.80 cfs 0.063 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>5.77"
Flow Length=193' Tc=6.0 min CN=82 Runoff=6.28 cfs 0.508 af

**SubcatchmentE 1.2C-1: Pond E 1.2C -** Runoff Area=8,435 sf 65.00% Impervious Runoff Depth>6.12"
Flow Length=126' Tc=6.0 min CN=85 Runoff=1.20 cfs 0.099 af

**SubcatchmentE 1.2D: Pond E 1.2D -** Runoff Area=127,255 sf 46.37% Impervious Runoff Depth>5.05"
Flow Length=473' Tc=16.2 min CN=76 Runoff=12.15 cfs 1.230 af

**SubcatchmentE 1.2E: Pond E 1.2E** Runoff Area=13,294 sf 34.60% Impervious Runoff Depth>4.50"
Flow Length=34' Tc=6.0 min CN=71 Runoff=1.48 cfs 0.114 af

**SubcatchmentE 1.3A: Aqueduct onto** Runoff Area=199,579 sf 34.45% Impervious Runoff Depth>3.99"
Flow Length=1,196' Tc=37.8 min CN=67 Runoff=10.53 cfs 1.522 af

**SubcatchmentE 4.0: Offsite to Sudbury R** Runoff Area=607,734 sf 9.67% Impervious Runoff Depth>2.99"
Flow Length=1,859' Tc=38.1 min CN=58 Runoff=23.90 cfs 3.481 af

**SubcatchmentW 10.0: Offsite to Sudbury** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>4.38"
Flow Length=509' Tc=7.8 min CN=70 Runoff=11.12 cfs 0.891 af

**SubcatchmentW 2.0: Onsite to Sudbury R** Runoff Area=329,977 sf 11.49% Impervious Runoff Depth>2.70"
Flow Length=793' Tc=15.6 min CN=55 Runoff=17.41 cfs 1.708 af

**SubcatchmentW 3.1: Pond P W 3.1** Runoff Area=500,344 sf 43.56% Impervious Runoff Depth>5.99"
Flow Length=1,553' Tc=11.6 min CN=84 Runoff=60.85 cfs 5.735 af

**SubcatchmentW 3.4: Gravel Processing** Runoff Area=162,229 sf 16.97% Impervious Runoff Depth>1.98"
Flow Length=460' Tc=14.6 min CN=48 Runoff=6.15 cfs 0.613 af

**SubcatchmentW 3.5: Small Depression to** Runoff Area=4,759 sf 27.98% Impervious Runoff Depth>3.70"
Flow Length=43' Tc=6.0 min CN=64 Runoff=0.44 cfs 0.034 af

**SubcatchmentW 9.1: Gravel Pit to Big** Runoff Area=227,372 sf 34.47% Impervious Runoff Depth>4.27"
Flow Length=440' Tc=6.1 min CN=69 Runoff=24.17 cfs 1.856 af

**SubcatchmentW 9.1A: Gravel Pit to** Runoff Area=94,325 sf 52.60% Impervious Runoff Depth>6.12"
Flow Length=875' Tc=7.4 min CN=85 Runoff=12.99 cfs 1.104 af

**SubcatchmentW 9.1B: Aqueduct to Big** Runoff Area=24,364 sf 16.03% Impervious Runoff Depth>3.59"
Flow Length=235' Tc=6.0 min CN=63 Runoff=2.21 cfs 0.167 af

**SubcatchmentW 9.1C: Culvert 2** Runoff Area=206,937 sf 57.07% Impervious Runoff Depth>5.89"
Flow Length=505' Tc=6.0 min CN=83 Runoff=28.60 cfs 2.330 af

**Pond MH-NCULV-A: MH-NCULV-A** Peak Elev=154.86' Inflow=42.72 cfs 4.389 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=42.72 cfs 4.389 af

**Pond MH-NCULV-B: MH-NCULV-B** Peak Elev=154.38' Inflow=42.72 cfs 4.389 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=42.72 cfs 4.389 af

**Pond P E 1.1A: 284** Peak Elev=139.04' Storage=286,321 cf Inflow=34.64 cfs 7.237 af
Outflow=5.03 cfs 0.670 af

**Pond P E 1.1B: 283** Peak Elev=147.18' Storage=164,020 cf Inflow=54.58 cfs 9.357 af
Outflow=32.40 cfs 5.937 af

**Pond P E 1.1B-4: P E 1.1B-4** Peak Elev=169.06' Storage=774 cf Inflow=7.74 cfs 0.585 af
Outflow=7.45 cfs 0.585 af

**Pond P E 1.1C: P E 1.1C** Peak Elev=171.08' Storage=9,486 cf Inflow=29.92 cfs 4.124 af
Outflow=21.45 cfs 4.124 af

**Pond P E 1.1D: P E 1.1D** Peak Elev=172.14' Storage=94,432 cf Inflow=45.88 cfs 3.732 af
Outflow=9.45 cfs 1.713 af

**Pond P E 1.2A: 282** Peak Elev=135.33' Storage=71,576 cf Inflow=46.89 cfs 5.669 af
Outflow=32.29 cfs 4.438 af

**Pond P E 1.2D: P E 1.2D** Peak Elev=158.23' Storage=44,882 cf Inflow=12.15 cfs 1.230 af
Outflow=3.19 cfs 0.694 af

**Pond P E 1.2E: P E 1.2E** Peak Elev=172.77' Storage=4,977 cf Inflow=1.48 cfs 0.114 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

**Pond P W 3.1: P W 3.1** Peak Elev=156.33' Storage=8,843 cf Inflow=60.85 cfs 5.942 af
Outflow=60.84 cfs 5.772 af

**Pond P W 3.4: P W 3.4** Peak Elev=184.03' Storage=17,845 cf Inflow=6.15 cfs 0.613 af
Outflow=0.69 cfs 0.207 af

**Pond P W 3.5: P W 3.5** Peak Elev=157.00' Storage=0 cf Inflow=0.44 cfs 0.034 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.44 cfs 0.034 af

**Pond P W 9.1: P W 9.1** Peak Elev=155.40' Storage=14,042 cf Inflow=55.43 cfs 4.345 af
42.0" x 42.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=42.72 cfs 4.356 af

**Pond P W 9.1B: P W 9.1B** Peak Elev=158.04' Storage=1,893 cf Inflow=2.21 cfs 0.167 af
Outflow=2.25 cfs 0.126 af

**Pond P W 9.1C: P W 9.1C** Peak Elev=166.34' Storage=517 cf Inflow=28.60 cfs 2.330 af
Outflow=28.61 cfs 2.328 af

**Pond P-CULV-N-OUTLET:P-CULV-N-OUTLET** Peak Elev=153.86' Storage=567 cf Inflow=42.72 cfs 4.389 af
Outflow=44.16 cfs 4.382 af

**Link DP North: DP North** Inflow=139.72 cfs 16.233 af
Primary=139.72 cfs 16.233 af

**Link DP Sudbury: (new Link)** Inflow=240.93 cfs 29.851 af
Primary=240.93 cfs 29.851 af

**Link DP Wellhead: DP Wellhead**
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=77.15 cfs 7.480 af
Primary=77.15 cfs 7.480 af

**Link L E 1.0: L E 1.0** Inflow=104.35 cfs 13.617 af
Primary=104.35 cfs 13.617 af

**Link L E 4.0: L E 4.0** Inflow=23.90 cfs 3.481 af
Primary=23.90 cfs 3.481 af

**Link L W 10.0: L W 10.0** Inflow=11.12 cfs 0.891 af
Primary=11.12 cfs 0.891 af

**Link L W 2.0: L W 2.0** Inflow=17.41 cfs 1.708 af
Primary=17.41 cfs 1.708 af

**Link L W 3.0: L W 3.0** Inflow=60.84 cfs 5.772 af
Primary=60.84 cfs 5.772 af

**Link L W 9.0: L W 9.0** Inflow=44.16 cfs 4.382 af
Primary=44.16 cfs 4.382 af

**Link Well E 1.1B: Well E 1.1B** Inflow=35.95 cfs 6.957 af
Primary=35.95 cfs 6.957 af

**Link Well E 1.2A: Well E 1.2A** Inflow=18.26 cfs 1.794 af
Primary=18.26 cfs 1.794 af

**Link Well E 1.2B: Well E 1.2B** Inflow=17.46 cfs 2.101 af
Primary=17.46 cfs 2.101 af

**Link Well E 1.2C: Well E 1.2C** Inflow=7.47 cfs 0.607 af
Primary=7.47 cfs 0.607 af

**Total Runoff Area = 130.597 ac Runoff Volume = 44.320 af Average Runoff Depth = 4.07"**
**78.71% Pervious = 102.789 ac 21.29% Impervious = 27.808 ac**

## Summary for Subcatchment E 1.0: (blank)

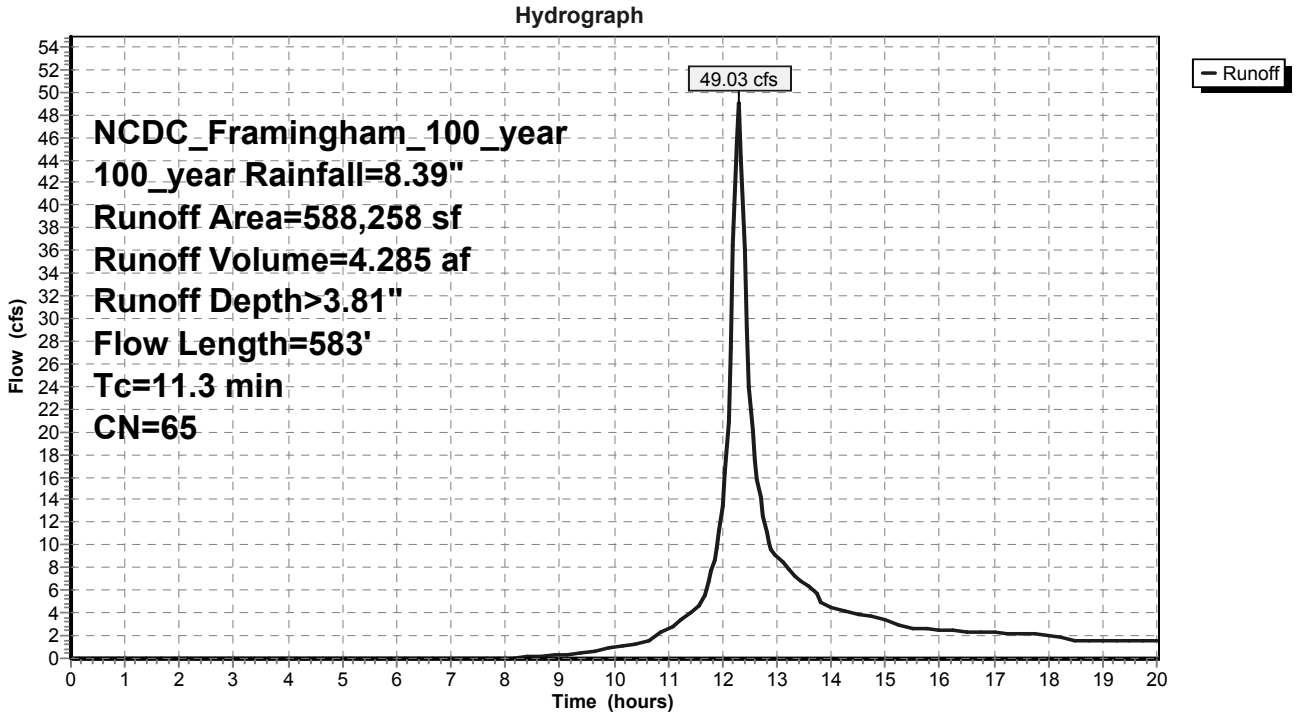
Runoff = 49.03 cfs @ 12.30 hrs, Volume= 4.285 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

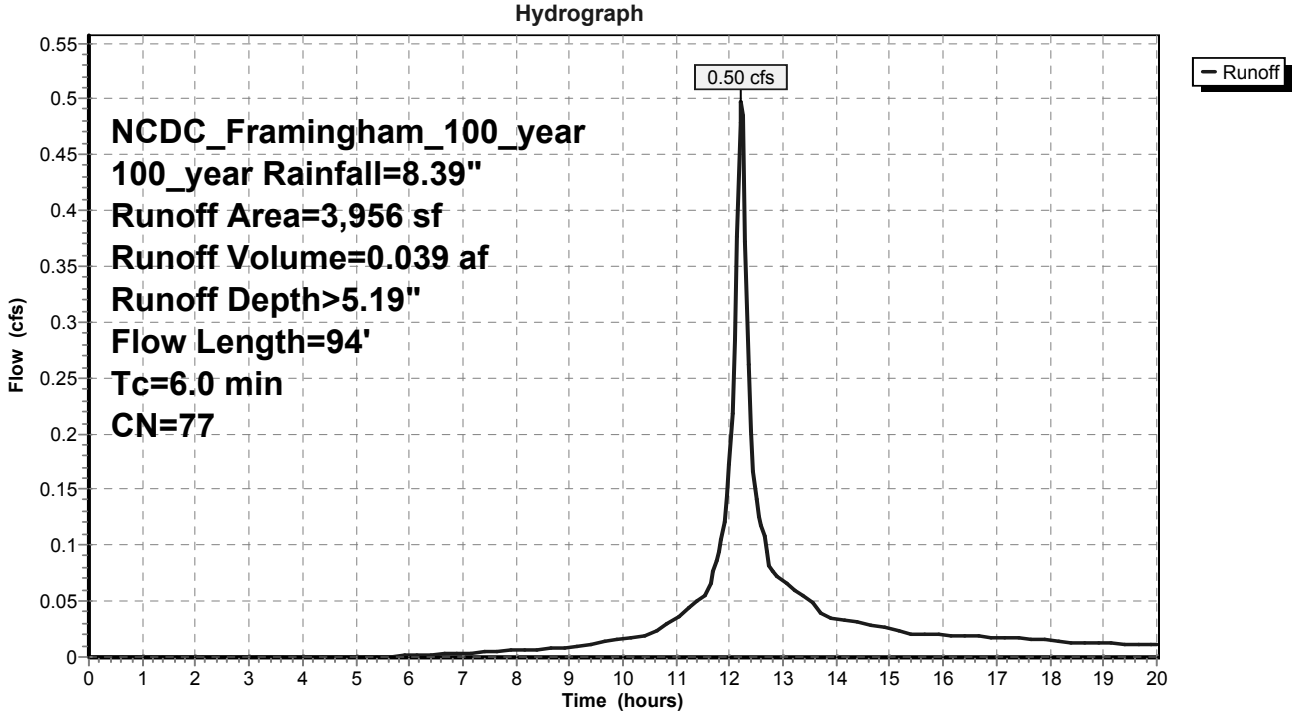
Runoff = 0.50 cfs @ 12.23 hrs, Volume= 0.039 af, Depth> 5.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: Onsite East South of Aqueduct

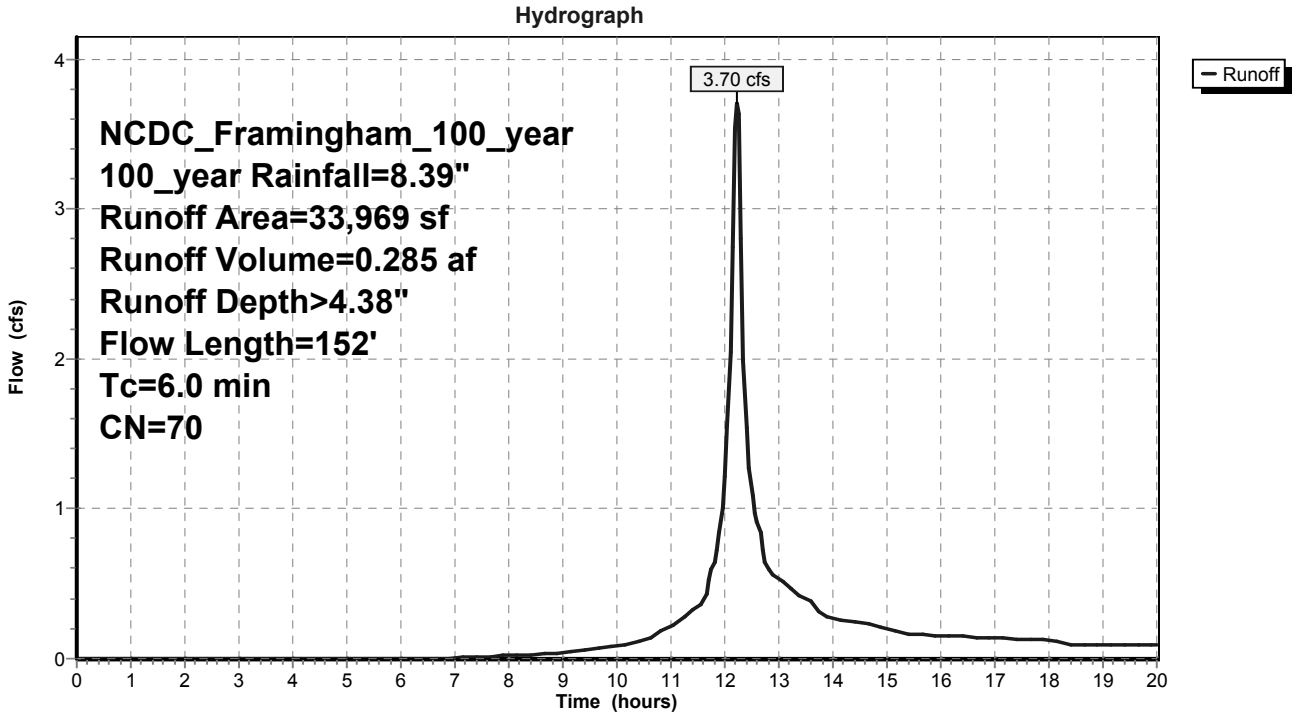
Runoff = 3.70 cfs @ 12.23 hrs, Volume= 0.285 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 28,892 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,969 | 70 | Weighted Average |
| | 15,189 | | 44.71% Pervious Area |
| | 18,780 | | 55.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 152 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: Onsite East South of Aqueduct



## Summary for Subcatchment E 1.0C: (blank)

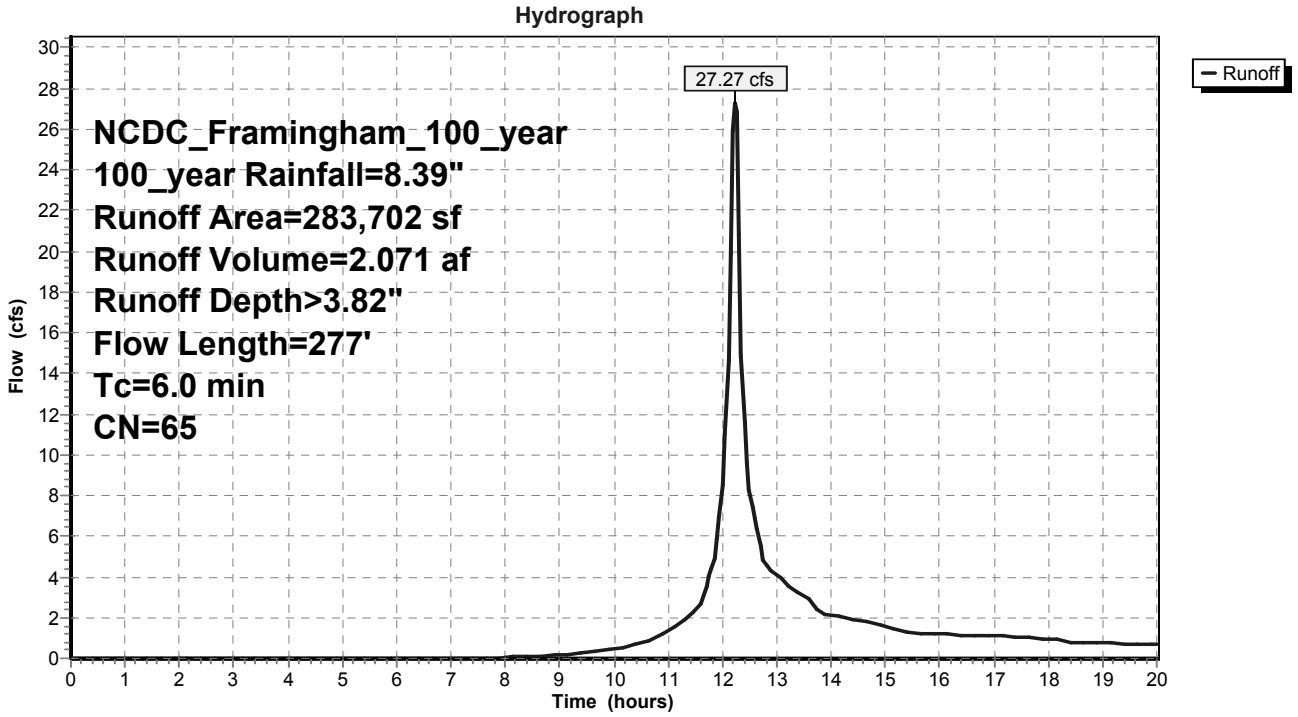
Runoff = 27.27 cfs @ 12.23 hrs, Volume= 2.071 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

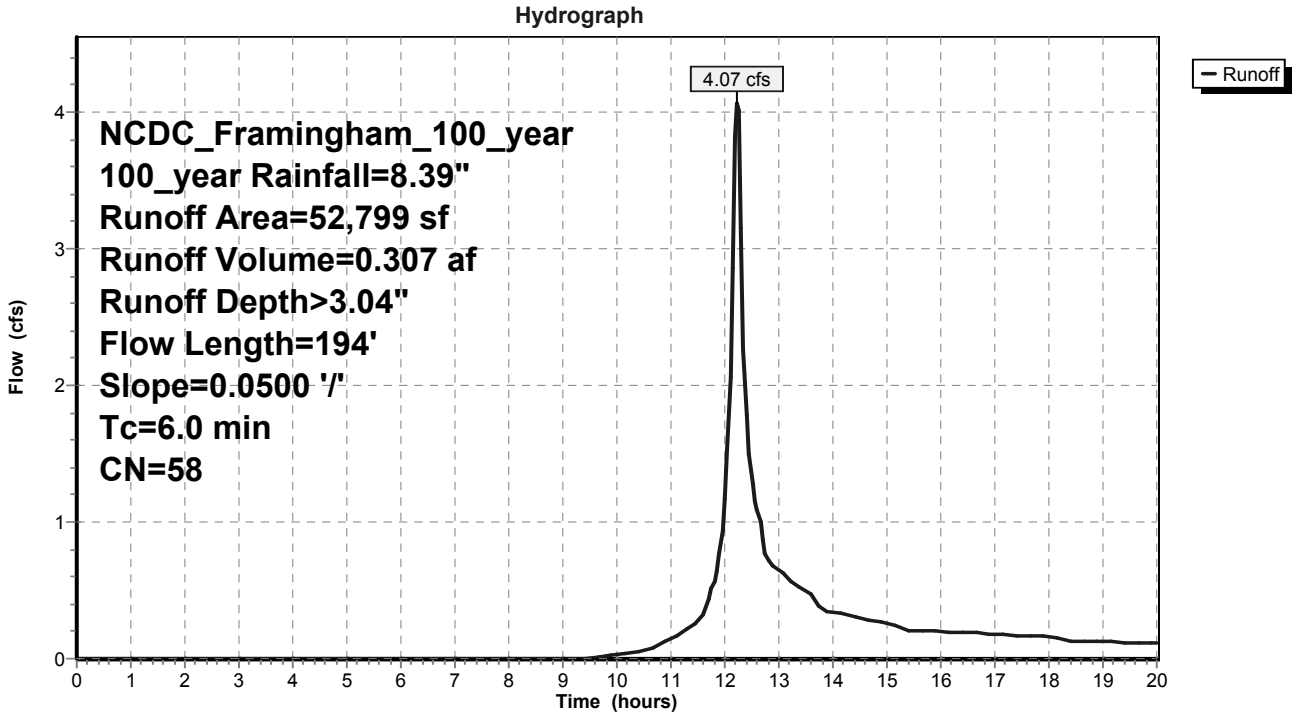
Runoff = 4.07 cfs @ 12.23 hrs, Volume= 0.307 af, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

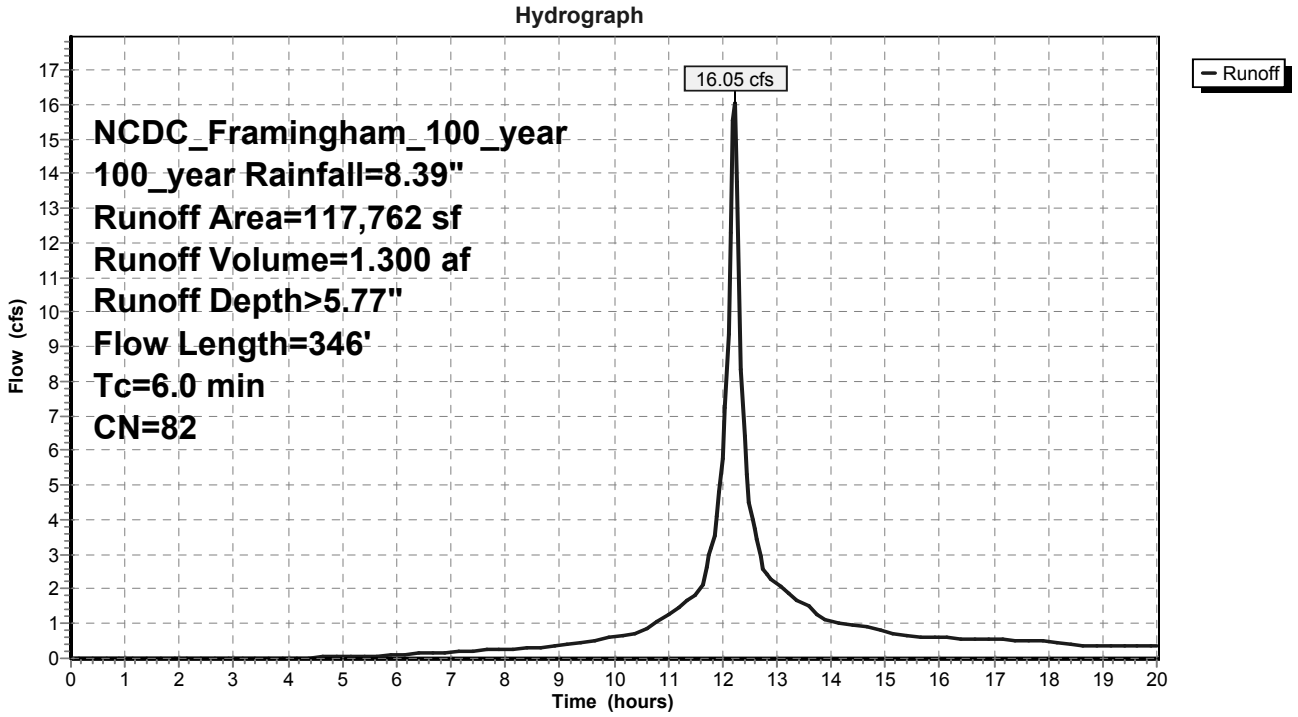
Runoff = 16.05 cfs @ 12.23 hrs, Volume= 1.300 af, Depth> 5.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

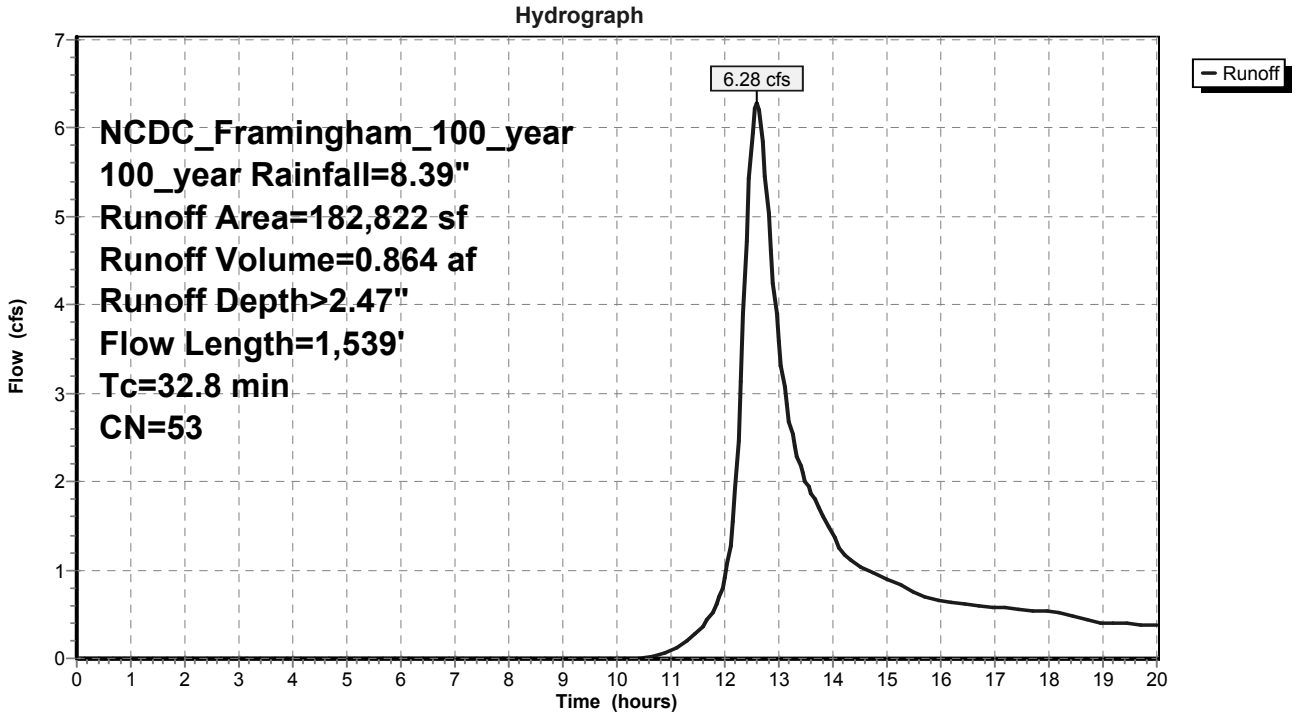
Runoff = 6.28 cfs @ 12.59 hrs, Volume= 0.864 af, Depth> 2.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

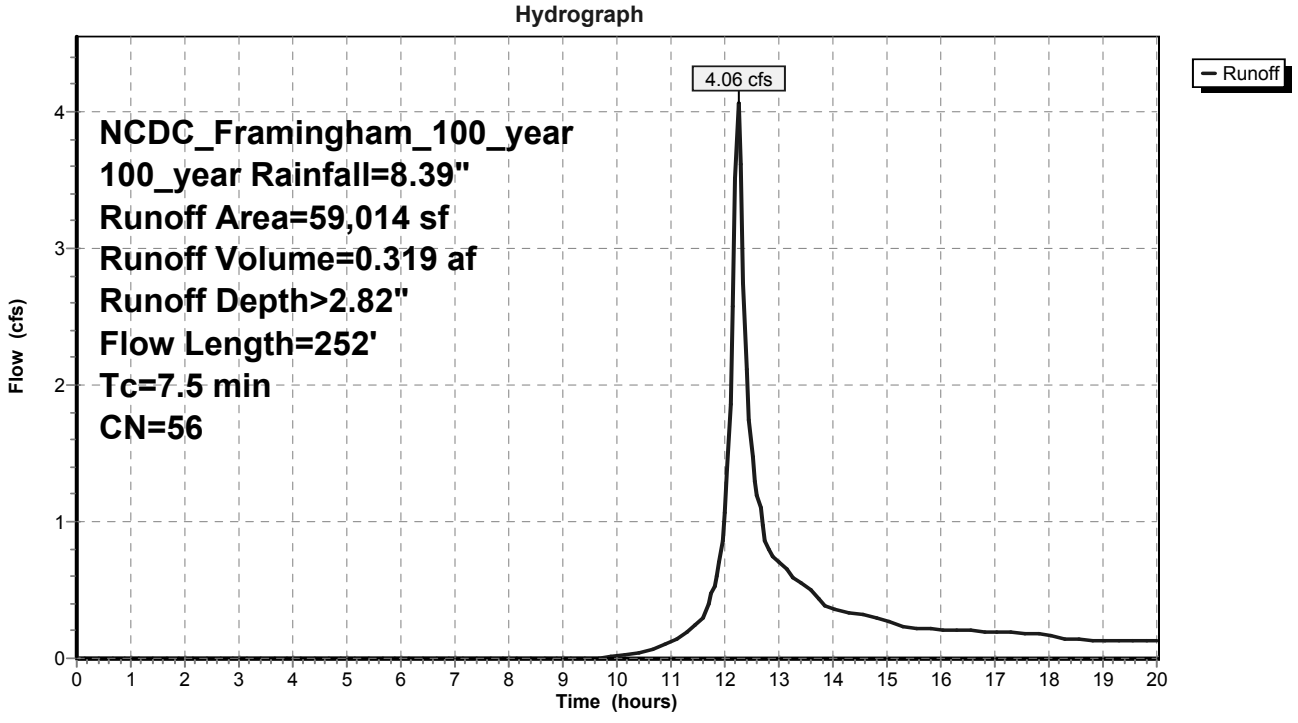
Runoff = 4.06 cfs @ 12.25 hrs, Volume= 0.319 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

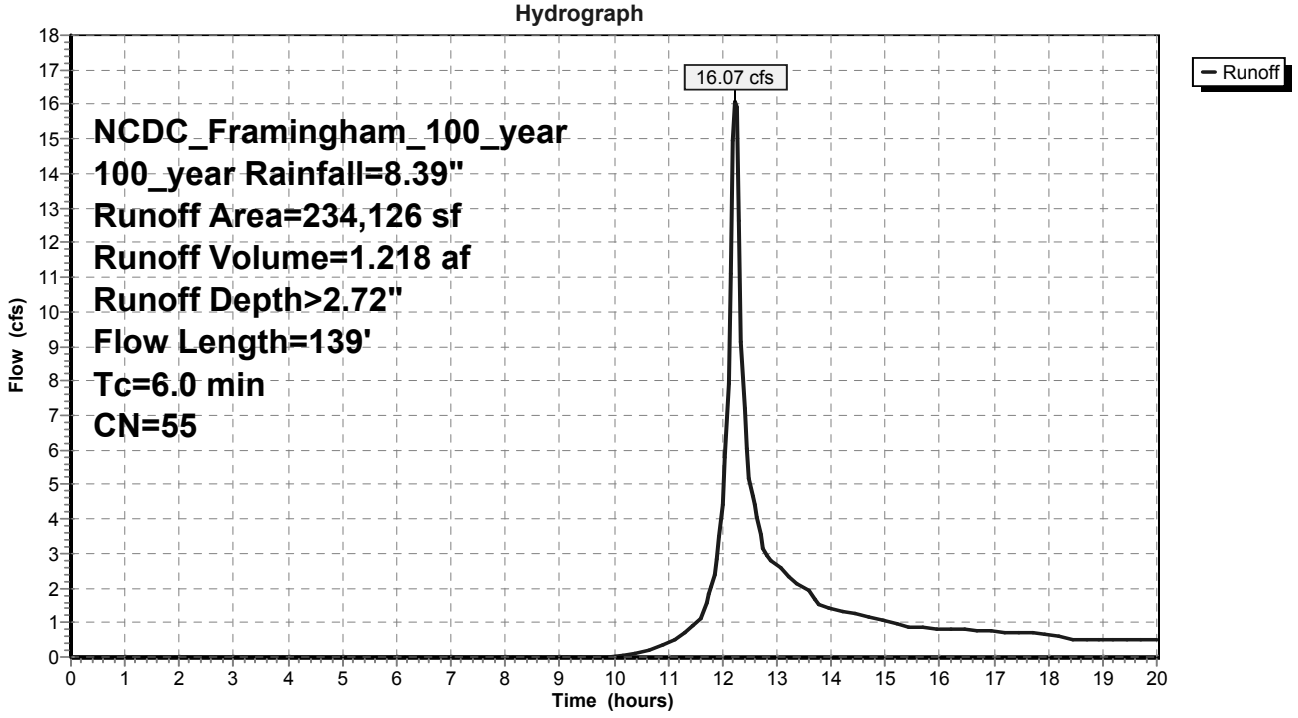
Runoff = 16.07 cfs @ 12.24 hrs, Volume= 1.218 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



## Summary for Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer

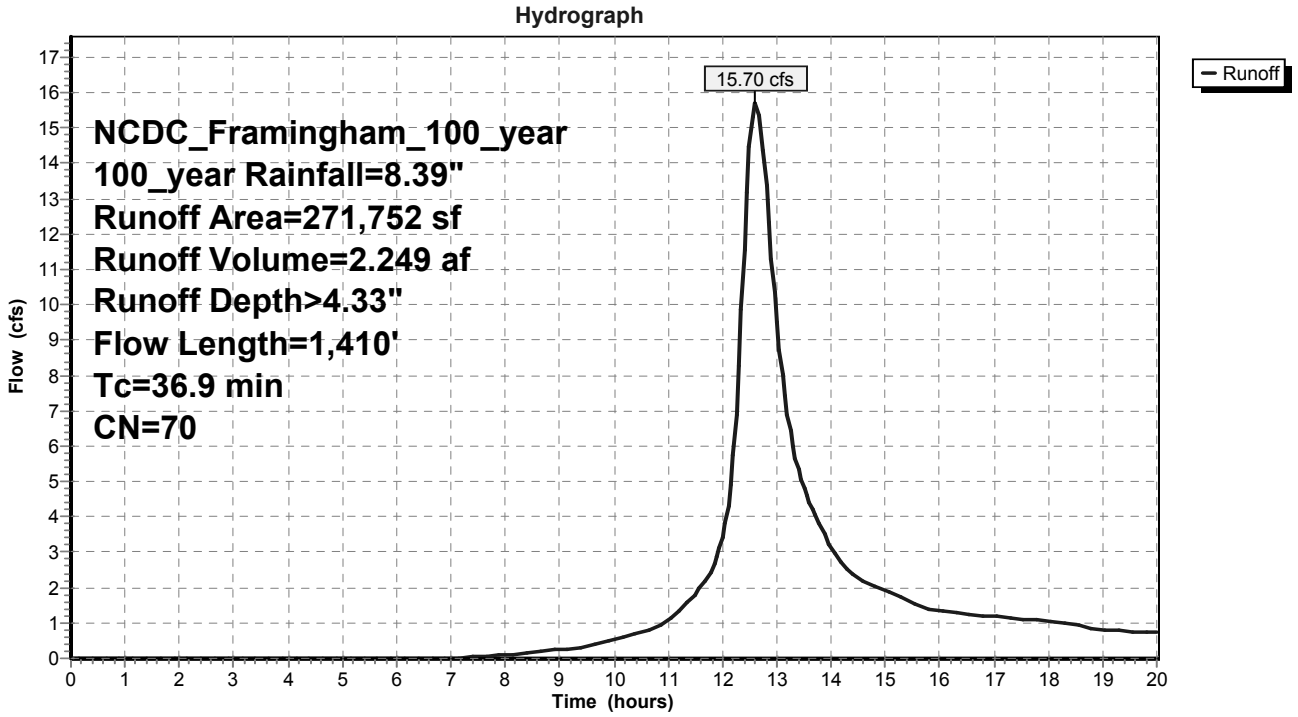
Runoff = 15.70 cfs @ 12.61 hrs, Volume= 2.249 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 39 | GRASS, 0% imperv, HSG A |
| * | 149 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,802 | 30 | WOODS, 0% imperv, HSG A |
| * | 87,233 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,883 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 138,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,521 | 98 | IMP, 100% imperv, HSG A |
| * | 8,368 | 98 | IMP, 100% imperv, HSG B |
| | 271,752 | 70 | Weighted Average |
| | 179,014 | | 65.87% Pervious Area |
| | 92,738 | | 34.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 17.2 | 50 | 0.0010 | 0.05 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.3 | 256 | 0.0659 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 36.9 | 1,410 | Total | | | |

## Subcatchment E 1.1B-3: Pond E 1.1B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer

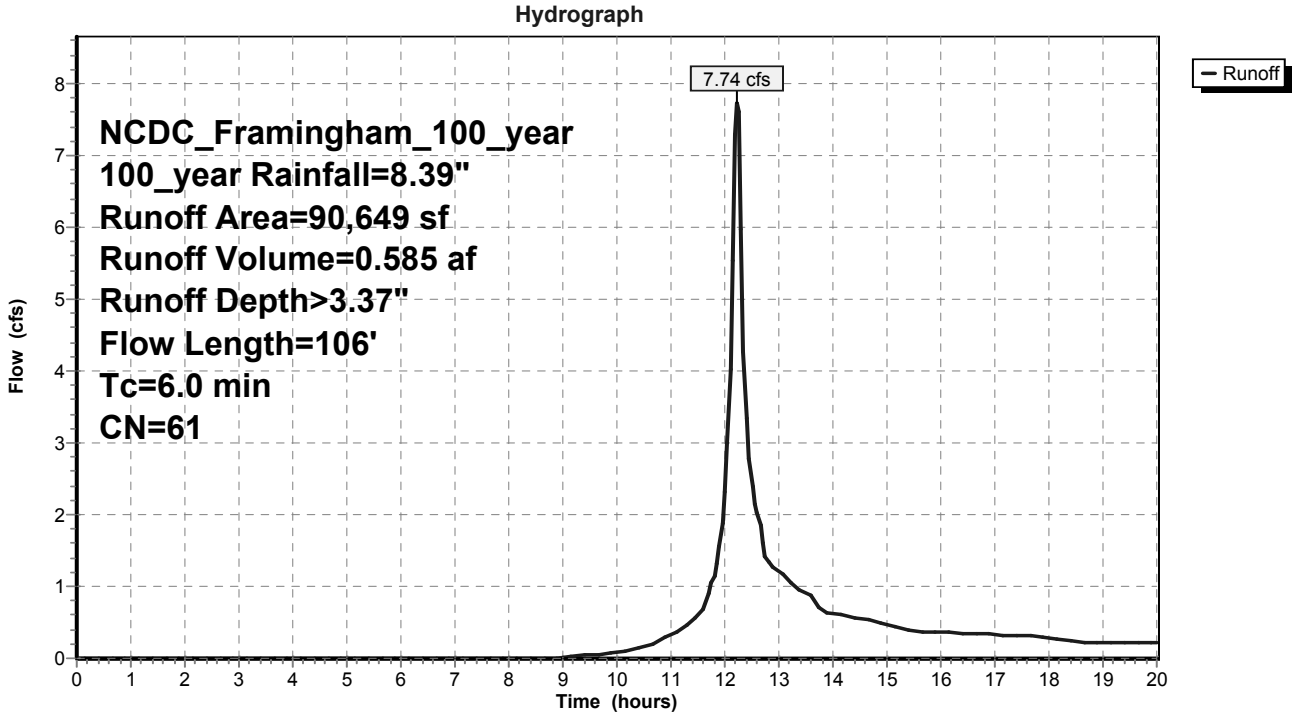
Runoff = 7.74 cfs @ 12.23 hrs, Volume= 0.585 af, Depth> 3.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 66,969 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 3,863 | 98 | IMP, 100% imperv, HSG B |
| | 90,649 | 61 | Weighted Average |
| | 90,649 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.0 | 50 | 0.1057 | 0.28 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 56 | 0.3343 | 4.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.2 | 106 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-4: Pond E 1.1B - Offsite Outside Well Buffer



## Summary for Subcatchment E 1.1C: Culvert 1

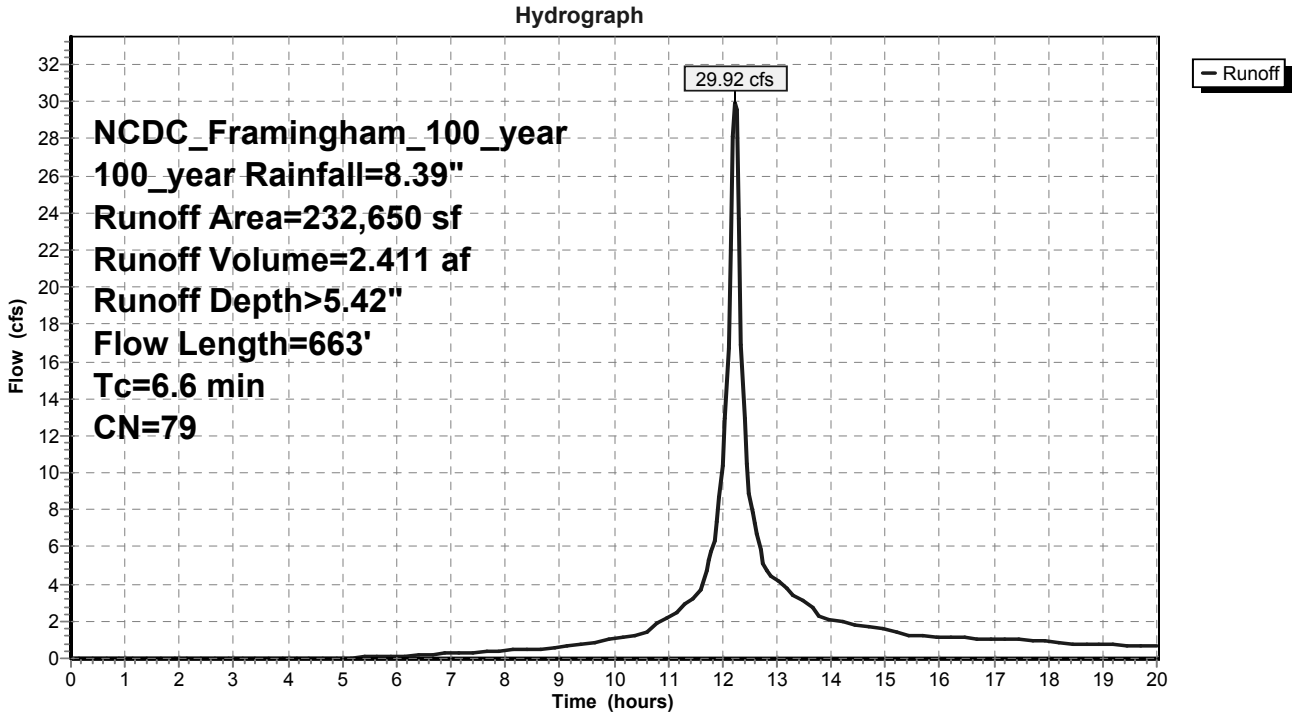
Runoff = 29.92 cfs @ 12.23 hrs, Volume= 2.411 af, Depth> 5.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 70,758 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,422 | 55 | WOODS, 0% imperv, HSG B |
| * | 420 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 85,790 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 64 | 98 | IMP, 100% imperv, HSG A |
| * | 61,196 | 98 | IMP, 100% imperv, HSG B |
| | 232,650 | 79 | Weighted Average |
| | 176,613 | | 75.91% Pervious Area |
| | 56,037 | | 24.09% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0104 | 0.89 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 91 | 0.0095 | 1.98 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 4 | 0.0148 | 1.96 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.6 | 125 | 0.0252 | 3.22 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.8 | 7 | 0.0001 | 0.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 166 | 0.0832 | 5.85 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0531 | 4.68 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 49 | 0.0163 | 2.06 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.4 | 134 | 0.0064 | 1.62 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 34 | 0.0414 | 3.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 6.6 | 663 | Total | | | |

## Subcatchment E 1.1C: Culvert 1



## Summary for Subcatchment E 1.1D: Pond E 1.1D

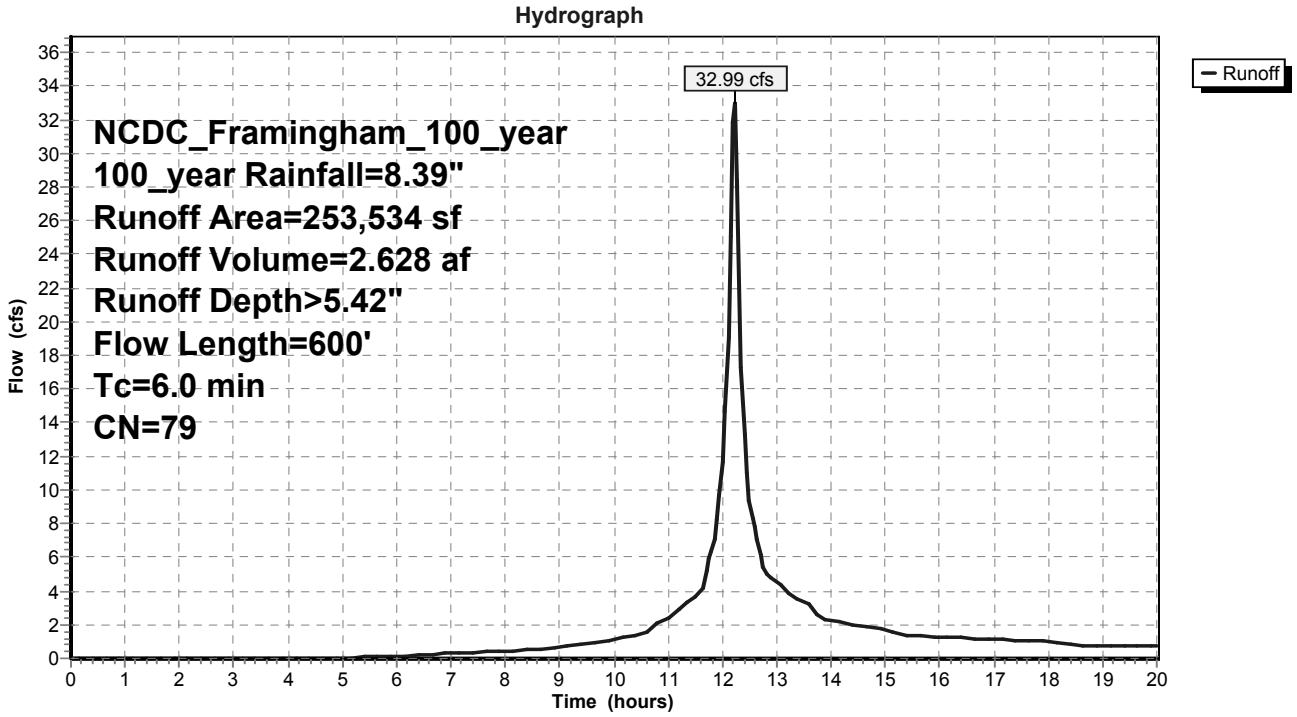
Runoff = 32.99 cfs @ 12.23 hrs, Volume= 2.628 af, Depth> 5.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 41,894 | 61 | GRASS, 0% imperv, HSG B |
| * | 33,714 | 55 | WOODS, 0% imperv, HSG B |
| * | 136,649 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 41,277 | 98 | IMP, 100% imperv, HSG B |
| | 253,534 | 79 | Weighted Average |
| | 164,713 | | 64.97% Pervious Area |
| | 88,822 | | 35.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.7 | 50 | 0.3362 | 0.50 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 13 | 0.3558 | 9.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 163 | 0.0873 | 2.07 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.7 | 374 | 0.0540 | 3.74 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.7 | 600 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1D: Pond E 1.1D



## Summary for Subcatchment E 1.2A: (blank)

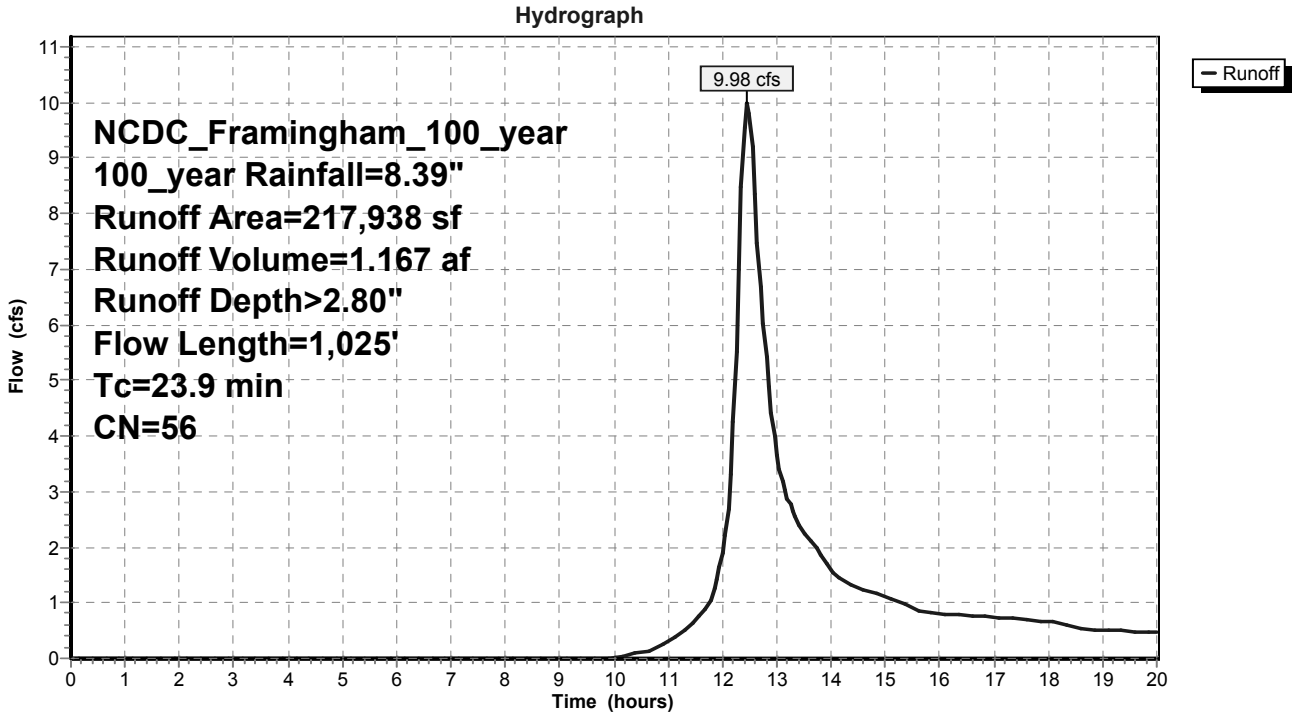
Runoff = 9.98 cfs @ 12.46 hrs, Volume= 1.167 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

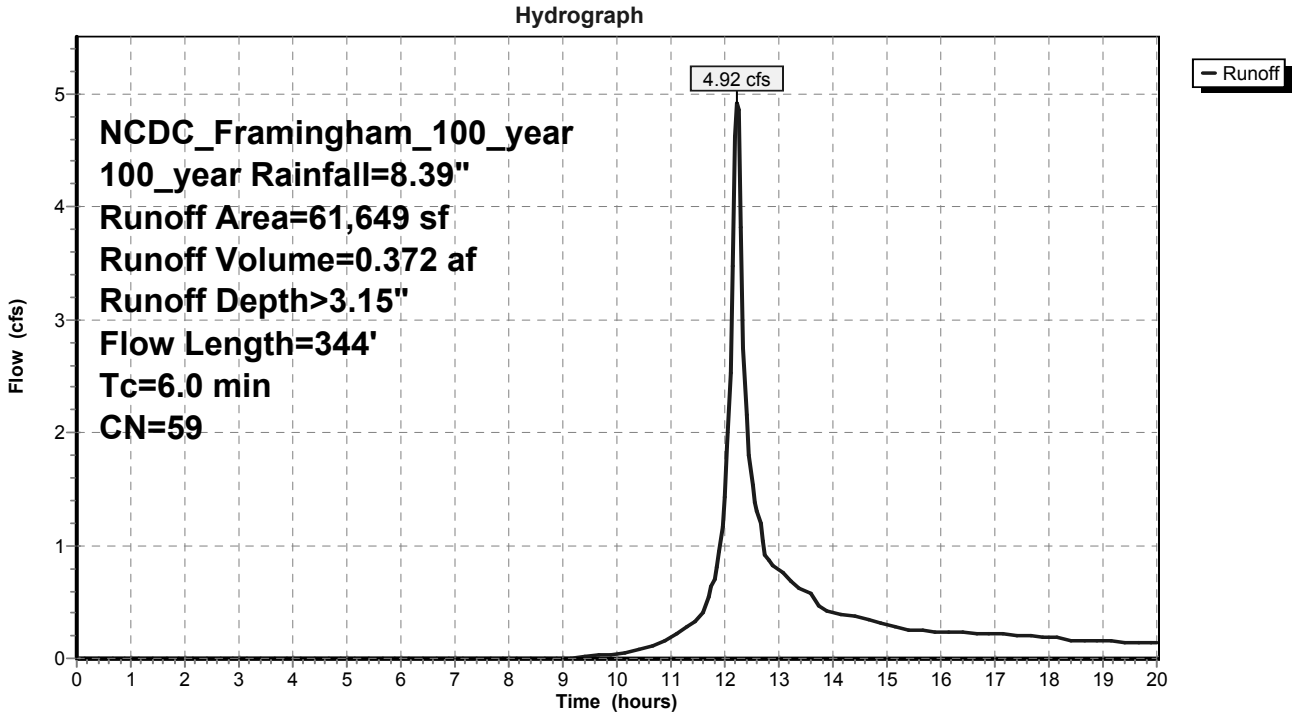
Runoff = 4.92 cfs @ 12.23 hrs, Volume= 0.372 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone

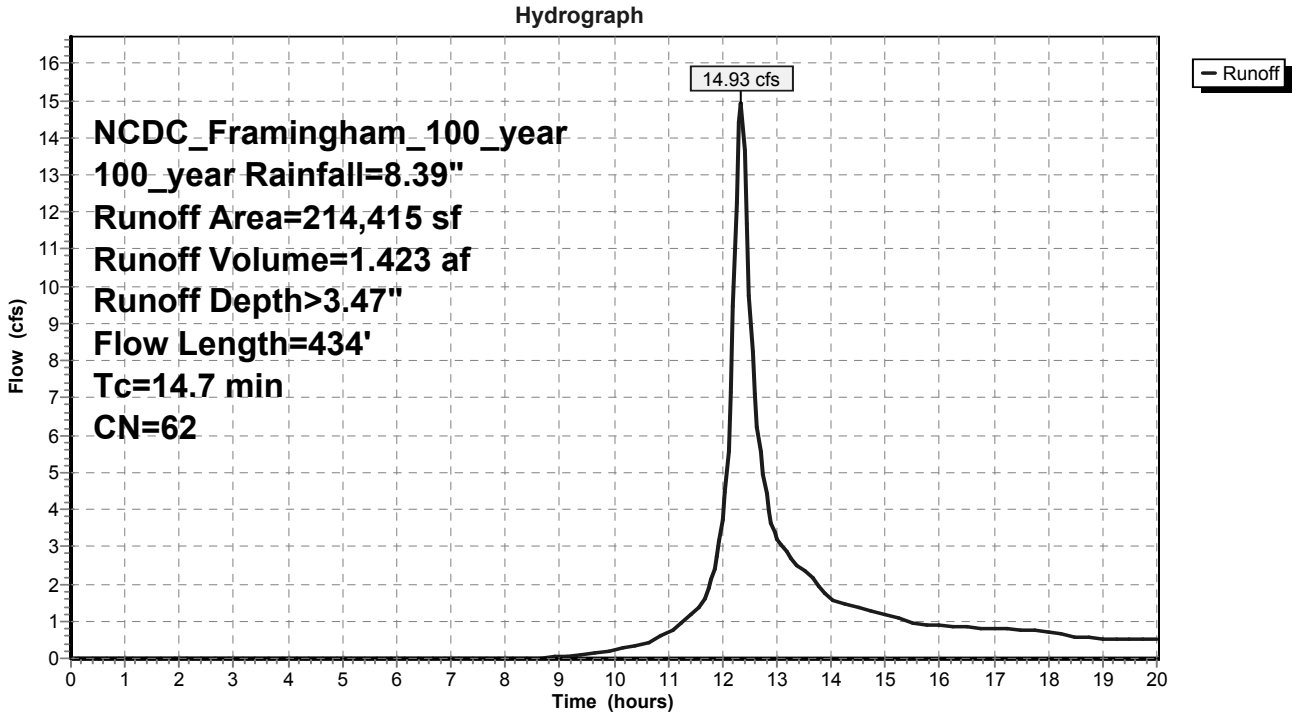
Runoff = 14.93 cfs @ 12.34 hrs, Volume= 1.423 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 24,009 | 30 | WOODS, 0% imperv, HSG A |
| * | 112,703 | 55 | WOODS, 0% imperv, HSG B |
| * | 20,960 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 56,743 | 85 | GRAVEL, 65% imperv, HSG B |
| | 214,415 | 62 | Weighted Average |
| | 163,908 | | 76.44% Pervious Area |
| | 50,507 | | 23.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0161 | 0.63 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 63 | 0.0993 | 5.07 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.7 | 434 | Total | | | |

## Subcatchment E 1.2A-2: Pond E 1.2A - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2B: (blank)

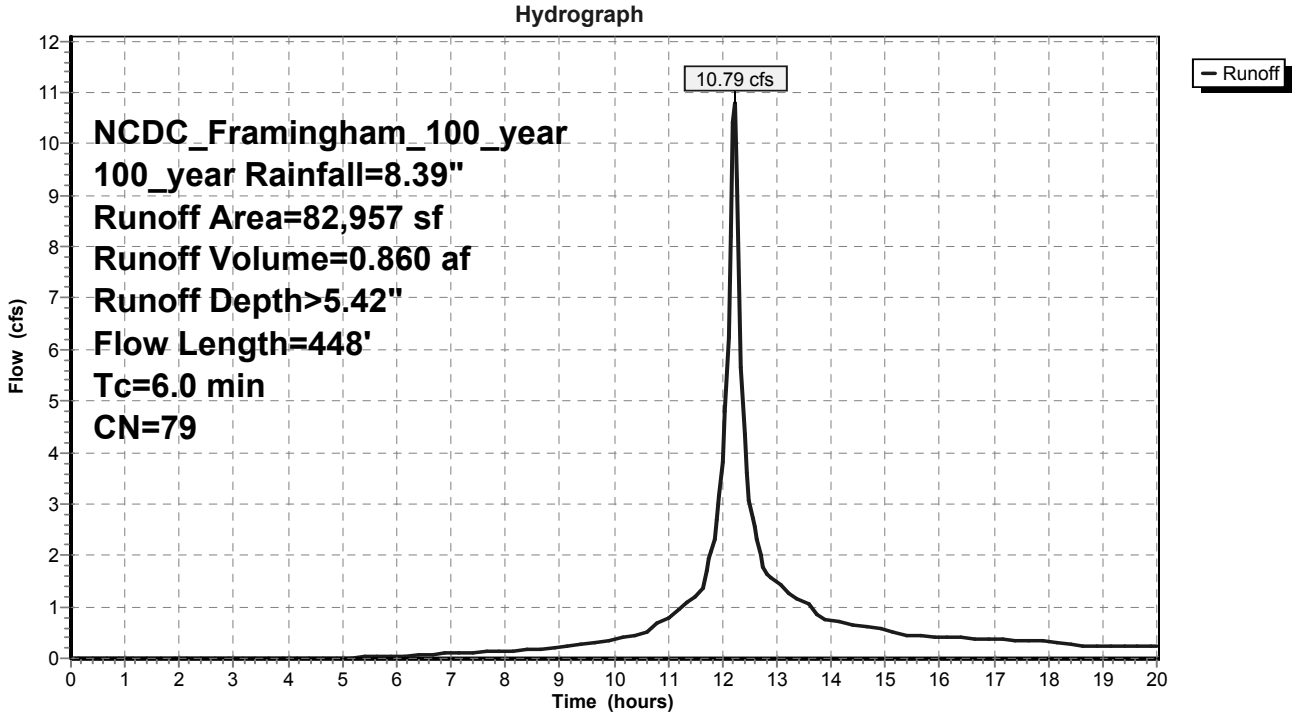
Runoff = 10.79 cfs @ 12.23 hrs, Volume= 0.860 af, Depth> 5.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer

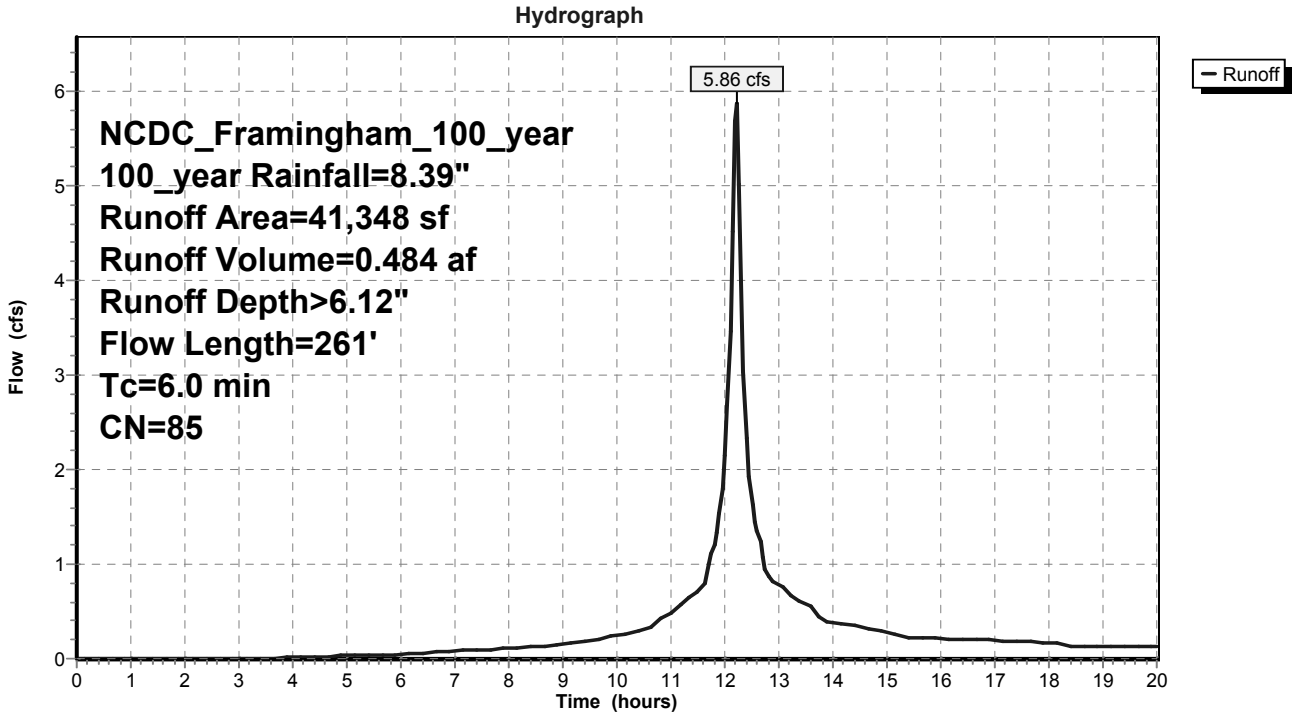
Runoff = 5.86 cfs @ 12.23 hrs, Volume= 0.484 af, Depth> 6.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27 | 55 | WOODS, 0% imperv, HSG B |
| * | 41,322 | 85 | GRAVEL, 65% imperv, HSG B |
| | 41,348 | 85 | Weighted Average |
| | 14,489 | | 35.04% Pervious Area |
| | 26,859 | | 64.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 211 | 0.0326 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.1 | 261 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-1: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer

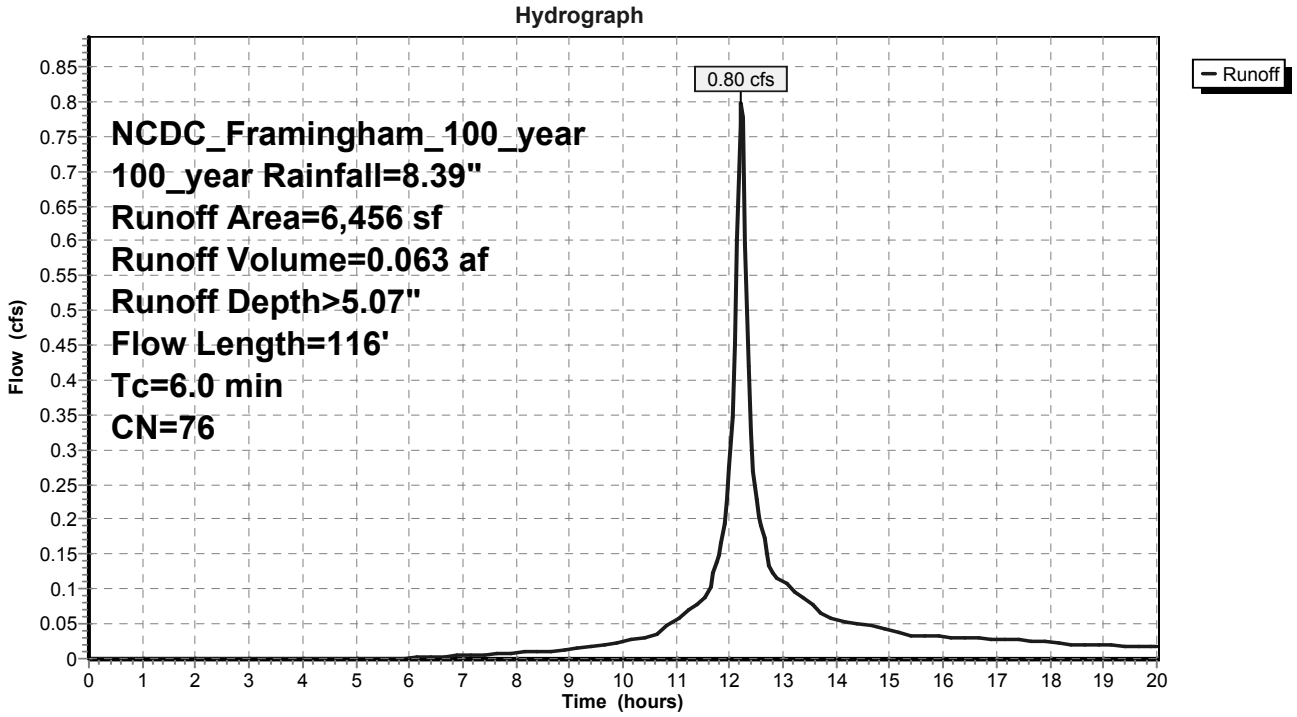
Runoff = 0.80 cfs @ 12.23 hrs, Volume= 0.063 af, Depth> 5.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,035 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,421 | 85 | GRAVEL, 65% imperv, HSG B |
| | 6,456 | 76 | Weighted Average |
| | 3,582 | | 55.49% Pervious Area |
| | 2,874 | | 44.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0740 | 1.71 | | **Sheet Flow,** Range n= 0.013 P2= 3.00" |
| 0.2 | 66 | 0.0982 | 5.05 | | **Shallow Concentrated Flow,** GRAVEL Kv= 16.1 fps |
| 0.7 | 116 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B-2: Pond E 1.2B - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2C: (blank)

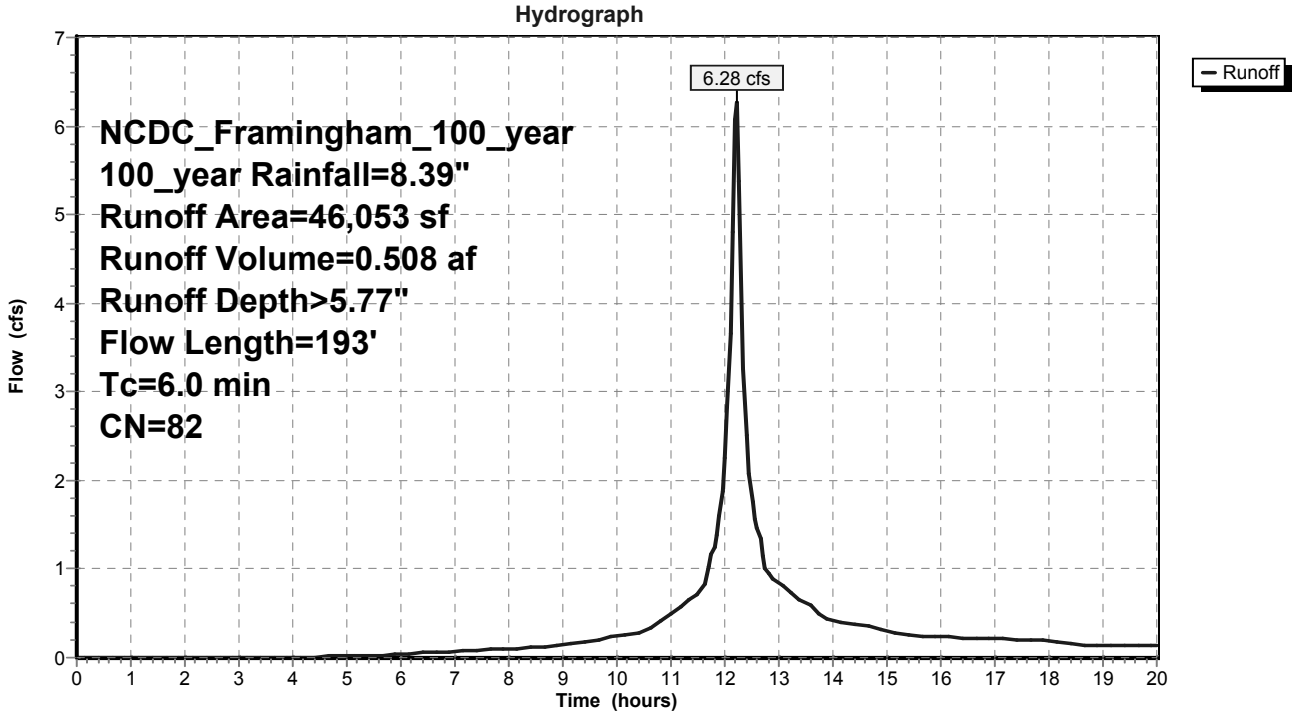
Runoff = 6.28 cfs @ 12.23 hrs, Volume= 0.508 af, Depth> 5.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone

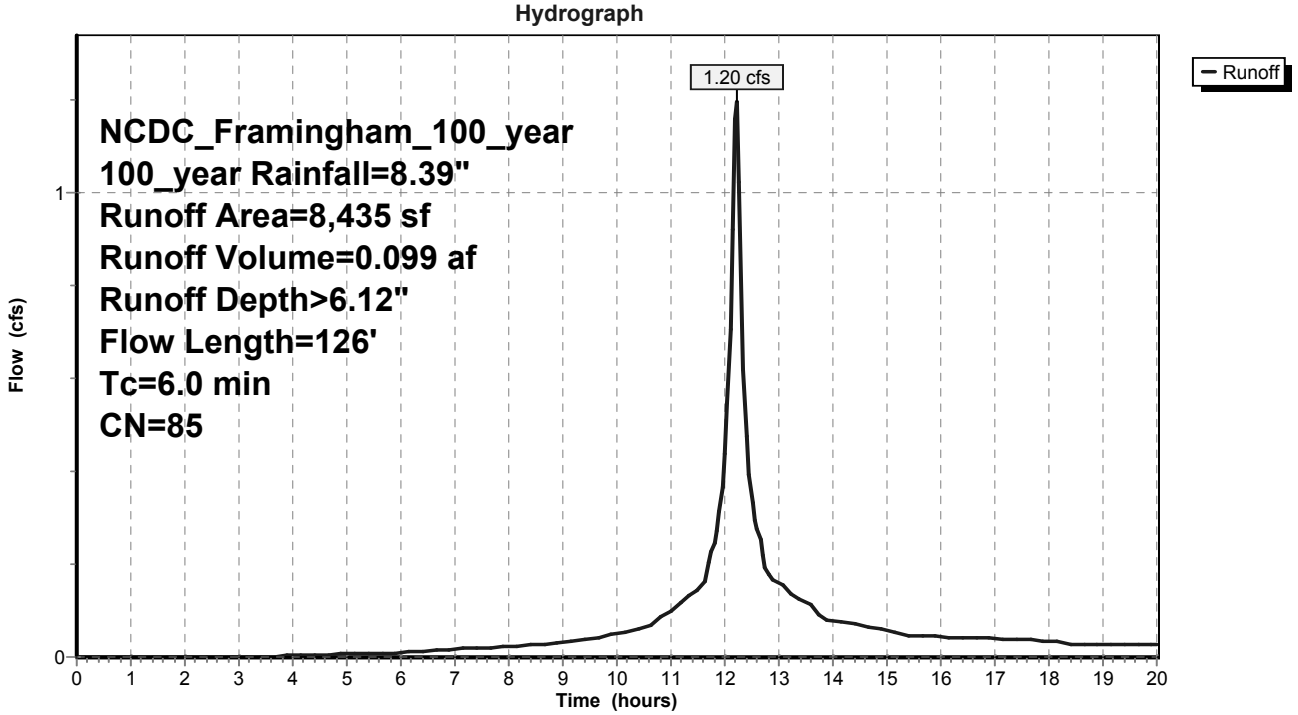
Runoff = 1.20 cfs @ 12.23 hrs, Volume= 0.099 af, Depth> 6.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 8,435 | 85 | GRAVEL, 65% imperv, HSG B |
| | 2,952 | | 35.00% Pervious Area |
| | 5,483 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 76 | 0.1026 | 5.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.6 | 126 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: Pond E 1.2C - Onsite Outside Well Buffer Zone



## Summary for Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer

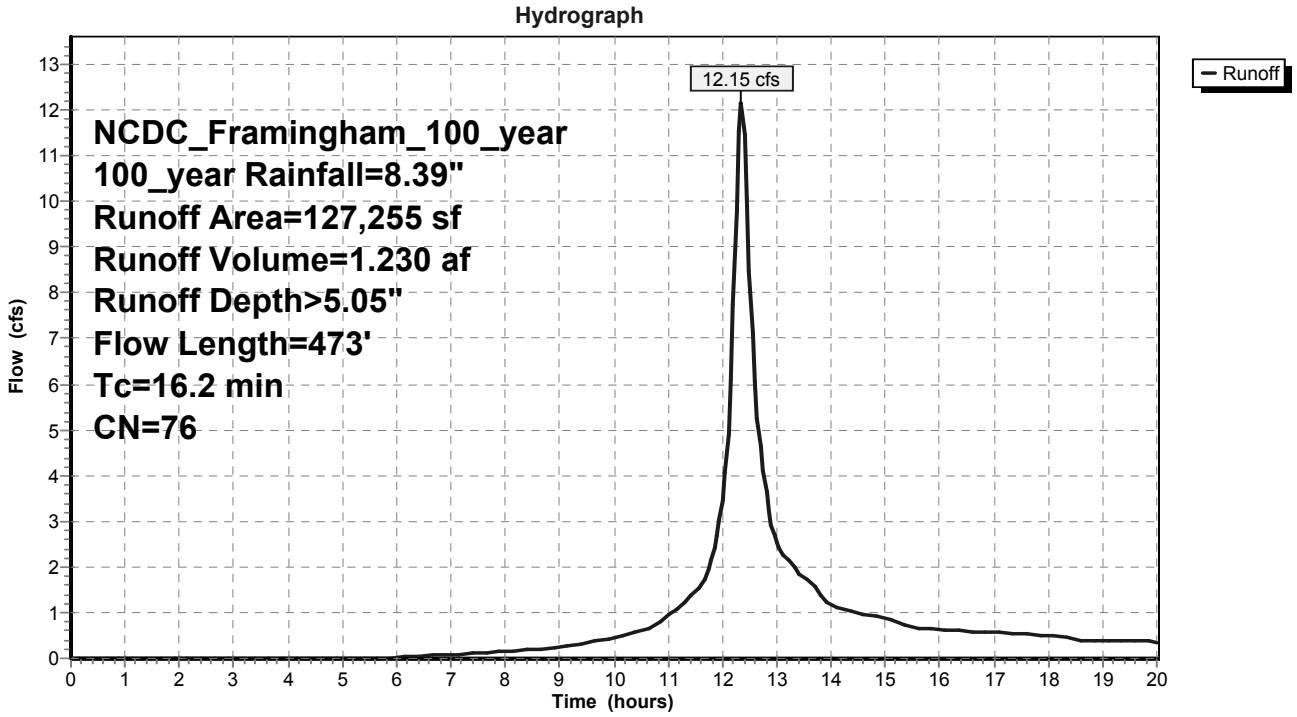
Runoff = 12.15 cfs @ 12.35 hrs, Volume= 1.230 af, Depth> 5.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 36,476 | 55 | WOODS, 0% imperv, HSG B |
| * | 90,779 | 85 | GRAVEL, 65% imperv, HSG B |
| | 127,255 | 76 | Weighted Average |
| | 68,249 | | 53.63% Pervious Area |
| | 59,006 | | 46.37% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | 50 | 0.0137 | 0.14 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 8.0 | 233 | 0.0009 | 0.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.5 | 75 | 0.2333 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 54 | 0.0131 | 1.84 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 19 | 0.0056 | 0.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 41 | 0.0176 | 2.13 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 16.2 | 473 | Total | | | |

## Subcatchment E 1.2D: Pond E 1.2D - Onsite Outside Well Buffer



## Summary for Subcatchment E 1.2E: Pond E 1.2E

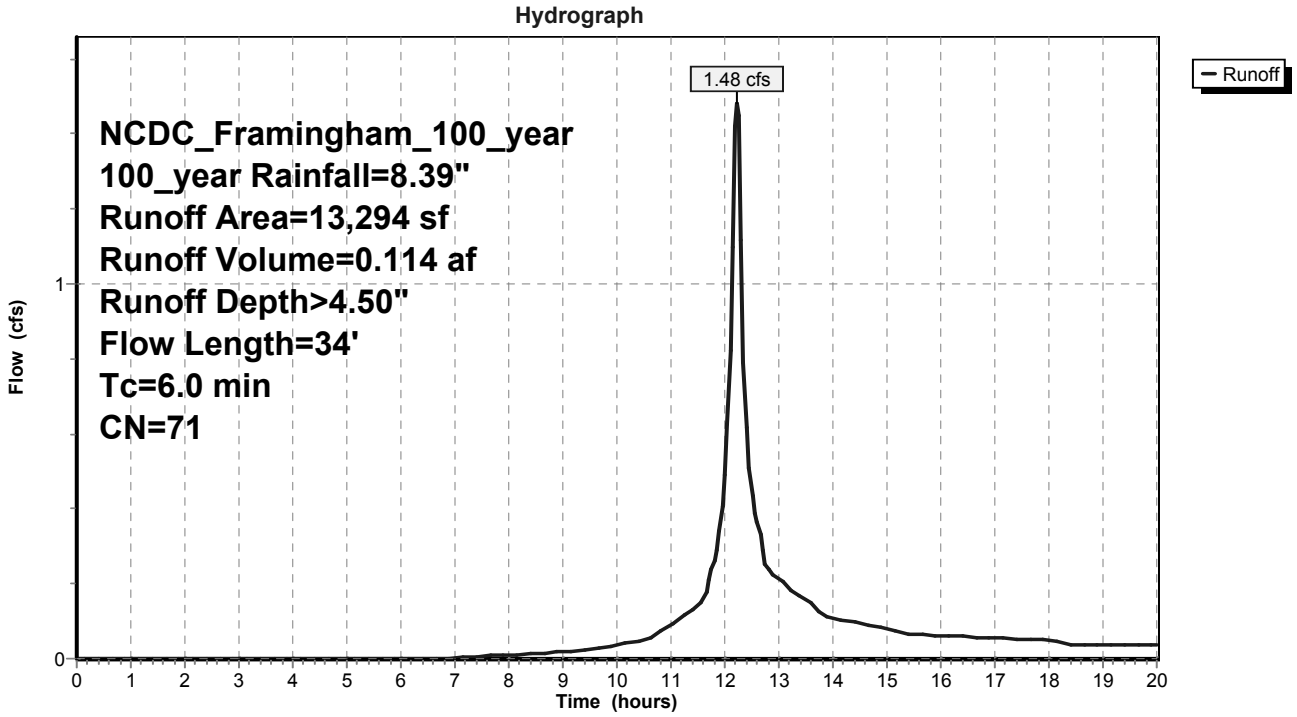
Runoff = 1.48 cfs @ 12.23 hrs, Volume= 0.114 af, Depth> 4.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,218 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,076 | 85 | GRAVEL, 65% imperv, HSG B |
| | 13,294 | 71 | Weighted Average |
| | 8,695 | | 65.40% Pervious Area |
| | 4,600 | | 34.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.9 | 31 | 0.3269 | 0.18 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 2 | 0.3283 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 3.0 | 34 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2E: Pond E 1.2E



## Summary for Subcatchment E 1.3A: Aqueduct onto SITE

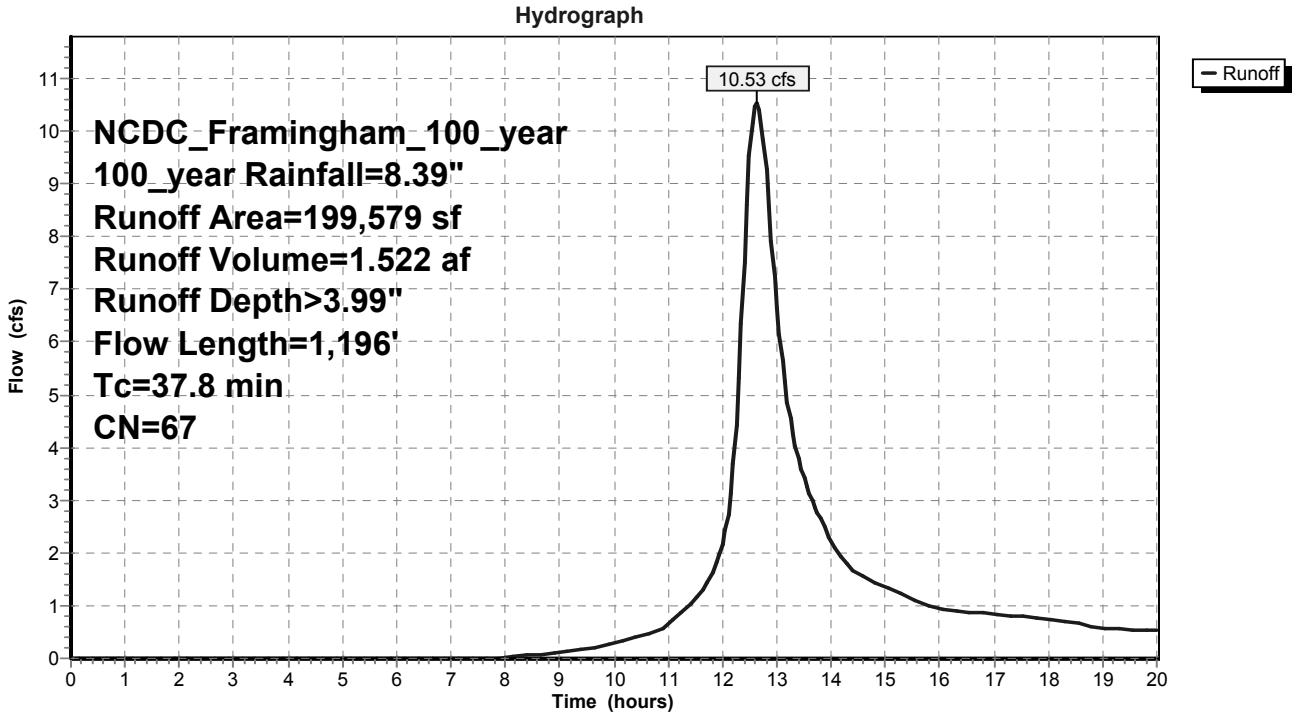
Runoff = 10.53 cfs @ 12.63 hrs, Volume= 1.522 af, Depth> 3.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,883 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 6,497 | 30 | WOODS, 0% imperv, HSG A |
| * | 62,664 | 55 | WOODS, 0% imperv, HSG B |
| * | 94,997 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 199,579 | 67 | Weighted Average |
| | 130,818 | | 65.55% Pervious Area |
| | 68,761 | | 34.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 1 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 12 | 0.0472 | 3.50 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 17.9 | 54 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 37.8 | 1,196 | Total | | | |

## Subcatchment E 1.3A: Aqueduct onto SITE



## Summary for Subcatchment E 4.0: Offsite to Sudbury R

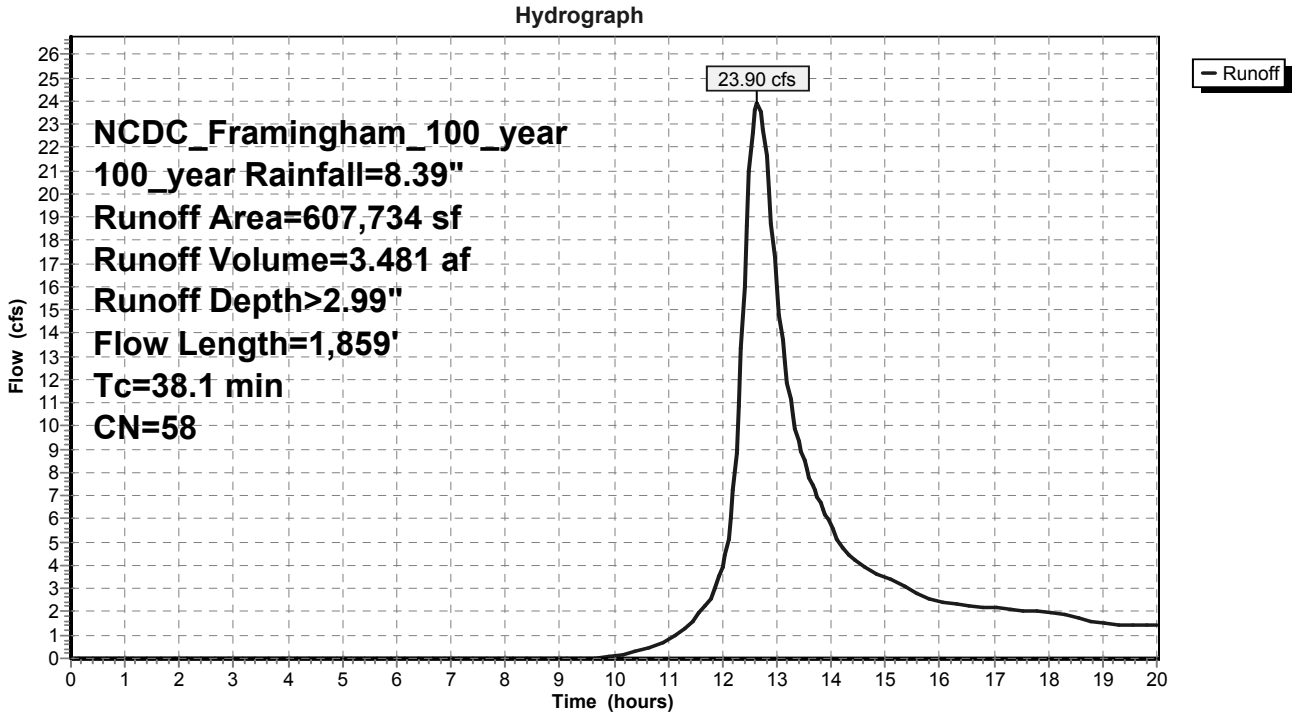
Runoff = 23.90 cfs @ 12.65 hrs, Volume= 3.481 af, Depth> 2.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 78,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 27,532 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,227 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,518 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 0% imperv, HSG A |
| * | 6,326 | 98 | Water, 0% imperv, HSG C |
| * | 12,063 | 98 | Water, 0% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 607,734 | 58 | Weighted Average |
| | 548,979 | | 90.33% Pervious Area |
| | 58,756 | | 9.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.2 | 194 | 0.0399 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 8.7 | 227 | 0.0076 | 0.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 38.1 | 1,859 | Total | | | |

## Subcatchment E 4.0: Offsite to Sudbury R



## Summary for Subcatchment W 10.0: Offsite to Sudbury R

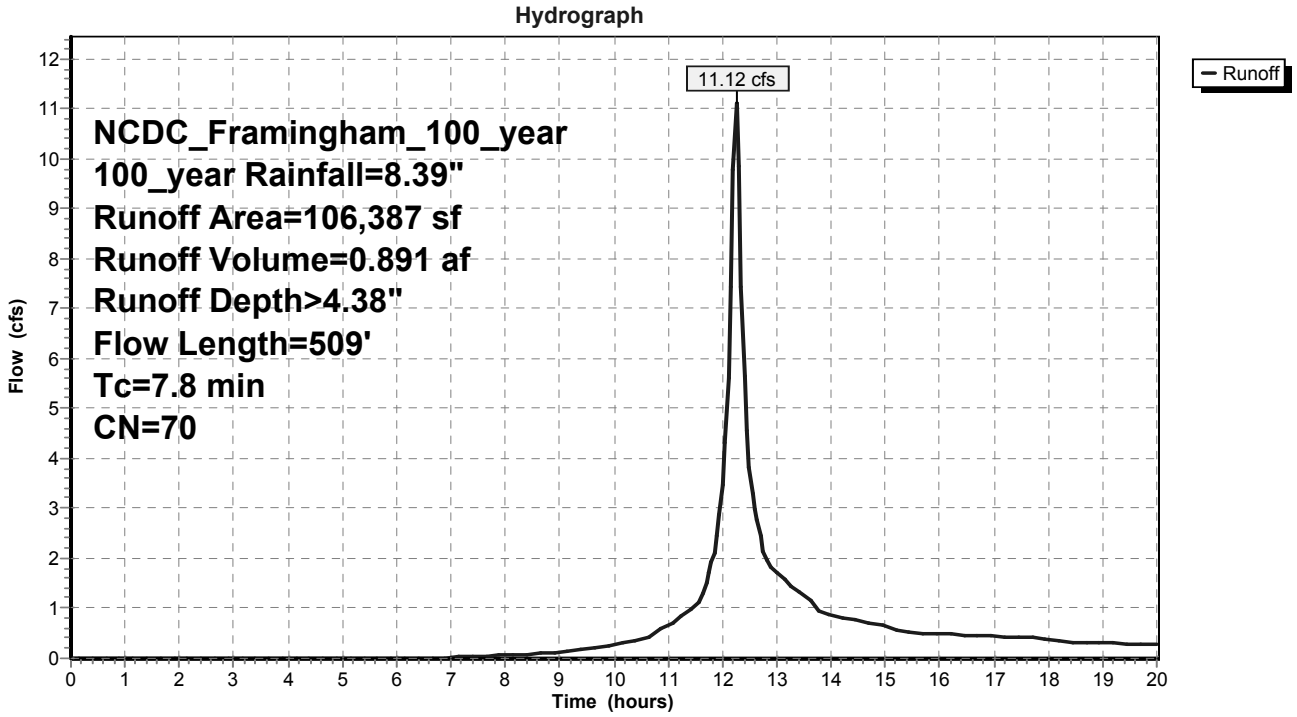
Runoff = 11.12 cfs @ 12.25 hrs, Volume= 0.891 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 0% imperv, HSG C |
| * | 6,541 | 98 | Water, 0% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 41 | 0.0223 | 0.75 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 11 | 0.2240 | 2.37 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 7.8 | 509 | Total | | | |

## Subcatchment W 10.0: Offsite to Sudbury R



## Summary for Subcatchment W 2.0: Onsite to Sudbury R

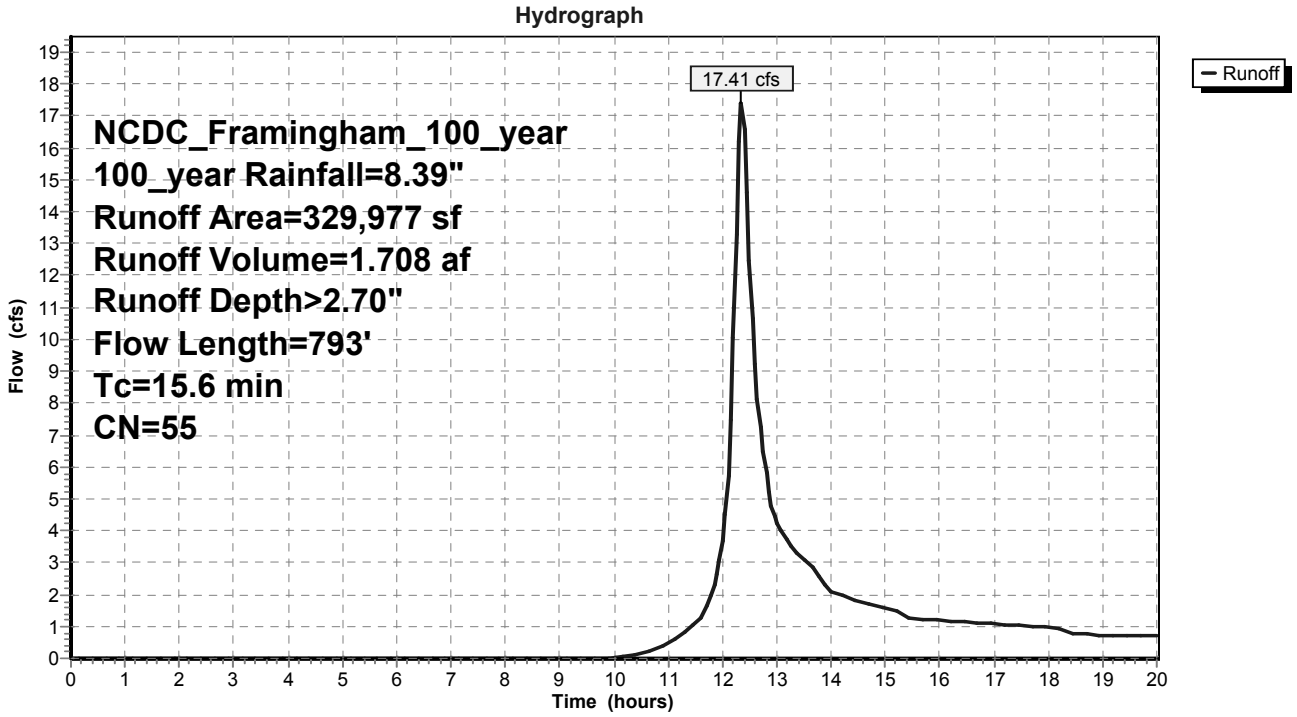
Runoff = 17.41 cfs @ 12.35 hrs, Volume= 1.708 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 160,572 | 30 | WOODS, 0% imperv, HSG A |
| * | 22 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 58,308 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 0 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 19,292 | 98 | Water, 0% imperv, HSG D |
| * | 1,268 | 98 | Water, 0% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 329,977 | 55 | Weighted Average |
| | 292,076 | | 88.51% Pervious Area |
| | 37,900 | | 11.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: Onsite to Sudbury R



## Summary for Subcatchment W 3.1: Pond P W 3.1

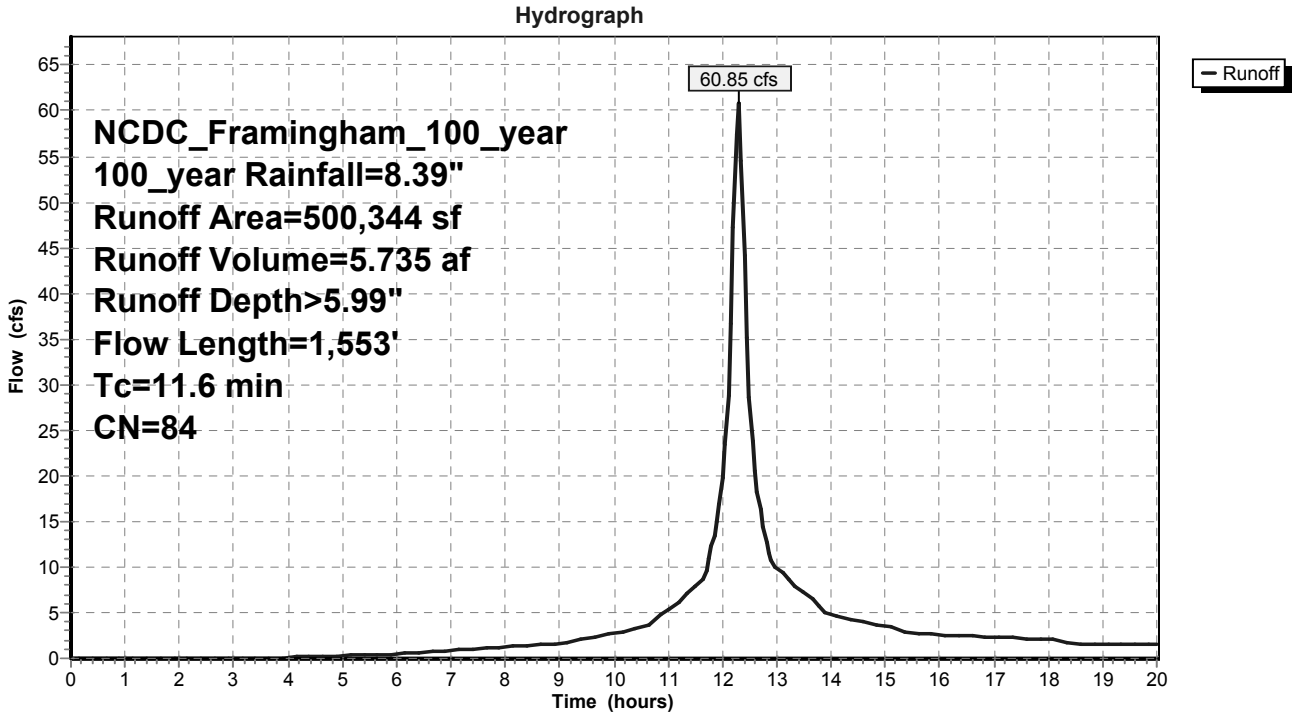
Runoff = 60.85 cfs @ 12.29 hrs, Volume= 5.735 af, Depth> 5.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 149 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 12,067 | 30 | WOODS, 0% imperv, HSG A |
| * | 10,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 137,585 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 197,738 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 22,211 | 98 | IMP, 100% imperv, HSG A |
| * | 118,525 | 98 | IMP, 100% imperv, HSG B |
| | 500,344 | 84 | Weighted Average |
| | 282,384 | | 56.44% Pervious Area |
| | 217,960 | | 43.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 50 | 0.0032 | 0.55 | | **Sheet Flow,** Smooth Surfaces n= 0.011 P2= 3.00" |
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 287 | 0.0109 | 2.12 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.8 | 686 | 0.0355 | 3.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 11.6 | 1,553 | Total | | | |

## Subcatchment W 3.1: Pond P W 3.1



## Summary for Subcatchment W 3.4: Gravel Processing Facility

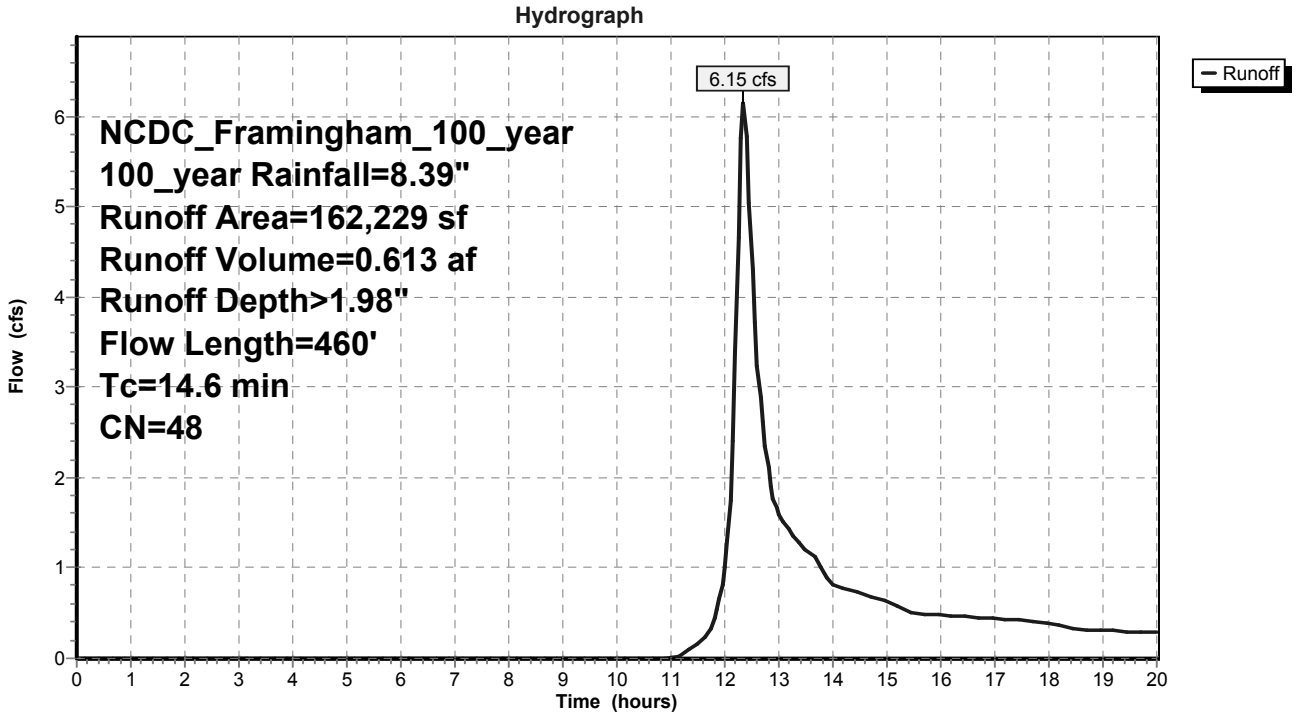
Runoff = 6.15 cfs @ 12.35 hrs, Volume= 0.613 af, Depth> 1.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,975 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,153 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 42,351 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 162,229 | 48 | Weighted Average |
| | 134,701 | | 83.03% Pervious Area |
| | 27,528 | | 16.97% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: Gravel Processing Facility



## Summary for Subcatchment W 3.5: Small Depression to Big Box

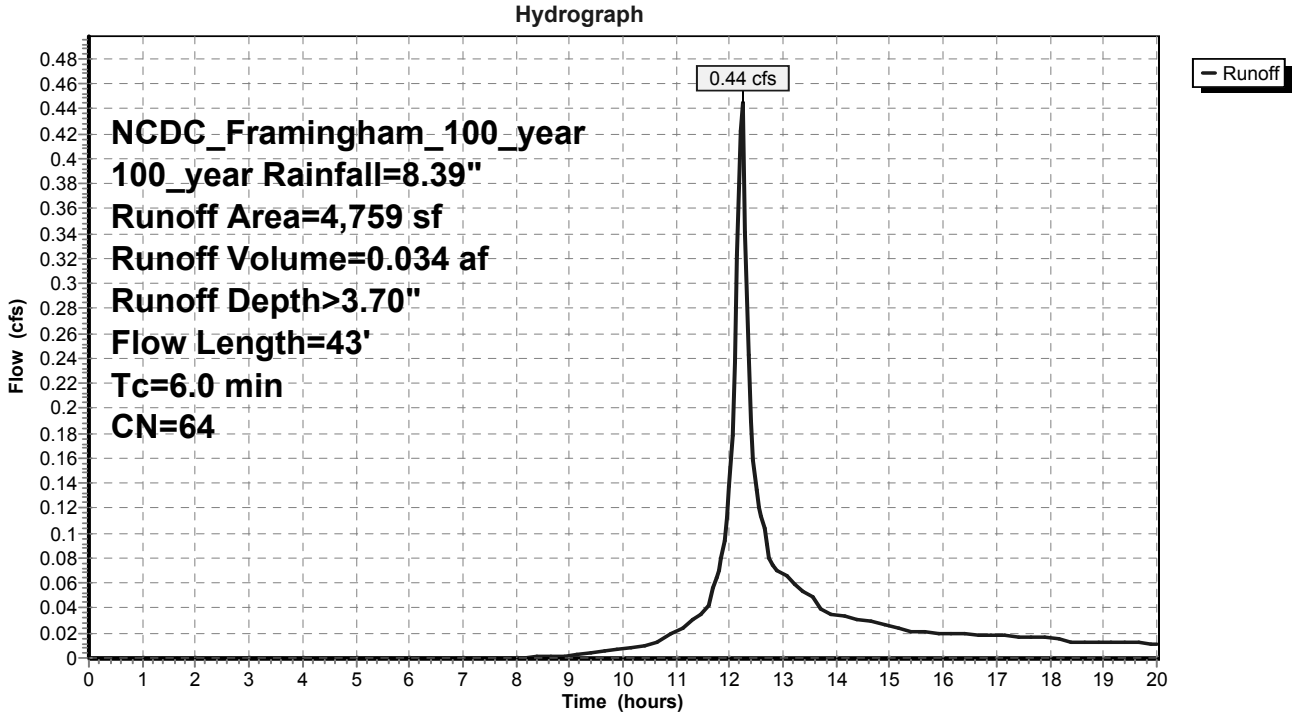
Runoff = 0.44 cfs @ 12.23 hrs, Volume= 0.034 af, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,714 | 30 | WOODS, 0% imperv, HSG A |
| * | 2,049 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 997 | 98 | IMP, 100% imperv, HSG A |
| | 4,759 | 64 | Weighted Average |
| | 3,427 | | 72.02% Pervious Area |
| | 1,332 | | 27.98% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 20 | 0.0320 | 1.16 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 12 | 0.1533 | 0.27 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.3 | 12 | 0.3938 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 2.3 | 43 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.5: Small Depression to Big Box



## Summary for Subcatchment W 9.1: Gravel Pit to Big Box Culvert

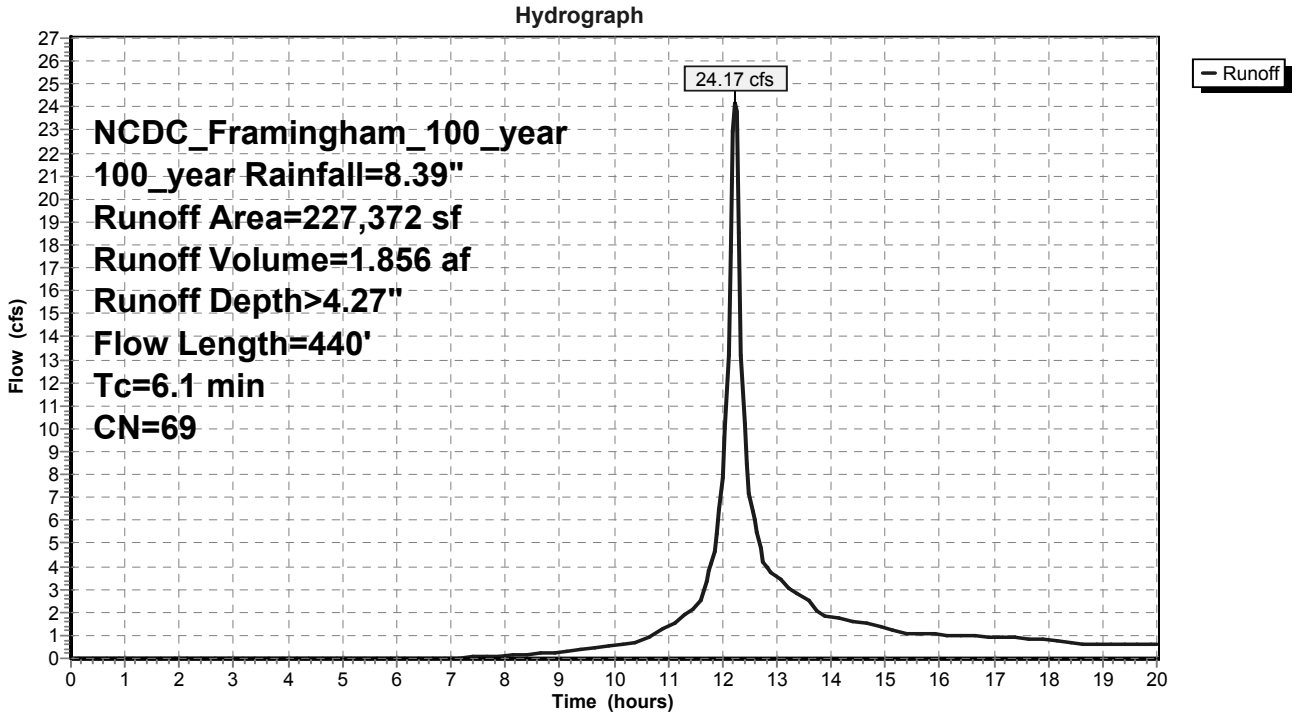
Runoff = 24.17 cfs @ 12.23 hrs, Volume= 1.856 af, Depth> 4.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 55,301 | 30 | WOODS, 0% imperv, HSG A |
| * | 14,585 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,790 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 53,800 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 6,069 | 98 | IMP, 100% imperv, HSG A |
| * | 30,826 | 98 | IMP, 100% imperv, HSG B |
| | 227,372 | 69 | Weighted Average |
| | 148,989 | | 65.53% Pervious Area |
| | 78,384 | | 34.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 206 | 0.0265 | 0.81 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 127 | 0.0402 | 3.23 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.2 | 107 | 0.0880 | 1.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 6.1 | 440 | Total | | | |

## Subcatchment W 9.1: Gravel Pit to Big Box Culvert



## Summary for Subcatchment W 9.1A: Gravel Pit to Roadway

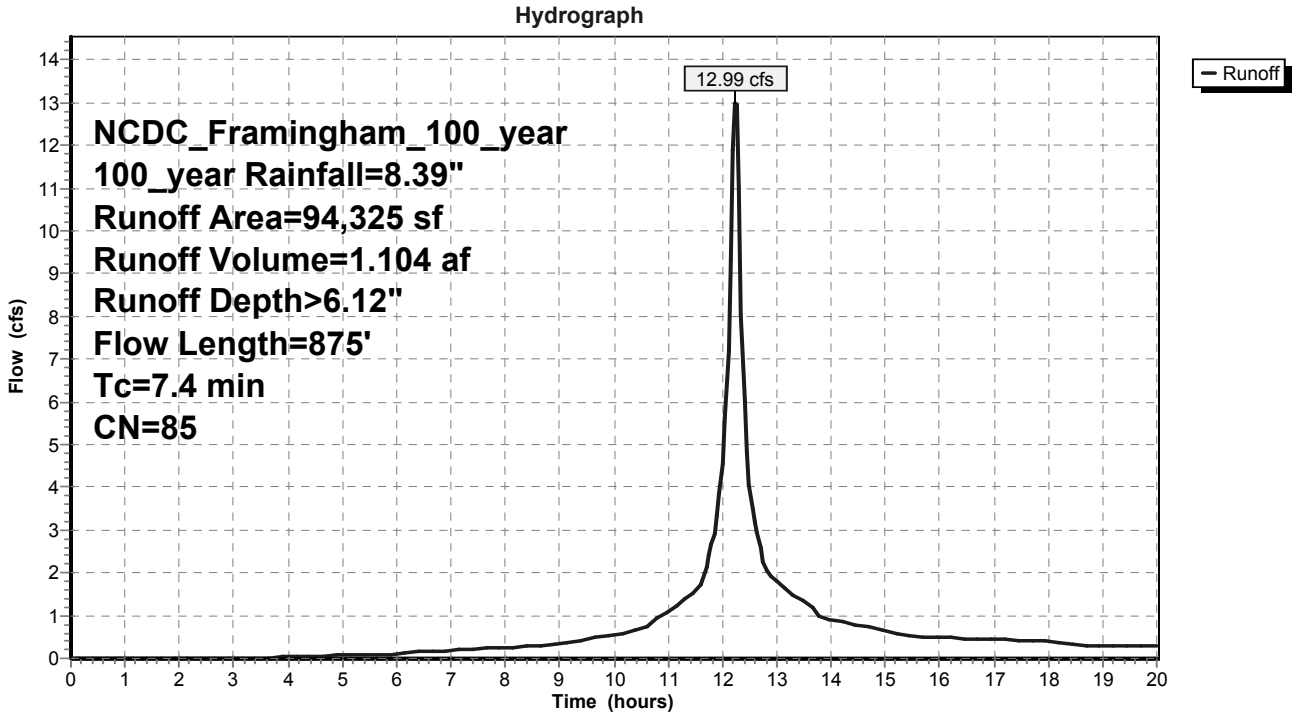
Runoff = 12.99 cfs @ 12.24 hrs, Volume= 1.104 af, Depth> 6.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6,124 | 55 | WOODS, 0% imperv, HSG B |
| * | 76,325 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 11,877 | 98 | IMP, 100% imperv, HSG B |
| | 94,325 | 85 | Weighted Average |
| | 44,714 | | 47.40% Pervious Area |
| | 49,611 | | 52.60% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.9 | 116 | 0.0112 | 2.15 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 20 | 0.0178 | 2.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 130 | 0.0176 | 2.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.0327 | 2.91 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 11 | 0.0775 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 2 | 0.0429 | 1.04 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0151 | 0.61 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.8 | 245 | 0.0082 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.4 | 875 | Total | | | |

## Subcatchment W 9.1A: Gravel Pit to Roadway



## Summary for Subcatchment W 9.1B: Aqueduct to Big Box

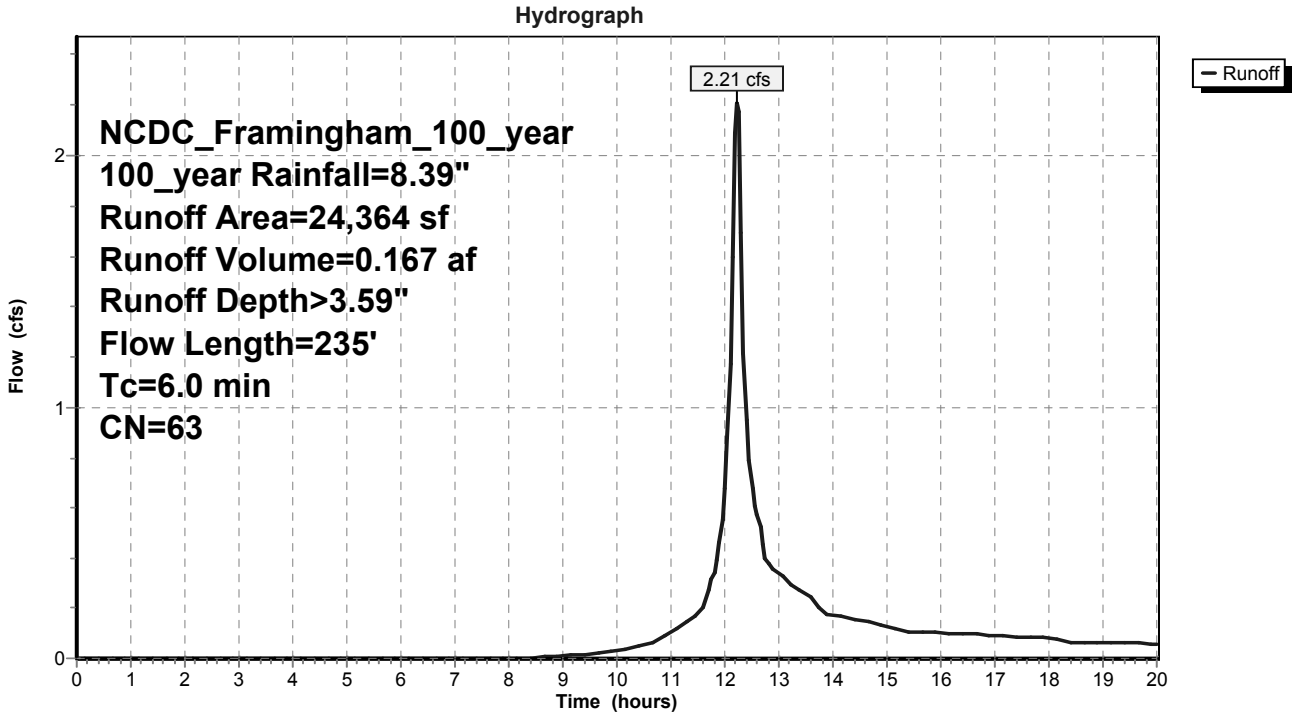
Runoff = 2.21 cfs @ 12.23 hrs, Volume= 0.167 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 123 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 681 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,458 | | 83.97% Pervious Area |
| | 3,905 | | 16.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: Aqueduct to Big Box



## Summary for Subcatchment W 9.1C: Culvert 2

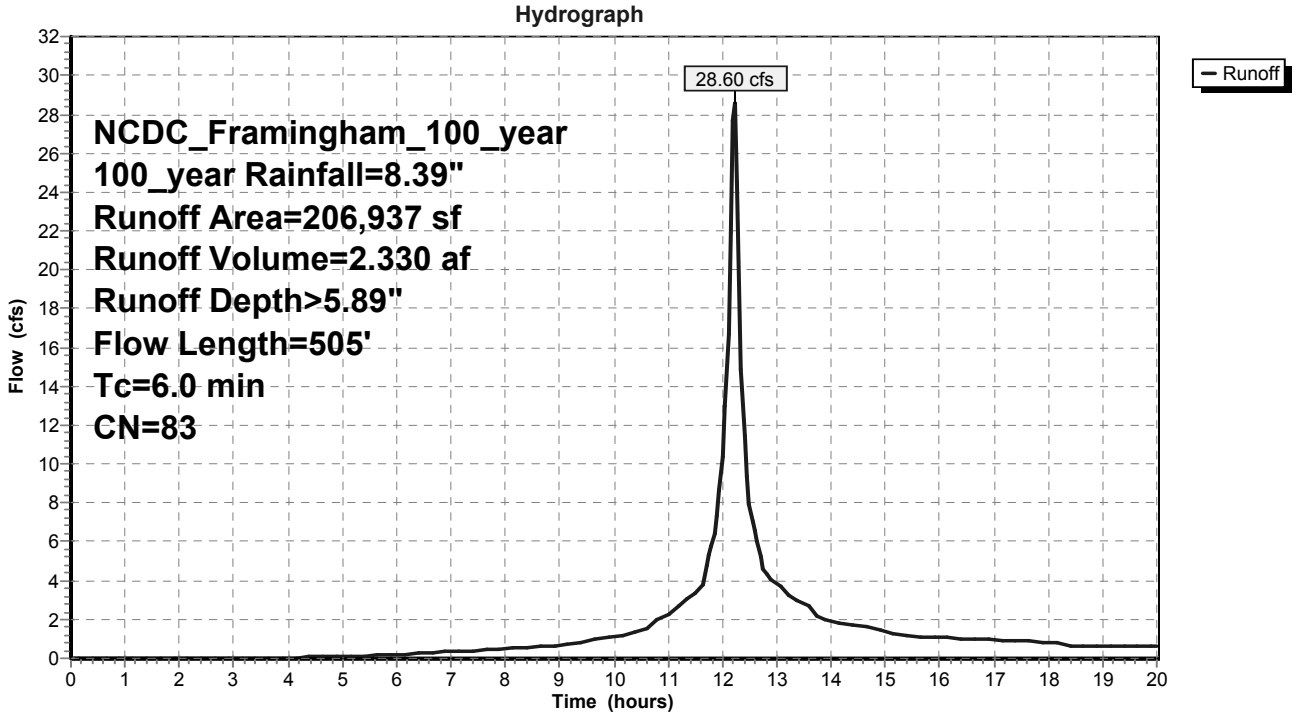
Runoff = 28.60 cfs @ 12.23 hrs, Volume= 2.330 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,598 | 55 | WOODS, 0% imperv, HSG B |
| * | 181,699 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,640 | 98 | IMP, 100% imperv, HSG B |
| | 206,937 | 83 | Weighted Average |
| | 88,833 | | 42.93% Pervious Area |
| | 118,104 | | 57.07% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 50 | 0.0641 | 0.26 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.3 | 455 | 0.0405 | 3.24 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 505 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1C: Culvert 2



## Summary for Pond MH-NCULV-A: MH-NCULV-A

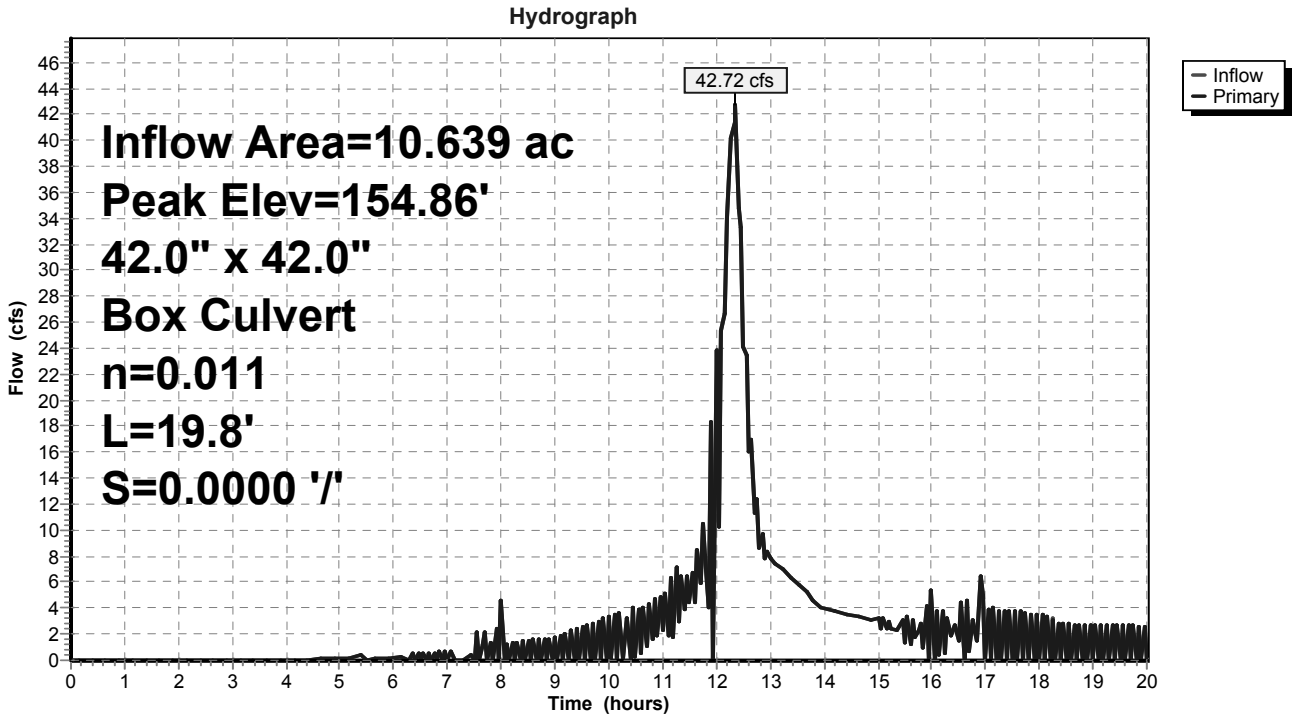
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 4.95" for 100_year event
Inflow = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af
Outflow = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af, Atten= 0%, Lag= 0.0 min
Primary = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 154.86' @ 12.30 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=39.80 cfs @ 12.34 hrs HW=154.78' TW=154.32' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 39.80 cfs @ 3.25 fps)

## Pond MH-NCULV-A: MH-NCULV-A



## Summary for Pond MH-NCULV-B: MH-NCULV-B

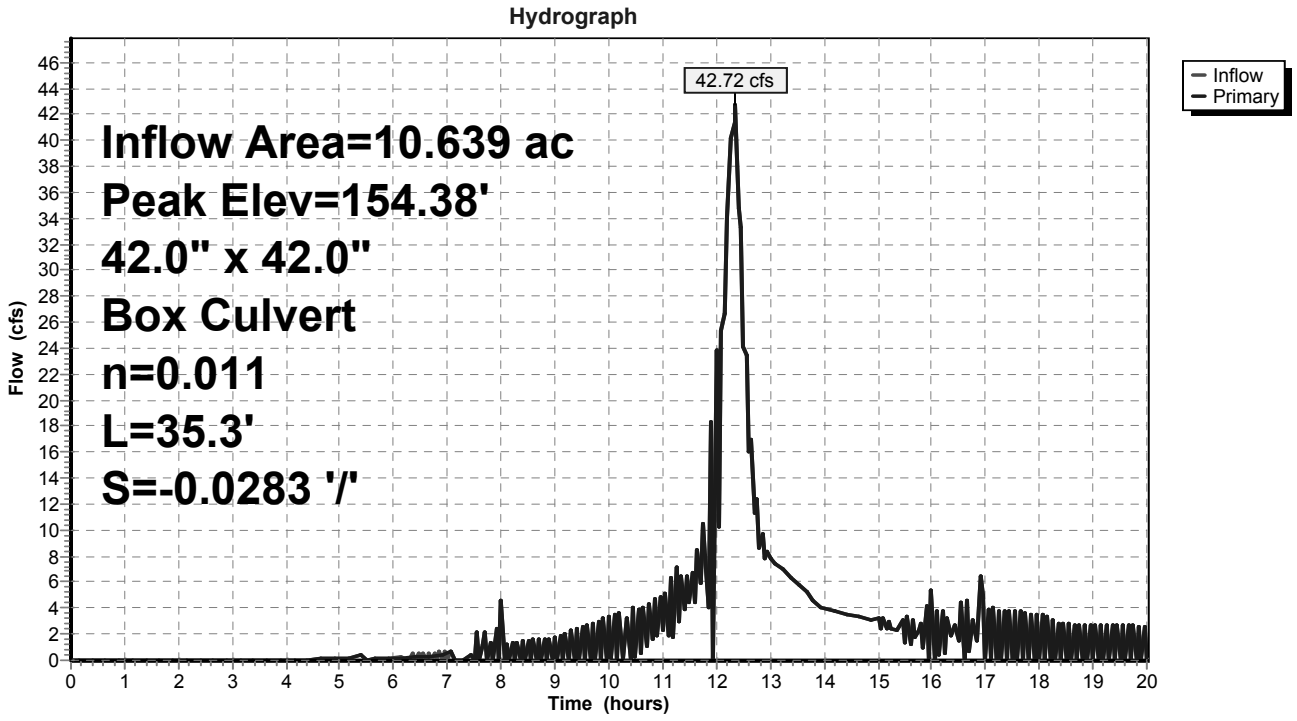
Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 4.95" for 100_year event
Inflow = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af
Outflow = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af, Atten= 0%, Lag= 0.0 min
Primary = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 154.38' @ 12.26 hrs
Flood Elev= 167.18'

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=41.29 cfs @ 12.34 hrs HW=154.32' TW=153.83' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 41.29 cfs @ 3.37 fps)

## Pond MH-NCULV-B: MH-NCULV-B



## Summary for Pond P E 1.1A: 284

Inflow Area = 35.276 ac, 19.71% Impervious, Inflow Depth > 2.46" for 100_year event
Inflow = 34.64 cfs @ 12.93 hrs, Volume= 7.237 af
Outflow = 5.03 cfs @ 18.47 hrs, Volume= 0.670 af, Atten= 85%, Lag= 332.2 min
Primary = 5.03 cfs @ 18.47 hrs, Volume= 0.670 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 139.04' @ 18.47 hrs Surf.Area= 58,173 sf Storage= 286,321 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= 468.4 min calculated for 0.670 af (9% of inflow)
Center-of-Mass det. time= 269.8 min ( 1,145.1 - 875.2 )

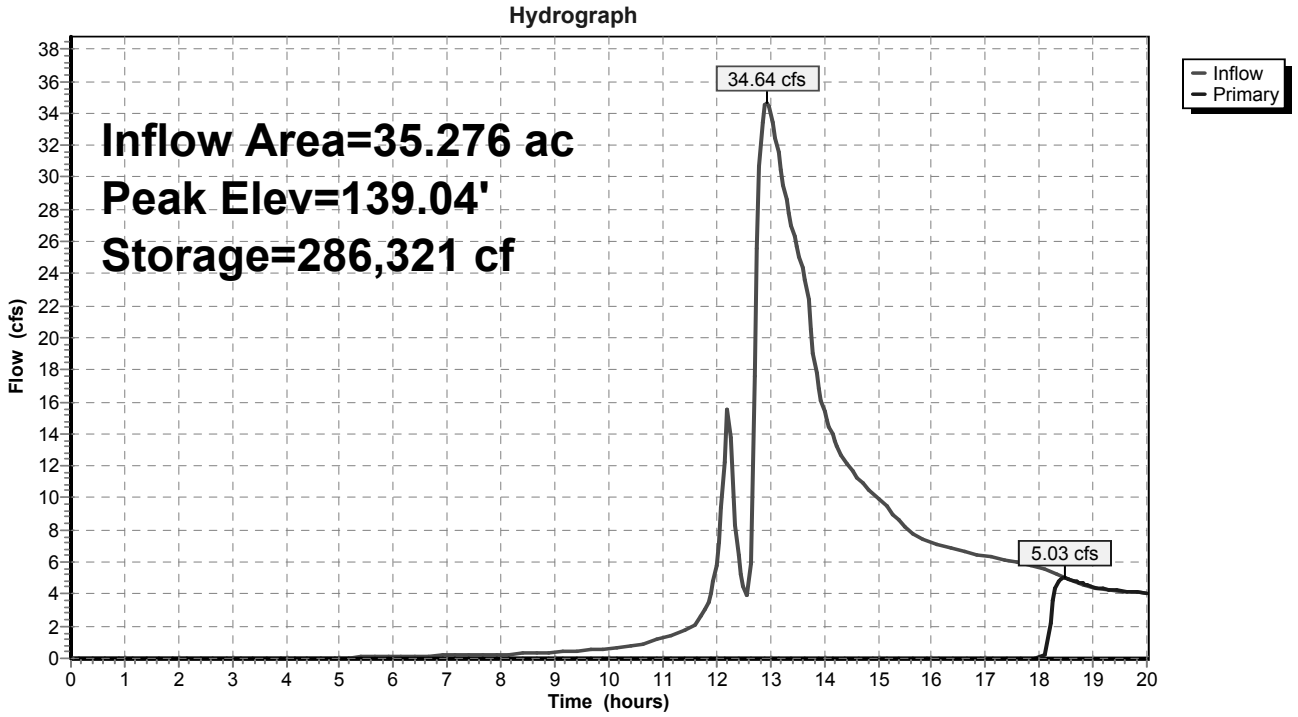
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=5.02 cfs @ 18.47 hrs HW=139.04' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 5.02 cfs @ 0.62 fps)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 32.573 ac, 20.73% Impervious, Inflow Depth > 3.45" for 100_year event
Inflow = 54.58 cfs @ 12.31 hrs, Volume= 9.357 af
Outflow = 32.40 cfs @ 12.94 hrs, Volume= 5.937 af, Atten= 41%, Lag= 37.9 min
Primary = 32.40 cfs @ 12.94 hrs, Volume= 5.937 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 147.18' @ 12.94 hrs Surf.Area= 109,690 sf Storage= 164,020 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= 154.2 min calculated for 5.922 af (63% of inflow)
Center-of-Mass det. time= 72.3 min ( 898.3 - 826.0 )

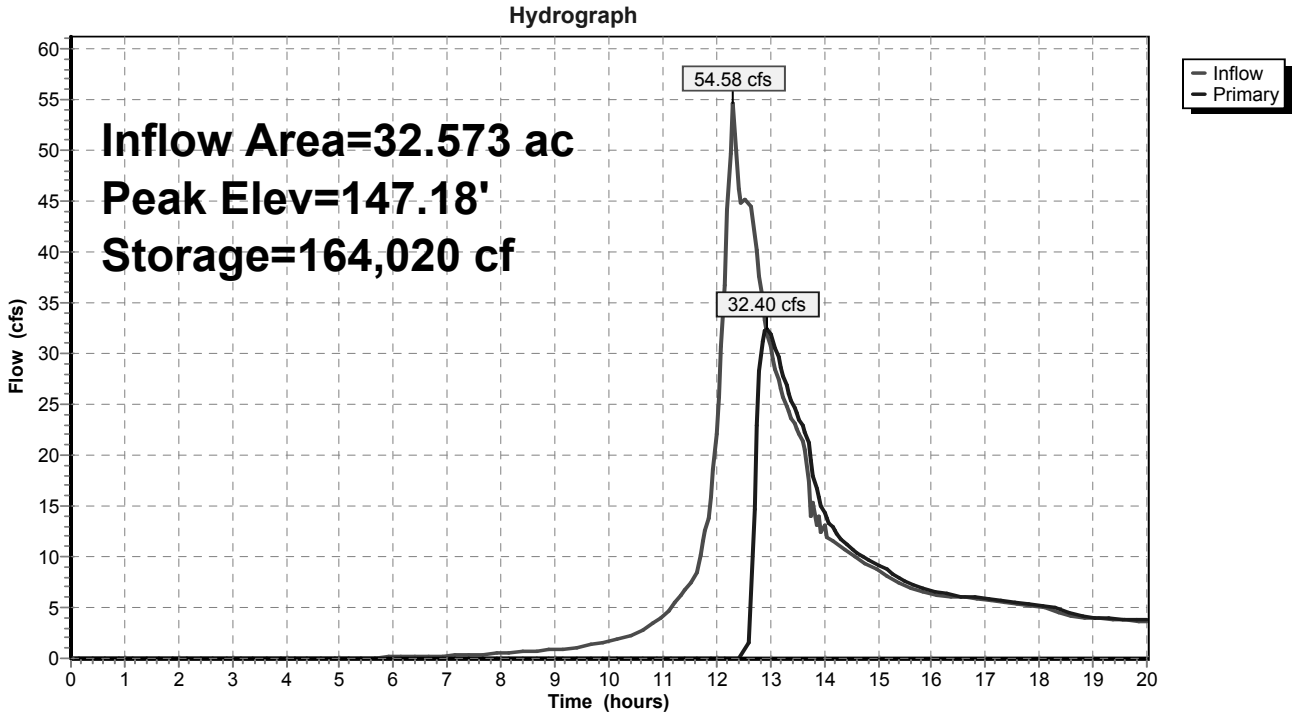
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=32.35 cfs @ 12.94 hrs HW=147.18' TW=134.49' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 32.35 cfs @ 1.36 fps)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.1B-4: P E 1.1B-4

Inflow Area = 2.081 ac, 0.00% Impervious, Inflow Depth > 3.37" for 100_year event
Inflow = 7.74 cfs @ 12.23 hrs, Volume= 0.585 af
Outflow = 7.45 cfs @ 12.26 hrs, Volume= 0.585 af, Atten= 4%, Lag= 1.5 min
Primary = 7.45 cfs @ 12.26 hrs, Volume= 0.585 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.06' @ 12.27 hrs Surf.Area= 1,002 sf Storage= 774 cf
Flood Elev= 170.00' Surf.Area= 2,939 sf Storage= 2,634 cf

Plug-Flow detention time= 0.8 min calculated for 0.583 af (100% of inflow)
Center-of-Mass det. time= 0.7 min ( 813.8 - 813.1 )

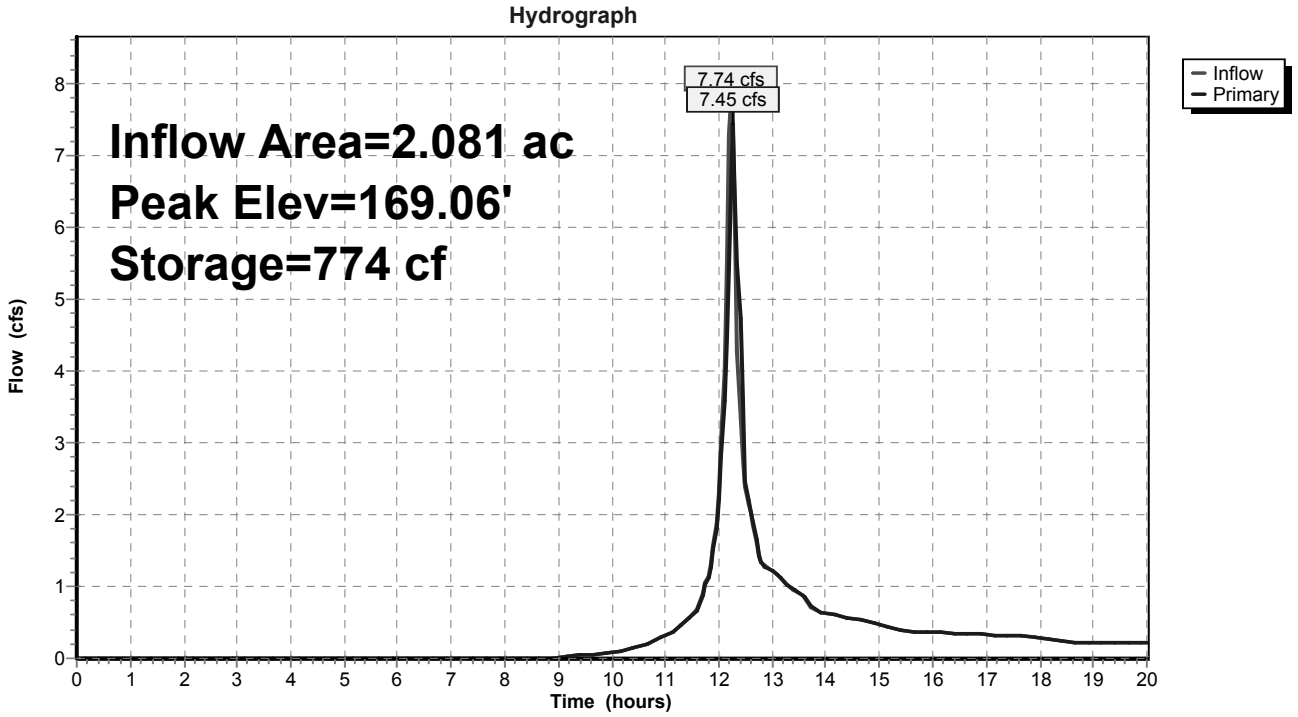
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 2,634 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 2 | 0 | 0 |
| 168.00 | 276 | 139 | 139 |
| 169.00 | 888 | 582 | 721 |
| 170.00 | 2,939 | 1,913 | 2,634 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 167.00' | **12.0" Round RCP_Round 15**<br>L= 69.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.00' / 165.40' S= 0.0230 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 169.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 72.00 148.00 229.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=7.23 cfs @ 12.26 hrs HW=169.03' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Inlet Controls 5.85 cfs @ 7.45 fps)
**2=Asymmetrical Weir** (Weir Controls 1.38 cfs @ 0.55 fps)

## Pond P E 1.1B-4: P E 1.1B-4



## Summary for Pond P E 1.1C: P E 1.1C

Inflow Area = 13.327 ac, 33.50% Impervious, Inflow Depth > 3.71" for 100_year event
Inflow = 29.92 cfs @ 12.23 hrs, Volume= 4.124 af
Outflow = 21.45 cfs @ 12.32 hrs, Volume= 4.124 af, Atten= 28%, Lag= 5.3 min
Primary = 21.45 cfs @ 12.32 hrs, Volume= 4.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 2 sf Storage= 0 cf
Peak Elev= 171.08' @ 12.32 hrs Surf.Area= 15,751 sf Storage= 9,486 cf
Flood Elev= 171.00' Surf.Area= 14,037 sf Storage= 8,304 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.4 min ( 827.2 - 823.8 )

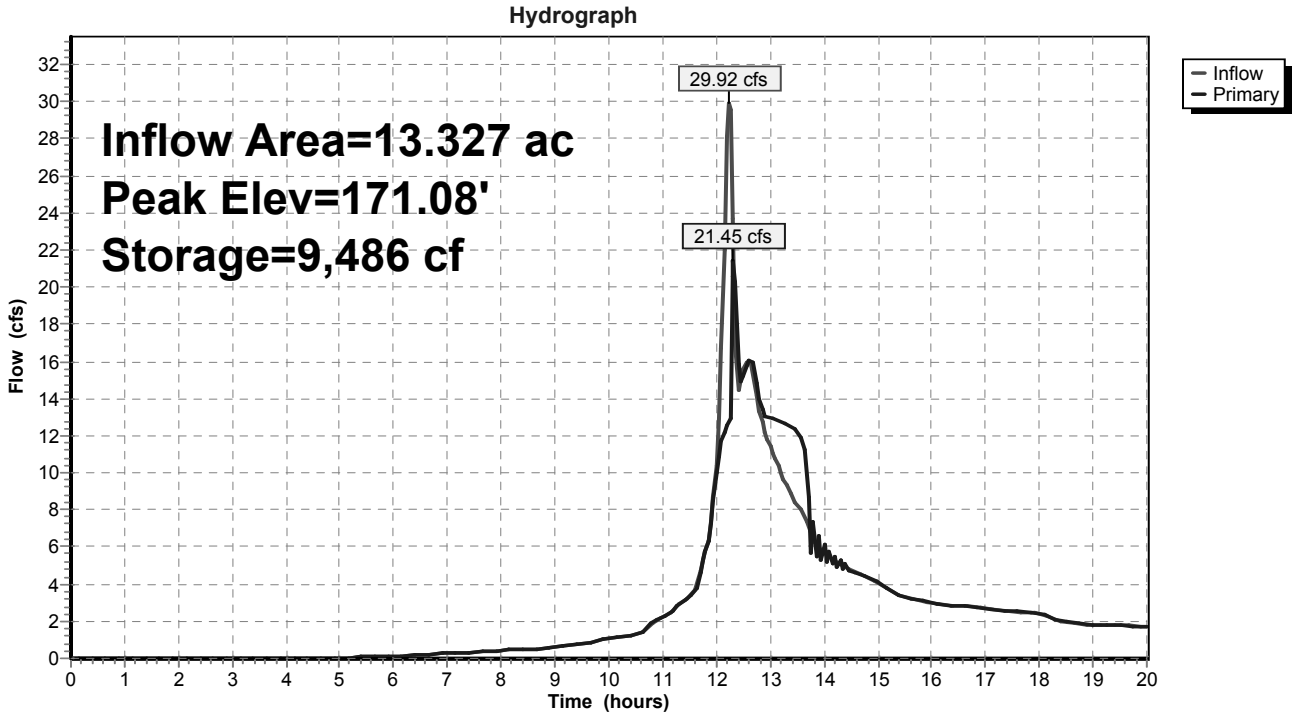
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 33,139 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 2 | 0 | 0 |
| 169.00 | 34 | 71 | 71 |
| 170.00 | 1,198 | 616 | 687 |
| 171.00 | 14,037 | 7,618 | 8,304 |
| 172.00 | 35,633 | 24,835 | 33,139 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.64' | **15.0" Round RCP_Round 15**<br>L= 85.2' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.64' / 165.18' S= 0.0054 '/' Cc= 0.900<br>n= 0.011, Flow Area= 1.23 sf |
| #2 | Primary | 171.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 200.00 333.00 436.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=20.46 cfs @ 12.32 hrs HW=171.06' TW=0.00' (Dynamic Tailwater)
**1=RCP_Round 15** (Barrel Controls 13.09 cfs @ 10.67 fps)
**2=Asymmetrical Weir** (Weir Controls 7.36 cfs @ 0.76 fps)

## Pond P E 1.1C: P E 1.1C



## Summary for Pond P E 1.1D: P E 1.1D

Inflow Area = 7.986 ac, 39.80% Impervious, Inflow Depth > 5.61" for 100_year event
Inflow = 45.88 cfs @ 12.23 hrs, Volume= 3.732 af
Outflow = 9.45 cfs @ 12.67 hrs, Volume= 1.713 af, Atten= 79%, Lag= 26.6 min
Primary = 9.45 cfs @ 12.67 hrs, Volume= 1.713 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 169.00' Surf.Area= 25 sf Storage= 0 cf
Peak Elev= 172.14' @ 12.67 hrs Surf.Area= 58,840 sf Storage= 94,432 cf
Flood Elev= 172.00' Surf.Area= 58,231 sf Storage= 86,010 cf

Plug-Flow detention time= 216.6 min calculated for 1.713 af (46% of inflow)
Center-of-Mass det. time= 116.4 min ( 889.1 - 772.8 )

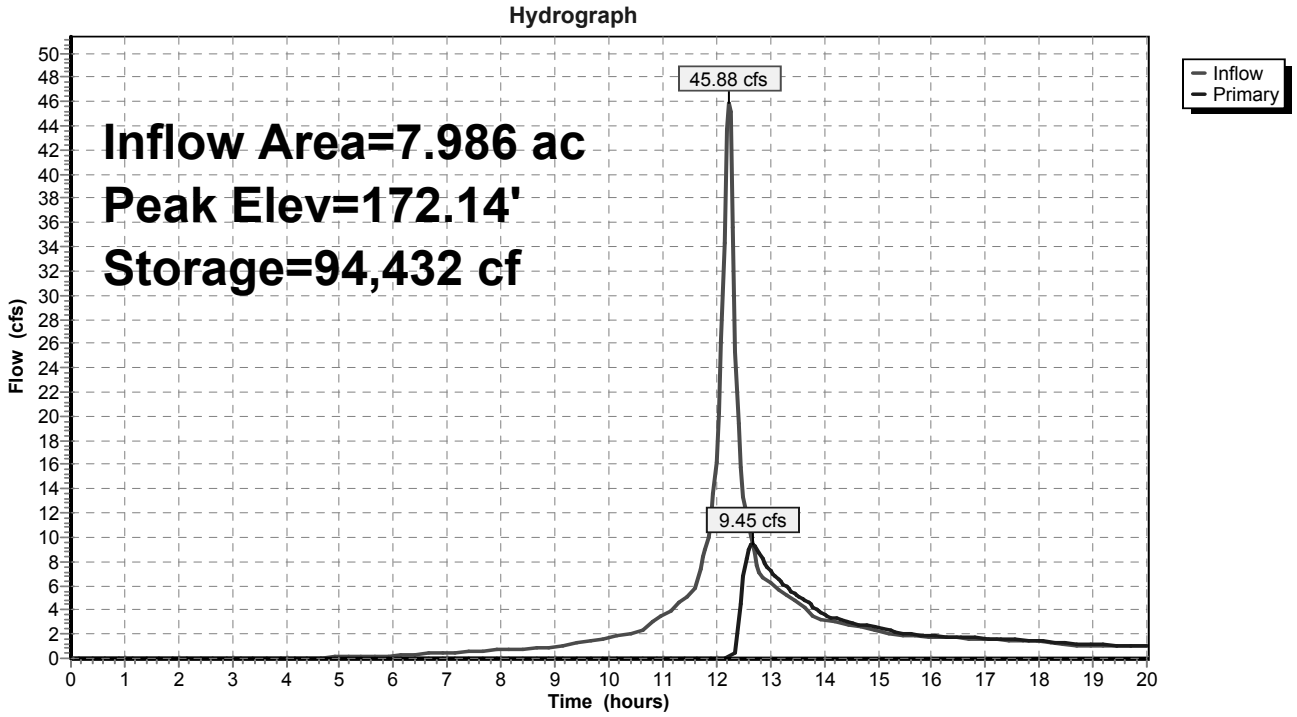
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 146,356 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 25 | 0 | 0 |
| 170.00 | 9,735 | 4,880 | 4,880 |
| 171.00 | 47,147 | 28,441 | 33,321 |
| 172.00 | 58,231 | 52,689 | 86,010 |
| 173.00 | 62,461 | 60,346 | 146,356 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 172.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 56.00 69.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=9.41 cfs @ 12.67 hrs HW=172.14' TW=171.03' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 9.41 cfs @ 1.20 fps)

## Pond P E 1.1D: P E 1.1D



## Summary for Pond P E 1.2A: 282

Inflow Area = 18.820 ac, 26.22% Impervious, Inflow Depth > 3.61" for 100_year event
Inflow = 46.89 cfs @ 12.25 hrs, Volume= 5.669 af
Outflow = 32.29 cfs @ 12.46 hrs, Volume= 4.438 af, Atten= 31%, Lag= 12.1 min
Primary = 32.29 cfs @ 12.46 hrs, Volume= 4.438 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 135.33' @ 12.46 hrs Surf.Area= 70,195 sf Storage= 71,576 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= 107.6 min calculated for 4.427 af (78% of inflow)
Center-of-Mass det. time= 47.8 min ( 861.8 - 814.0 )

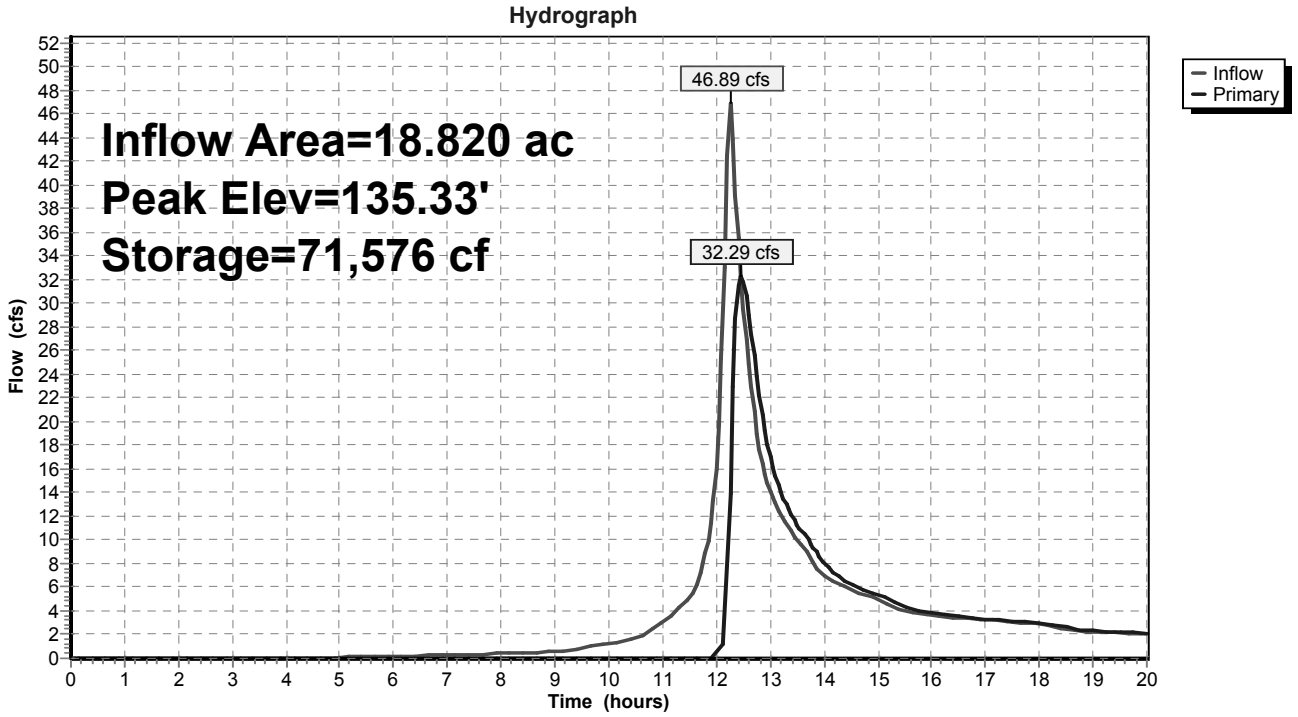
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=32.22 cfs @ 12.46 hrs HW=135.33' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 32.22 cfs @ 1.63 fps)

## Pond P E 1.2A: 282



## Summary for Pond P E 1.2D: P E 1.2D

Inflow Area = 3.227 ac, 45.26% Impervious, Inflow Depth > 4.57" for 100_year event
Inflow = 12.15 cfs @ 12.35 hrs, Volume= 1.230 af
Outflow = 3.19 cfs @ 12.86 hrs, Volume= 0.694 af, Atten= 74%, Lag= 30.7 min
Primary = 3.19 cfs @ 12.86 hrs, Volume= 0.694 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 10,809 sf Storage= 15,981 cf
Peak Elev= 158.23' @ 12.86 hrs Surf.Area= 33,617 sf Storage= 44,882 cf (28,901 cf above start)
Flood Elev= 159.00' Surf.Area= 39,090 sf Storage= 72,926 cf (56,945 cf above start)

Plug-Flow detention time= 335.3 min calculated for 0.327 af (27% of inflow)
Center-of-Mass det. time= 101.4 min ( 892.8 - 791.4 )

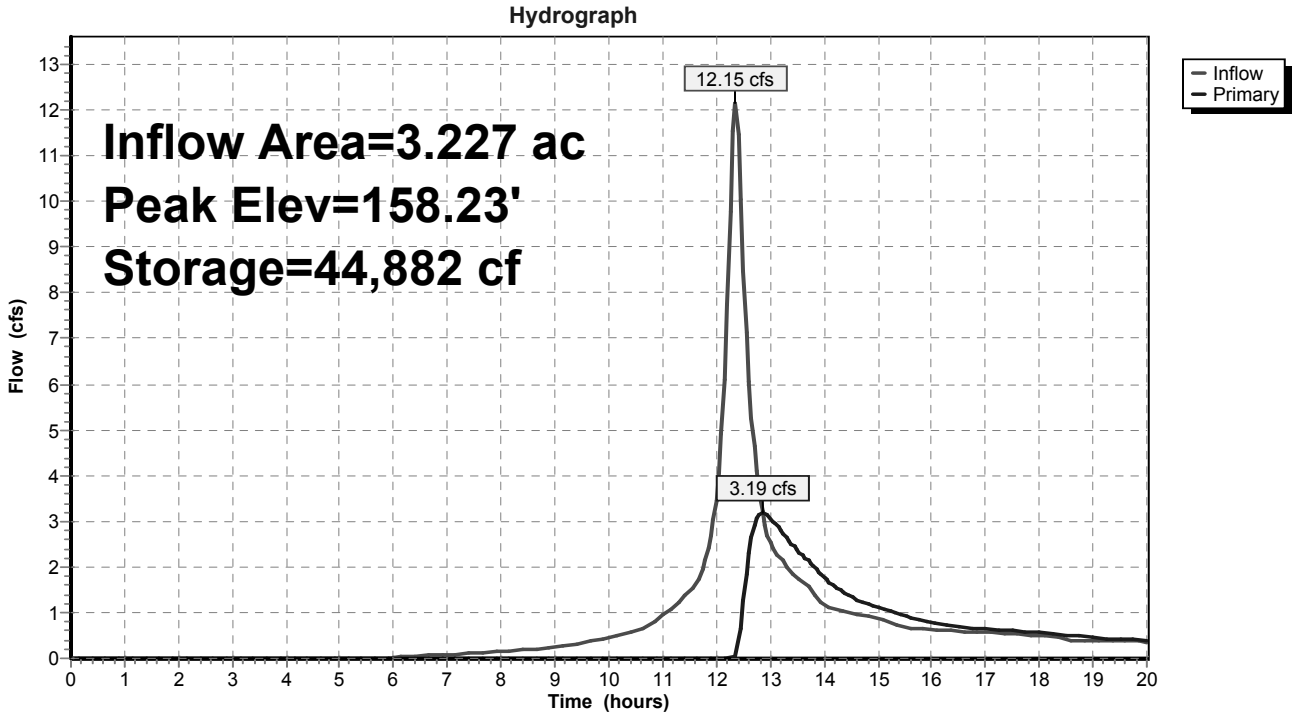
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 154.00' | 72,926 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 154.00 | 288 | 0 | 0 |
| 155.00 | 3,513 | 1,900 | 1,900 |
| 156.00 | 6,920 | 5,216 | 7,117 |
| 157.00 | 10,809 | 8,865 | 15,981 |
| 158.00 | 31,995 | 21,402 | 37,383 |
| 159.00 | 39,090 | 35,542 | 72,926 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 5.00 13.00 18.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=3.18 cfs @ 12.86 hrs HW=158.23' TW=0.00' (Dynamic Tailwater)
↑└**1=Asymmetrical Weir** (Weir Controls 3.18 cfs @ 1.35 fps)

## Pond P E 1.2D: P E 1.2D



## Summary for Pond P E 1.2E: P E 1.2E

Inflow Area = 0.305 ac, 34.60% Impervious, Inflow Depth > 4.50" for 100_year event
Inflow = 1.48 cfs @ 12.23 hrs, Volume= 0.114 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 413 sf Storage= 0 cf
Peak Elev= 172.77' @ 20.00 hrs Surf.Area= 5,406 sf Storage= 4,977 cf
Flood Elev= 173.00' Surf.Area= 6,101 sf Storage= 6,273 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 21,312 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

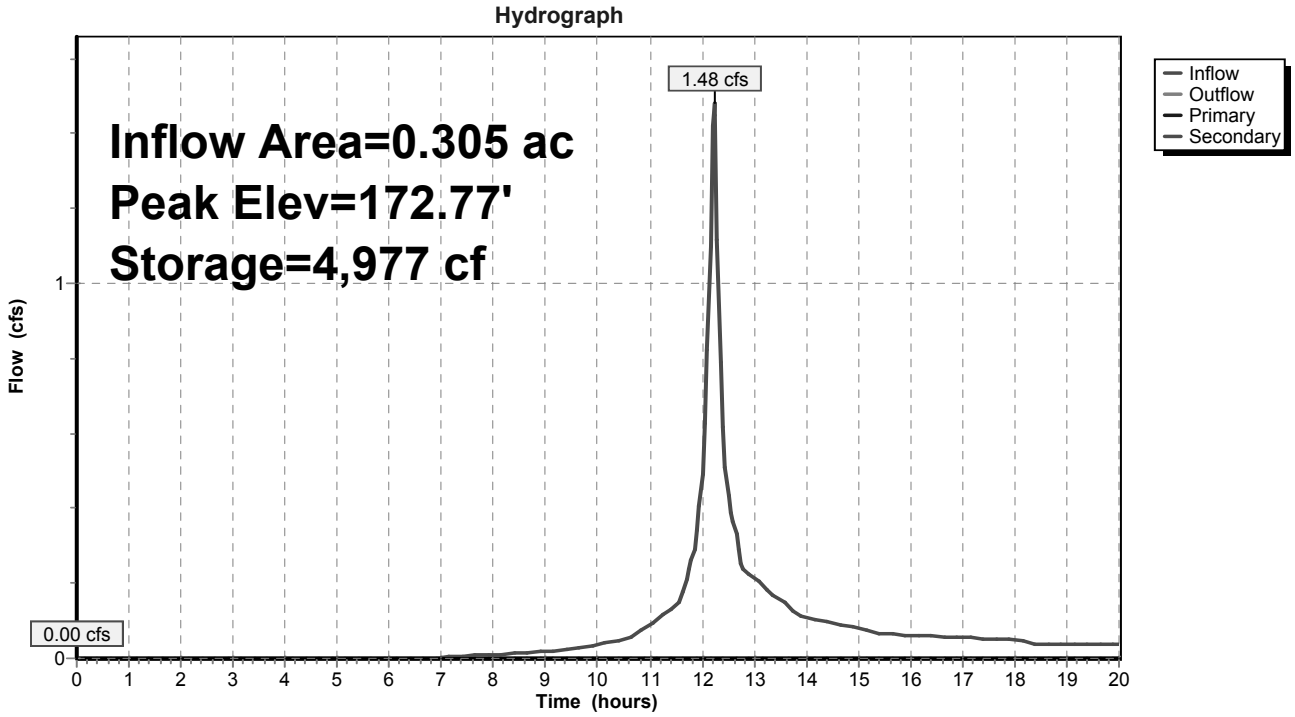
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 413 | 0 | 0 |
| 172.00 | 3,016 | 1,715 | 1,715 |
| 173.00 | 6,101 | 4,559 | 6,273 |
| 174.00 | 7,653 | 6,877 | 13,150 |
| 175.00 | 8,670 | 8,161 | 21,312 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 6.00 20.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Secondary | 173.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 2.00 20.00 25.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=157.00' (Dynamic Tailwater)
**1=Asymmetrical Weir** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=171.00' TW=0.00' (Dynamic Tailwater)
**2=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2E: P E 1.2E



## Summary for Pond P W 3.1: P W 3.1

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 4.69" for 100_year event
Inflow = 60.85 cfs @ 12.29 hrs, Volume= 5.942 af
Outflow = 60.84 cfs @ 12.30 hrs, Volume= 5.772 af, Atten= 0%, Lag= 0.3 min
Primary = 60.84 cfs @ 12.30 hrs, Volume= 5.772 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.33' @ 12.30 hrs Surf.Area= 5,344 sf Storage= 8,843 cf
Flood Elev= 157.00' Surf.Area= 7,260 sf Storage= 13,079 cf

Plug-Flow detention time= 22.9 min calculated for 5.758 af (97% of inflow)
Center-of-Mass det. time= 11.8 min ( 789.0 - 777.2 )

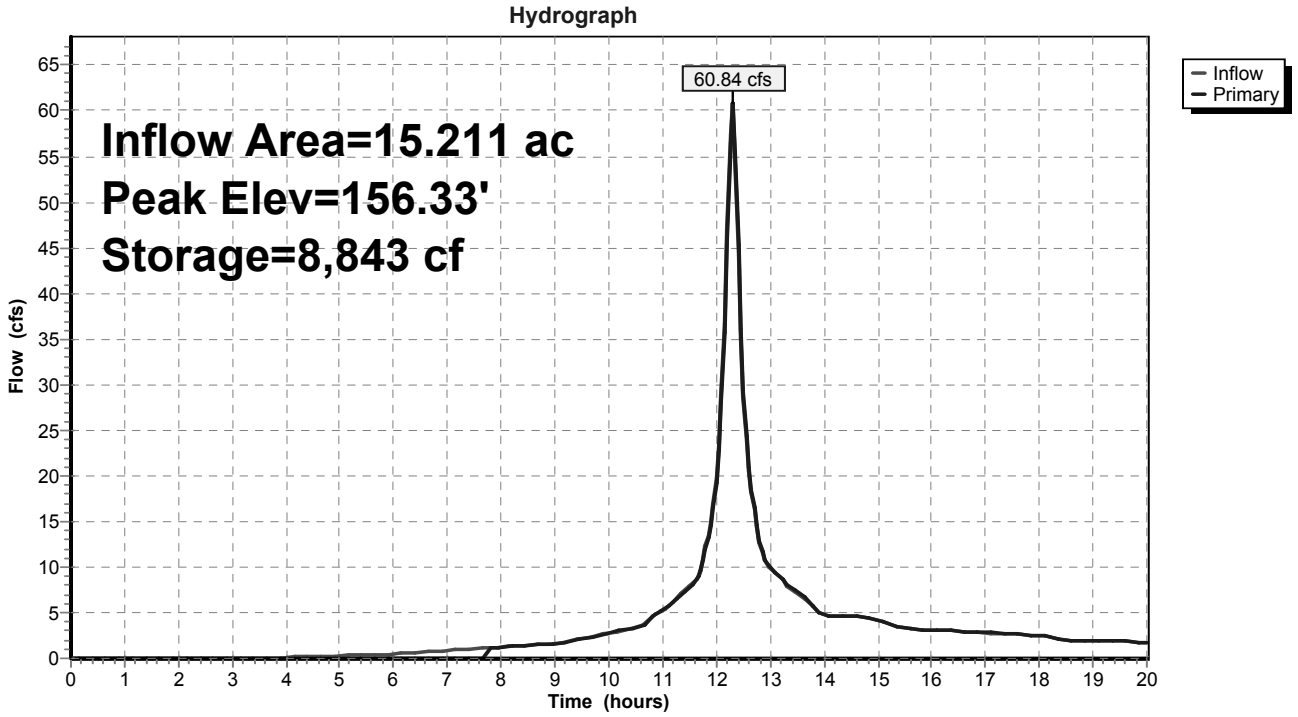
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 13,079 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,411 | 3,837 | 7,244 |
| 157.00 | 7,260 | 5,835 | 13,079 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=60.60 cfs @ 12.30 hrs HW=156.33' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 60.60 cfs @ 1.71 fps)

## Pond P W 3.1: P W 3.1



## Summary for Pond P W 3.4: P W 3.4

Inflow Area = 3.724 ac, 16.97% Impervious, Inflow Depth > 1.98" for 100_year event
Inflow = 6.15 cfs @ 12.35 hrs, Volume= 0.613 af
Outflow = 0.69 cfs @ 14.66 hrs, Volume= 0.207 af, Atten= 89%, Lag= 138.7 min
Primary = 0.69 cfs @ 14.66 hrs, Volume= 0.207 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 184.03' @ 14.66 hrs Surf.Area= 10,500 sf Storage= 17,845 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= 269.0 min calculated for 0.207 af (34% of inflow)
Center-of-Mass det. time= 160.2 min ( 1,006.2 - 846.0 )

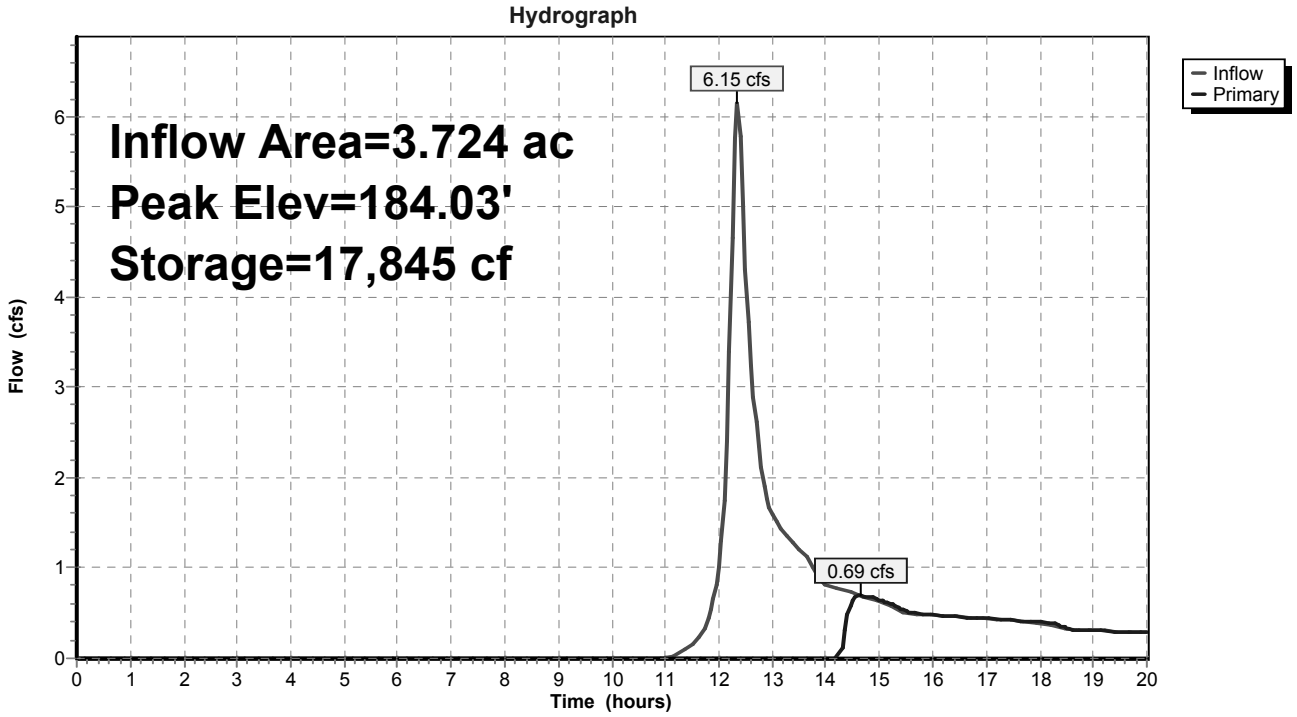
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.69 cfs @ 14.66 hrs HW=184.03' TW=156.06' (Dynamic Tailwater)
↑└**1=Asymmetrical Weir** (Weir Controls 0.69 cfs @ 0.58 fps)

## Pond P W 3.4: P W 3.4



## Summary for Pond P W 3.5: P W 3.5

Inflow Area = 0.109 ac, 27.98% Impervious, Inflow Depth > 3.70" for 100_year event
Inflow = 0.44 cfs @ 12.23 hrs, Volume= 0.034 af
Outflow = 0.44 cfs @ 12.23 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.23 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 9 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 9 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,452 sf Storage= 2,460 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 807.4 - 807.4 )

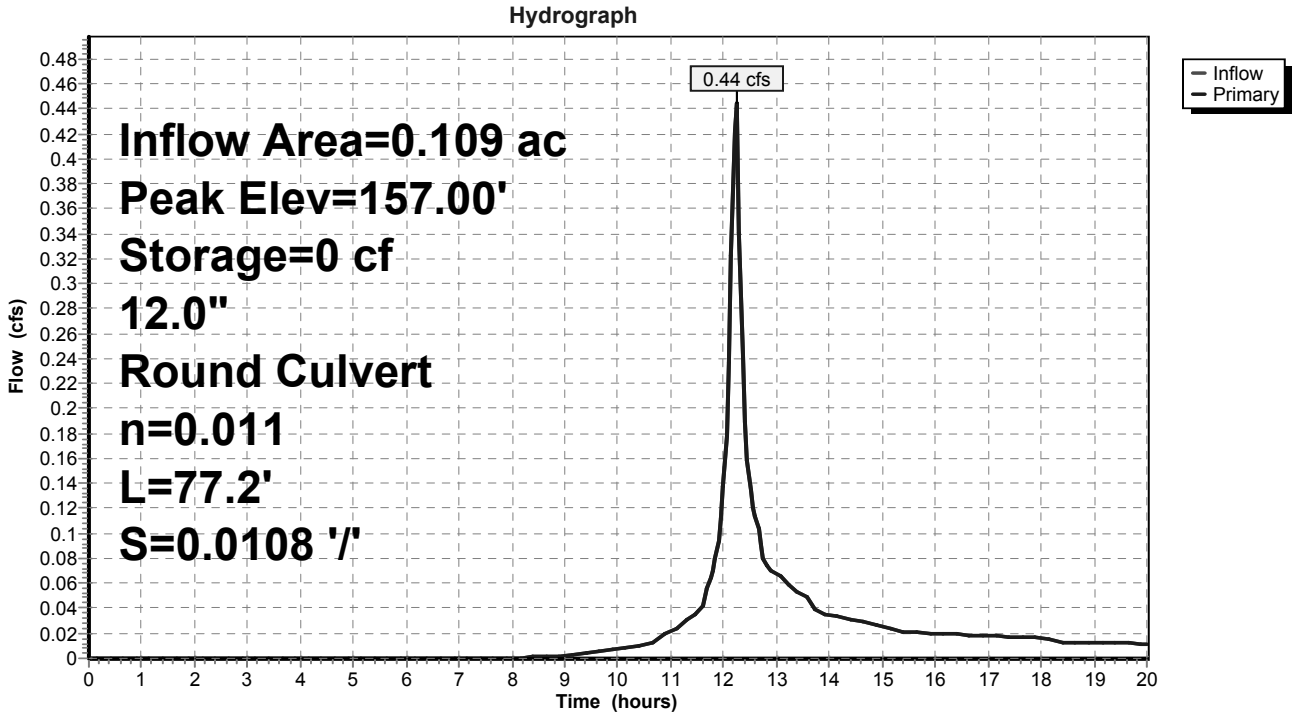
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 2,460 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 9 | 0 | 0 |
| 158.00 | 277 | 143 | 143 |
| 159.00 | 560 | 419 | 562 |
| 160.00 | 892 | 726 | 1,288 |
| 161.00 | 1,452 | 1,172 | 2,460 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Culvert**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.23 hrs HW=157.00' TW=155.08' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.00 cfs of 1.85 cfs potential flow)

## Pond P W 3.5: P W 3.5



## Summary for Pond P W 9.1: P W 9.1

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 4.90" for 100_year event
Inflow = 55.43 cfs @ 12.23 hrs, Volume= 4.345 af
Outflow = 42.72 cfs @ 12.34 hrs, Volume= 4.356 af, Atten= 23%, Lag= 6.3 min
Primary = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 155.40' @ 12.31 hrs Surf.Area= 8,608 sf Storage= 14,042 cf
Flood Elev= 157.00' Surf.Area= 13,136 sf Storage= 31,231 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.8 min ( 786.2 - 783.4 )

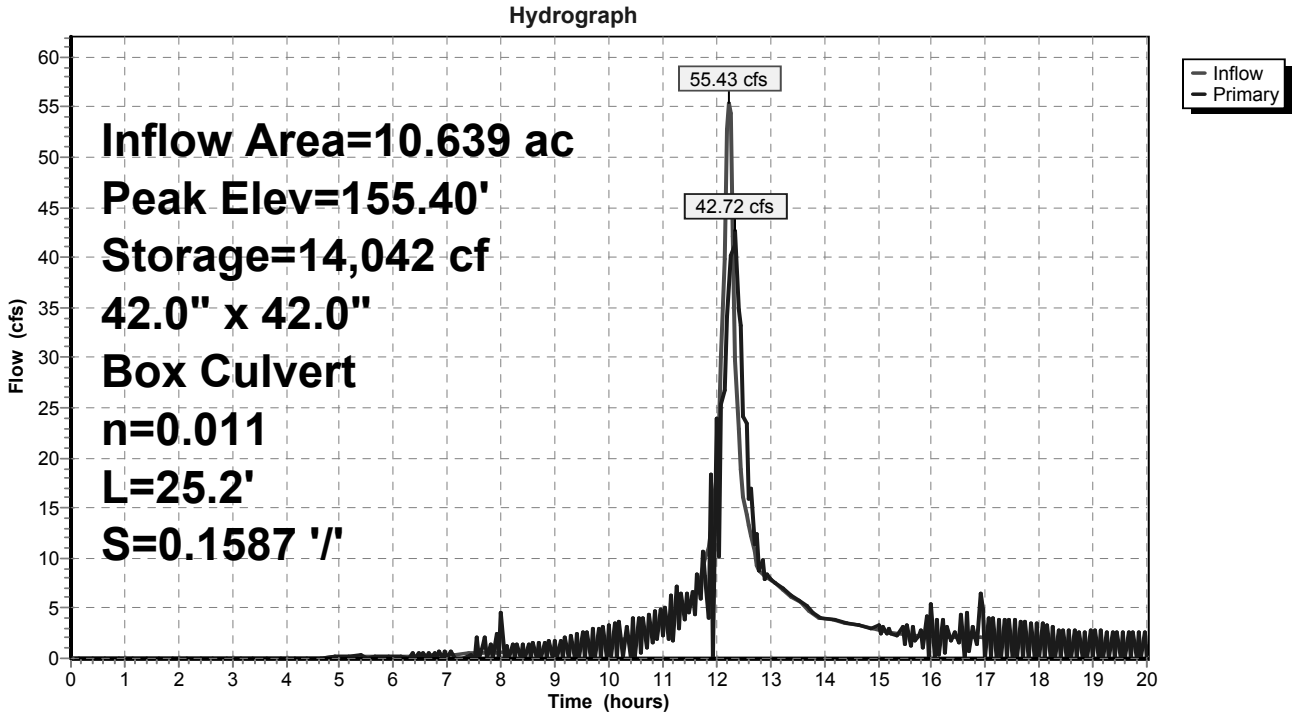
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 152.00' | 48,001 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 152.00 | 13 | 0 | 0 |
| 153.00 | 1,797 | 905 | 905 |
| 154.00 | 5,163 | 3,480 | 4,385 |
| 155.00 | 7,699 | 6,431 | 10,816 |
| 156.00 | 9,997 | 8,848 | 19,665 |
| 157.00 | 13,136 | 11,566 | 31,231 |
| 158.00 | 20,405 | 16,770 | 48,001 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=42.48 cfs @ 12.34 hrs HW=155.31' TW=154.78' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 42.48 cfs @ 3.47 fps)

## Pond P W 9.1: P W 9.1



## Summary for Pond P W 9.1B: P W 9.1B

Inflow Area = 0.559 ac, 16.03% Impervious, Inflow Depth > 3.59" for 100_year event
Inflow = 2.21 cfs @ 12.23 hrs, Volume= 0.167 af
Outflow = 2.25 cfs @ 12.25 hrs, Volume= 0.126 af, Atten= 0%, Lag= 0.9 min
Primary = 2.25 cfs @ 12.25 hrs, Volume= 0.126 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 158.04' @ 12.25 hrs Surf.Area= 2,899 sf Storage= 1,893 cf
Flood Elev= 158.00' Surf.Area= 2,833 sf Storage= 1,783 cf

Plug-Flow detention time= 102.6 min calculated for 0.126 af (75% of inflow)
Center-of-Mass det. time= 38.0 min ( 847.3 - 809.3 )

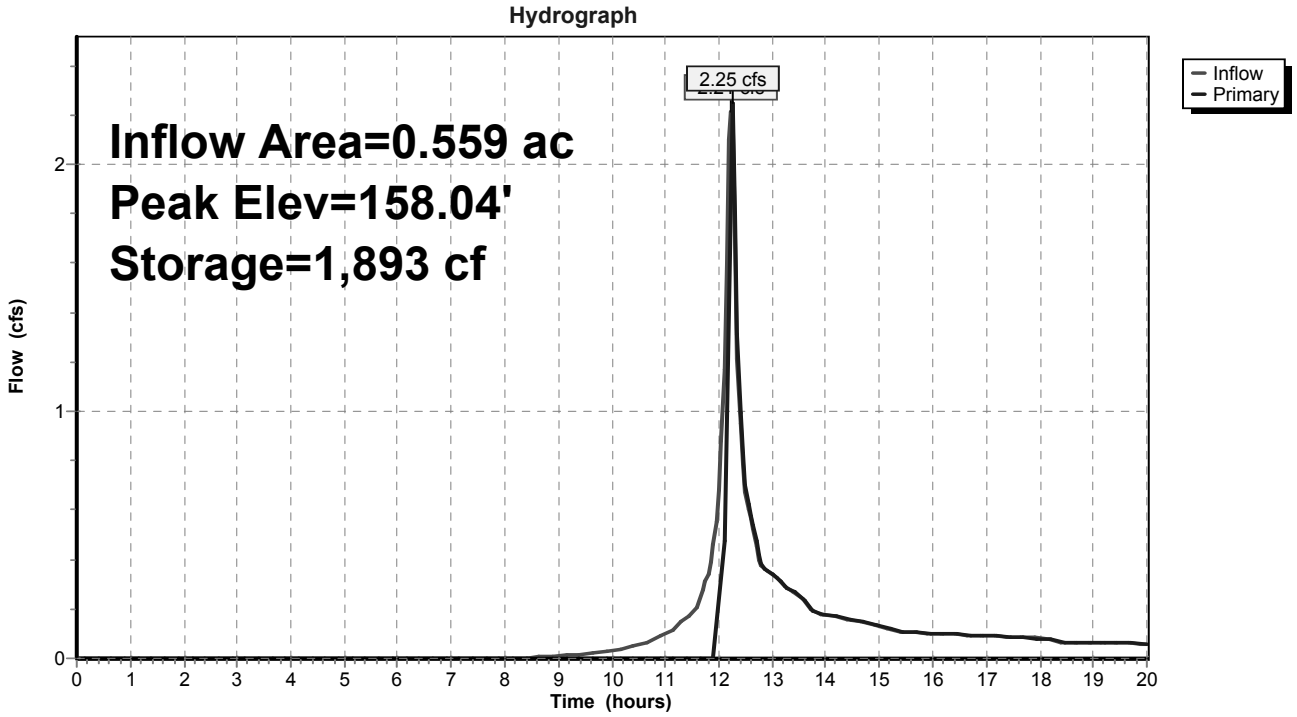
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=2.22 cfs @ 12.25 hrs HW=158.04' TW=155.20' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 2.22 cfs @ 0.63 fps)

## Pond P W 9.1B: P W 9.1B



## Summary for Pond P W 9.1C: P W 9.1C

Inflow Area = 4.751 ac, 57.07% Impervious, Inflow Depth > 5.89" for 100_year event
Inflow = 28.60 cfs @ 12.23 hrs, Volume= 2.330 af
Outflow = 28.61 cfs @ 12.23 hrs, Volume= 2.328 af, Atten= 0%, Lag= 0.1 min
Primary = 28.61 cfs @ 12.23 hrs, Volume= 2.328 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 165.00' Surf.Area= 139 sf Storage= 0 cf
Peak Elev= 166.34' @ 12.23 hrs Surf.Area= 666 sf Storage= 517 cf
Flood Elev= 167.00' Surf.Area= 989 sf Storage= 1,067 cf

Plug-Flow detention time= 1.2 min calculated for 2.323 af (100% of inflow)
Center-of-Mass det. time= 0.9 min ( 768.1 - 767.2 )

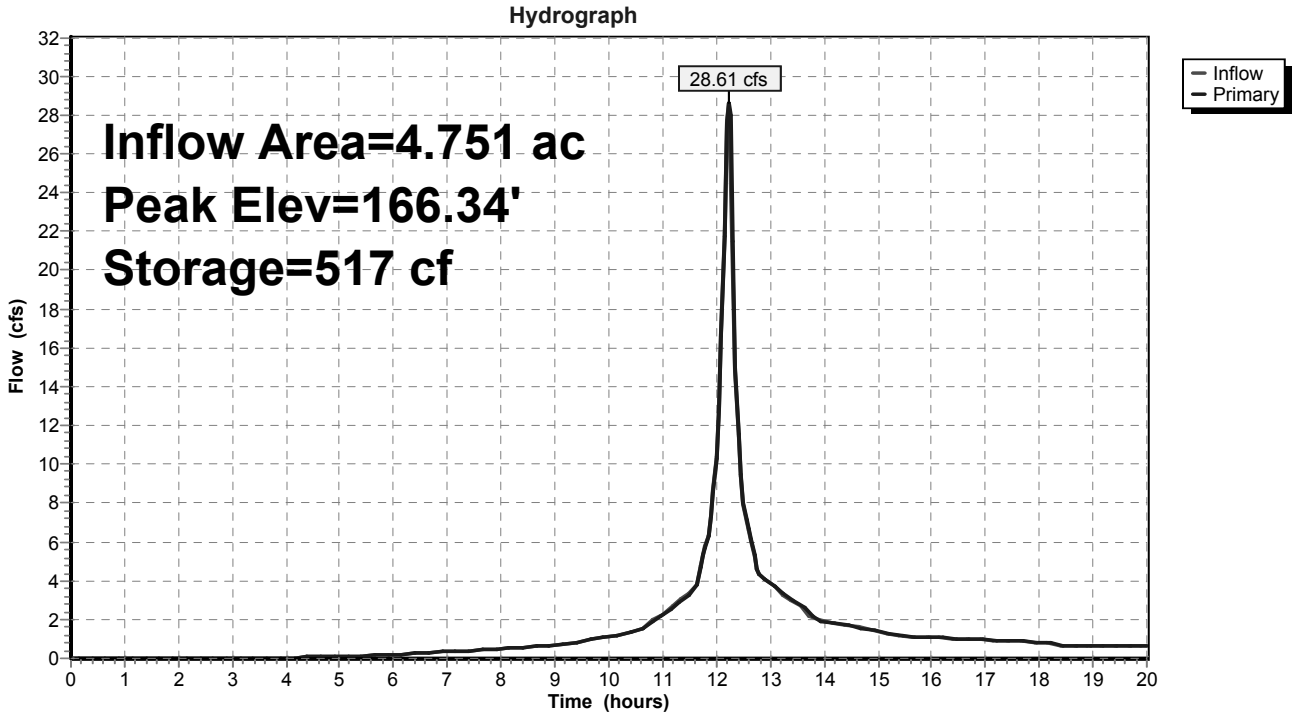
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 3,394 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 139 | 0 | 0 |
| 166.00 | 503 | 321 | 321 |
| 167.00 | 989 | 746 | 1,067 |
| 168.00 | 3,665 | 2,327 | 3,394 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 165.00' | **12.0" Round Culvert**<br>L= 49.5' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 165.00' / 164.00' S= 0.0202 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |
| #2 | Primary | 166.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 15.00 46.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=27.76 cfs @ 12.23 hrs HW=166.33' TW=155.05' (Dynamic Tailwater)
**1=Culvert** (Inlet Controls 4.30 cfs @ 5.48 fps)
**2=Asymmetrical Weir** (Weir Controls 23.46 cfs @ 1.46 fps)

## Pond P W 9.1C: P W 9.1C



## Summary for Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 4.95" for 100_year event
Inflow = 42.72 cfs @ 12.34 hrs, Volume= 4.389 af
Outflow = 44.16 cfs @ 12.34 hrs, Volume= 4.382 af, Atten= 0%, Lag= 0.4 min
Primary = 44.16 cfs @ 12.34 hrs, Volume= 4.382 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 150.00' Surf.Area= 101 sf Storage= 0 cf
Peak Elev= 153.86' @ 12.34 hrs Surf.Area= 193 sf Storage= 567 cf
Flood Elev= 154.00' Surf.Area= 197 sf Storage= 595 cf

Plug-Flow detention time= 2.0 min calculated for 4.371 af (100% of inflow)
Center-of-Mass det. time= 1.4 min ( 786.7 - 785.3 )

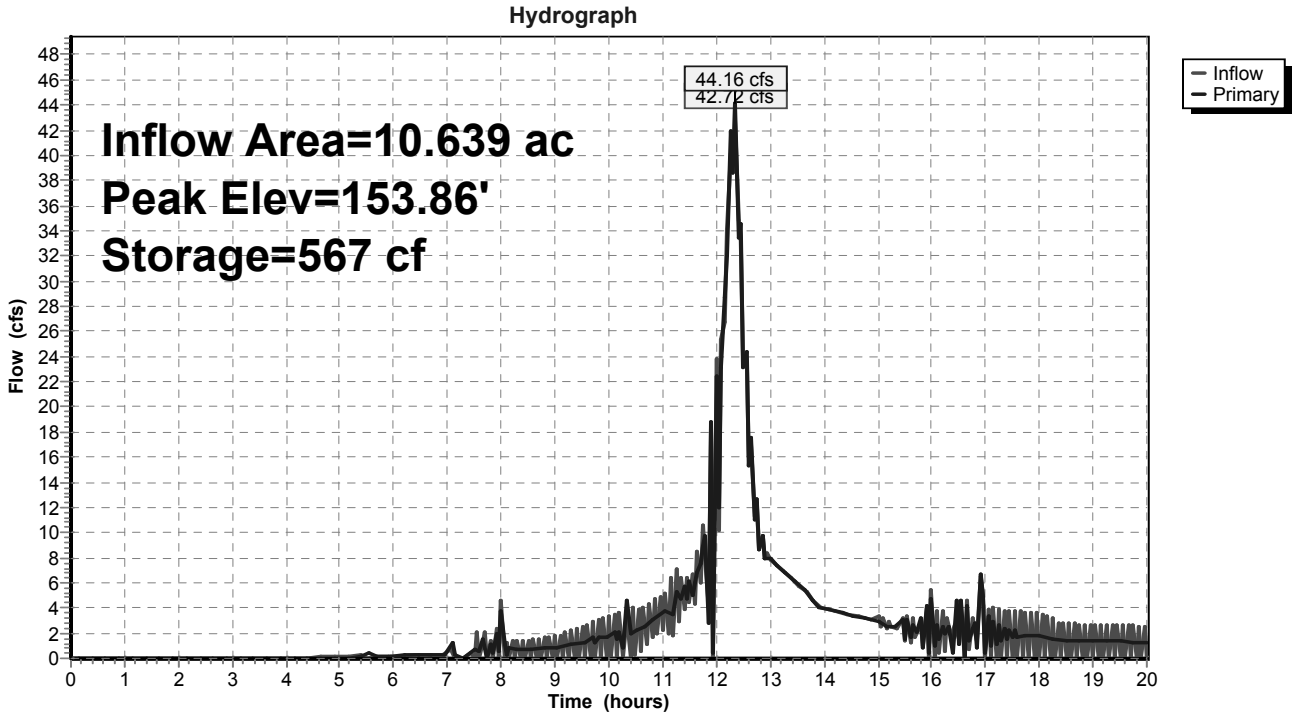
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 150.00' | 595 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 150.00 | 101 | 0 | 0 |
| 154.00 | 197 | 595 | 595 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 153.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 18.00 21.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=43.08 cfs @ 12.34 hrs HW=153.84' TW=0.00' (Dynamic Tailwater)
↑**1=Asymmetrical Weir** (Weir Controls 43.08 cfs @ 2.55 fps)

## Pond P-CULV-N-OUTLET: P-CULV-N-OUTLET

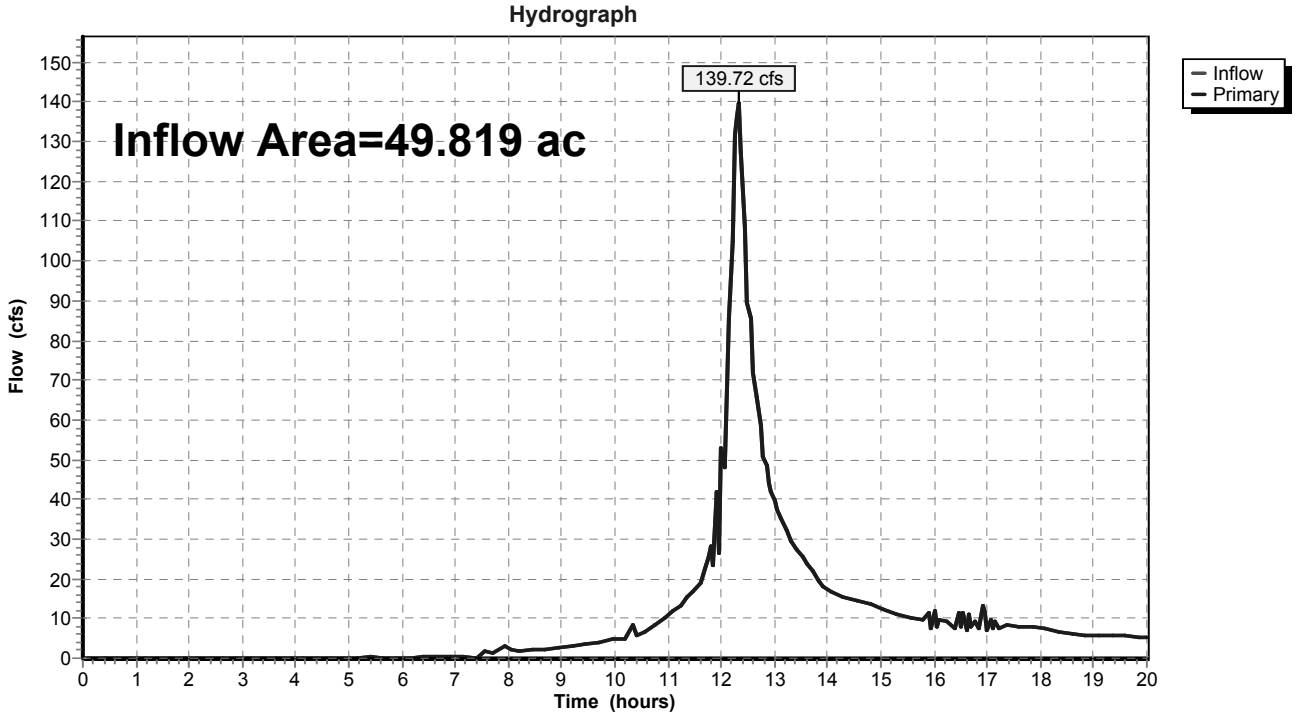


## Summary for Link DP North: DP North

Inflow Area = 49.819 ac, 26.12% Impervious, Inflow Depth > 3.91" for 100_year event
Inflow = 139.72 cfs @ 12.33 hrs, Volume= 16.233 af
Primary = 139.72 cfs @ 12.33 hrs, Volume= 16.233 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

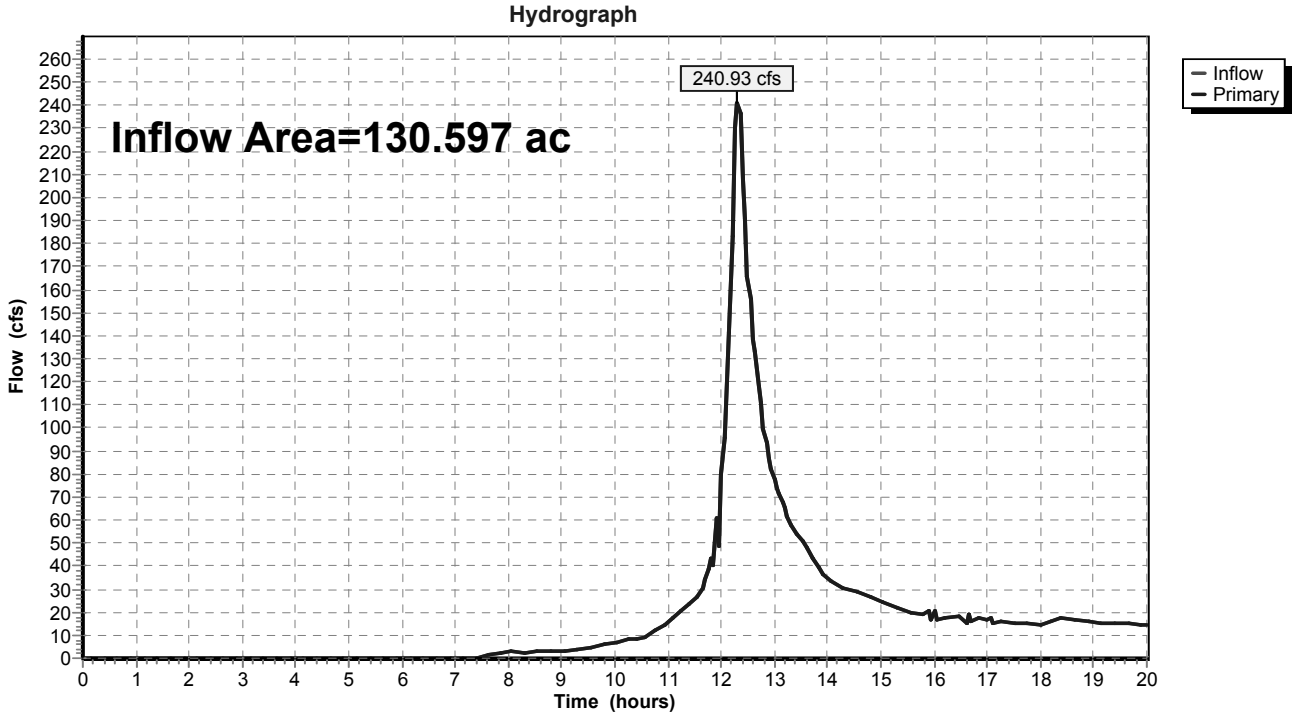


## Summary for Link DP Sudbury: (new Link)

Inflow Area = 130.597 ac, 21.29% Impervious, Inflow Depth > 2.74" for 100_year event
Inflow = 240.93 cfs @ 12.31 hrs, Volume= 29.851 af
Primary = 240.93 cfs @ 12.31 hrs, Volume= 29.851 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: (new Link)

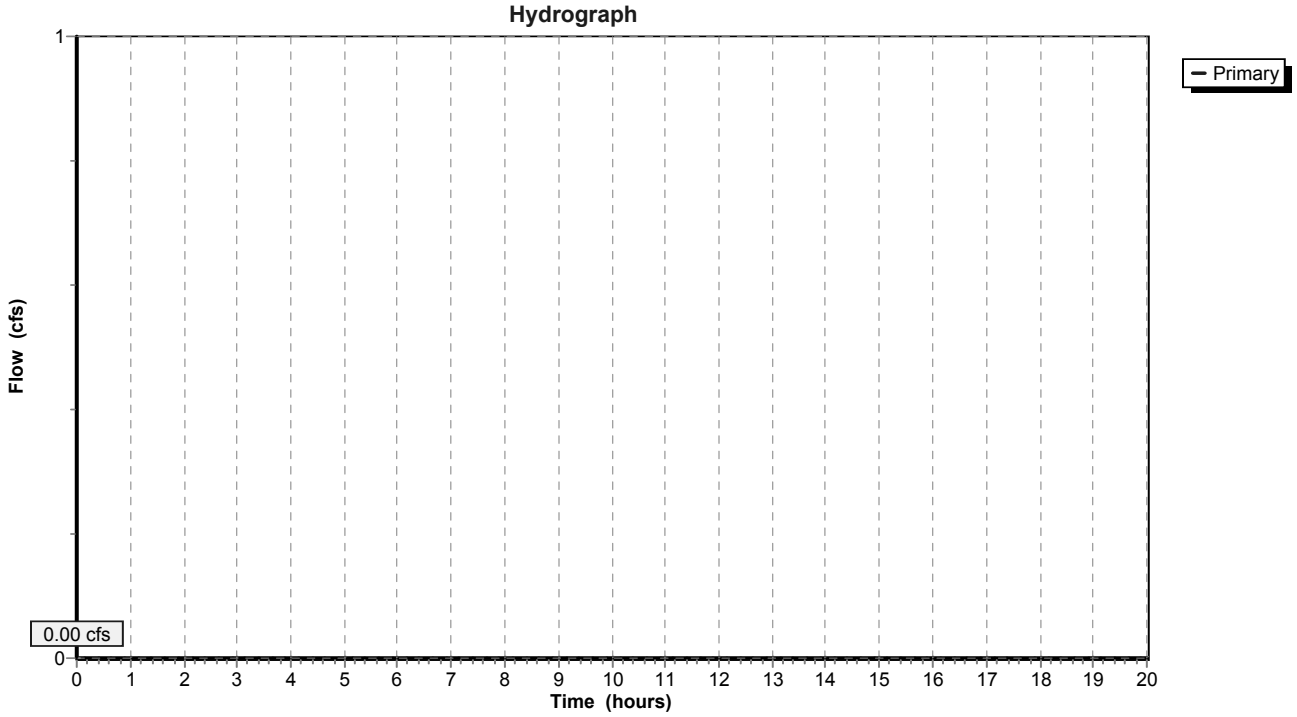


## Summary for Link DP Wellhead: DP Wellhead

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

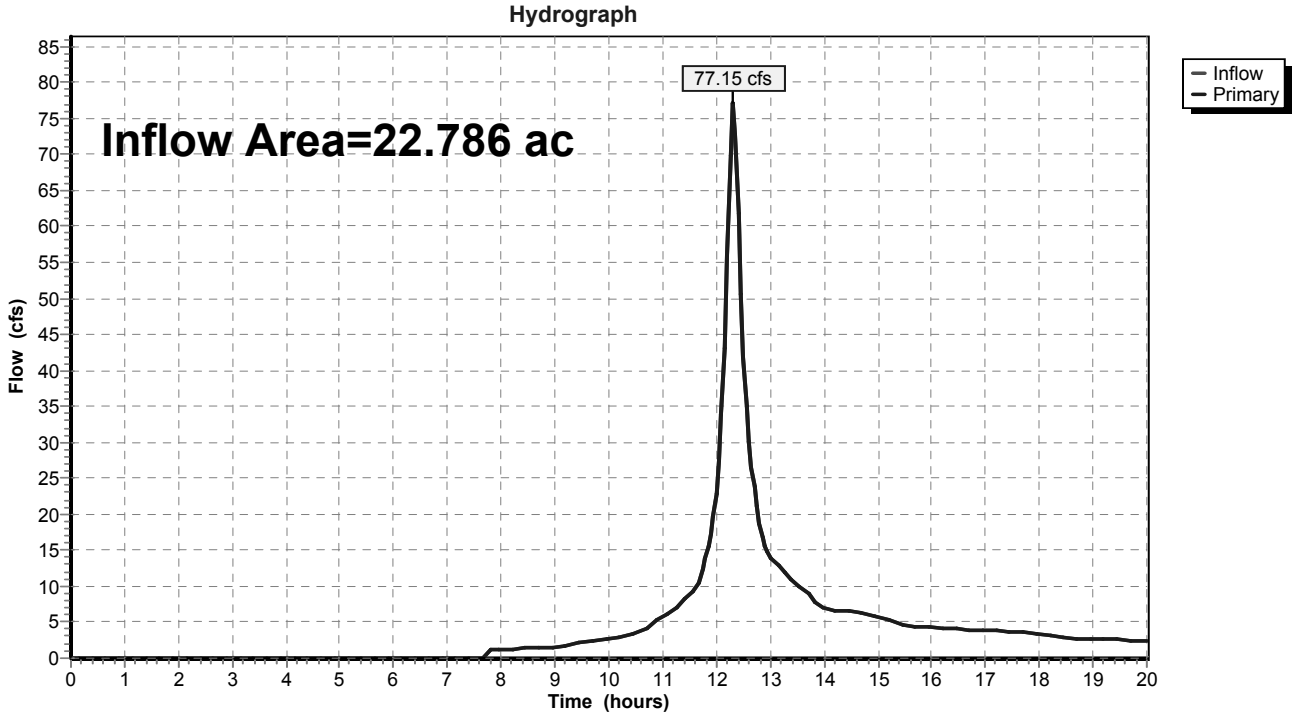


## Summary for Link DP West: DP West

Inflow Area = 22.786 ac, 28.55% Impervious, Inflow Depth > 3.94" for 100_year event
Inflow = 77.15 cfs @ 12.31 hrs, Volume= 7.480 af
Primary = 77.15 cfs @ 12.31 hrs, Volume= 7.480 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

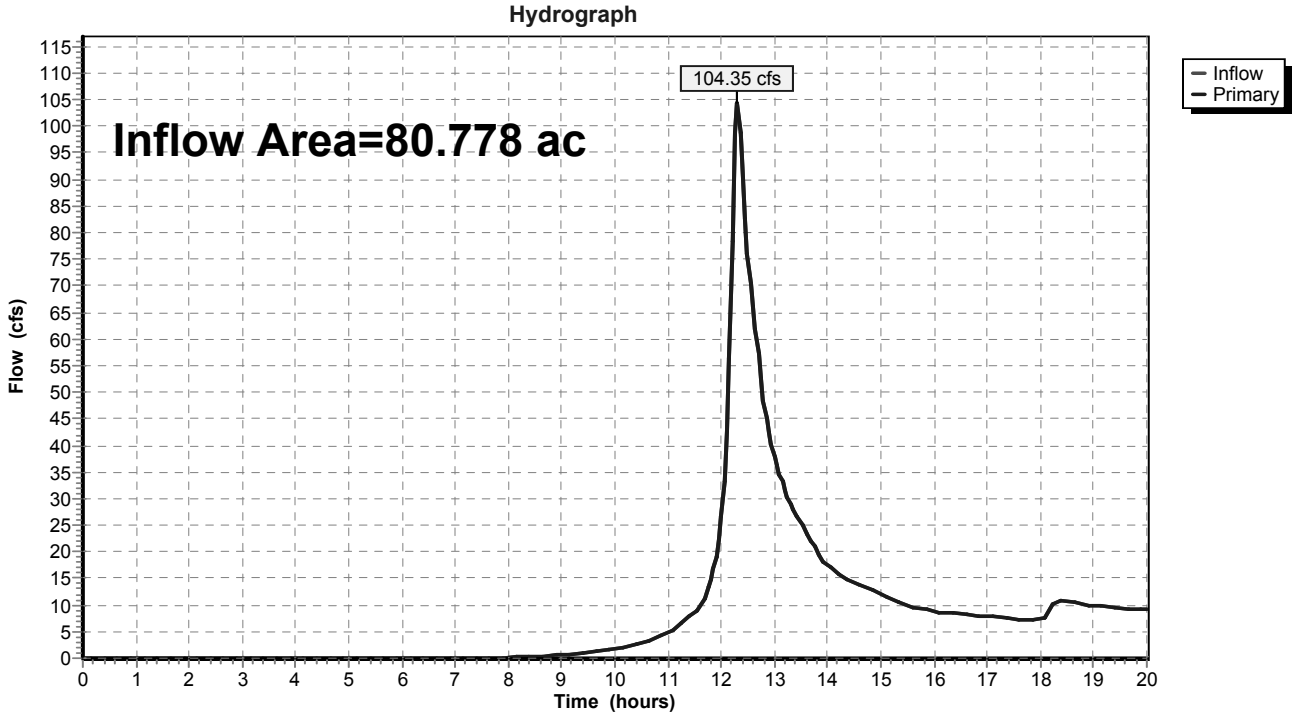


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 80.778 ac, 18.32% Impervious, Inflow Depth > 2.02" for 100_year event
Inflow = 104.35 cfs @ 12.30 hrs, Volume= 13.617 af
Primary = 104.35 cfs @ 12.30 hrs, Volume= 13.617 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

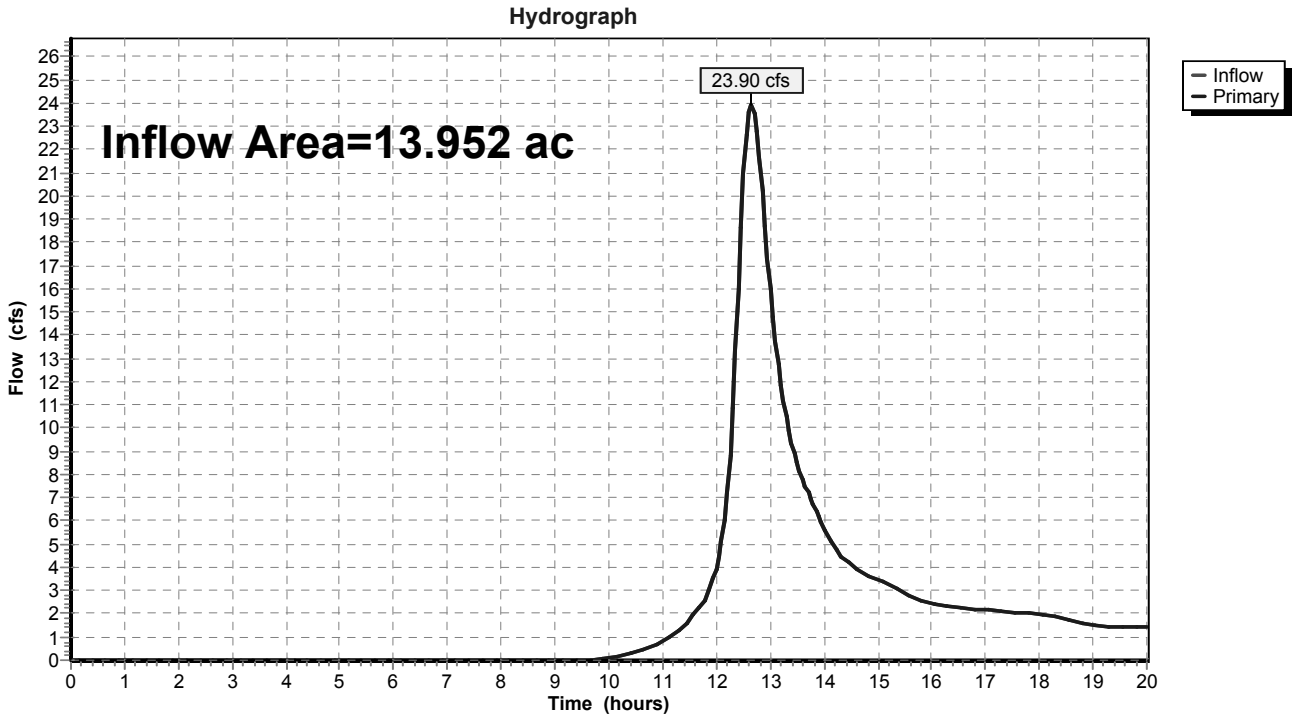


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.952 ac, 9.67% Impervious, Inflow Depth > 2.99" for 100_year event
Inflow = 23.90 cfs @ 12.65 hrs, Volume= 3.481 af
Primary = 23.90 cfs @ 12.65 hrs, Volume= 3.481 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

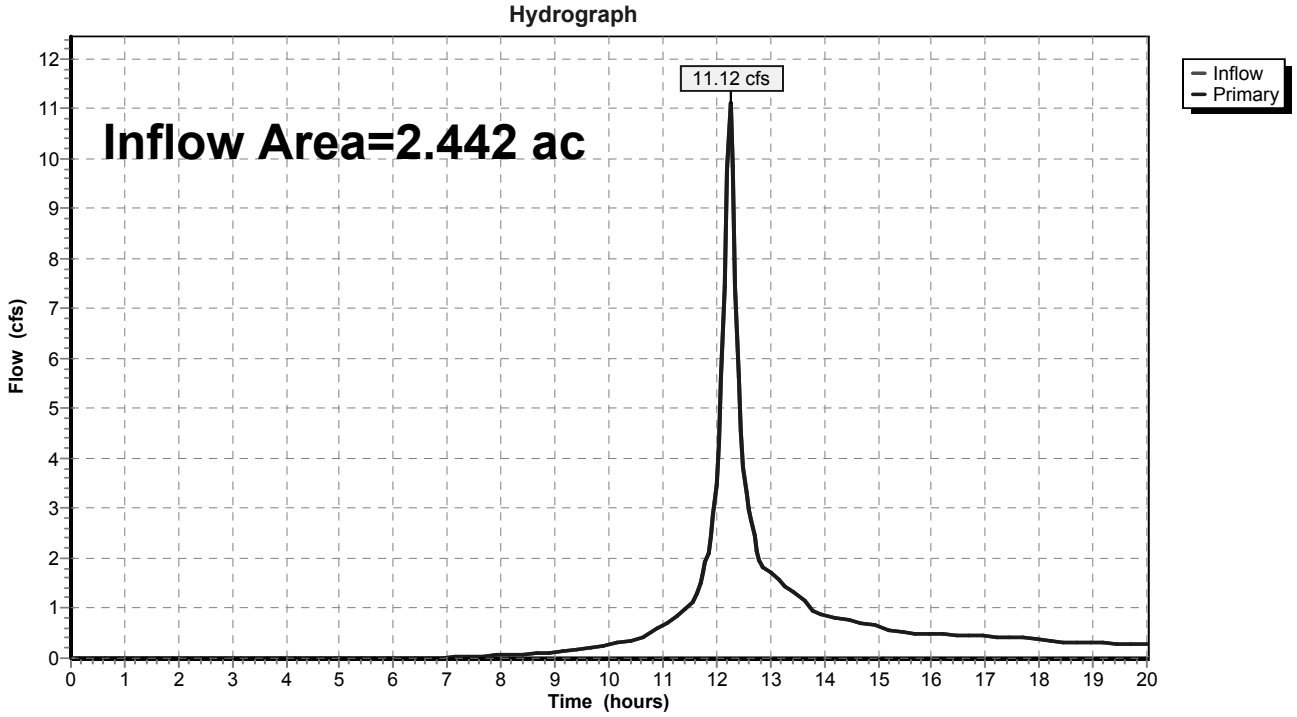


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 4.38" for 100_year event
Inflow = 11.12 cfs @ 12.25 hrs, Volume= 0.891 af
Primary = 11.12 cfs @ 12.25 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 10.0: L W 10.0

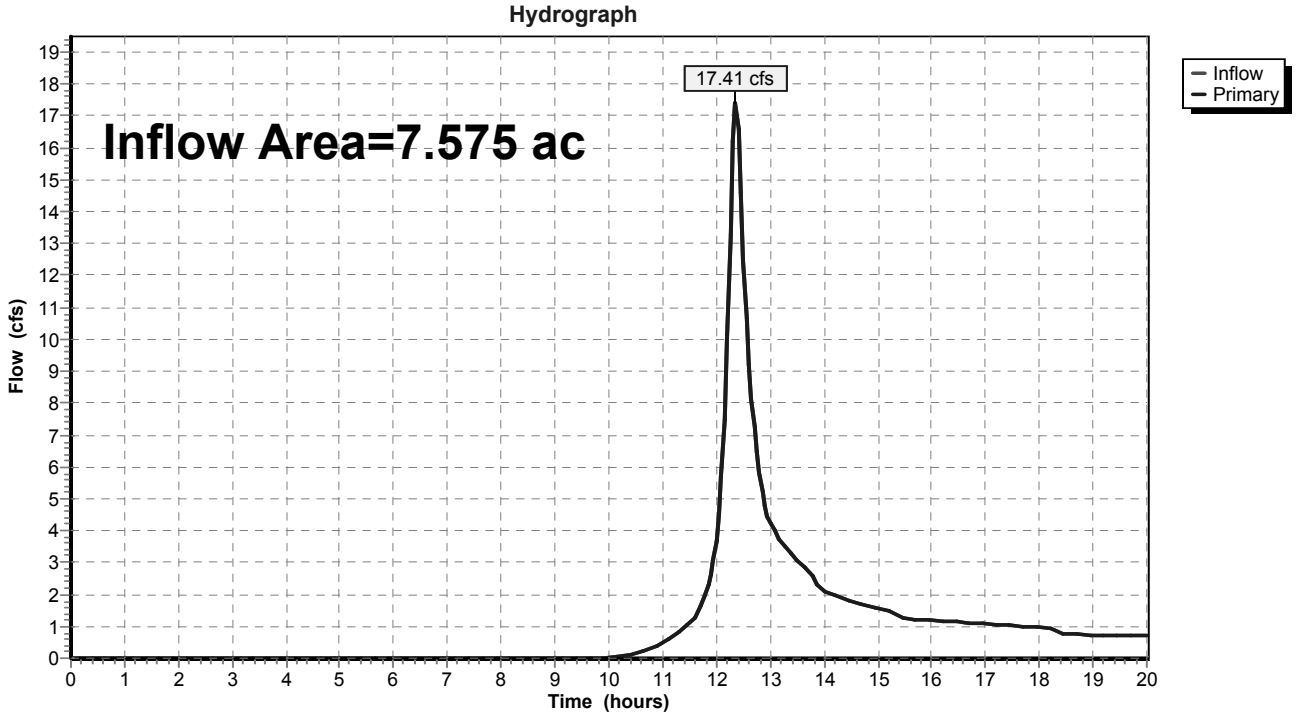


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 7.575 ac, 11.49% Impervious, Inflow Depth > 2.70" for 100_year event
Inflow = 17.41 cfs @ 12.35 hrs, Volume= 1.708 af
Primary = 17.41 cfs @ 12.35 hrs, Volume= 1.708 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 2.0: L W 2.0

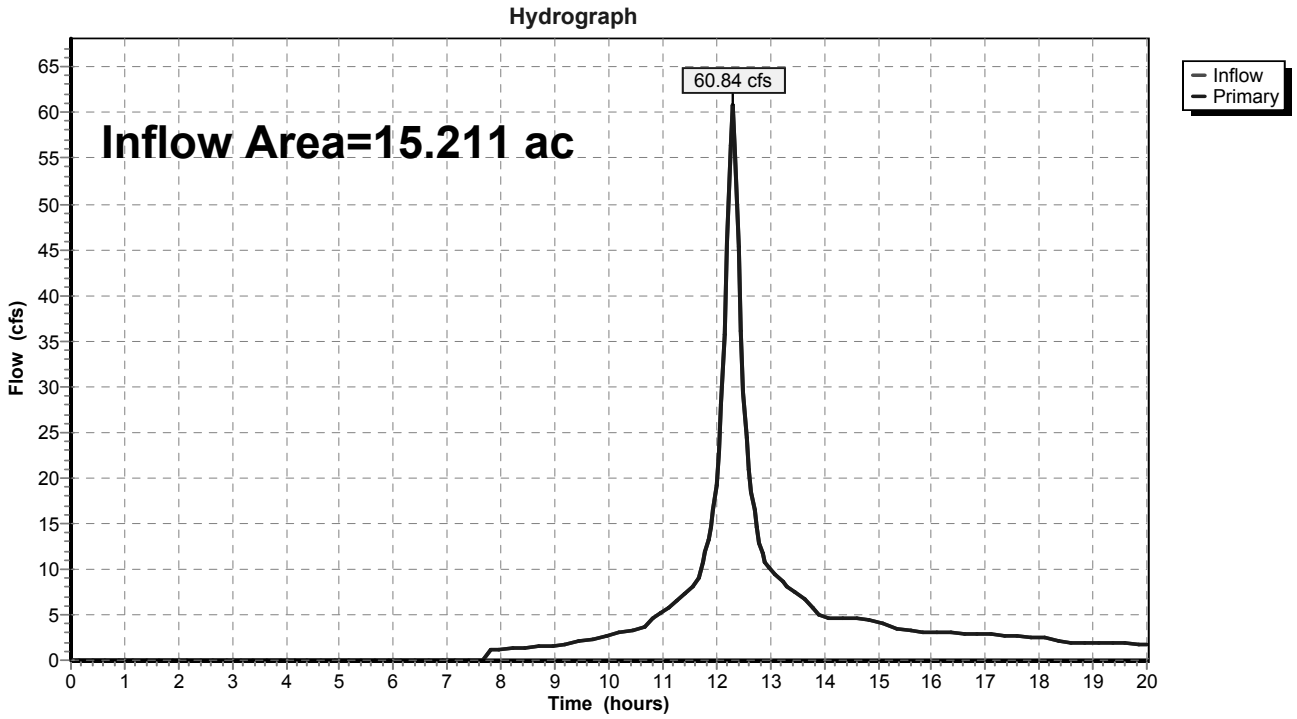


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 15.211 ac, 37.05% Impervious, Inflow Depth > 4.55" for 100_year event
Inflow = 60.84 cfs @ 12.30 hrs, Volume= 5.772 af
Primary = 60.84 cfs @ 12.30 hrs, Volume= 5.772 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 3.0: L W 3.0

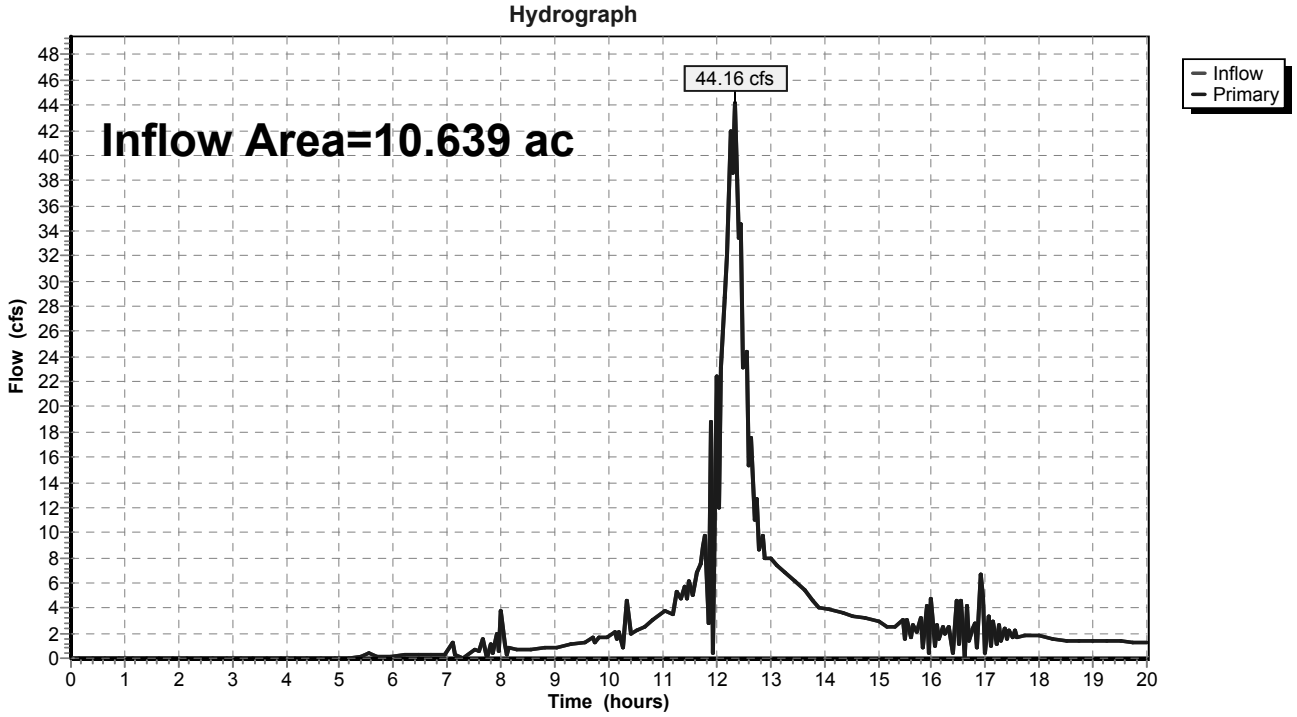


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 10.639 ac, 43.53% Impervious, Inflow Depth > 4.94" for 100_year event
Inflow = 44.16 cfs @ 12.34 hrs, Volume= 4.382 af
Primary = 44.16 cfs @ 12.34 hrs, Volume= 4.382 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

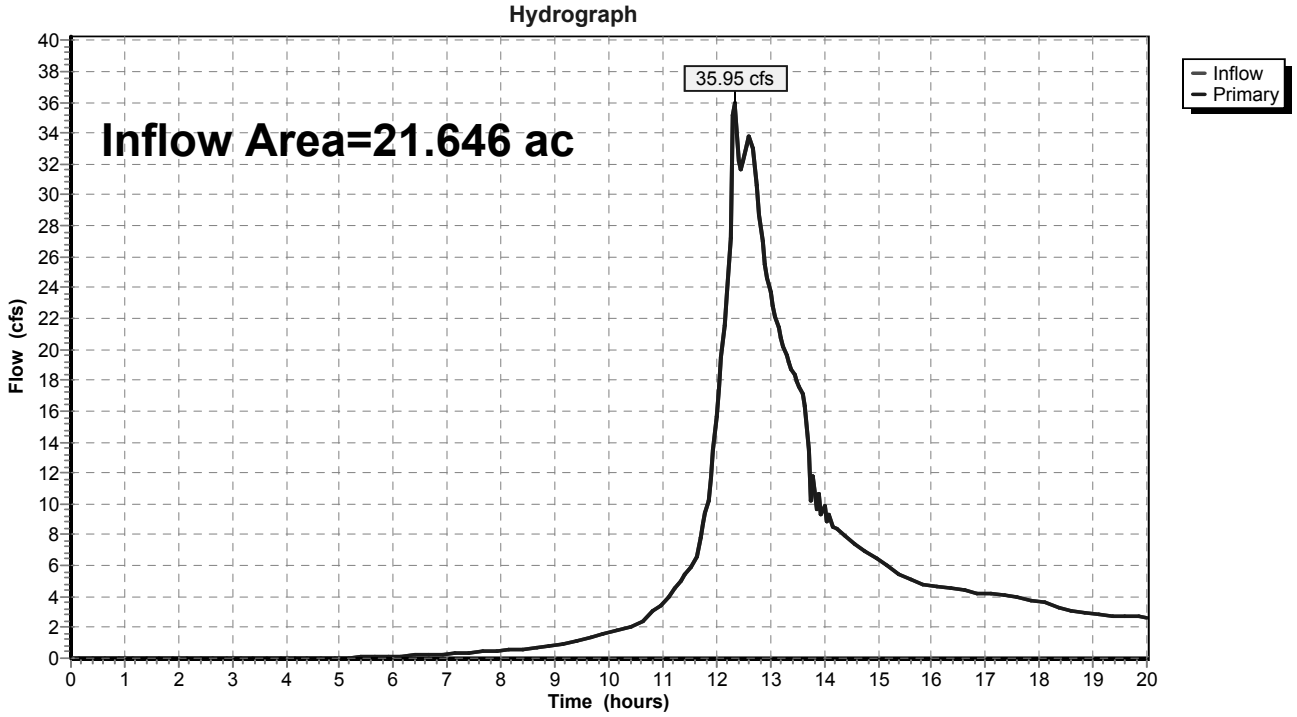


## Summary for Link Well E 1.1B: Well E 1.1B

Inflow Area = 21.646 ac, 30.46% Impervious, Inflow Depth > 3.86" for 100_year event
Inflow = 35.95 cfs @ 12.33 hrs, Volume= 6.957 af
Primary = 35.95 cfs @ 12.33 hrs, Volume= 6.957 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.1B: Well E 1.1B

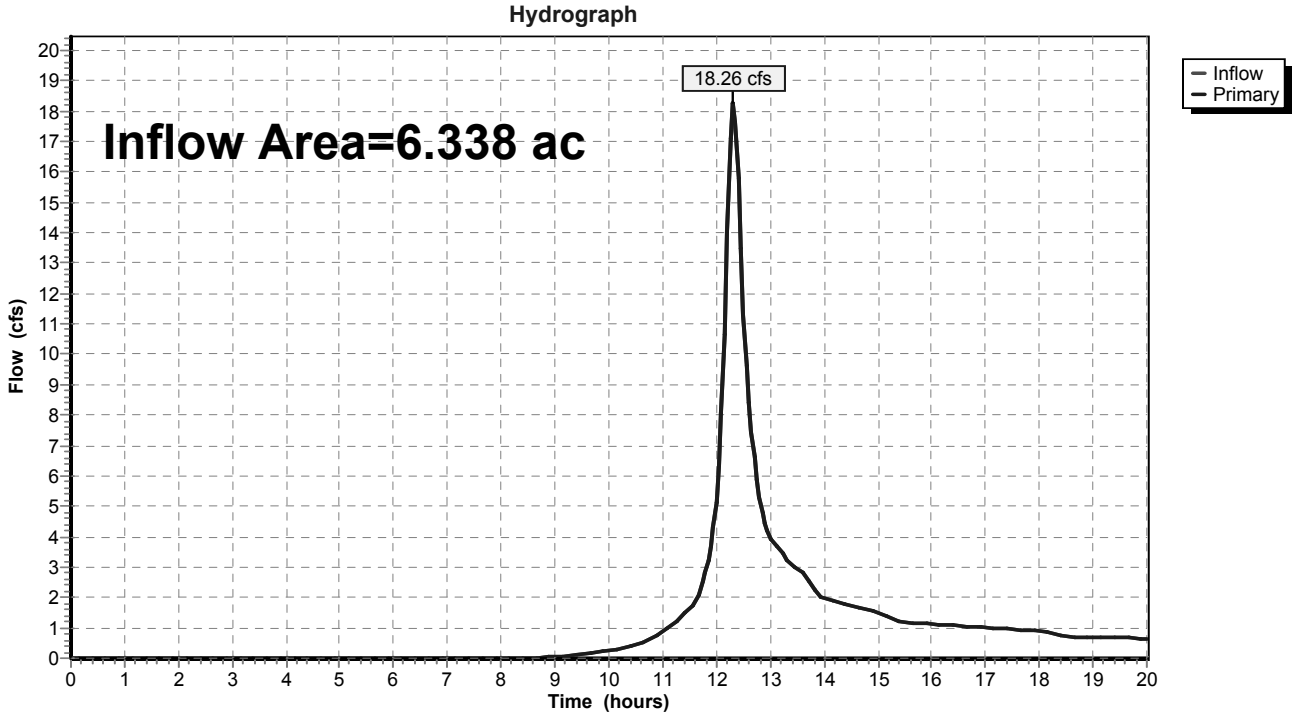


## Summary for Link Well E 1.2A: Well E 1.2A

Inflow Area = 6.338 ac, 22.15% Impervious, Inflow Depth > 3.40" for 100_year event
Inflow = 18.26 cfs @ 12.31 hrs, Volume= 1.794 af
Primary = 18.26 cfs @ 12.31 hrs, Volume= 1.794 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2A: Well E 1.2A

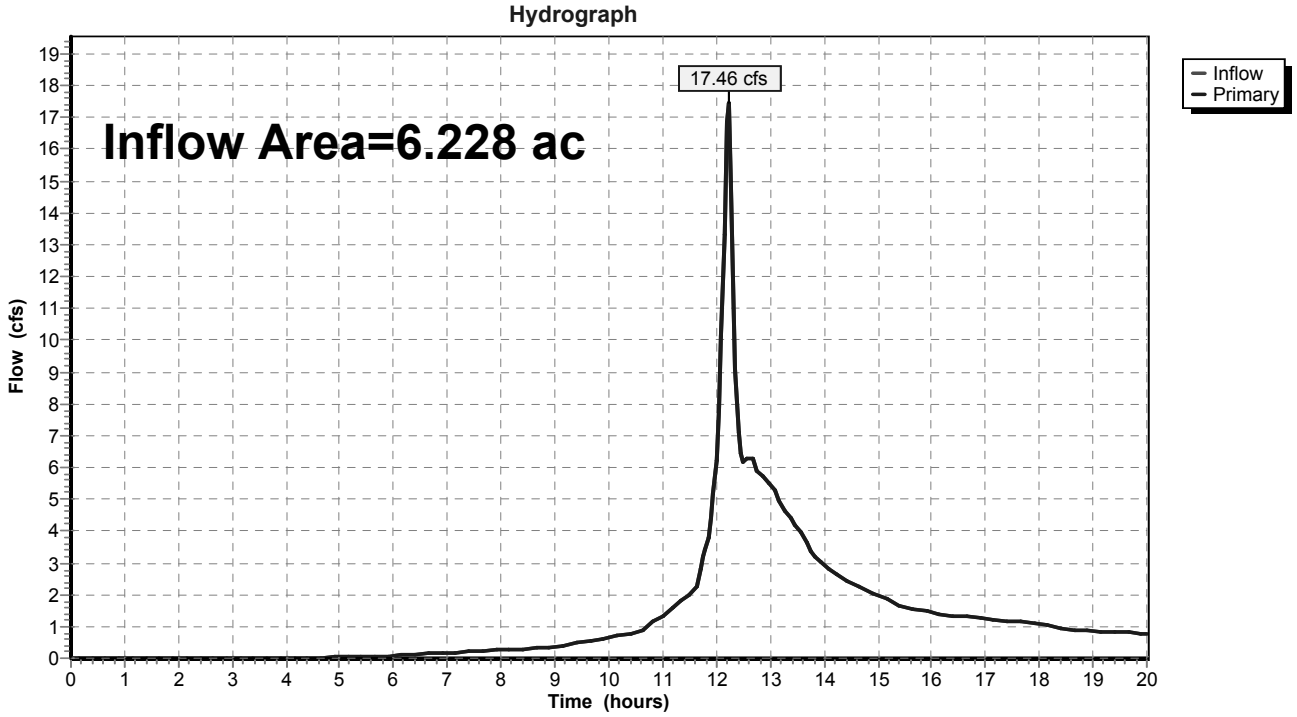


## Summary for Link Well E 1.2B: Well E 1.2B

Inflow Area = 6.228 ac, 50.45% Impervious, Inflow Depth > 4.05" for 100_year event
Inflow = 17.46 cfs @ 12.23 hrs, Volume= 2.101 af
Primary = 17.46 cfs @ 12.23 hrs, Volume= 2.101 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2B: Well E 1.2B

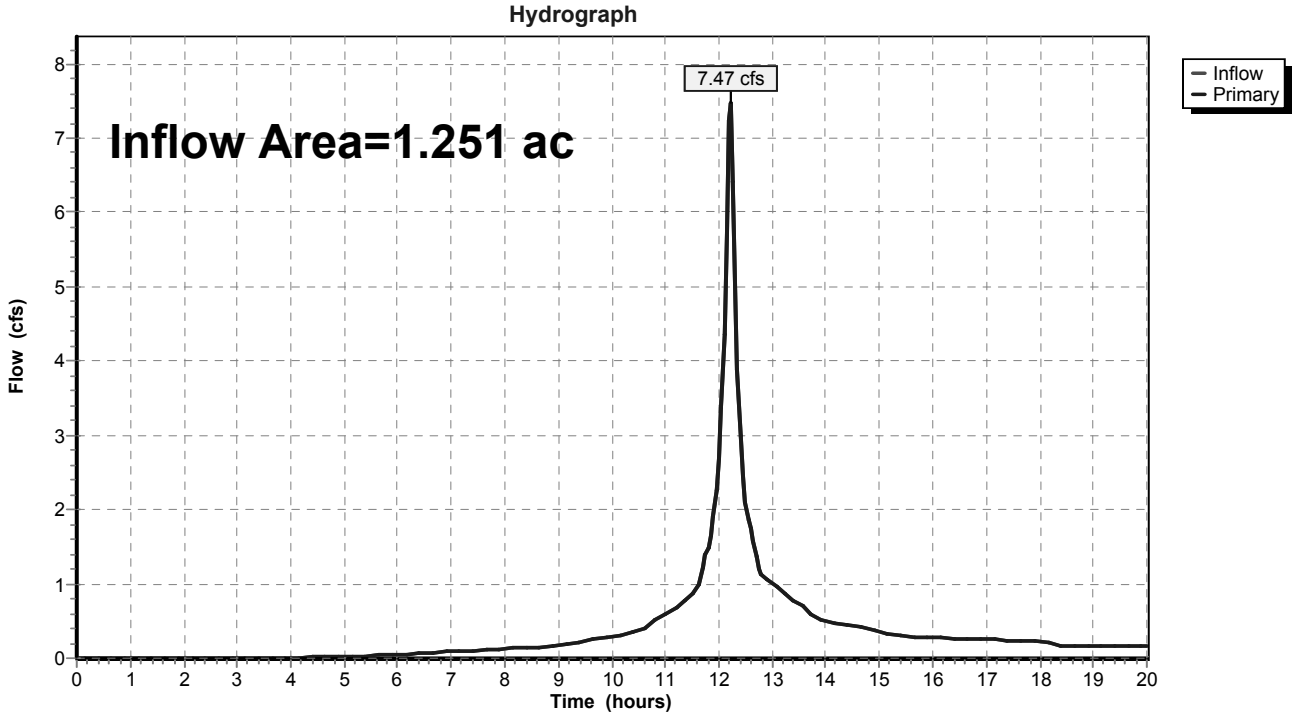


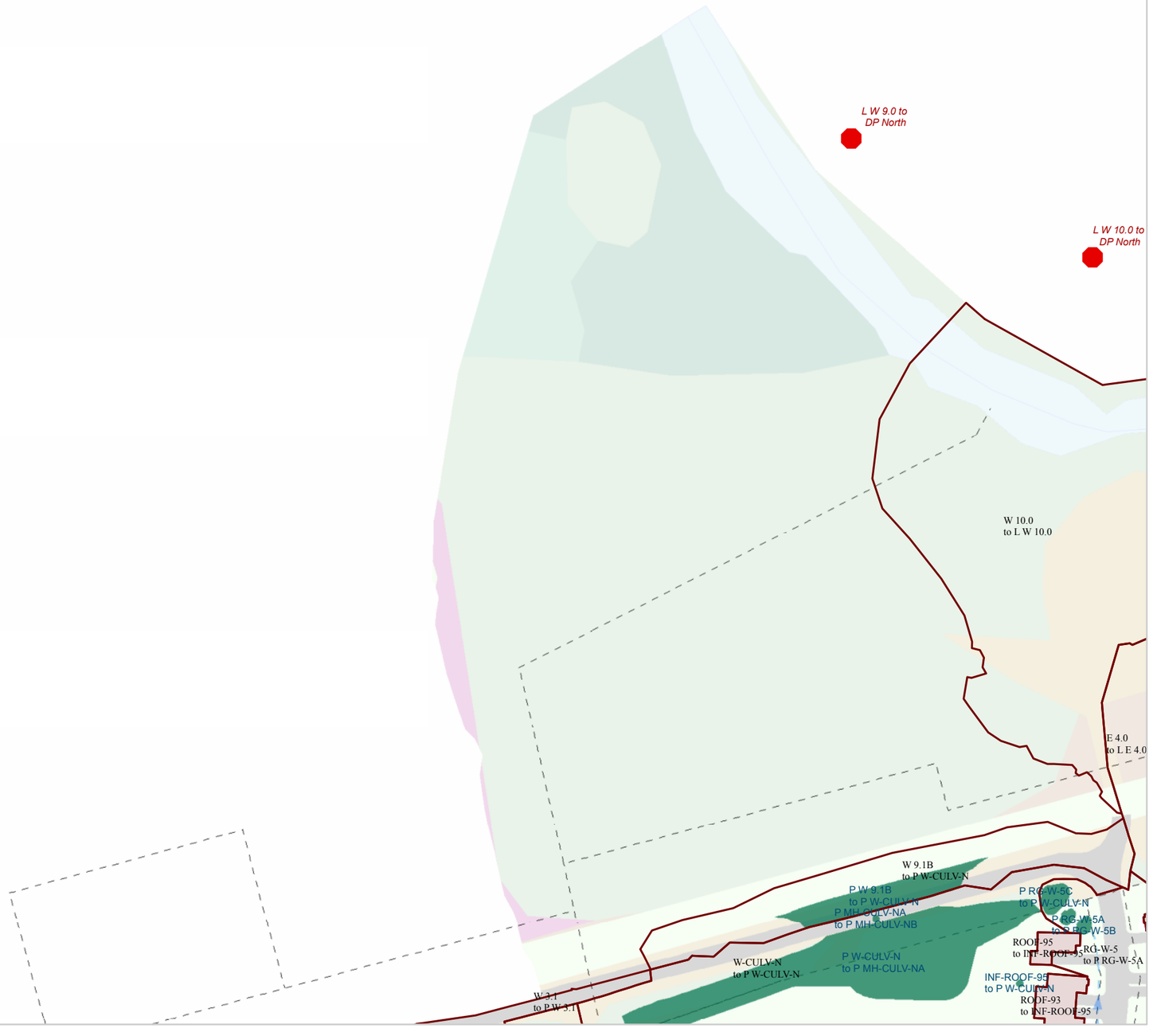
## Summary for Link Well E 1.2C: Well E 1.2C

Inflow Area = 1.251 ac, 18.55% Impervious, Inflow Depth > 5.82" for 100_year event
Inflow = 7.47 cfs @ 12.23 hrs, Volume= 0.607 af
Primary = 7.47 cfs @ 12.23 hrs, Volume= 0.607 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link Well E 1.2C: Well E 1.2C






Vanasse Hangen Brustlin, Inc.

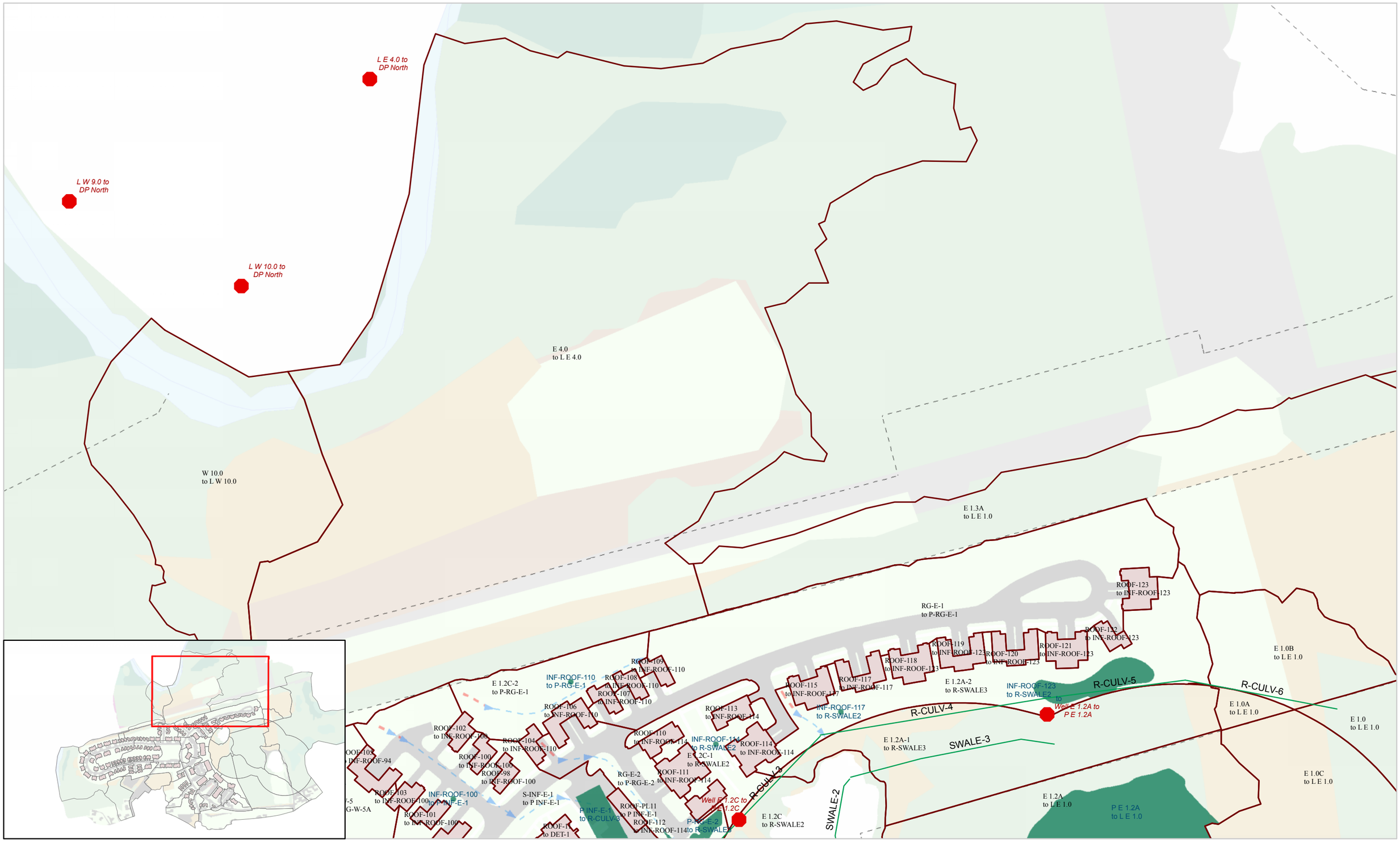
April 2013

0 50 100 200 Feet

1 inch = 125 feet

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Stormwater Report
Proposed Conditions Node Diagram




VHB Vanasse Hangen Brustlin, Inc.

April 2013

0 50 100 200 Feet

1 inch = 125 feet

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Stormwater Report
Proposed Conditions Node Diagram

Vanasse Hangen Brustlin, Inc.

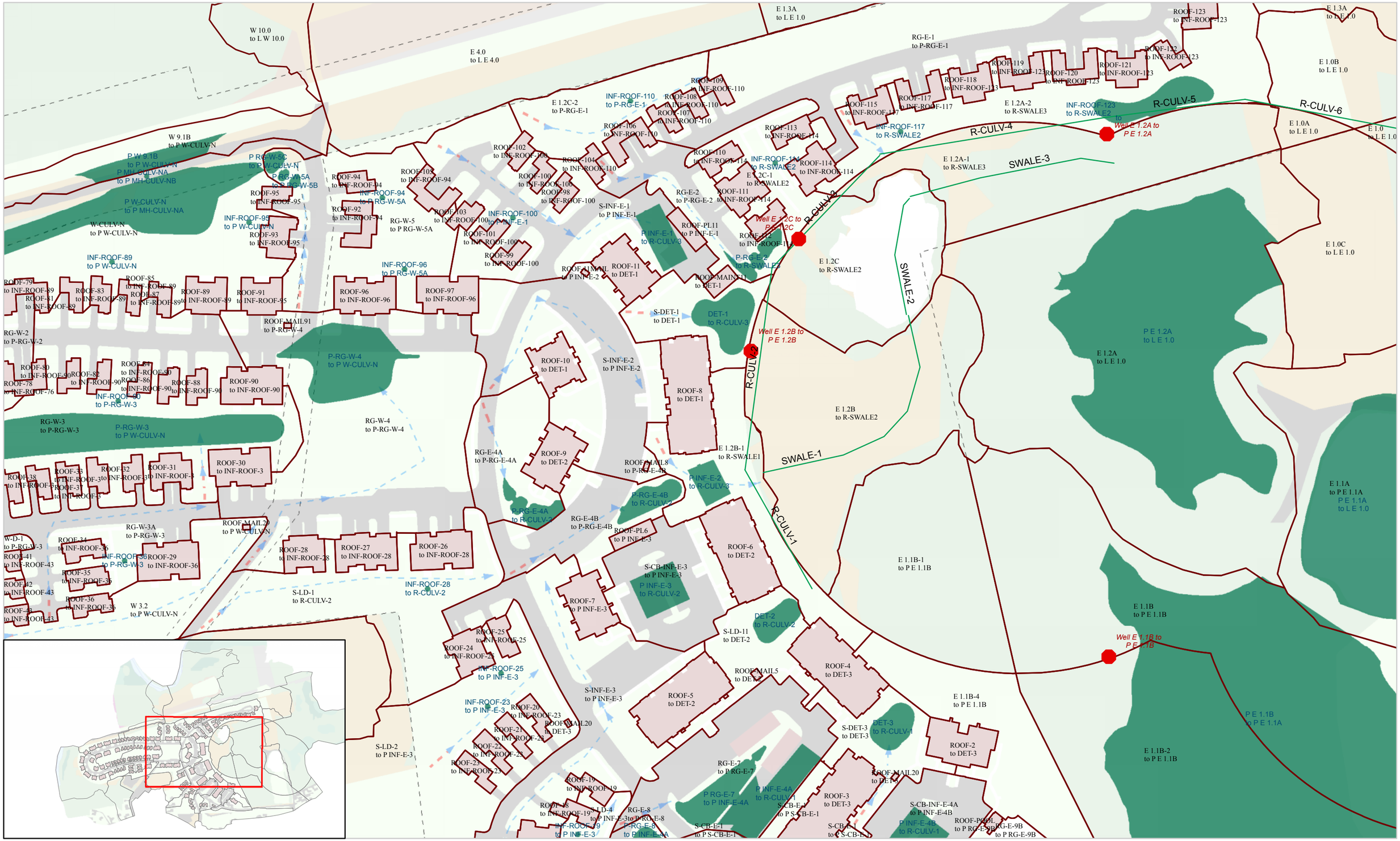
April 2013

0 50 100 200 Feet

1 inch = 125 feet

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Stormwater Report
Proposed Conditions Node Diagram


W 10.0
to L W 10.0
E 4.0
to L E 4.0
E 1.3A
to L E 1.0
RG-E-1
to P-RG-E-1
ROOF-123
to INF-ROOF-123
E 1.3A
to L E 1.0
ROOF-122
to INF-ROOF-123
E 1.0B
to L E 1.0
ROOF-121
to INF-ROOF-123
ROOF-120
to INF-ROOF-123
ROOF-119
to INF-ROOF-123
ROOF-118
to INF-ROOF-123
ROOF-117
to INF-ROOF-117
ROOF-115
to INF-ROOF-117
E 1.2A-2
to R-SWALE3
INF-ROOF-123
to R-SWALE2
to
Well E 1.2A to
P E 1.2A
R-CULV-5
R-CULV-6
R-CULV-4
E 1.0A
to L E 1.0
E 1.0
to L E 1.0
INF-ROOF-117
to R-SWALE2
ROOF-113
to INF-ROOF-114
ROOF-110
to INF-ROOF-114
INF-ROOF-114
to R-SWALE2
ROOF-114
to INF-ROOF-114
E 1.2A-1
to R-SWALE3
SWALE-3
E 1.2C-1
to R-SWALE2
ROOF-111
to INF-ROOF-114
R-CULV-3
Well E 1.2C to
P E 1.2C
ROOF-112
to INF-ROOF-114
E 1.2C
to R-SWALE2
P-RG-E-2
to R-SWALE2
SWALE-2
E 1.0C
to L E 1.0
ROOF-MAIN11
to DET-1
ROOF-11
to DET-1
ROOF-MAIL11
to P INF-E-2
S-DET-1
to DET-1
DET-1
to R-CULV-3
Well E 1.2B to
P E 1.2B
R-CULV-2
P E 1.2A
to L E 1.0
E 1.2A
to L E 1.0
E 1.2B
to R-SWALE2
SWALE-1
E 1.2B-1
to R-SWALE1
E 1.1A
to P E 1.1A
P E 1.1A
to L E 1.0
R-CULV-1
E 1.1B-1
to P E 1.1B
E 1.1B
to P E 1.1B
Well E 1.1B to
P E 1.1B
P E 1.1B
to P E 1.1A
E 1.1B-4
to P E 1.1B
E 1.1B-2
to P E 1.1B
ROOF-2
to DET-3
S-DET-3
to DET-3
DET-3
to R-CULV-1
ROOF-MAIL20
to DET-3
ROOF-3
to DET-3
S-CB-INF-E-4A
to P INF-E-4B
P INF-E-4B
to R-CULV-1
ROOF-POOL
to P RG-E-9B
RG-E-9B
to P RG-E-9B
S-CB-E-1
to P S-CB-E-1
P RG-E-7
to P INF-E-4A
P INF-E-4A
to R-CULV-1
RG-E-7
to P RG-E-7
ROOF-4
to DET-3
ROOF-5
to DET-2
S-INF-E-3
to P INF-E-3
INF-ROOF-25
to P INF-E-3
ROOF-25
to INF-ROOF-25
ROOF-24
to INF-ROOF-25
ROOF-7
to P INF-E-3
S-LD-11
to DET-2
DET-2
to R-CULV-2
ROOF-6
to DET-2
S-CB-INF-E-3
to P INF-E-3
P INF-E-3
to R-CULV-2
ROOF-PL6
to P INF-E-3
P-RG-E-4B
to R-CULV-2
P INF-E-2
to R-CULV-3
ROOF-MAIL8
to P-RG-E-4B
RG-E-4B
to P-RG-E-4B
P-RG-E-4A
to R-CULV-2
RG-E-4A
to P-RG-E-4A
ROOF-9
to DET-2
ROOF-8
to DET-1
S-INF-E-2
to P INF-E-2
ROOF-10
to DET-1
ROOF-MAIL91
to P-RG-W-4
P-RG-W-4
to P W-CULV-N
RG-W-4
to P-RG-W-4
INF-ROOF-96
to P RG-W-5A
ROOF-96
to INF-ROOF-96
ROOF-97
to INF-ROOF-96
ROOF-85
to INF-ROOF-89
ROOF-87
to INF-ROOF-89
ROOF-89
to INF-ROOF-89
ROOF-91
to INF-ROOF-95
ROOF-79
to INF-ROOF-89
ROOF-81
to INF-ROOF-89
ROOF-83
to INF-ROOF-89
INF-ROOF-89
to P W-CULV-N
RG-W-2
to P-RG-W-2
ROOF-80
to INF-ROOF-90
ROOF-78
to INF-ROOF-76
ROOF-82
to INF-ROOF-90
ROOF-84
to INF-ROOF-90
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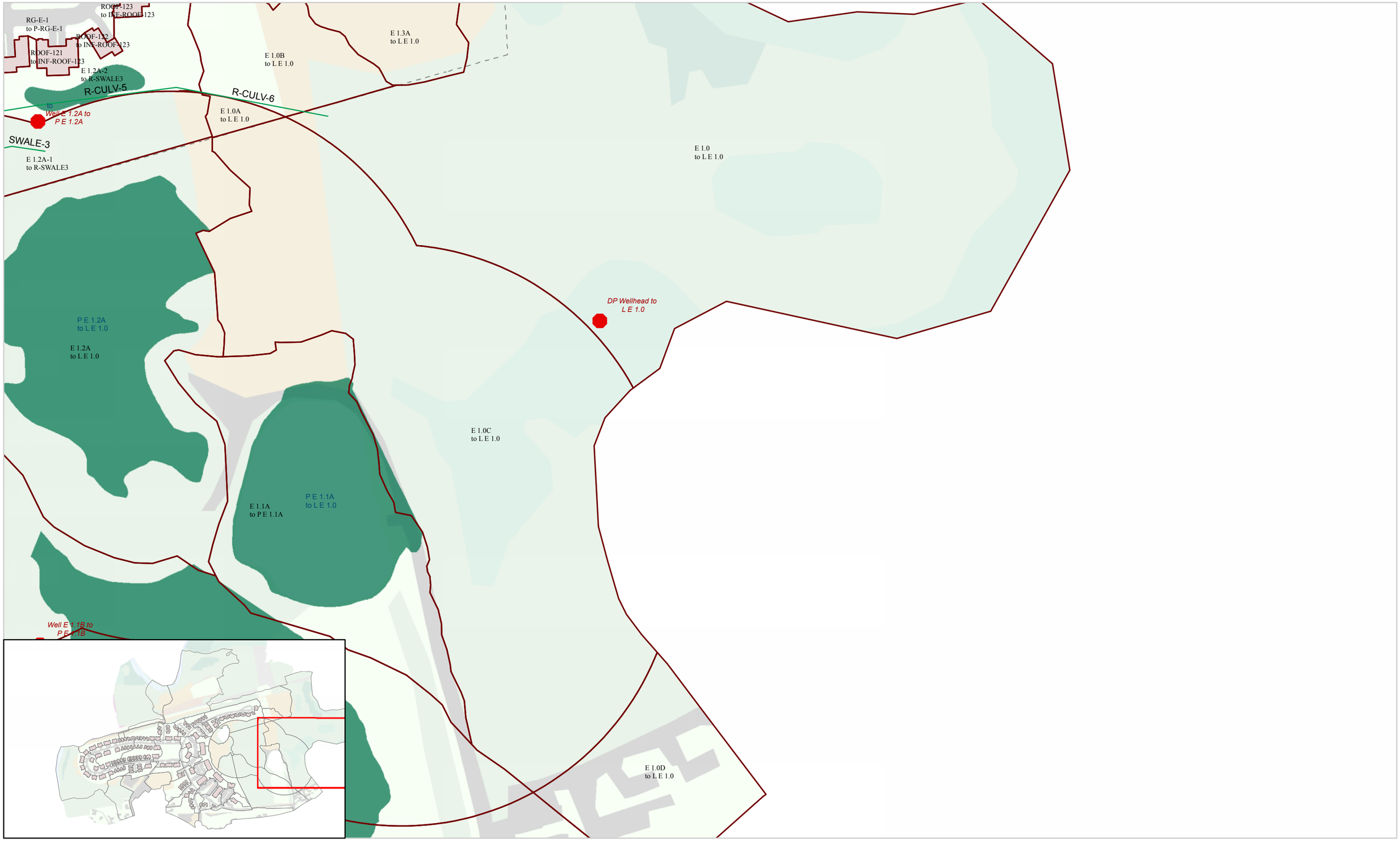
to INF-ROOF-90
ROOF-88
to INF-ROOF-90
ROOF-90
to INF-ROOF-90
INF-ROOF-90
to P-RG-W-3
RG-W-3
to P-RG-W-3
P-RG-W-3
to P W-CULV-N
ROOF-38
to INF-ROOF-3
ROOF-33
to INF-ROOF-3
ROOF-37
to INF-ROOF-3
ROOF-32
to INF-ROOF-3
ROOF-31
to INF-ROOF-3
ROOF-30
to INF-ROOF-3
RG-W-3A
to P-RG-W-3
ROOF-MAIL29
to P W-CULV-N
W-D-1
to P-RG-W-3
ROOF-41
to INF-ROOF-43
ROOF-34
to INF-ROOF-36
INF-ROOF-36
to P-RG-W-3
ROOF-29
to INF-ROOF-36
ROOF-35
to INF-ROOF-36
ROOF-42
to INF-ROOF-43
ROOF-36
to INF-ROOF-36
ROOF-43
to INF-ROOF-43
W 3.2
to P W-CULV-N
ROOF-28
to INF-ROOF-28
ROOF-27
to INF-ROOF-28
ROOF-26
to INF-ROOF-28
S-LD-1
to R-CULV-2
INF-ROOF-28
to R-CULV-2
S-LD-2
to P INF-E-3
INF-ROOF-23
to P INF-E-3
ROOF-20
to INF-ROOF-23
ROOF-21
to INF-ROOF-23
ROOF-22
to INF-ROOF-23
ROOF-23
to INF-ROOF-23
ROOF-MAIL20
to DET-3
ROOF-19
to INF-ROOF-19
ROOF-18
to INF-ROOF-19
S-LD-4
to P INF-E-3
INF-ROOF-19
to P INF-E-3
RG-E-8
to P RG-E-8
P-RG-E-8
to P INF-E-4A
S-CB-E-1
to P S-CB-E-1
W 9.1B
to P W-CULV-N
P W 9.1B
to P W-CULV-N
P MH-CULV-NA
to P MH-CULV-NB
P RG-W-5C
to P W-CULV-N
P RG-W-5A
to P RG-W-5B
P W-CULV-N
to P MH-CULV-NA
W-CULV-N
to P W-CULV-N
INF-ROOF-95
to P W-CULV-N
ROOF-95
to INF-ROOF-95
ROOF-93
to INF-ROOF-95
ROOF-94
to INF-ROOF-94
INF-ROOF-94
to P RG-W-5A
ROOF-92
to INF-ROOF-94
RG-W-5
to P RG-W-5A
ROOF-103
to INF-ROOF-94
ROOF-103
to INF-ROOF-100
INF-ROOF-100
to P INF-E-1
ROOF-101
to INF-ROOF-100
ROOF-99
to INF-ROOF-100
ROOF-102
to INF-ROOF-106
ROOF-106
to INF-ROOF-110
ROOF-104
to INF-ROOF-110
ROOF-100
to INF-ROOF-106
ROOF-98
to INF-ROOF-100
S-INF-E-1
to P INF-E-1
P INF-E-1
to R-CULV-3
ROOF-PL11
to P INF-E-1
ROOF-MAIL1
to P INF-E-2
INF-ROOF-110
to P-RG-E-1
E 1.2C-2
to P-RG-E-1
ROOF-109
to INF-ROOF-110
ROOF-108
to INF-ROOF-110
ROOF-107
to INF-ROOF-110
INF-ROOF-89
to P W-CULV-N
INF-ROOF-96
to P RG-W-5A




Vanasse Hangen Brustlin, Inc.

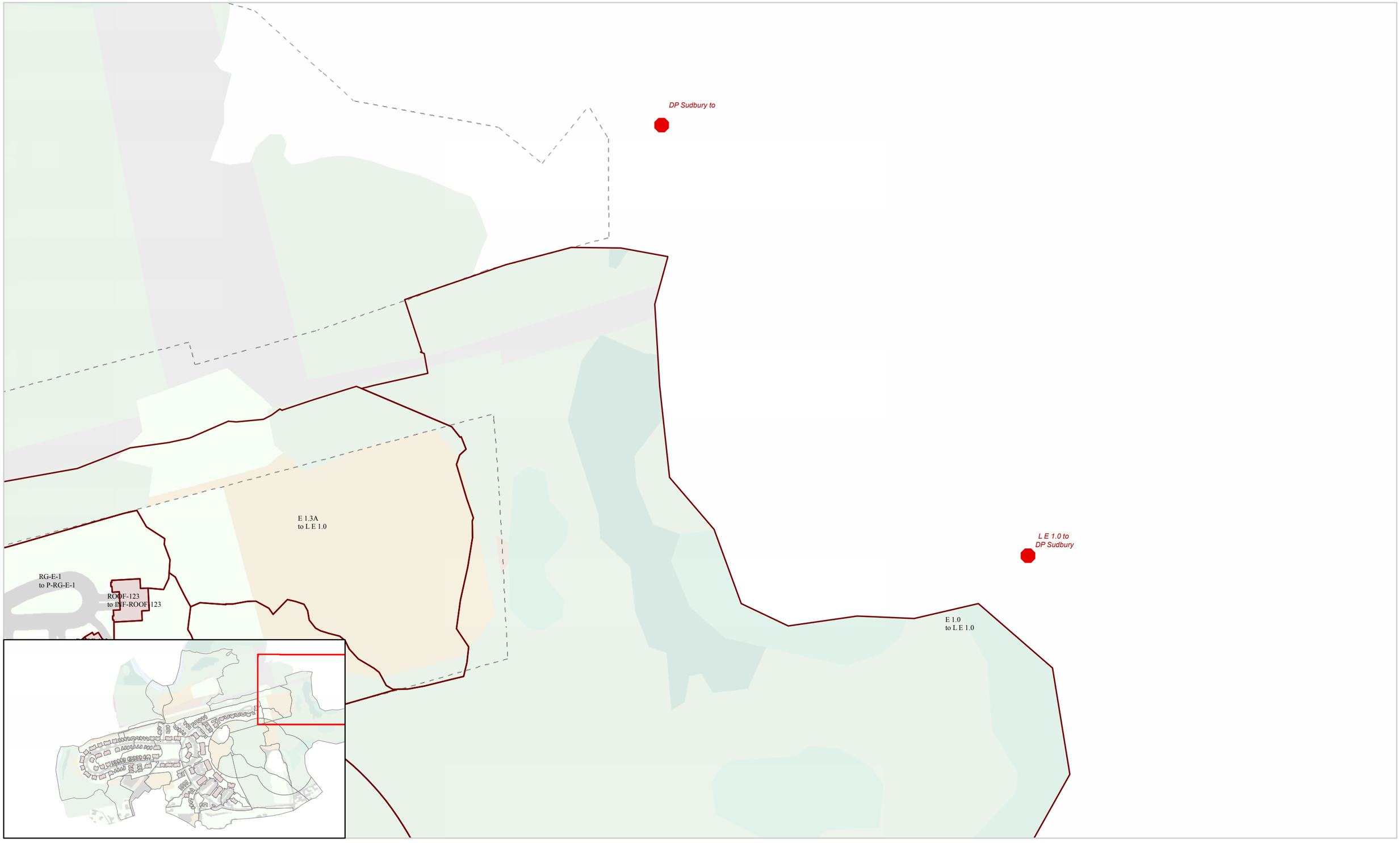
April 2013

0 50 100 200 Feet

1 inch = 125 feet

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Stormwater Report
Proposed Conditions Node Diagram




VHB Vanasse Hangen Brustlin, Inc.

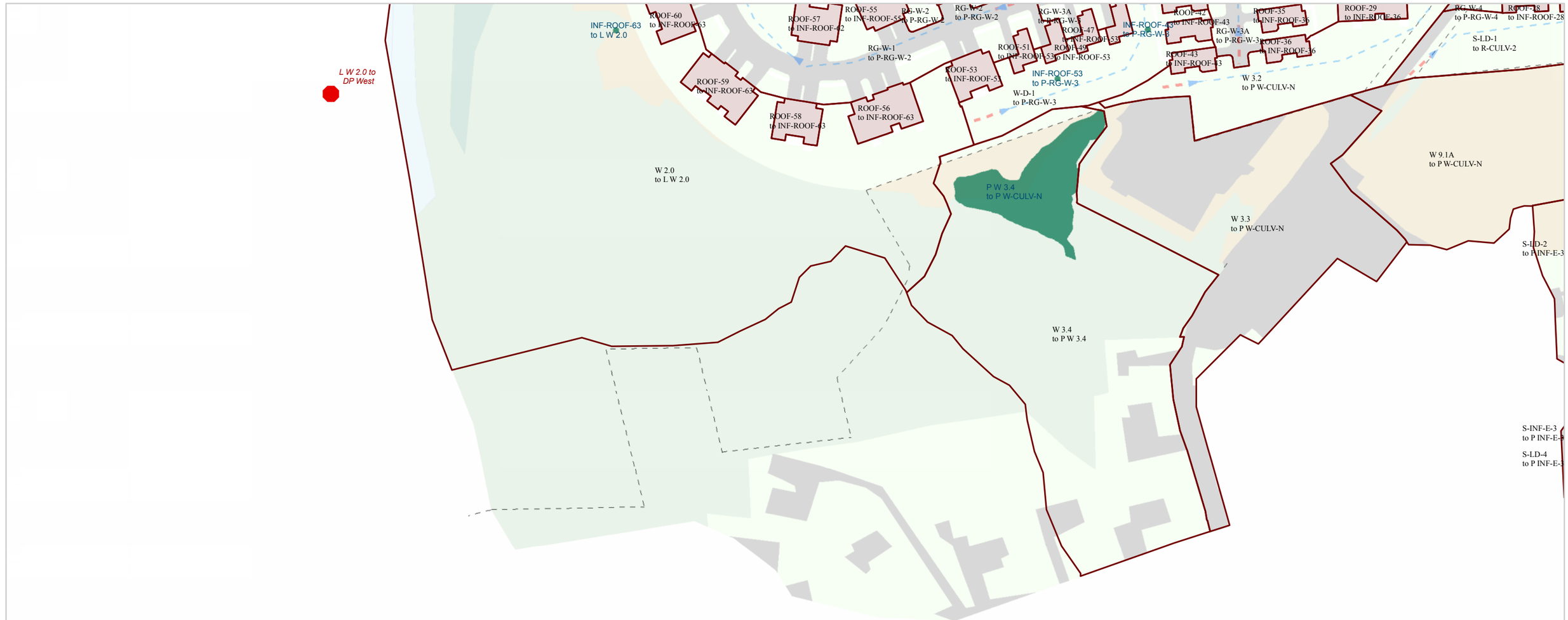
April 2013

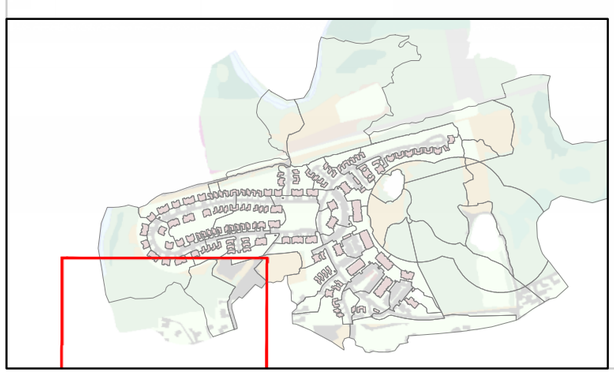
0 50 100 200 Feet

1 inch = 125 feet

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Stormwater Report
Proposed Conditions Node Diagram



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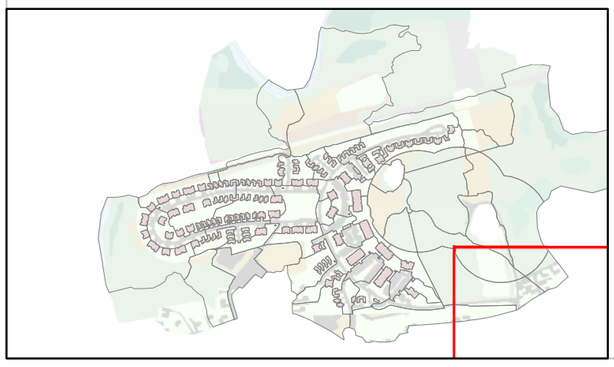

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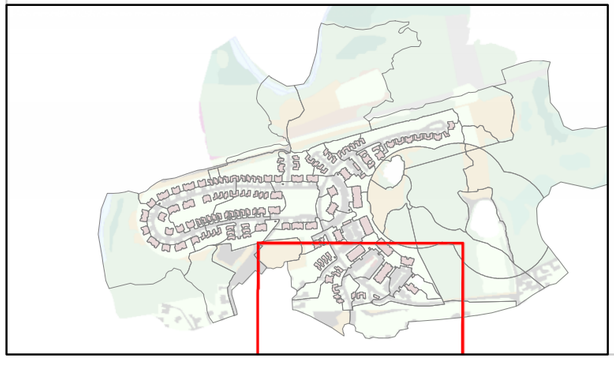
Proposed Conditions Node Diagram



Vanasse Hangen Brustlin, Inc.

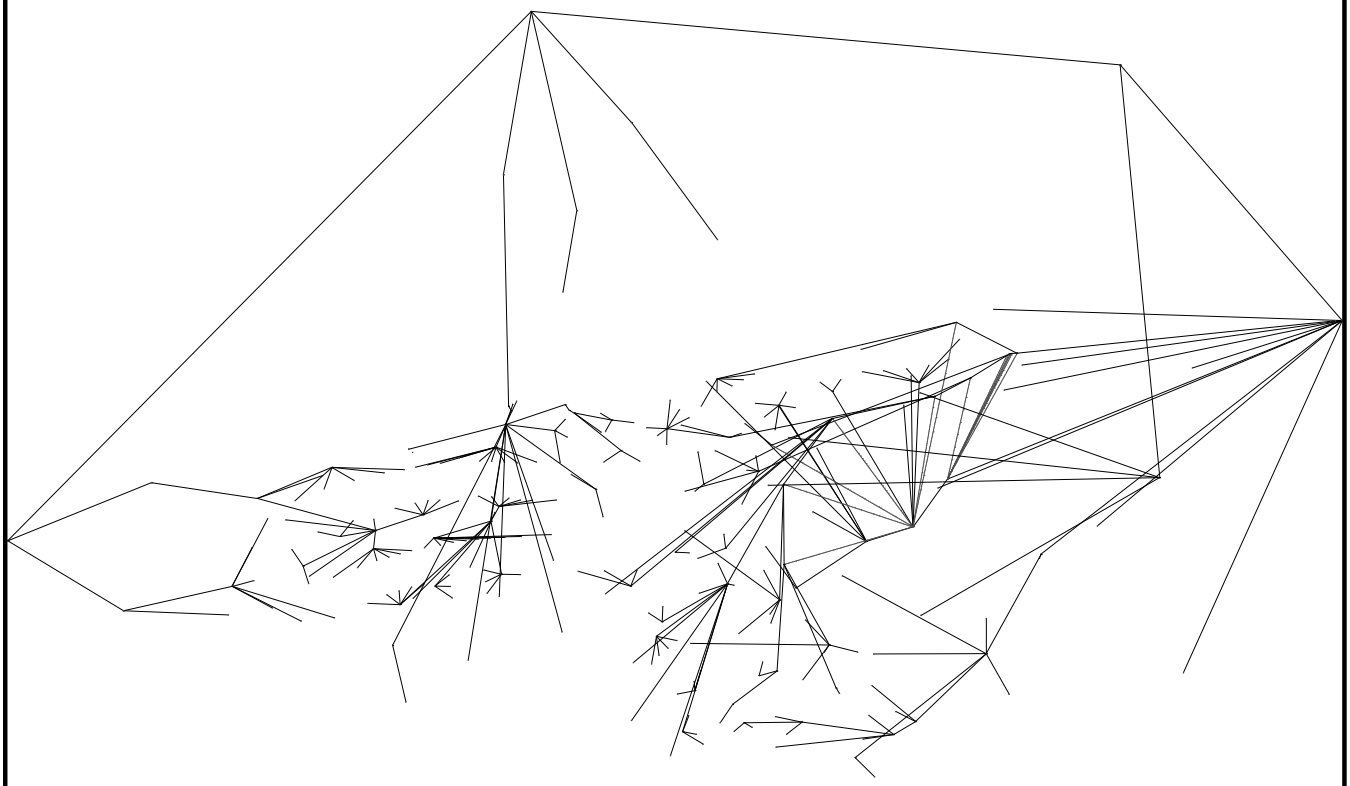
April 2013

0 50 100 200 Feet

1 inch = 125 feet

Danforth Green
Riverpath Drive
Framingham, Massachusetts

Stormwater Report
Proposed Conditions Node Diagram



Subcat Reach Pond Link

**Routing Diagram for PR-12004_CULV**
Prepared by VHB, Inc., Printed 5/10/2013
HydroCAD® 10.00 s/n 07577 © 2012 HydroCAD Software Solutions LLC

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.168 | 98 | DECK, 100% imperv, HSG A (RG-E-1, RG-E-9A, RG-E-9B, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, ROOF-58, W 2.0, W 3.1, W-CULV-N, W-D-1) |
| 0.470 | 98 | DECK, 100% imperv, HSG B (E 1.1B-4, E 1.2B-1, E 1.2C-1, RG-E-1, RG-E-2, RG-E-4A, RG-E-4B, RG-E-8, RG-E-9A, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, RG-W-5, ROOF-10, ROOF-3, ROOF-4, ROOF-5, ROOF-6, ROOF-8, S-CB-E-1, S-CB-INF-E-3, S-DET-1, S-DET-3, S-INF-E-1, S-INF-E-2, S-INF-E-3, S-LD-1, S-LD-11, S-LD-2, S-LD-4, W 2.0, W 3.1, W 3.2, W-CULV-N) |
| 5.244 | 30 | Forest, 0% imperv, HSG A (E 1.0, E 1.0C, E 4.0, W 10.0, W 2.0) |
| 6.873 | 55 | Forest, 0% imperv, HSG B (E 1.0, E 1.0C, E 1.3A, E 4.0) |
| 0.898 | 70 | Forest, 0% imperv, HSG C (E 4.0, W 10.0) |
| 3.960 | 77 | Forest, 0% imperv, HSG D (E 1.0, E 1.0C, E 4.0, W 2.0) |
| 0.610 | 98 | Forest, 0% imperv, HSG W (E 1.0, E 1.0C, E 4.0, W 10.0) |
| 0.851 | 45 | Forested Wetland, 0% imperv, HSG A (E 4.0) |
| 0.761 | 66 | Forested Wetland, 0% imperv, HSG B (E 1.0, E 4.0) |
| 0.031 | 77 | Forested Wetland, 0% imperv, HSG C (E 4.0) |
| 0.857 | 83 | Forested Wetland, 0% imperv, HSG D (E 1.0, W 2.0) |
| 10.524 | 39 | GRASS, 0% imperv, HSG A (E 1.0, E 1.0B, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E 1.1B-4, E 1.2A-1, E 1.2A-2, E 1.3A, E 4.0, E-CULV-S, RG-E-1, RG-E-9A, RG-E-9B, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, RG-W-5, W 10.0, W 2.0, W 3.1, W 3.2, W 3.3, W 3.4, W 9.1B, W-CULV-N, W-D-1, W-D-3) |
| 27.187 | 61 | GRASS, 0% imperv, HSG B (E 1.0C, E 1.1A, E 1.1B, E 1.1B-1, E 1.1B-2, E 1.1B-4, E 1.2A-1, E 1.2A-2, E 1.2B, E 1.2B-1, E 1.2C, E 1.2C-1, E 1.2C-2, E 1.3A, E 4.0, E-CULV-S, RG-E-1, RG-E-2, RG-E-4A, RG-E-4B, RG-E-7, RG-E-8, RG-E-9A, RG-E-9B, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, RG-W-5, ROOF-115, ROOF-2, ROOF-4, ROOF-6, S-CB-E-1, S-CB-INF-E-3, S-CB-INF-E-4A, S-DET-1, S-DET-3, S-INF-E-1, S-INF-E-2, S-INF-E-3, S-LD-1, S-LD-11, S-LD-2, S-LD-4, W 10.0, W 2.0, W 3.1, W 3.2, W 3.3, W 3.4, W 9.1B, W-CULV-N, W-D-1) |
| 4.655 | 77 | GRAVEL, 65% imperv, HSG A (E 1.0, E 1.0A, E 1.0B, E 1.0C, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.3A, E 4.0, RG-W-5, W 10.0, W 2.0, W 3.1, W 3.2, W 3.3, W 3.4, W 9.1B, W-CULV-N, W-D-3) |
| 8.110 | 85 | GRAVEL, 65% imperv, HSG B (E 1.0, E 1.0C, E 1.1A, E 1.1B-1, E 1.1B-2, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.2B, E 1.2B-1, E 1.2C, E 1.2C-1, E 1.3A, E 4.0, E-CULV-S, RG-E-2, RG-E-8, RG-W-5, S-DET-1, S-LD-1, S-LD-2, S-LD-4, W 10.0, W 3.1, W 3.3, W 9.1A, W 9.1B, W-CULV-N) |
| 0.596 | 90 | GRAVEL, 65% imperv, HSG C (E 4.0, W 10.0) |
| 3.309 | 98 | IMP, 100% imperv, HSG A (E 1.0C, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E-CULV-S, RG-E-1, RG-E-9A, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, RG-W-5, W 3.1, W 3.2, W 3.3, W 3.4, W 9.1B, W-CULV-N, W-D-1) |
| 10.719 | 98 | IMP, 100% imperv, HSG B (E 1.0C, E 1.1A, E 1.1B-2, E 1.2A, E 1.2B-1, E 1.2C-1, E 4.0, E-CULV-S, RG-E-1, RG-E-2, RG-E-4A, RG-E-4B, RG-E-7, RG-E-8, RG-E-9A, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, RG-W-5, S-CB-E-1, S-CB-INF-E-3, S-CB-INF-E-4A, S-DET-3, S-INF-E-1, S-INF-E-2, S-INF-E-3, S-LD-1, S-LD-2, S-LD-4, W 3.1, W 3.3, W 9.1A, W 9.1B, W-CULV-N) |

## Area Listing (all nodes) (continued)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.193 | 77 | Mining, 0% imperv, HSG A (E 1.0, E 4.0, W 10.0) |
| 1.302 | 86 | Mining, 0% imperv, HSG B (E 4.0, W 10.0) |
| 0.005 | 91 | Mining, 0% imperv, HSG C (E 4.0) |
| 0.097 | 78 | Non-Forested Wetland, 0% imperv, HSG A (E 1.0, E 1.0C) |
| 1.079 | 78 | Non-Forested Wetland, 0% imperv, HSG B (E 1.0, E 1.0C) |
| 0.576 | 78 | Non-Forested Wetland, 0% imperv, HSG D (E 1.0, E 1.0C) |
| 2.334 | 98 | Non-Forested Wetland, 0% imperv, HSG W (E 1.0, E 1.0C) |
| 0.545 | 79 | Powerline/Utility, 0% imperv, HSG B (E 1.0, E 1.3A, E 4.0) |
| 1.669 | 98 | ROOF, 100% imperv, HSG A (RG-W-1, RG-W-2, ROOF-1, ROOF-121, ROOF-122, ROOF-123, ROOF-40, ROOF-41, ROOF-42, ROOF-43, ROOF-44, ROOF-45, ROOF-46, ROOF-47, ROOF-48, ROOF-49, ROOF-50, ROOF-51, ROOF-52, ROOF-53, ROOF-54, ROOF-55, ROOF-56, ROOF-57, ROOF-58, ROOF-59, ROOF-60, ROOF-61, ROOF-70, ROOF-71, ROOF-72, ROOF-73, ROOF-74, ROOF-75, ROOF-76, ROOF-77, ROOF-78, ROOF-79, ROOF-80, ROOF-81, ROOF-82, ROOF-83, ROOF-84, ROOF-85, ROOF-87, ROOF-89, ROOF-91, ROOF-93, ROOF-95) |
| 5.806 | 98 | ROOF, 100% imperv, HSG B (E 1.2A-2, E 1.2C-2, RG-E-1, RG-E-7, RG-W-3, RG-W-3A, RG-W-5, ROOF-1, ROOF-10, ROOF-100, ROOF-101, ROOF-102, ROOF-103, ROOF-104, ROOF-105, ROOF-106, ROOF-107, ROOF-108, ROOF-109, ROOF-11, ROOF-110, ROOF-111, ROOF-112, ROOF-113, ROOF-114, ROOF-115, ROOF-117, ROOF-118, ROOF-119, ROOF-11MAIL, ROOF-12, ROOF-120, ROOF-121, ROOF-13, ROOF-14, ROOF-15, ROOF-16, ROOF-17, ROOF-18, ROOF-19, ROOF-2, ROOF-20, ROOF-21, ROOF-22, ROOF-23, ROOF-24, ROOF-25, ROOF-26, ROOF-27, ROOF-28, ROOF-29, ROOF-3, ROOF-30, ROOF-31, ROOF-32, ROOF-33, ROOF-34, ROOF-35, ROOF-36, ROOF-37, ROOF-38, ROOF-39, ROOF-4, ROOF-40, ROOF-41, ROOF-42, ROOF-43, ROOF-5, ROOF-57, ROOF-6, ROOF-62, ROOF-63, ROOF-64, ROOF-65, ROOF-66, ROOF-67, ROOF-68, ROOF-69, ROOF-7, ROOF-70, ROOF-72, ROOF-74, ROOF-76, ROOF-78, ROOF-8, ROOF-80, ROOF-82, ROOF-84, ROOF-86, ROOF-88, ROOF-9, ROOF-90, ROOF-91, ROOF-92, ROOF-93, ROOF-94, ROOF-95, ROOF-96, ROOF-97, ROOF-98, ROOF-99, ROOF-BS1, ROOF-MAIL20, ROOF-MAIL29, ROOF-MAIL5, ROOF-MAIL64, ROOF-MAIL8, ROOF-MAIL91, ROOF-MAINT11, ROOF-PL11, ROOF-PL6, ROOF-POOL, ROOF-RECY, S-CB-E-1, S-DET-3, S-INF-E-3, W-D-1) |
| 0.152 | 98 | SIDEWALK, 100% imperv, HSG A (E-CULV-S, RG-E-1, RG-E-9A, RG-E-9B, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, W-D-1) |
| 1.023 | 98 | SIDEWALK, 100% imperv, HSG B (E 1.1B-4, E 1.2B-1, E 1.2C-1, E-CULV-S, RG-E-1, RG-E-2, RG-E-4A, RG-E-4B, RG-E-7, RG-E-8, RG-E-9A, RG-E-9B, RG-W-1, RG-W-2, RG-W-3A, RG-W-4, S-CB-E-1, S-CB-INF-E-3, S-CB-INF-E-4A, S-DET-1, S-DET-3, S-INF-E-1, S-INF-E-2, S-INF-E-3, S-LD-1, S-LD-11, S-LD-2, S-LD-4, W 3.2, W-D-1) |

## Area Listing (all nodes) (continued)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 1.165 | 98 | W, 100% imperv, HSG B (E 1.1A) |
| 0.547 | 98 | WATER, 100% imperv, HSG B (E 1.2C) |
| 10.265 | 30 | WOODS, 0% imperv, HSG A (E 1.0, E 1.0B, E 1.0C, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.3A, RG-W-5, W 2.0, W 3.1, W 3.3, W 3.4, W-CULV-N, W-D-3) |
| 16.084 | 55 | WOODS, 0% imperv, HSG B (E 1.0, E 1.0C, E 1.1A, E 1.1B, E 1.1B-1, E 1.1B-2, E 1.1B-4, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.2B, E 1.2B-1, E 1.2C, E 1.2C-2, E 1.3A, E 4.0, RG-E-1, RG-W-5, S-INF-E-1, S-LD-1, S-LD-2, W 2.0, W 3.1, W 3.3, W 3.4, W 9.1A, W 9.1B) |
| 0.659 | 77 | WOODS, 0% imperv, HSG D (W 2.0) |
| 0.031 | 98 | Water, 100% imperv, HSG A (E 4.0) |
| 0.346 | 98 | Water, 100% imperv, HSG C (E 4.0, W 10.0) |
| 0.443 | 98 | Water, 100% imperv, HSG D (W 2.0) |
| 0.456 | 98 | Water, 100% imperv, HSG W (E 4.0, W 10.0, W 2.0) |
| **130.598** | **66** | **TOTAL AREA** |

## Soil Listing (all nodes)

| Area (acres) | Soil Group | Subcatchment Numbers |
|---|---|---|
| 37.156 | HSG A | E 1.0, E 1.0A, E 1.0B, E 1.0C, E 1.0D, E 1.1A, E 1.1B, E 1.1B-2, E 1.1B-4, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.3A, E 4.0, E-CULV-S, RG-E-1, RG-E-9A, RG-E-9B, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, RG-W-5, ROOF-1, ROOF-121, ROOF-122, ROOF-123, ROOF-40, ROOF-41, ROOF-42, ROOF-43, ROOF-44, ROOF-45, ROOF-46, ROOF-47, ROOF-48, ROOF-49, ROOF-50, ROOF-51, ROOF-52, ROOF-53, ROOF-54, ROOF-55, ROOF-56, ROOF-57, ROOF-58, ROOF-59, ROOF-60, ROOF-61, ROOF-70, ROOF-71, ROOF-72, ROOF-73, ROOF-74, ROOF-75, ROOF-76, ROOF-77, ROOF-78, ROOF-79, ROOF-80, ROOF-81, ROOF-82, ROOF-83, ROOF-84, ROOF-85, ROOF-87, ROOF-89, ROOF-91, ROOF-93, ROOF-95, W 10.0, W 2.0, W 3.1, W 3.2, W 3.3, W 3.4, W 9.1B, W-CULV-N, W-D-1, W-D-3 |
| 81.670 | HSG B | E 1.0, E 1.0C, E 1.1A, E 1.1B, E 1.1B-1, E 1.1B-2, E 1.1B-4, E 1.2A, E 1.2A-1, E 1.2A-2, E 1.2B, E 1.2B-1, E 1.2C, E 1.2C-1, E 1.2C-2, E 1.3A, E 4.0, E-CULV-S, RG-E-1, RG-E-2, RG-E-4A, RG-E-4B, RG-E-7, RG-E-8, RG-E-9A, RG-E-9B, RG-W-1, RG-W-2, RG-W-3, RG-W-3A, RG-W-4, RG-W-5, ROOF-1, ROOF-10, ROOF-100, ROOF-101, ROOF-102, ROOF-103, ROOF-104, ROOF-105, ROOF-106, ROOF-107, ROOF-108, ROOF-109, ROOF-11, ROOF-110, ROOF-111, ROOF-112, ROOF-113, ROOF-114, ROOF-115, ROOF-117, ROOF-118, ROOF-119, ROOF-11MAIL, ROOF-12, ROOF-120, ROOF-121, ROOF-13, ROOF-14, ROOF-15, ROOF-16, ROOF-17, ROOF-18, ROOF-19, ROOF-2, ROOF-20, ROOF-21, ROOF-22, ROOF-23, ROOF-24, ROOF-25, ROOF-26, ROOF-27, ROOF-28, ROOF-29, ROOF-3, ROOF-30, ROOF-31, ROOF-32, ROOF-33, ROOF-34, ROOF-35, ROOF-36, ROOF-37, ROOF-38, ROOF-39, ROOF-4, ROOF-40, ROOF-41, ROOF-42, ROOF-43, ROOF-5, ROOF-57, ROOF-6, ROOF-62, ROOF-63, ROOF-64, ROOF-65, ROOF-66, ROOF-67, ROOF-68, ROOF-69, ROOF-7, ROOF-70, ROOF-72, ROOF-74, ROOF-76, ROOF-78, ROOF-8, ROOF-80, ROOF-82, ROOF-84, ROOF-86, ROOF-88, ROOF-9, ROOF-90, ROOF-91, ROOF-92, ROOF-93, ROOF-94, ROOF-95, ROOF-96, ROOF-97, ROOF-98, ROOF-99, ROOF-BS1, ROOF-MAIL20, ROOF-MAIL29, ROOF-MAIL5, ROOF-MAIL64, ROOF-MAIL8, ROOF-MAIL91, ROOF-MAINT11, ROOF-PL11, ROOF-PL6, ROOF-POOL, ROOF-RECY, S-CB-E-1, S-CB-INF-E-3, S-CB-INF-E-4A, S-DET-1, S-DET-3, S-INF-E-1, S-INF-E-2, S-INF-E-3, S-LD-1, S-LD-11, S-LD-2, S-LD-4, W 10.0, W 2.0, W 3.1, W 3.2, W 3.3, W 3.4, W 9.1A, W 9.1B, W-CULV-N, W-D-1 |
| 1.876 | HSG C | E 4.0, W 10.0 |
| 6.495 | HSG D | E 1.0, E 1.0C, E 4.0, W 2.0 |
| 3.401 | Other | E 1.0, E 1.0C, E 4.0, W 10.0, W 2.0 |
| **130.598** | | **TOTAL AREA** |

## Ground Covers (all nodes)

| HSG-A (acres) | HSG-B (acres) | HSG-C (acres) | HSG-D (acres) | Other (acres) | Total (acres) | Ground Cover | Subcatchme Numbers |
|---|---|---|---|---|---|---|---|
| 0.168 | 0.470 | 0.000 | 0.000 | 0.000 | 0.638 | DECK, 100% imperv | |
| 5.244 | 6.873 | 0.898 | 3.960 | 0.610 | 17.584 | Forest, 0% imperv | |
| 0.851 | 0.761 | 0.031 | 0.857 | 0.000 | 2.499 | Forested Wetland, 0% imperv | |
| 10.524 | 27.187 | 0.000 | 0.000 | 0.000 | 37.710 | GRASS, 0% imperv | |
| 4.655 | 8.110 | 0.596 | 0.000 | 0.000 | 13.360 | GRAVEL, 65% imperv | |
| 3.309 | 10.719 | 0.000 | 0.000 | 0.000 | 14.028 | IMP, 100% imperv | |
| 0.193 | 1.302 | 0.005 | 0.000 | 0.000 | 1.500 | Mining, 0% imperv | |
| 0.097 | 1.079 | 0.000 | 0.576 | 2.334 | 4.086 | Non-Forested Wetland, 0% imperv | |
| 0.000 | 0.545 | 0.000 | 0.000 | 0.000 | 0.545 | Powerline/Utility, 0% imperv | |
| 1.669 | 5.806 | 0.000 | 0.000 | 0.000 | 7.475 | ROOF, 100% imperv | |
| 0.152 | 1.023 | 0.000 | 0.000 | 0.000 | 1.176 | SIDEWALK, 100% imperv | |
| 0.000 | 1.165 | 0.000 | 0.000 | 0.000 | 1.165 | W, 100% imperv | |
| 0.000 | 0.547 | 0.000 | 0.000 | 0.000 | 0.547 | WATER, 100% imperv | |
| 10.265 | 16.084 | 0.000 | 0.659 | 0.000 | 27.008 | WOODS, 0% imperv | |
| 0.031 | 0.000 | 0.346 | 0.443 | 0.456 | 1.276 | Water, 100% imperv | |
| **37.156** | **81.670** | **1.876** | **6.495** | **3.401** | **130.598** | **TOTAL AREA** | |

## Pipe Listing (all nodes)

| Line# | Node Number | In-Invert (feet) | Out-Invert (feet) | Length (feet) | Slope (ft/ft) | n | Diam/Width (inches) | Height (inches) | Inside-Fill (inches) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | RG-E-9A | 0.00 | 0.00 | 32.6 | 0.0114 | 0.011 | 12.0 | 0.0 | 0.0 |
| 2 | DET-1 | 164.00 | 163.80 | 15.0 | 0.0133 | 0.013 | 18.0 | 0.0 | 0.0 |
| 3 | DET-2 | 162.00 | 161.80 | 25.0 | 0.0080 | 0.013 | 18.0 | 0.0 | 0.0 |
| 4 | DET-3 | 169.00 | 168.40 | 48.0 | 0.0125 | 0.013 | 18.0 | 0.0 | 0.0 |
| 5 | P E-CULV-S | 164.00 | 158.00 | 236.0 | 0.0254 | 0.013 | 18.0 | 0.0 | 0.0 |
| 6 | P INF-E-1 | 160.50 | 159.50 | 200.0 | 0.0050 | 0.013 | 18.0 | 0.0 | 0.0 |
| 7 | P INF-E-2 | 162.00 | 161.00 | 200.0 | 0.0050 | 0.013 | 18.0 | 0.0 | 0.0 |
| 8 | P INF-E-3 | 162.75 | 161.75 | 200.0 | 0.0050 | 0.013 | 24.0 | 0.0 | 0.0 |
| 9 | P INF-E-4A | 168.00 | 167.00 | 200.0 | 0.0050 | 0.013 | 24.0 | 0.0 | 0.0 |
| 10 | P INF-E-4B | 166.90 | 166.80 | 200.0 | 0.0005 | 0.013 | 18.0 | 0.0 | 0.0 |
| 11 | P MH-CULV-NA | 147.58 | 147.58 | 19.8 | 0.0000 | 0.011 | 42.0 | 42.0 | 0.0 |
| 12 | P MH-CULV-NB | 147.58 | 148.58 | 35.3 | -0.0283 | 0.011 | 42.0 | 42.0 | 0.0 |
| 13 | P RG-E-7 | 169.40 | 169.20 | 35.0 | 0.0057 | 0.013 | 18.0 | 0.0 | 0.0 |
| 14 | P RG-E-9A | 151.00 | 150.20 | 46.0 | 0.0174 | 0.013 | 18.0 | 0.0 | 0.0 |
| 15 | P S-CB-E-1 | 167.80 | 169.20 | 16.0 | -0.0875 | 0.013 | 18.0 | 0.0 | 0.0 |
| 16 | P W-CULV-N | 151.58 | 147.58 | 25.2 | 0.1587 | 0.011 | 36.0 | 36.0 | 0.0 |
| 17 | P W-D-3 | 156.12 | 155.29 | 77.2 | 0.0108 | 0.011 | 12.0 | 0.0 | 0.0 |
| 18 | P-RG-E-1 | 140.00 | 139.50 | 50.0 | 0.0100 | 0.013 | 18.0 | 0.0 | 0.0 |
| 19 | P-RG-E-2 | 155.90 | 155.70 | 18.0 | 0.0111 | 0.013 | 18.0 | 0.0 | 0.0 |
| 20 | P-RG-E-4A | 168.00 | 167.30 | 65.0 | 0.0108 | 0.013 | 18.0 | 0.0 | 0.0 |
| 21 | P-RG-E-4B | 162.90 | 161.90 | 72.0 | 0.0139 | 0.013 | 18.0 | 0.0 | 0.0 |
| 22 | P-RG-E-8 | 170.40 | 169.20 | 91.0 | 0.0132 | 0.013 | 18.0 | 0.0 | 0.0 |
| 23 | P-RG-W-2 | 162.10 | 160.80 | 135.0 | 0.0096 | 0.013 | 18.0 | 0.0 | 0.0 |
| 24 | P-RG-W-3 | 164.00 | 163.00 | 133.0 | 0.0075 | 0.013 | 18.0 | 0.0 | 0.0 |
| 25 | P-RG-W-4 | 166.40 | 166.00 | 42.0 | 0.0095 | 0.013 | 18.0 | 0.0 | 0.0 |
| 26 | R-CULV-1 | 162.00 | 158.10 | 195.0 | 0.0200 | 0.013 | 24.0 | 0.0 | 0.0 |
| 27 | R-CULV-10 | 136.50 | 135.00 | 339.0 | 0.0044 | 0.013 | 36.0 | 0.0 | 0.0 |
| 28 | R-CULV-2 | 158.00 | 155.10 | 191.0 | 0.0152 | 0.013 | 36.0 | 0.0 | 0.0 |
| 29 | R-CULV-3 | 155.00 | 150.10 | 230.0 | 0.0213 | 0.013 | 24.0 | 0.0 | 0.0 |
| 30 | R-CULV-4 | 150.00 | 149.50 | 38.0 | 0.0132 | 0.013 | 24.0 | 0.0 | 0.0 |
| 31 | R-CULV-5 | 149.40 | 148.10 | 78.3 | 0.0166 | 0.013 | 24.0 | 0.0 | 0.0 |
| 32 | R-CULV-6 | 148.00 | 145.10 | 135.0 | 0.0215 | 0.013 | 36.0 | 0.0 | 0.0 |
| 33 | R-CULV-7 | 145.00 | 141.10 | 197.0 | 0.0198 | 0.013 | 36.0 | 0.0 | 0.0 |
| 34 | R-CULV-8 | 141.00 | 138.70 | 197.0 | 0.0117 | 0.013 | 36.0 | 0.0 | 0.0 |
| 35 | R-CULV-9 | 138.71 | 136.60 | 197.0 | 0.0107 | 0.013 | 36.0 | 0.0 | 0.0 |

## Notes Listing (all nodes)

| Line# | Node Number | Notes |
|---|---|---|
| 1 | P INF-E-1 | Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5% |
| 2 | | Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr. |
| 3 | P INF-E-2 | Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5% |
| 4 | | Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr. |
| 5 | P INF-E-3 | Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5% |
| 6 | | Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr. |
| 7 | P INF-E-4A | Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5% |
| 8 | | Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr. |
| 9 | P INF-E-4B | Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5% |
| 10 | | Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr. |
| 11 | P RG-E-9B | No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours. |
| 12 | P RG-W-5C | No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.1 in/hr to drawdown in 72 hours. |
| 13 | P-RG-E-1 | No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours. |
| 14 | P-RG-E-2 | No Infiltration rate assumed in the model. However, an infiltration rate of 0.17 in/hr will be required to meet the 72 hour drawdown requirement. |
| 15 | P-RG-W-3 | No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.85 in/hr to drawdown in 72 hours. |

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>0.48"
Flow Length=583' Tc=11.3 min CN=65 Runoff=6.44 cfs 0.540 af

**SubcatchmentE 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>1.03"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.13 cfs 0.008 af

**SubcatchmentE 1.0B: (blank)** Runoff Area=33,902 sf 25.51% Impervious Runoff Depth>0.14"
Flow Length=186' Tc=6.0 min CN=53 Runoff=0.03 cfs 0.009 af

**SubcatchmentE 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>0.48"
Flow Length=277' Tc=6.0 min CN=65 Runoff=3.82 cfs 0.262 af

**SubcatchmentE 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>0.26"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=0.25 cfs 0.026 af

**SubcatchmentE 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>1.34"
Flow Length=346' Tc=6.0 min CN=82 Runoff=4.93 cfs 0.301 af

**SubcatchmentE 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>0.13"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=0.11 cfs 0.046 af

**SubcatchmentE 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>0.20"
Flow Length=252' Tc=7.5 min CN=56 Runoff=0.15 cfs 0.023 af

**SubcatchmentE 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>0.18"
Flow Length=139' Tc=6.0 min CN=55 Runoff=0.46 cfs 0.081 af

**SubcatchmentE 1.1B-4: (blank)** Runoff Area=38,504 sf 0.00% Impervious Runoff Depth>0.35"
Tc=0.0 min CN=61 Runoff=0.38 cfs 0.026 af

**SubcatchmentE 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>0.20"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=0.35 cfs 0.084 af

**SubcatchmentE 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>0.29"
Flow Length=344' Tc=6.0 min CN=59 Runoff=0.36 cfs 0.034 af

**SubcatchmentE 1.2A-2: (blank)** Runoff Area=48,650 sf 0.01% Impervious Runoff Depth>0.12"
Flow Length=93' Tc=6.0 min CN=52 Runoff=0.03 cfs 0.011 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>1.15"
Flow Length=448' Tc=6.0 min CN=79 Runoff=3.00 cfs 0.183 af

**SubcatchmentE 1.2B-1: (blank)** Runoff Area=28,861 sf 2.32% Impervious Runoff Depth>0.38"
Flow Length=182' Tc=8.0 min CN=62 Runoff=0.25 cfs 0.021 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>1.34"
Flow Length=193' Tc=6.0 min CN=82 Runoff=1.93 cfs 0.118 af

**SubcatchmentE 1.2C-1: (blank)** Runoff Area=15,993 sf 0.21% Impervious Runoff Depth>0.52"
Flow Length=98' Tc=6.0 min CN=66 Runoff=0.24 cfs 0.016 af

**SubcatchmentE 1.2C-2: (blank)** Runoff Area=20,935 sf 0.00% Impervious Runoff Depth>0.34"
Flow Length=288' Tc=7.7 min CN=61 Runoff=0.16 cfs 0.014 af

**SubcatchmentE 1.3A: (blank)** Runoff Area=201,598 sf 29.96% Impervious Runoff Depth>0.44"
Flow Length=1,196' Tc=20.9 min CN=64 Runoff=1.44 cfs 0.170 af

**SubcatchmentE 4.0: (blank)** Runoff Area=604,094 sf 9.70% Impervious Runoff Depth>0.24"
Flow Length=1,859' Tc=50.0 min CN=58 Runoff=1.05 cfs 0.283 af

**SubcatchmentE-CULV-S: (blank)** Runoff Area=196,467 sf 0.93% Impervious Runoff Depth>0.44"
Flow Length=319' Tc=9.5 min CN=64 Runoff=2.06 cfs 0.167 af

**SubcatchmentRG-E-1: (blank)** Runoff Area=104,917 sf 0.00% Impervious Runoff Depth>0.73"
Flow Length=750' Tc=7.6 min CN=71 Runoff=2.22 cfs 0.146 af

**SubcatchmentRG-E-2: (blank)** Runoff Area=20,767 sf 0.08% Impervious Runoff Depth>1.09"
Flow Length=270' Tc=6.0 min CN=78 Runoff=0.71 cfs 0.043 af

**SubcatchmentRG-E-4A: (blank)** Runoff Area=21,054 sf 0.00% Impervious Runoff Depth>0.83"
Flow Length=114' Tc=6.0 min CN=73 Runoff=0.54 cfs 0.033 af

**SubcatchmentRG-E-4B: (blank)** Runoff Area=22,865 sf 0.00% Impervious Runoff Depth>1.40"
Flow Length=197' Tc=6.0 min CN=83 Runoff=1.00 cfs 0.061 af

**SubcatchmentRG-E-7: (blank)** Runoff Area=41,427 sf 0.00% Impervious Runoff Depth>1.94"
Flow Length=88' Tc=6.0 min CN=90 Runoff=2.40 cfs 0.153 af

**SubcatchmentRG-E-8: (blank)** Runoff Area=28,390 sf 0.01% Impervious Runoff Depth>0.87"
Flow Length=252' Tc=6.0 min CN=74 Runoff=0.78 cfs 0.048 af

**SubcatchmentRG-E-9A: (blank)** Runoff Area=43,781 sf 0.00% Impervious Runoff Depth>0.93"
Flow Length=372' Tc=8.2 min CN=75 Runoff=1.18 cfs 0.077 af

**SubcatchmentRG-E-9B: (blank)** Runoff Area=22,781 sf 0.00% Impervious Runoff Depth>0.31"
Flow Length=186' Tc=6.0 min CN=60 Runoff=0.16 cfs 0.014 af

**SubcatchmentRG-W-1: (blank)** Runoff Area=65,101 sf 0.00% Impervious Runoff Depth>0.93"
Flow Length=495' Tc=6.0 min CN=75 Runoff=1.89 cfs 0.115 af

**SubcatchmentRG-W-2: (blank)** Runoff Area=111,691 sf 0.00% Impervious Runoff Depth>0.56"
Flow Length=336' Tc=6.0 min CN=67 Runoff=1.82 cfs 0.119 af

**SubcatchmentRG-W-3: (blank)** Runoff Area=91,227 sf 0.00% Impervious Runoff Depth>0.45"
Flow Length=97' Tc=6.0 min CN=64 Runoff=1.10 cfs 0.078 af

**SubcatchmentRG-W-3A: (blank)** Runoff Area=37,790 sf 0.00% Impervious Runoff Depth>1.62"
Flow Length=365' Tc=6.0 min CN=86 Runoff=1.88 cfs 0.117 af

**SubcatchmentRG-W-4: (blank)** Runoff Area=100,346 sf 0.00% Impervious Runoff Depth>0.87"
Flow Length=452' Tc=6.1 min CN=74 Runoff=2.73 cfs 0.168 af

**SubcatchmentRG-W-5: (blank)** Runoff Area=42,562 sf 0.79% Impervious Runoff Depth>0.60"
Flow Length=182' Tc=6.0 min CN=68 Runoff=0.76 cfs 0.049 af

**SubcatchmentROOF-1: (blank)** Runoff Area=4,580 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-10: (blank)** Runoff Area=4,268 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.022 af

**SubcatchmentROOF-100: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-101: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-102: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-103: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-104: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-105: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-106: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-107: (blank)** Runoff Area=1,154 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.09 cfs 0.006 af

**SubcatchmentROOF-108: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-109: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-11: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.026 af

**SubcatchmentROOF-110: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-111: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.016 af

**SubcatchmentROOF-112: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-113: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-114: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.016 af

**SubcatchmentROOF-115: (blank)** Runoff Area=2,606 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.014 af

**SubcatchmentROOF-117: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-118: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.014 af

**SubcatchmentROOF-119: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-11MAIL: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.000 af

**SubcatchmentROOF-12: (blank)** Runoff Area=2,311 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-120: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-121: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.014 af

**SubcatchmentROOF-122: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-123: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.014 af

**SubcatchmentROOF-13: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-14: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-15: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-16: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-17: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.016 af

**SubcatchmentROOF-18: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.008 af

**SubcatchmentROOF-19: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.008 af

**SubcatchmentROOF-2: (blank)** Runoff Area=5,339 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.44 cfs 0.028 af

**SubcatchmentROOF-20: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.008 af

**SubcatchmentROOF-21: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.008 af

**SubcatchmentROOF-22: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.008 af

**SubcatchmentROOF-23: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.008 af

**SubcatchmentROOF-24: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.016 af

**SubcatchmentROOF-25: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-26: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-27: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

**SubcatchmentROOF-28: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-29: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-3: (blank)** Runoff Area=11,005 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.91 cfs 0.057 af

**SubcatchmentROOF-30: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-31: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.014 af

**SubcatchmentROOF-32: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-33: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-34: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-35: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-36: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-37: (blank)** Runoff Area=1,153 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.09 cfs 0.006 af

**SubcatchmentROOF-38: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-39: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-4: (blank)** Runoff Area=9,675 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.80 cfs 0.050 af

**SubcatchmentROOF-40: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-41: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-42: (blank)** Runoff Area=1,505 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.008 af

**SubcatchmentROOF-43: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.008 af

**SubcatchmentROOF-44: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-45: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-46: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-47: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-48: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-49: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-5: (blank)** Runoff Area=9,831 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.051 af

**SubcatchmentROOF-50: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-51: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-52: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-53: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-54: (blank)** Runoff Area=2,936 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-55: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-56: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-57: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-58: (blank)** Runoff Area=2,942 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-59: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

**SubcatchmentROOF-6: (blank)** Runoff Area=9,941 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.82 cfs 0.052 af

**SubcatchmentROOF-60: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-61: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

**SubcatchmentROOF-62: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-63: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-64: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

**SubcatchmentROOF-65: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

**SubcatchmentROOF-66: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-67: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-68: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

**SubcatchmentROOF-69: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-7: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.026 af

**SubcatchmentROOF-70: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-71: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-72: (blank)** Runoff Area=1,156 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-73: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-74: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-75: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-76: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-77: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-78: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-79: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-8: (blank)** Runoff Area=11,381 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.94 cfs 0.059 af

**SubcatchmentROOF-80: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-81: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-82: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-83: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-84: (blank)** Runoff Area=1,149 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.09 cfs 0.006 af

**SubcatchmentROOF-85: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-86: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-87: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-88: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-89: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-9: (blank)** Runoff Area=4,992 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.026 af

**SubcatchmentROOF-90: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-91: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.24 cfs 0.015 af

**SubcatchmentROOF-92: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.012 af

**SubcatchmentROOF-93: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.014 af

**SubcatchmentROOF-94: (blank)** Runoff Area=1,301 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.007 af

**SubcatchmentROOF-95: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-96: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.36 cfs 0.023 af

**SubcatchmentROOF-97: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.38 cfs 0.024 af

**SubcatchmentROOF-98: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-99: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.006 af

**SubcatchmentROOF-BS1: (blank)** Runoff Area=84 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.000 af

**SubcatchmentROOF-MAIL20: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL29: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.000 af

**SubcatchmentROOF-MAIL5: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL64: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.000 af

**SubcatchmentROOF-MAIL8: (blank)** Runoff Area=97 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL91: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.000 af

**SubcatchmentROOF-MAINT11: (blank)** Runoff Area=1,104 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.09 cfs 0.006 af

**SubcatchmentROOF-PL11: (blank)** Runoff Area=1,431 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.007 af

**SubcatchmentROOF-PL6: (blank)** Runoff Area=1,429 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.007 af

**SubcatchmentROOF-POOL: (blank)** Runoff Area=449 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.04 cfs 0.002 af

**SubcatchmentROOF-RECY: (blank)** Runoff Area=854 sf 0.00% Impervious Runoff Depth>2.72"
Tc=0.0 min CN=98 Runoff=0.07 cfs 0.004 af

**SubcatchmentS-CB-E-1: (blank)** Runoff Area=47,382 sf 0.00% Impervious Runoff Depth>1.09"
Flow Length=297' Tc=6.0 min CN=78 Runoff=1.63 cfs 0.099 af

**SubcatchmentS-CB-INF-E-3: (blank)** Runoff Area=25,604 sf 0.00% Impervious Runoff Depth>2.03"
Tc=0.0 min CN=91 Runoff=1.79 cfs 0.099 af

**SubcatchmentS-CB-INF-E-4A: (blank)** Runoff Area=25,704 sf 0.00% Impervious Runoff Depth>2.30"
Tc=0.0 min CN=94 Runoff=1.96 cfs 0.113 af

**SubcatchmentS-DET-1: (blank)** Runoff Area=17,810 sf 0.18% Impervious Runoff Depth>0.41"
Flow Length=96' Tc=9.6 min CN=63 Runoff=0.16 cfs 0.014 af

**SubcatchmentS-DET-3: (blank)** Runoff Area=17,177 sf 0.00% Impervious Runoff Depth>0.52"
Flow Length=131' Tc=8.8 min CN=66 Runoff=0.23 cfs 0.017 af

**SubcatchmentS-INF-E-1: (blank)** Runoff Area=51,657 sf 0.00% Impervious Runoff Depth>1.09"
Flow Length=363' Tc=8.3 min CN=78 Runoff=1.65 cfs 0.108 af

**SubcatchmentS-INF-E-2: (blank)** Runoff Area=50,824 sf 0.00% Impervious Runoff Depth>1.40"
Flow Length=358' Tc=6.6 min CN=83 Runoff=2.20 cfs 0.136 af

**SubcatchmentS-INF-E-3: (blank)** Runoff Area=74,846 sf 0.00% Impervious Runoff Depth>0.98"
Flow Length=616' Tc=13.2 min CN=76 Runoff=1.81 cfs 0.140 af

**SubcatchmentS-LD-1: (blank)** Runoff Area=46,138 sf 4.25% Impervious Runoff Depth>0.48"
Flow Length=447' Tc=13.4 min CN=65 Runoff=0.47 cfs 0.042 af

**SubcatchmentS-LD-11: (blank)** Runoff Area=18,104 sf 0.00% Impervious Runoff Depth>0.52"
Tc=0.0 min CN=66 Runoff=0.32 cfs 0.018 af

**SubcatchmentS-LD-2: (blank)** Runoff Area=74,501 sf 9.20% Impervious Runoff Depth>0.60"
Flow Length=214' Tc=6.0 min CN=68 Runoff=1.32 cfs 0.085 af

**SubcatchmentS-LD-4: (blank)** Runoff Area=94,445 sf 9.85% Impervious Runoff Depth>0.93"
Flow Length=345' Tc=8.3 min CN=75 Runoff=2.53 cfs 0.167 af

**SubcatchmentW 10.0: (blank)** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>0.68"
Flow Length=509' Tc=8.8 min CN=70 Runoff=1.99 cfs 0.139 af

**SubcatchmentW 2.0: (blank)** Runoff Area=331,247 sf 3.38% Impervious Runoff Depth>0.10"
Flow Length=793' Tc=15.6 min CN=51 Runoff=0.13 cfs 0.062 af

**SubcatchmentW 3.1: (blank)** Runoff Area=57,507 sf 19.47% Impervious Runoff Depth>0.78"
Flow Length=413' Tc=8.1 min CN=72 Runoff=1.28 cfs 0.085 af

**SubcatchmentW 3.2: (blank)** Runoff Area=34,449 sf 0.01% Impervious Runoff Depth>0.34"
Flow Length=456' Tc=12.9 min CN=61 Runoff=0.21 cfs 0.023 af

**SubcatchmentW 3.3: (blank)** Runoff Area=88,756 sf 10.36% Impervious Runoff Depth>1.85"
Flow Length=530' Tc=6.0 min CN=89 Runoff=4.96 cfs 0.315 af

**SubcatchmentW 3.4: (blank)** Runoff Area=132,546 sf 5.02% Impervious Runoff Depth>0.00"
Flow Length=460' Tc=14.6 min CN=41 Runoff=0.00 cfs 0.000 af

**SubcatchmentW 9.1A: (blank)** Runoff Area=64,234 sf 61.01% Impervious Runoff Depth>1.54"
Flow Length=323' Tc=6.0 min CN=85 Runoff=3.07 cfs 0.190 af

**SubcatchmentW 9.1B: (blank)** Runoff Area=24,364 sf 16.02% Impervious Runoff Depth>0.41"
Flow Length=235' Tc=6.0 min CN=63 Runoff=0.26 cfs 0.019 af

**SubcatchmentW-CULV-N: (blank)** Runoff Area=74,124 sf 5.73% Impervious Runoff Depth>0.03"
Flow Length=84' Tc=6.0 min CN=46 Runoff=0.01 cfs 0.004 af

**SubcatchmentW-D-1: (blank)** Runoff Area=26,114 sf 0.00% Impervious Runoff Depth>0.01"
Flow Length=312' Tc=22.9 min CN=44 Runoff=0.00 cfs 0.001 af

**SubcatchmentW-D-3: (blank)** Runoff Area=6,640 sf 9.99% Impervious Runoff Depth>0.01"
Flow Length=89' Slope=0.1229 '/' Tc=6.0 min CN=43 Runoff=0.00 cfs 0.000 af

**Reach R-SWALE1: (new Reach)** Avg. Flow Depth=0.01' Max Vel=0.33 fps Inflow=0.25 cfs 0.021 af
n=0.035 L=377.0' S=0.0531 '/' Capacity=189.21 cfs Outflow=0.11 cfs 0.020 af

**Reach R-SWALE2: (new Reach)** Avg. Flow Depth=0.08' Max Vel=1.03 fps Inflow=5.34 cfs 0.354 af
n=0.035 L=174.0' S=0.0172 '/' Capacity=107.87 cfs Outflow=5.03 cfs 0.351 af

**Reach R-SWALE3: (new Reach)** Avg. Flow Depth=0.06' Max Vel=0.62 fps Inflow=5.40 cfs 0.403 af
n=0.035 L=302.0' S=0.0099 '/' Capacity=161.76 cfs Outflow=4.17 cfs 0.395 af

**Pond DET-1: 387** Peak Elev=169.31' Storage=5,484 cf Inflow=1.83 cfs 0.127 af
Outflow=0.03 cfs 0.001 af

**Pond DET-2: 391** Peak Elev=164.71' Storage=2,537 cf Inflow=2.36 cfs 0.148 af
Outflow=1.20 cfs 0.109 af

**Pond DET-3: 395** Peak Elev=174.70' Storage=3,167 cf Inflow=2.23 cfs 0.153 af
Outflow=1.06 cfs 0.099 af

**Pond INF-ROOF-100: 368** Peak Elev=170.93' Storage=1,639 cf Inflow=0.60 cfs 0.038 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-110: 299** Peak Elev=166.69' Storage=109 cf Inflow=0.57 cfs 0.036 af
Outflow=0.55 cfs 0.034 af

**Pond INF-ROOF-114: 297** Peak Elev=164.02' Storage=2,319 cf Inflow=0.89 cfs 0.057 af
Outflow=0.02 cfs 0.003 af

**Pond INF-ROOF-117: 295** Peak Elev=162.53' Storage=1,115 cf Inflow=0.40 cfs 0.026 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-123: 119** Peak Elev=148.53' Storage=2,784 cf Inflow=1.12 cfs 0.071 af
Outflow=0.03 cfs 0.007 af

**Pond INF-ROOF-13: 384** Peak Elev=179.81' Storage=819 cf Inflow=0.30 cfs 0.019 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-16: 375** Peak Elev=181.02' Storage=1,115 cf Inflow=0.40 cfs 0.026 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-19: 377** Peak Elev=177.87' Storage=1,364 cf Inflow=0.50 cfs 0.031 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-23: 372** Peak Elev=181.84' Storage=1,319 cf Inflow=0.48 cfs 0.030 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-25: 382** Peak Elev=174.21' Storage=1,056 cf Inflow=0.38 cfs 0.024 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-28:** Peak Elev=174.77' Storage=1,161 cf Inflow=0.98 cfs 0.062 af
Outflow=0.93 cfs 0.037 af

**Pond INF-ROOF-3: 370** Peak Elev=162.92' Storage=3,566 cf Inflow=1.29 cfs 0.082 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-36: 366** Peak Elev=190.02' Storage=2,096 cf Inflow=0.76 cfs 0.048 af
Outflow=0.02 cfs 0.000 af

**Pond INF-ROOF-43: 364** Peak Elev=162.15' Storage=1,045 cf Inflow=0.38 cfs 0.024 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-53: 362** Peak Elev=162.06' Storage=1,716 cf Inflow=0.62 cfs 0.039 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-55: 314** Peak Elev=163.11' Storage=2,446 cf Inflow=0.89 cfs 0.056 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-62: 310** Peak Elev=190.03' Storage=1,048 cf Inflow=0.48 cfs 0.031 af
Outflow=0.04 cfs 0.007 af

**Pond INF-ROOF-63: 308** Peak Elev=190.29' Storage=3,144 cf Inflow=1.83 cfs 0.116 af
Outflow=1.00 cfs 0.044 af

**Pond INF-ROOF-67: 316** Peak Elev=190.24' Storage=1,048 cf Inflow=0.74 cfs 0.047 af
Outflow=0.79 cfs 0.023 af

**Pond INF-ROOF-71: 312** Peak Elev=190.09' Storage=2,620 cf Inflow=1.30 cfs 0.083 af
Outflow=0.17 cfs 0.022 af

**Pond INF-ROOF-76: 318** Peak Elev=163.02' Storage=2,010 cf Inflow=0.73 cfs 0.046 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-89: 338** Peak Elev=162.13' Storage=3,126 cf Inflow=1.13 cfs 0.072 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-90: 336** Peak Elev=163.03' Storage=2,418 cf Inflow=0.88 cfs 0.056 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-94: 342** Peak Elev=163.77' Storage=1,344 cf Inflow=0.49 cfs 0.031 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-95: 340** Peak Elev=164.71' Storage=1,519 cf Inflow=0.55 cfs 0.035 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-96: 344** Peak Elev=190.24' Storage=1,048 cf Inflow=0.74 cfs 0.047 af
Outflow=0.79 cfs 0.023 af

**Pond P E 1.1A: 284** Peak Elev=133.32' Storage=13,116 cf Inflow=4.93 cfs 0.301 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B: 283** Peak Elev=144.32' Storage=18,878 cf Inflow=2.47 cfs 0.434 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.2A: 282** Peak Elev=134.22' Storage=17,163 cf Inflow=4.17 cfs 0.395 af
Outflow=0.00 cfs 0.000 af

**Pond P E-CULV-S: 231** Peak Elev=168.45' Storage=734 cf Inflow=2.06 cfs 0.167 af
Outflow=1.81 cfs 0.158 af

**Pond P INF-E-1:** Peak Elev=164.30' Storage=4,169 cf Inflow=1.68 cfs 0.115 af
Discarded=0.02 cfs 0.019 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.019 af

**Pond P INF-E-2: 142** Peak Elev=166.65' Storage=3,036 cf Inflow=2.20 cfs 0.137 af
Discarded=0.01 cfs 0.011 af Primary=0.28 cfs 0.059 af Outflow=0.29 cfs 0.070 af

**Pond P INF-E-3:** Peak Elev=170.70' Storage=15,380 cf Inflow=6.10 cfs 0.525 af
Discarded=0.02 cfs 0.031 af Primary=0.26 cfs 0.147 af Outflow=0.29 cfs 0.178 af

**Pond P INF-E-4A: 145** Peak Elev=170.04' Storage=3,656 cf Inflow=1.86 cfs 0.099 af
Discarded=0.01 cfs 0.008 af Primary=0.04 cfs 0.007 af Outflow=0.05 cfs 0.015 af

**Pond P INF-E-4B: 140** Peak Elev=170.63' Storage=2,746 cf Inflow=1.96 cfs 0.113 af
Discarded=0.01 cfs 0.011 af Primary=0.18 cfs 0.052 af Outflow=0.19 cfs 0.063 af

**Pond P MH-CULV-NA: 114** Peak Elev=149.47' Inflow=8.39 cfs 0.699 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=8.38 cfs 0.699 af

**Pond P MH-CULV-NB: 115** Peak Elev=149.40' Inflow=8.38 cfs 0.699 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=8.38 cfs 0.699 af

**Pond P RG-E-7:** Peak Elev=173.93' Storage=2,778 cf Inflow=2.40 cfs 0.153 af
Outflow=1.86 cfs 0.099 af

**Pond P RG-E-9A:** Peak Elev=165.83' Storage=436 cf Inflow=2.95 cfs 0.201 af
Outflow=2.89 cfs 0.196 af

**Pond P RG-E-9B: 244** Peak Elev=150.53' Storage=4,903 cf Inflow=3.06 cfs 0.212 af
Outflow=0.38 cfs 0.101 af

**Pond P RG-W-5A: 250** Peak Elev=163.60' Storage=86 cf Inflow=1.41 cfs 0.072 af
Outflow=1.47 cfs 0.070 af

**Pond P RG-W-5B: 252** Peak Elev=162.60' Storage=66 cf Inflow=1.47 cfs 0.070 af
Outflow=1.44 cfs 0.069 af

**Pond P RG-W-5C: 254** Peak Elev=161.54' Storage=822 cf Inflow=1.44 cfs 0.069 af
Outflow=0.37 cfs 0.051 af

**Pond P S-CB-E-1: 263** Peak Elev=171.62' Storage=240 cf Inflow=1.66 cfs 0.103 af
Outflow=1.65 cfs 0.099 af

**Pond P W 3.1: 5** Peak Elev=156.01' Storage=7,383 cf Inflow=1.28 cfs 0.243 af
Discarded=0.01 cfs 0.008 af Primary=0.29 cfs 0.066 af Outflow=0.30 cfs 0.074 af

**Pond P W 3.4: 13** Peak Elev=180.00' Storage=3 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

**Pond P W 9.1B: 14** Peak Elev=157.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

**Pond P W-CULV-N: 227** Peak Elev=153.00' Storage=0 cf Inflow=8.39 cfs 0.699 af
36.0" x 36.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=8.39 cfs 0.699 af

**Pond P W-D-3: 111** Peak Elev=158.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.00 cfs 0.000 af

**Pond P-RG-E-1:** Peak Elev=141.41' Storage=3,233 cf Inflow=2.45 cfs 0.181 af
Primary=0.59 cfs 0.114 af Secondary=0.00 cfs 0.000 af Outflow=0.59 cfs 0.114 af

**Pond P-RG-E-2:** Peak Elev=162.57' Storage=697 cf Inflow=0.71 cfs 0.043 af
Primary=0.34 cfs 0.029 af Secondary=0.00 cfs 0.000 af Outflow=0.34 cfs 0.029 af

**Pond P-RG-E-4A:** Peak Elev=171.73' Storage=450 cf Inflow=0.54 cfs 0.033 af
Outflow=0.24 cfs 0.025 af

**Pond P-RG-E-4B:** Peak Elev=169.82' Storage=1,186 cf Inflow=1.01 cfs 0.062 af
Outflow=0.33 cfs 0.039 af

**Pond P-RG-E-8:** Peak Elev=174.63' Storage=2,068 cf Inflow=0.78 cfs 0.048 af
Outflow=0.00 cfs 0.000 af

**Pond P-RG-W-2: 306** Peak Elev=171.19' Storage=5,914 cf Inflow=4.12 cfs 0.265 af
Outflow=0.41 cfs 0.135 af

**Pond P-RG-W-3:** Peak Elev=168.84' Storage=8,502 cf Inflow=2.97 cfs 0.195 af
Outflow=0.00 cfs 0.000 af

**Pond P-RG-W-4:** Peak Elev=171.27' Storage=3,250 cf Inflow=2.74 cfs 0.168 af
Outflow=0.41 cfs 0.098 af

**Pond R-CULV-1: PIPE 1** Peak Elev=162.40' Inflow=1.21 cfs 0.158 af
Primary=1.21 cfs 0.158 af Secondary=0.00 cfs 0.000 af Outflow=1.21 cfs 0.158 af

**Pond R-CULV-10: PIPE 10** Peak Elev=137.31' Inflow=3.85 cfs 0.760 af
Primary=3.85 cfs 0.760 af Secondary=0.00 cfs 0.000 af Outflow=3.85 cfs 0.760 af

**Pond R-CULV-2: PIPE 2** Peak Elev=158.51' Inflow=2.40 cfs 0.414 af
Primary=2.40 cfs 0.414 af Secondary=0.00 cfs 0.000 af Outflow=2.40 cfs 0.414 af

**Pond R-CULV-3: PIPE 3** Peak Elev=155.69' Inflow=3.44 cfs 0.616 af
Primary=3.44 cfs 0.616 af Secondary=0.00 cfs 0.000 af Outflow=3.44 cfs 0.616 af

**Pond R-CULV-4: PIPE 4** Peak Elev=150.77' Inflow=3.44 cfs 0.616 af
Primary=3.44 cfs 0.616 af Secondary=0.00 cfs 0.000 af Outflow=3.44 cfs 0.616 af

**Pond R-CULV-5: PIPE 5** Peak Elev=150.09' Inflow=3.44 cfs 0.617 af
Primary=3.44 cfs 0.617 af Secondary=0.00 cfs 0.000 af Outflow=3.44 cfs 0.617 af

**Pond R-CULV-6: PIPE 6** Peak Elev=148.64' Inflow=3.77 cfs 0.646 af
Primary=3.77 cfs 0.646 af Secondary=0.00 cfs 0.000 af Outflow=3.77 cfs 0.646 af

**Pond R-CULV-7: PIPE 7** Peak Elev=145.64' Inflow=3.77 cfs 0.646 af
Primary=3.77 cfs 0.646 af Secondary=0.00 cfs 0.000 af Outflow=3.77 cfs 0.646 af

**Pond R-CULV-8: PIPE 8** Peak Elev=141.66' Inflow=3.77 cfs 0.646 af
Primary=3.77 cfs 0.646 af Secondary=0.00 cfs 0.000 af Outflow=3.77 cfs 0.646 af

**Pond R-CULV-9: PIPE 9** Peak Elev=139.38' Inflow=3.77 cfs 0.646 af
Primary=3.77 cfs 0.646 af Secondary=0.00 cfs 0.000 af Outflow=3.77 cfs 0.646 af

**Link DP CULV: outflow from culvert** Inflow=3.85 cfs 0.760 af
Primary=3.85 cfs 0.760 af

**Link DP North: DP North** Inflow=10.16 cfs 1.293 af
Primary=10.16 cfs 1.293 af

**Link DP Sudbury: DP Sudbury** Inflow=23.74 cfs 3.151 af
Primary=23.74 cfs 3.151 af

**Link DP Wellhead: DP Wellhead** Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=1.00 cfs 0.171 af
Primary=1.00 cfs 0.171 af

**Link L E 1.0: L E 1.0** Inflow=14.21 cfs 1.859 af
Primary=14.21 cfs 1.859 af

**Link L E 4.0: L E 4.0** Inflow=1.05 cfs 0.283 af
Primary=1.05 cfs 0.283 af

**Link L W 10.0: L W 10.0** Inflow=1.99 cfs 0.139 af
Primary=1.99 cfs 0.139 af

**Link L W 2.0: L W 2.0** Inflow=1.00 cfs 0.105 af
Primary=1.00 cfs 0.105 af

**Link L W 3.0: L W 3.0** Inflow=0.29 cfs 0.066 af
Primary=0.29 cfs 0.066 af

**Link L W 9.0: L W 9.0** Inflow=8.38 cfs 0.699 af
Primary=8.38 cfs 0.699 af

**Link L Well 1.1B: L Well 1.1B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2A: L Well 1.2A**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2B: L Well 1.2B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2C: L Well 1.2C**
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 130.598 ac Runoff Volume = 7.205 af Average Runoff Depth = 0.66"**
**93.35% Pervious = 121.914 ac 6.65% Impervious = 8.684 ac**

## Summary for Subcatchment E 1.0: (blank)

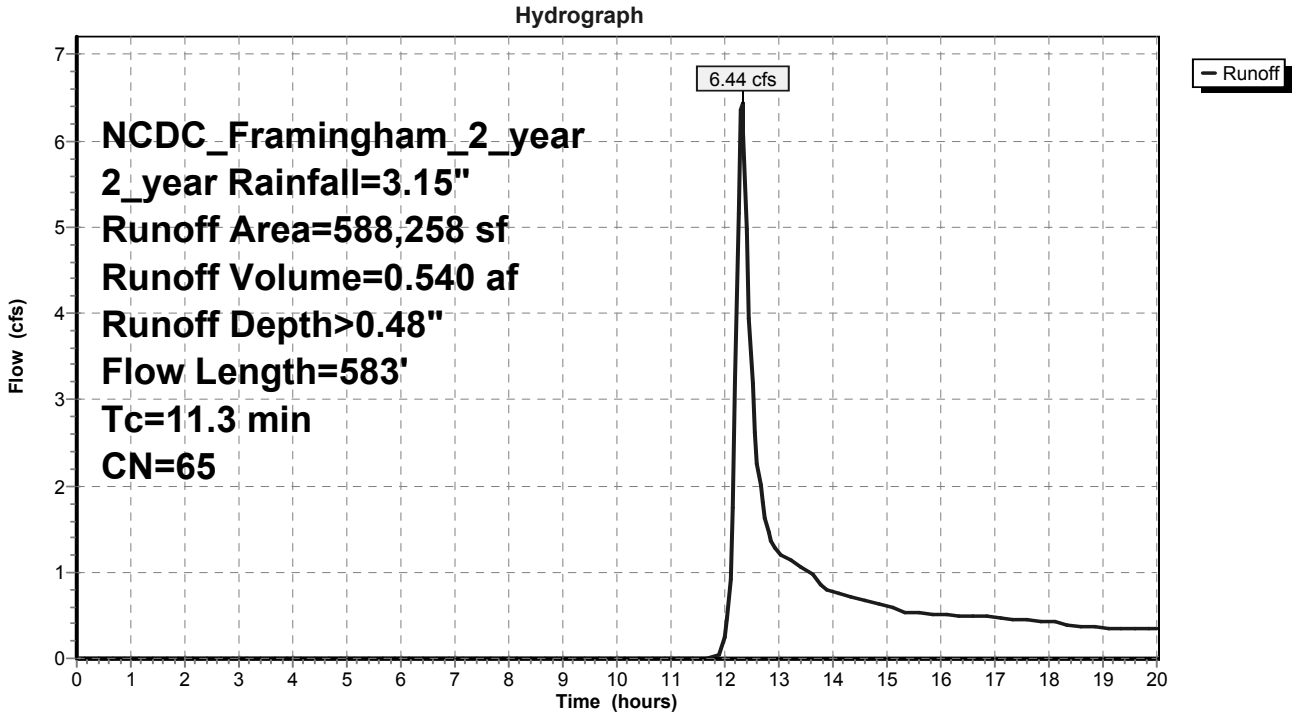
Runoff = 6.44 cfs @ 12.32 hrs, Volume= 0.540 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

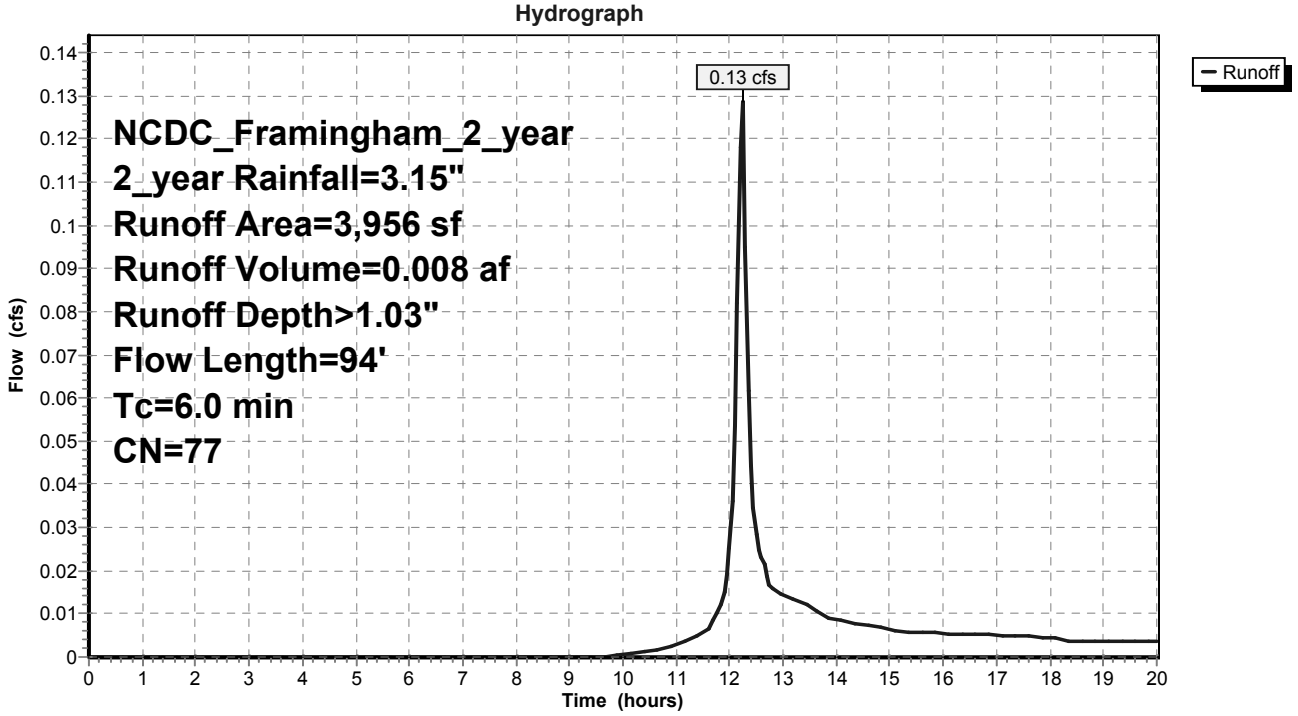
Runoff = 0.13 cfs @ 12.24 hrs, Volume= 0.008 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: (blank)

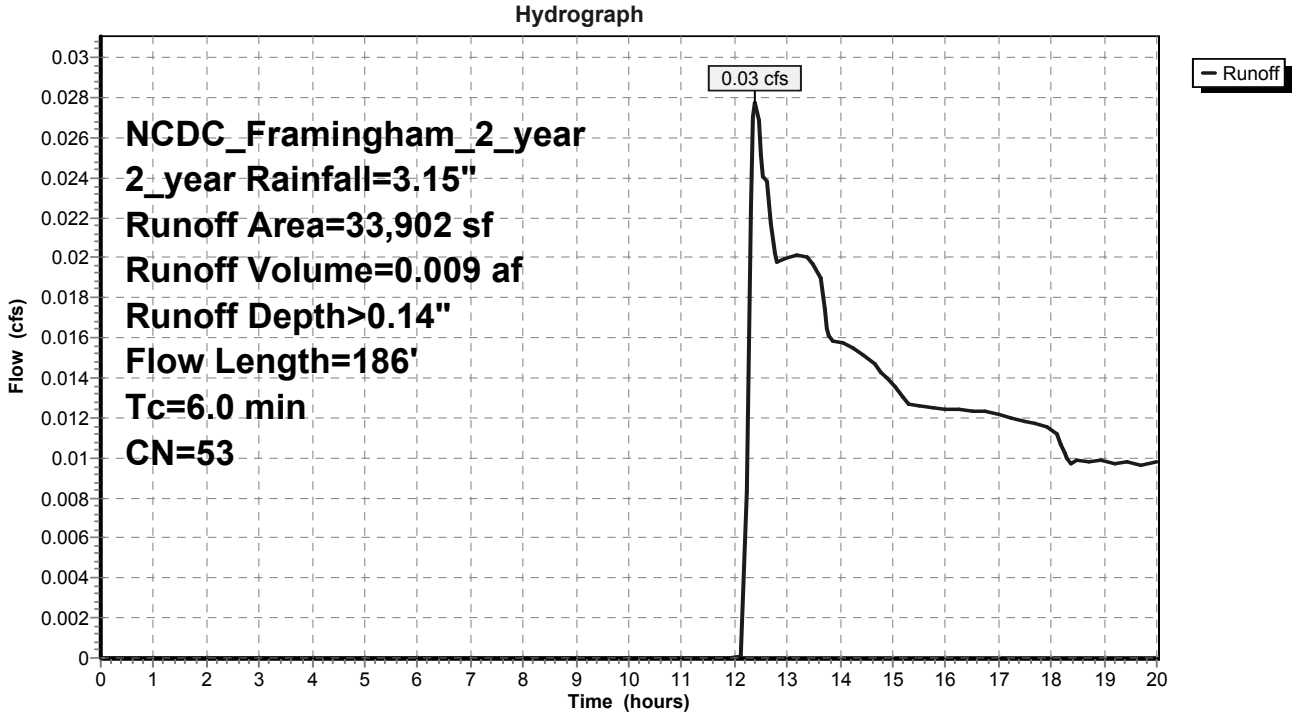
Runoff = 0.03 cfs @ 12.40 hrs, Volume= 0.009 af, Depth> 0.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,518 | 39 | GRASS, 0% imperv, HSG A |
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 13,308 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,902 | 53 | Weighted Average |
| | 25,252 | | 74.49% Pervious Area |
| | 8,650 | | 25.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.5 | 34 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.5 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: (blank)



## Summary for Subcatchment E 1.0C: (blank)

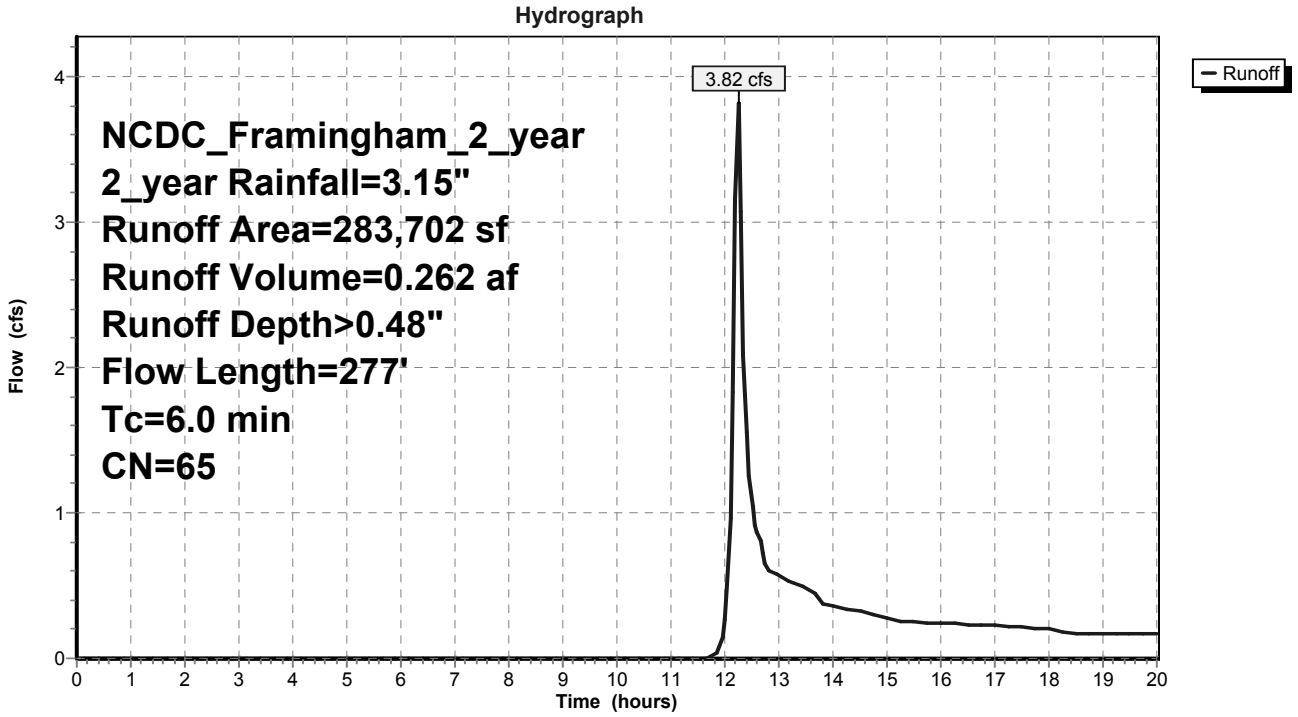
Runoff = 3.82 cfs @ 12.25 hrs, Volume= 0.262 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

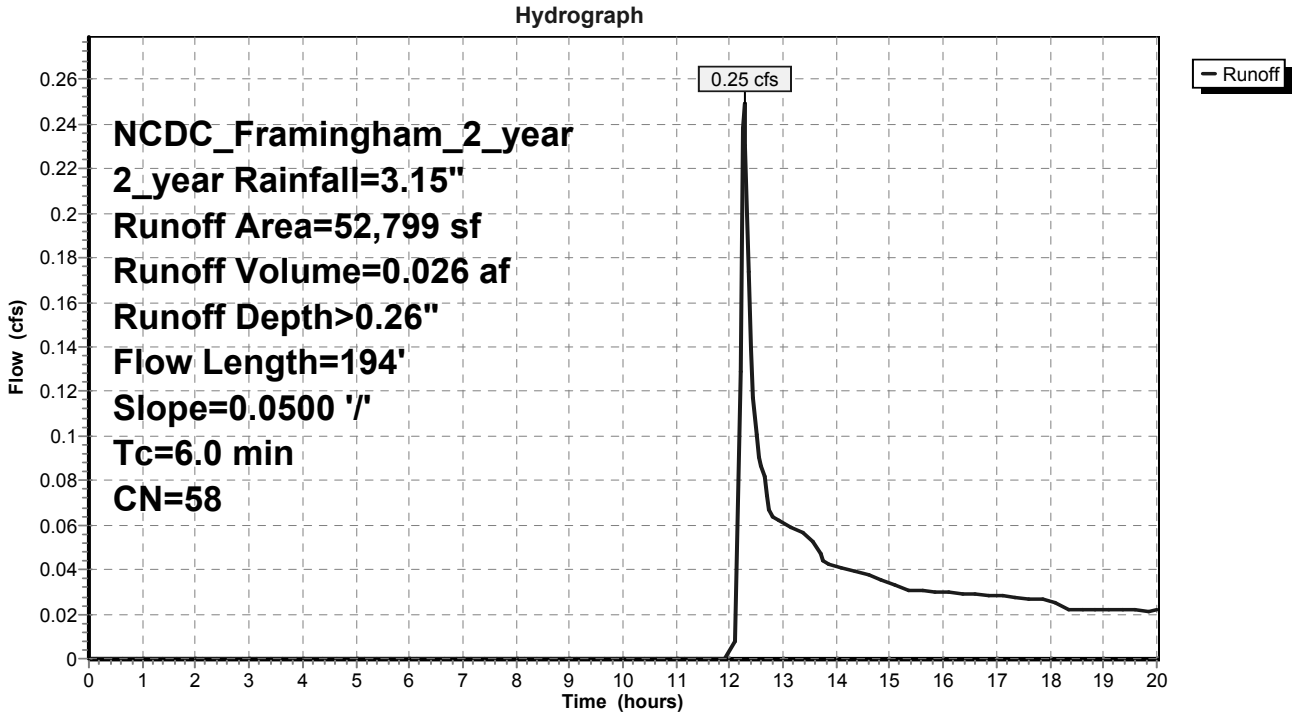
Runoff = 0.25 cfs @ 12.27 hrs, Volume= 0.026 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

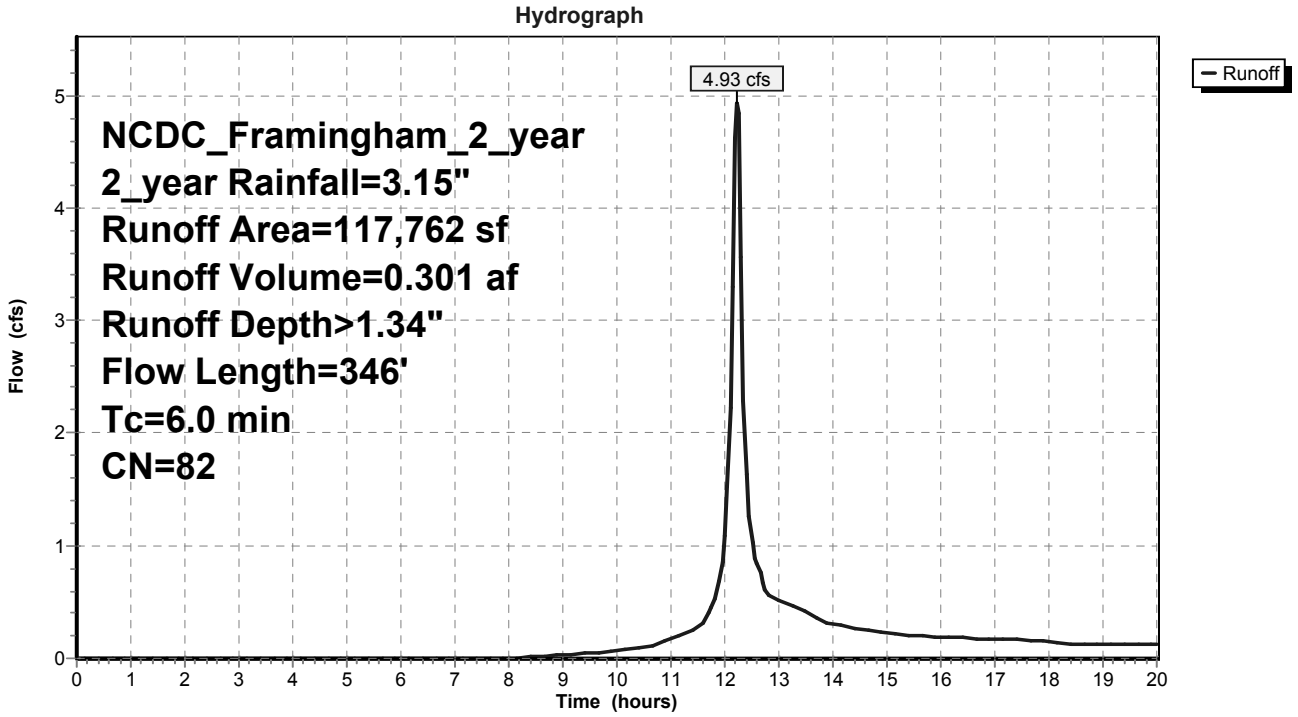
Runoff = 4.93 cfs @ 12.23 hrs, Volume= 0.301 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

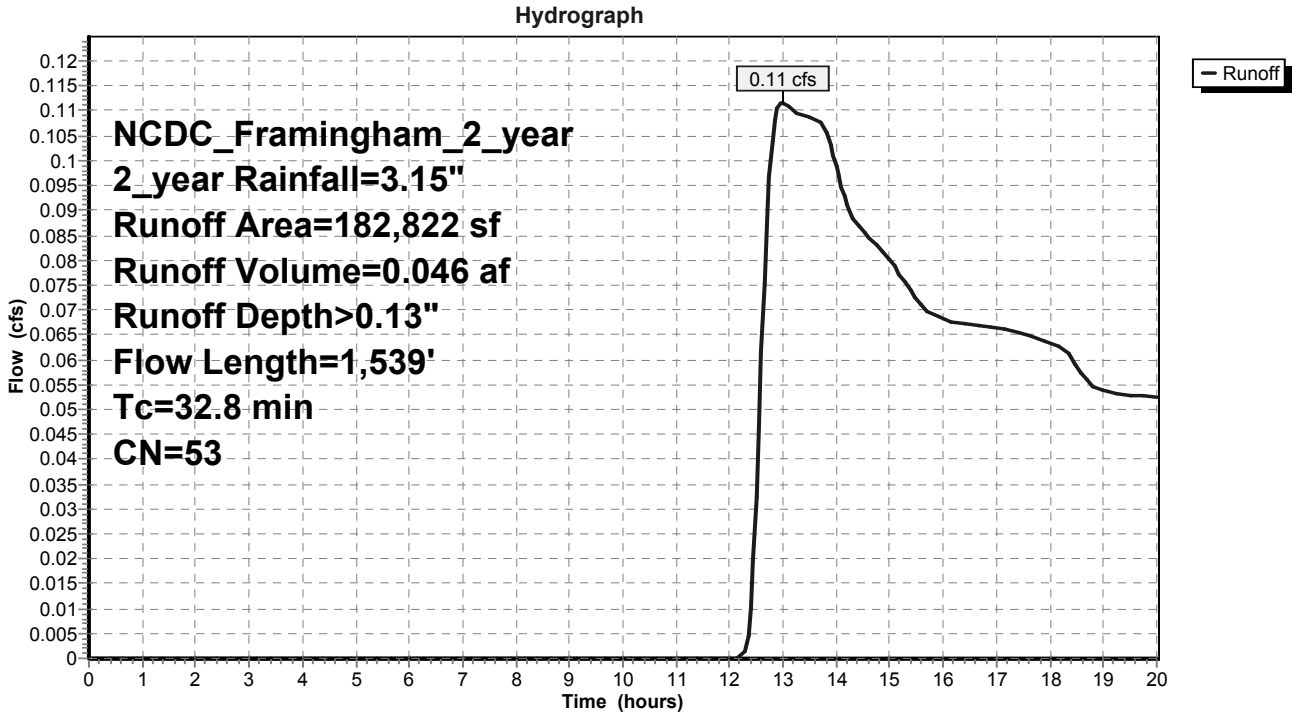
Runoff = 0.11 cfs @ 12.99 hrs, Volume= 0.046 af, Depth> 0.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

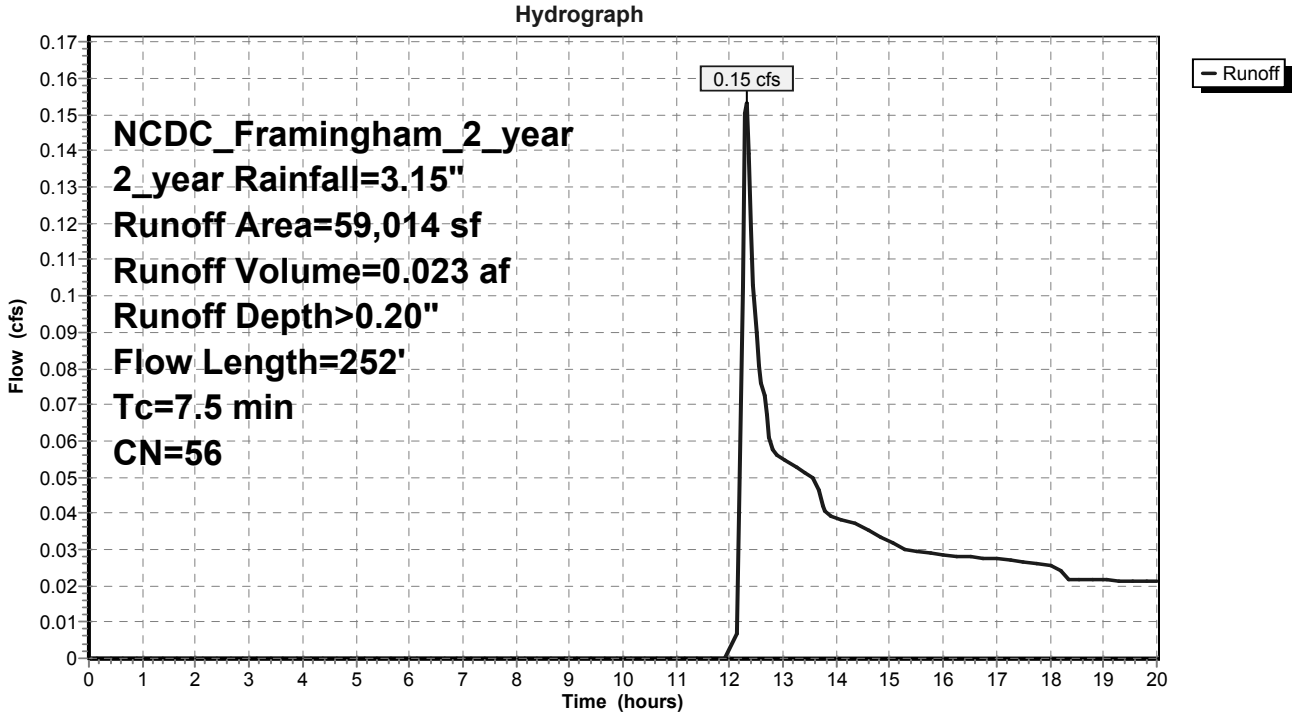
Runoff = 0.15 cfs @ 12.32 hrs, Volume= 0.023 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

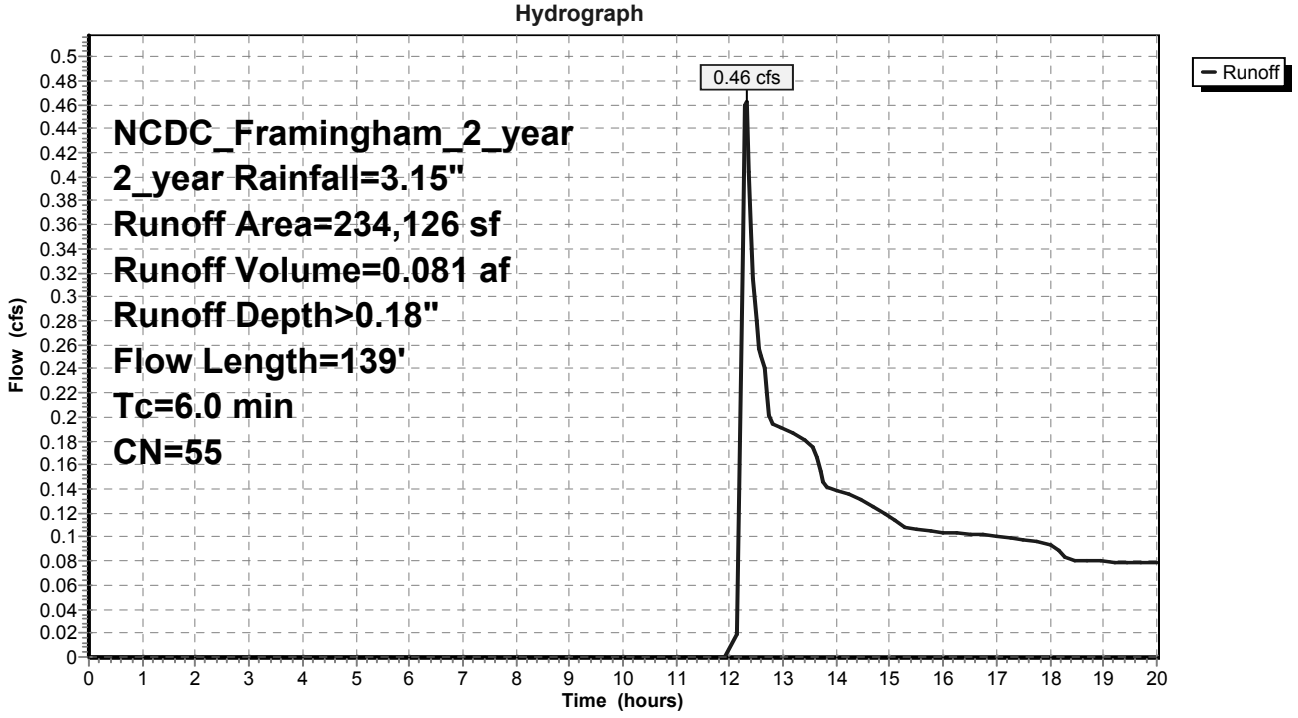
Runoff = 0.46 cfs @ 12.31 hrs, Volume= 0.081 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



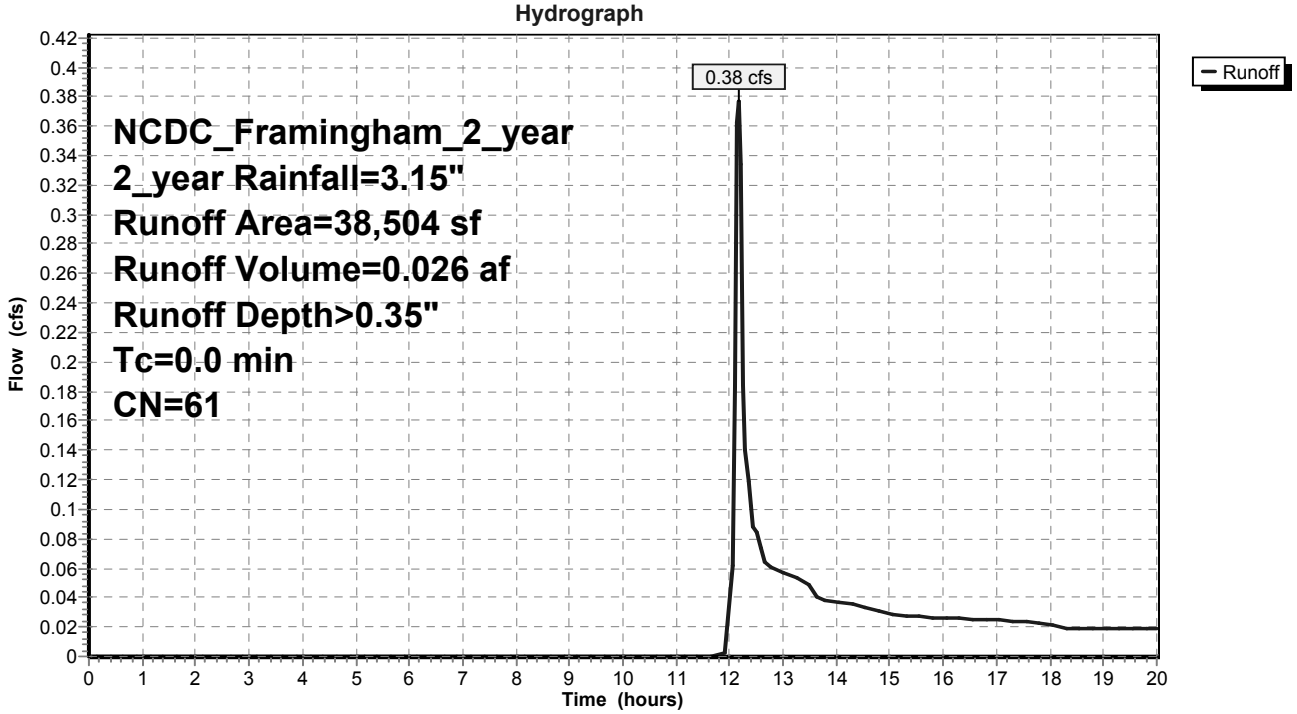
## Summary for Subcatchment E 1.1B-4: (blank)

Runoff = 0.38 cfs @ 12.17 hrs, Volume= 0.026 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,690 | 39 | GRASS, 0% imperv, HSG A |
| * | 34,430 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 55 | WOODS, 0% imperv, HSG B |
| * | 398 | 98 | DECK, 100% imperv, HSG B |
| * | 984 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 38,504 | 61 | Weighted Average |
| | 38,504 | | 100.00% Pervious Area |

## Subcatchment E 1.1B-4: (blank)



## Summary for Subcatchment E 1.2A: (blank)

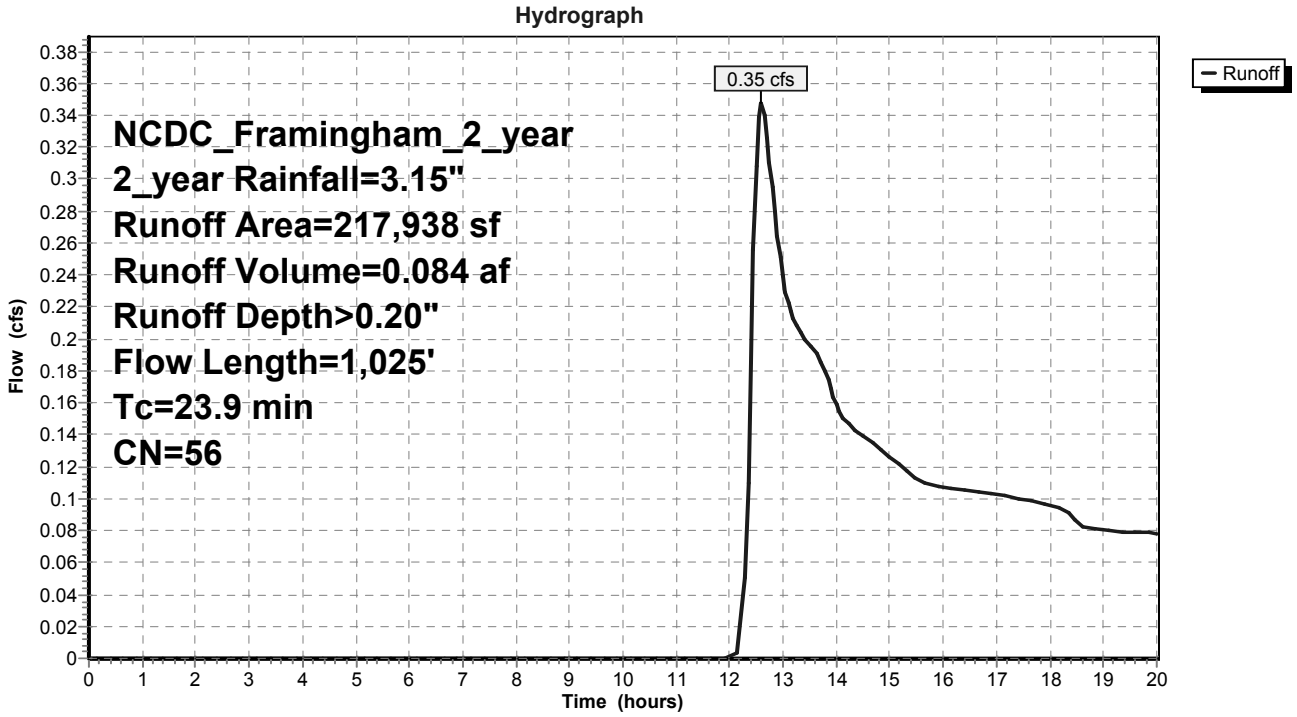
Runoff = 0.35 cfs @ 12.60 hrs, Volume= 0.084 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

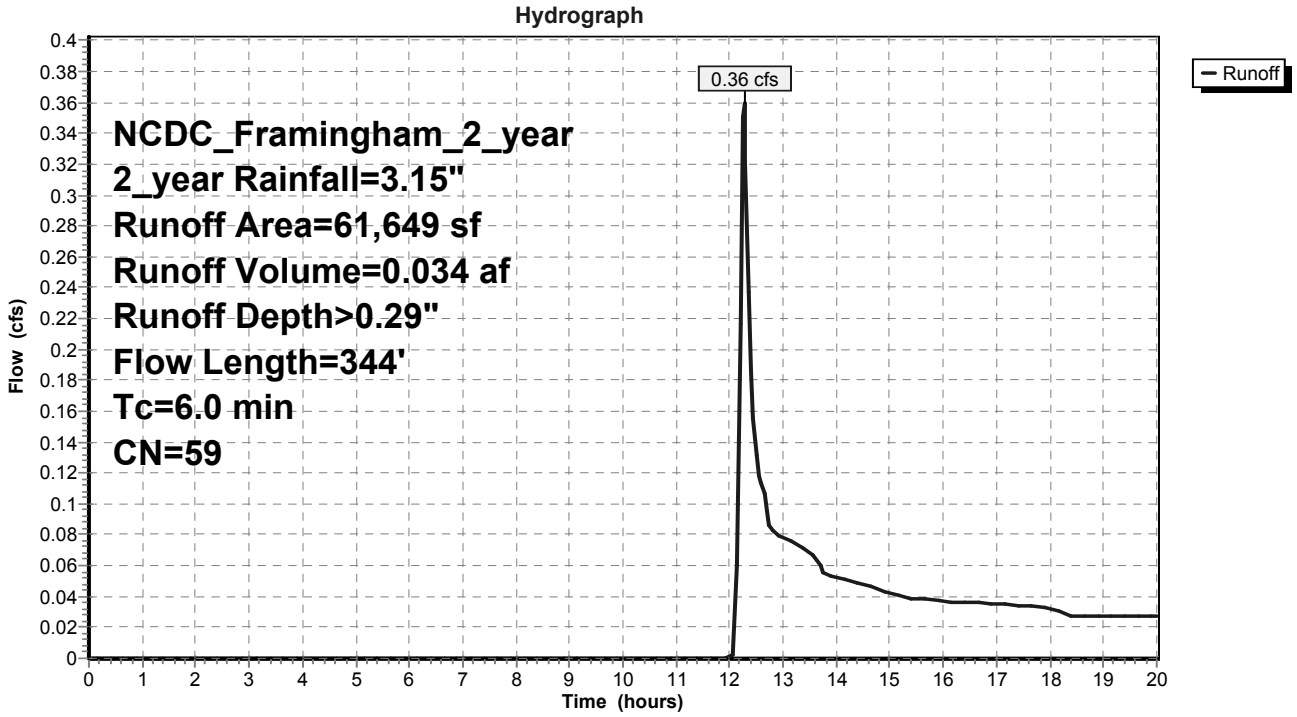
Runoff = 0.36 cfs @ 12.27 hrs, Volume= 0.034 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: (blank)

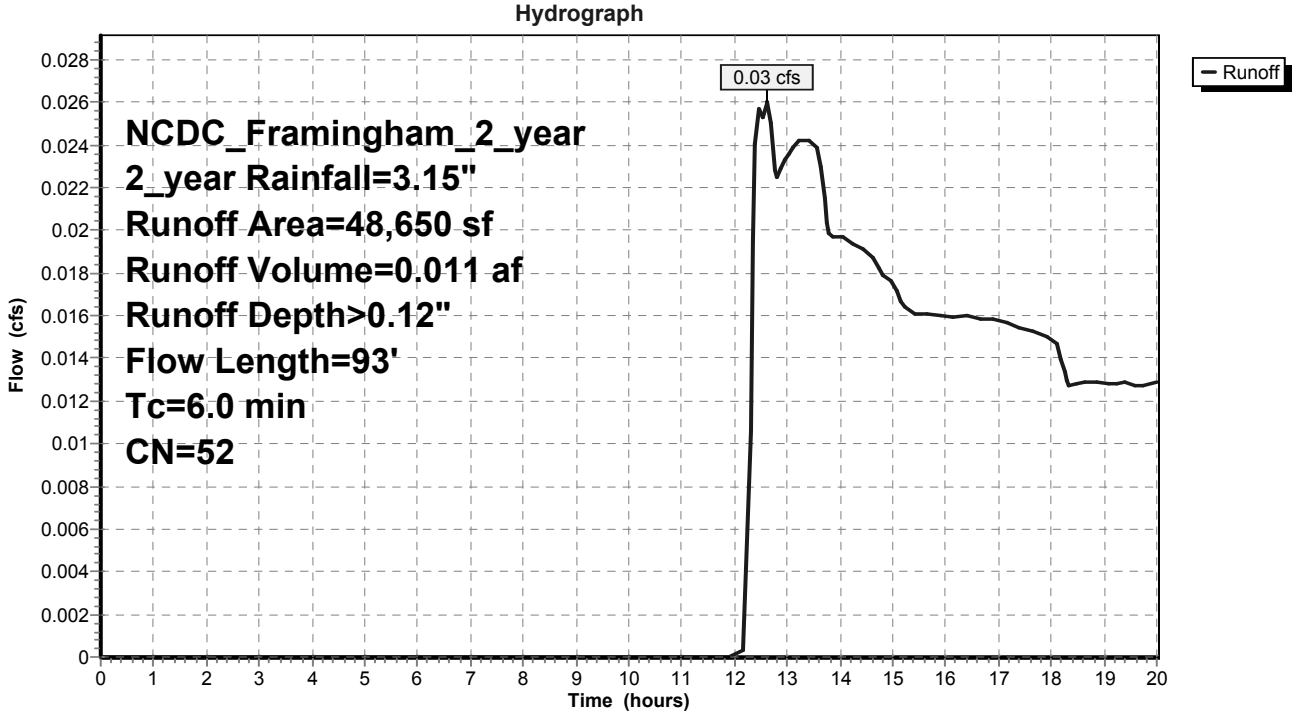
Runoff = 0.03 cfs @ 12.62 hrs, Volume= 0.011 af, Depth> 0.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,296 | 39 | GRASS, 0% imperv, HSG A |
| * | 28,321 | 61 | GRASS, 0% imperv, HSG B |
| * | 1 | 30 | WOODS, 0% imperv, HSG A |
| * | 24 | 55 | WOODS, 0% imperv, HSG B |
| * | 0 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG B |
| | 48,650 | 52 | Weighted Average |
| | 48,646 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.8 | 50 | 0.1251 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 43 | 0.1289 | 2.51 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.1 | 93 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-2: (blank)



## Summary for Subcatchment E 1.2B: (blank)

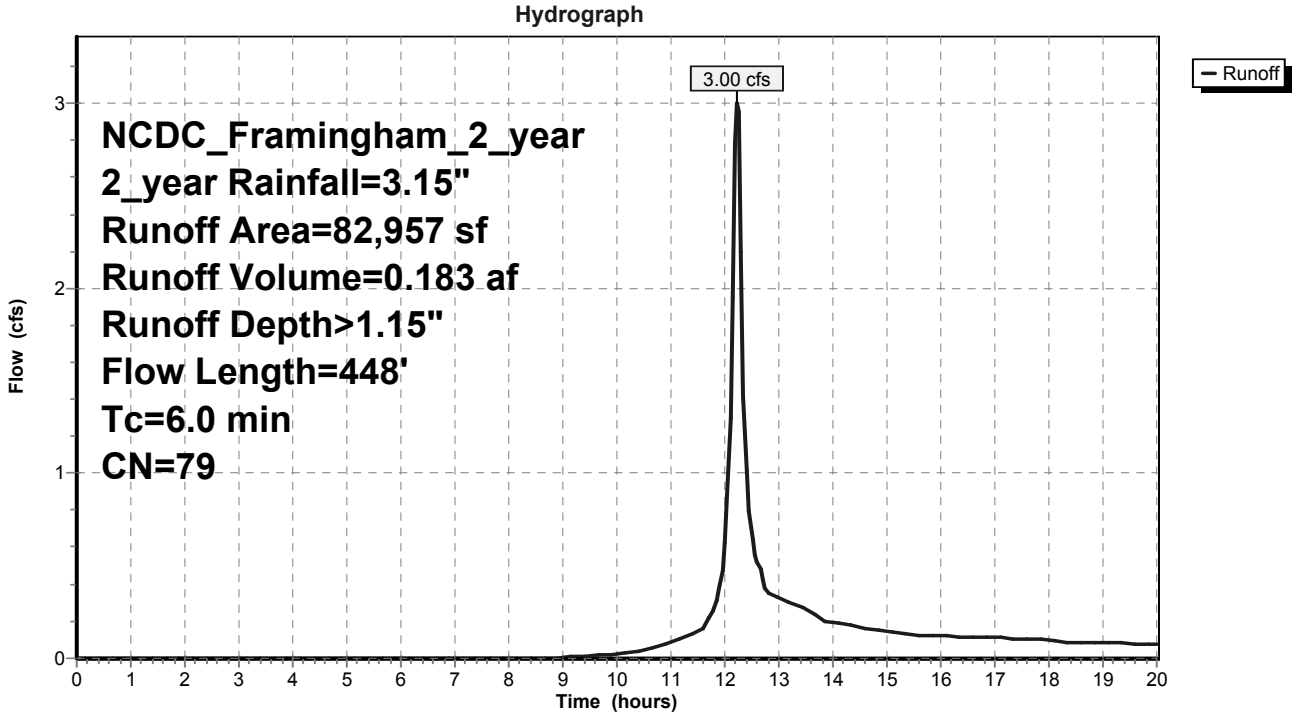
Runoff = 3.00 cfs @ 12.23 hrs, Volume= 0.183 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: (blank)

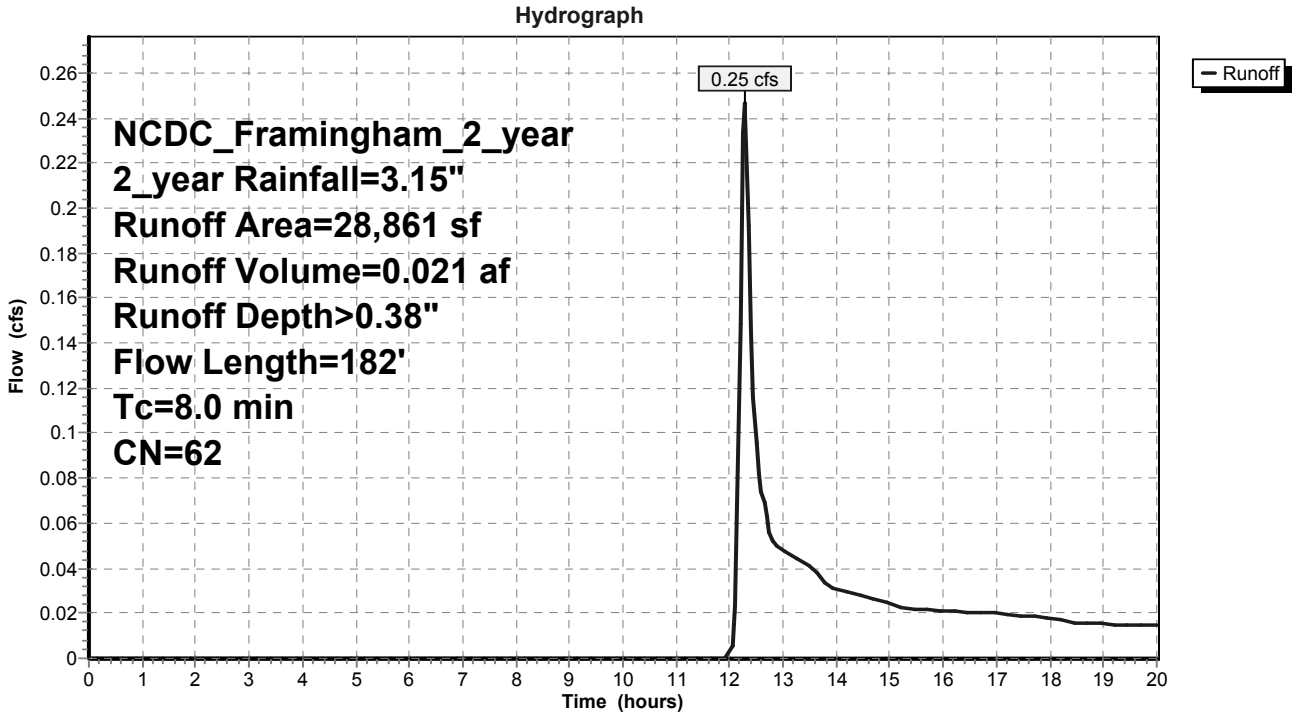
Runoff = 0.25 cfs @ 12.28 hrs, Volume= 0.021 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,232 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,162 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,032 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 145 | 98 | DECK, 100% imperv, HSG B |
| * | 0 | 98 | IMP, 100% imperv, HSG B |
| * | 289 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,861 | 62 | Weighted Average |
| | 28,190 | | 97.68% Pervious Area |
| | 671 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.9 | 50 | 0.0129 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 127 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 3 | 0.0270 | 0.82 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0294 | 2.76 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 182 | Total | | | |

## Subcatchment E 1.2B-1: (blank)



## Summary for Subcatchment E 1.2C: (blank)

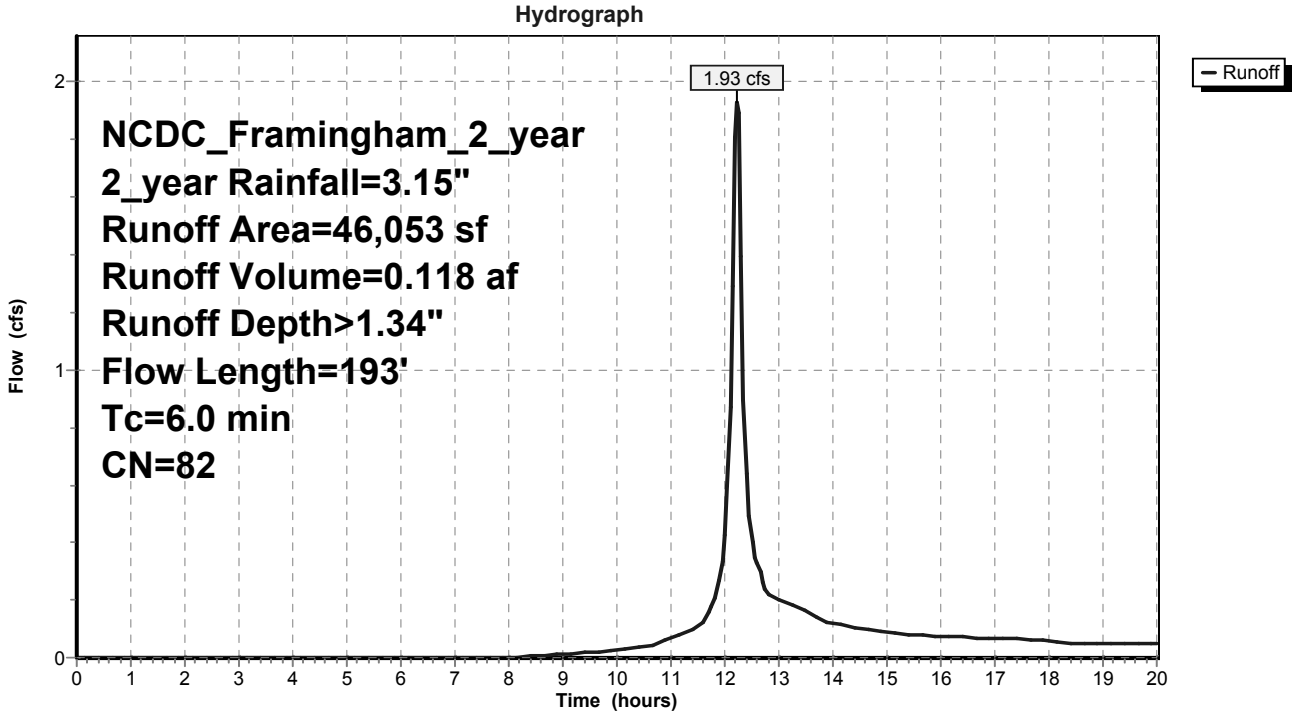
Runoff = 1.93 cfs @ 12.23 hrs, Volume= 0.118 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: (blank)

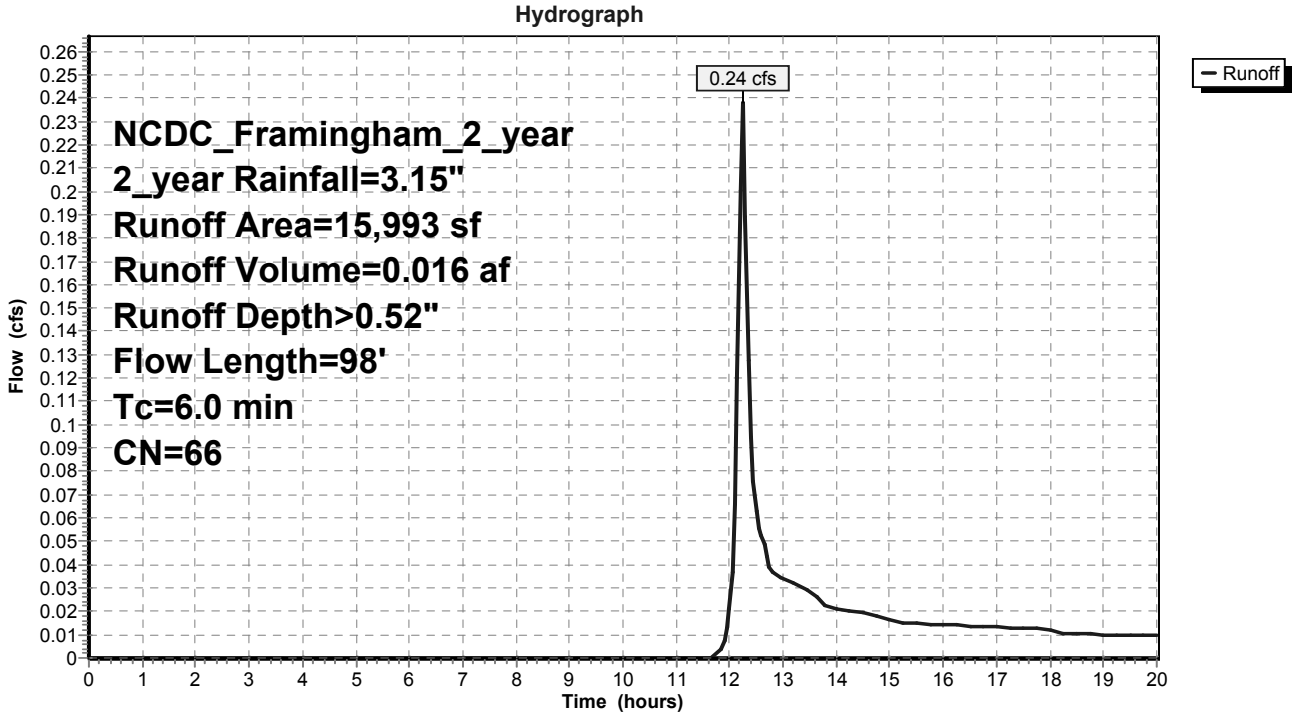
Runoff = 0.24 cfs @ 12.25 hrs, Volume= 0.016 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,637 | 61 | GRASS, 0% imperv, HSG B |
| * | 53 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 449 | 98 | DECK, 100% imperv, HSG B |
| * | 2 | 98 | IMP, 100% imperv, HSG B |
| * | 1,852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 15,993 | 66 | Weighted Average |
| | 15,959 | | 99.79% Pervious Area |
| | 34 | | 0.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.6 | 50 | 0.1160 | 0.32 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 48 | 0.3500 | 2.96 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 98 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: (blank)



## Summary for Subcatchment E 1.2C-2: (blank)

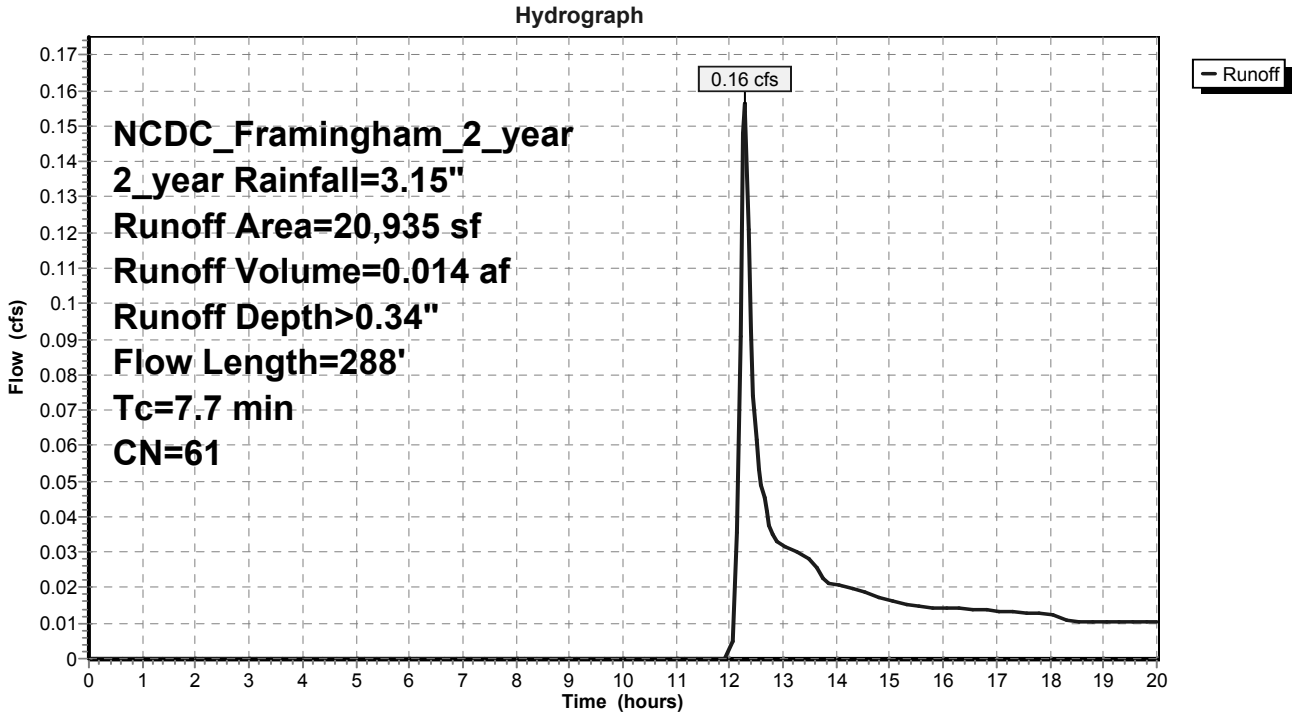
Runoff = 0.16 cfs @ 12.28 hrs, Volume= 0.014 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,831 | 61 | GRASS, 0% imperv, HSG B |
| * | 99 | 55 | WOODS, 0% imperv, HSG B |
| * | 4 | 98 | ROOF, 100% imperv, HSG B |
| | 20,935 | 61 | Weighted Average |
| | 20,935 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 238 | 0.0295 | 1.20 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 7.7 | 288 | Total | | | |

## Subcatchment E 1.2C-2: (blank)



## Summary for Subcatchment E 1.3A: (blank)

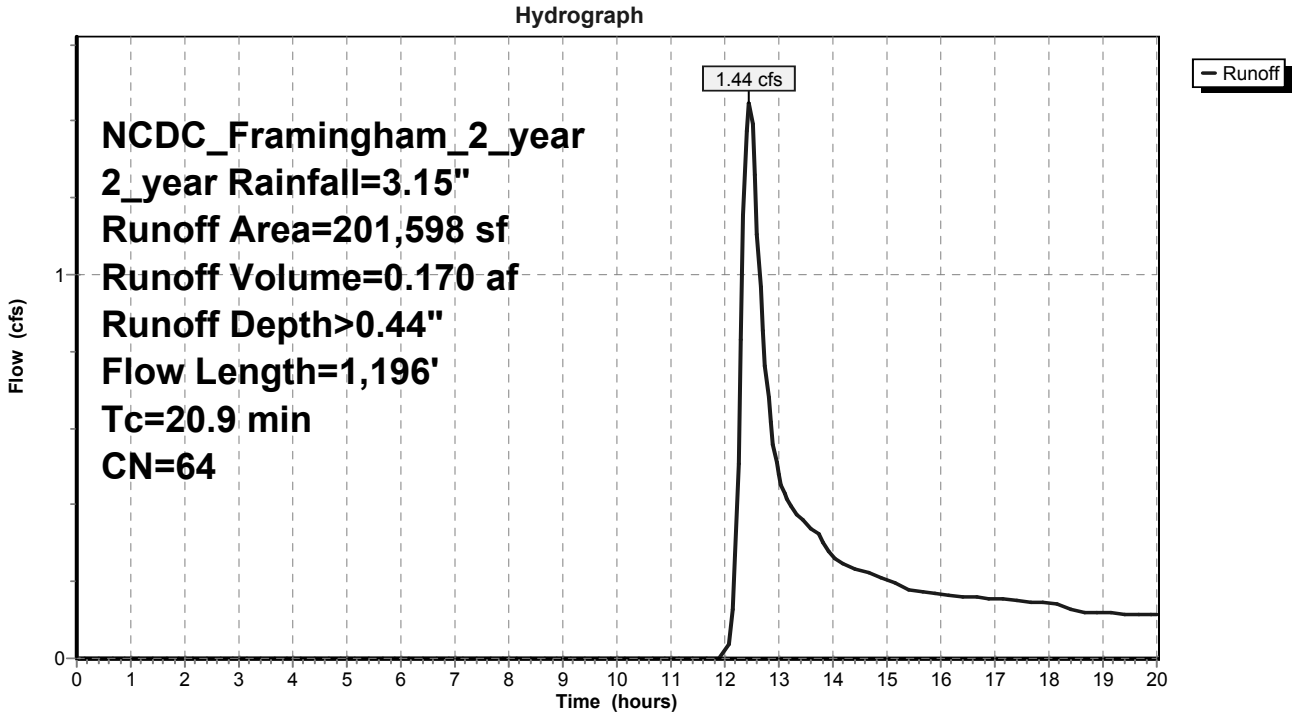
Runoff = 1.44 cfs @ 12.45 hrs, Volume= 0.170 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,522 | 39 | GRASS, 0% imperv, HSG A |
| * | 23,999 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 4,288 | 30 | WOODS, 0% imperv, HSG A |
| * | 61,112 | 55 | WOODS, 0% imperv, HSG B |
| * | 82,137 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 201,598 | 64 | Weighted Average |
| | 141,195 | | 70.04% Pervious Area |
| | 60,402 | | 29.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 1 | 1.6445 | 6.41 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 12 | 0.0806 | 4.57 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 54 | 0.0186 | 0.68 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.9 | 1,196 | Total | | | |

## Subcatchment E 1.3A: (blank)



## Summary for Subcatchment E 4.0: (blank)

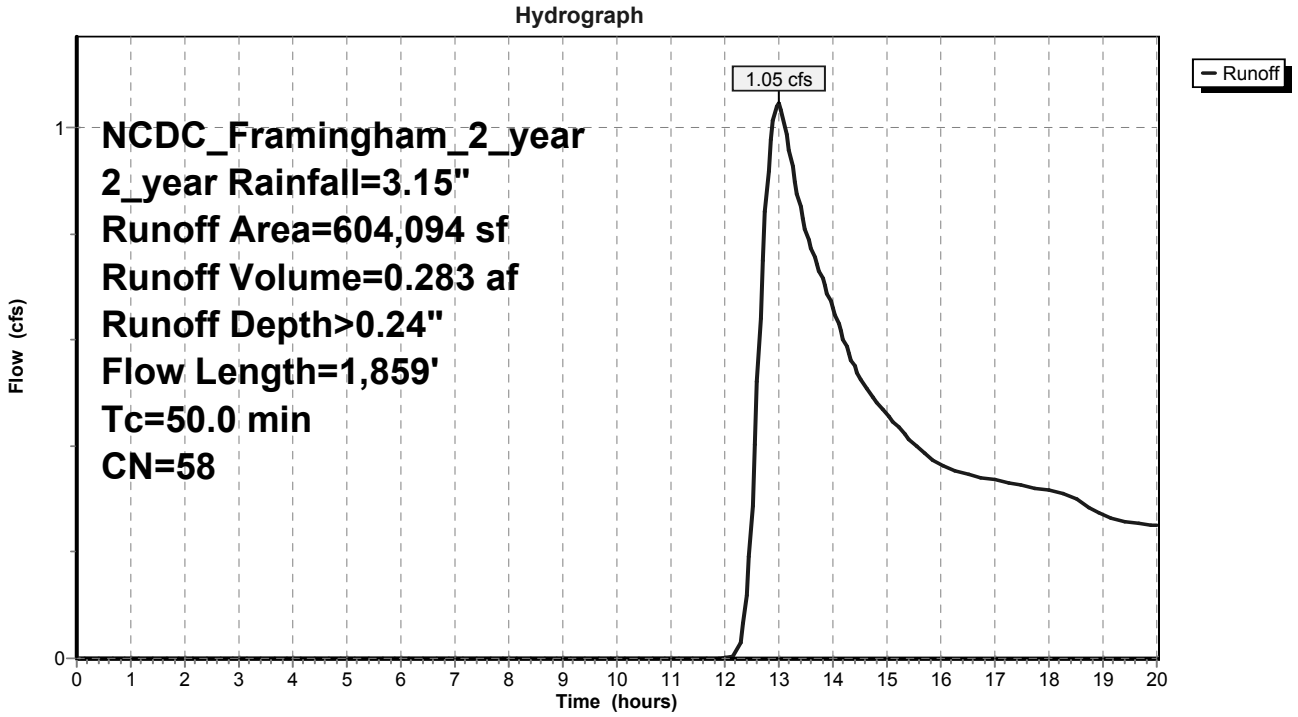
Runoff = 1.05 cfs @ 13.00 hrs, Volume= 0.283 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 82,277 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 20,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,226 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,230 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 100% imperv, HSG A |
| * | 6,325 | 98 | Water, 100% imperv, HSG C |
| * | 12,063 | 98 | Water, 100% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 604,094 | 58 | Weighted Average |
| | 545,526 | | 90.30% Pervious Area |
| | 58,568 | | 9.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 6.5 | 194 | 0.0399 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 17.3 | 227 | 0.0076 | 0.22 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 50.0 | 1,859 | Total | | | |

## Subcatchment E 4.0: (blank)



## Summary for Subcatchment E-CULV-S: (blank)

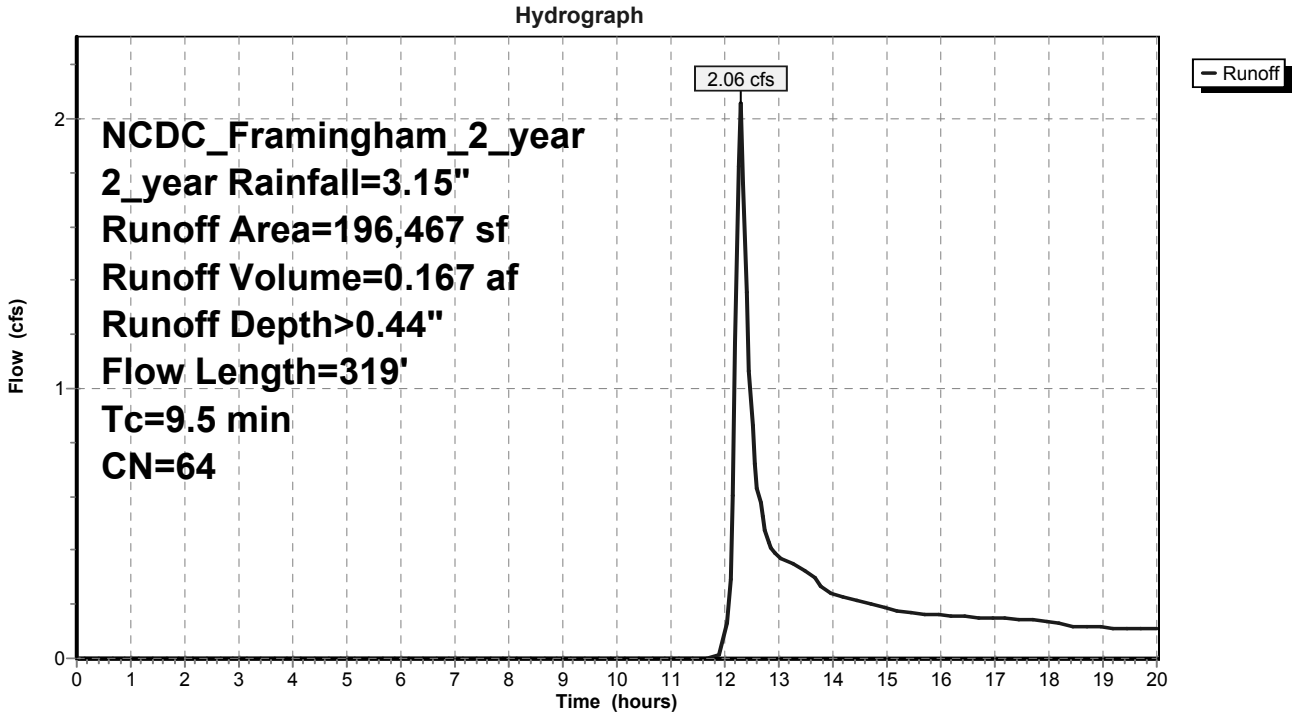
Runoff = 2.06 cfs @ 12.30 hrs, Volume= 0.167 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,373 | 39 | GRASS, 0% imperv, HSG A |
| * | 153,204 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,809 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 18,529 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 8 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 196,467 | 64 | Weighted Average |
| | 194,642 | | 99.07% Pervious Area |
| | 1,826 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 128 | 0.1151 | 2.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 141 | 0.0163 | 2.59 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 9.5 | 319 | Total | | | |

## Subcatchment E-CULV-S: (blank)



## Summary for Subcatchment RG-E-1: (blank)

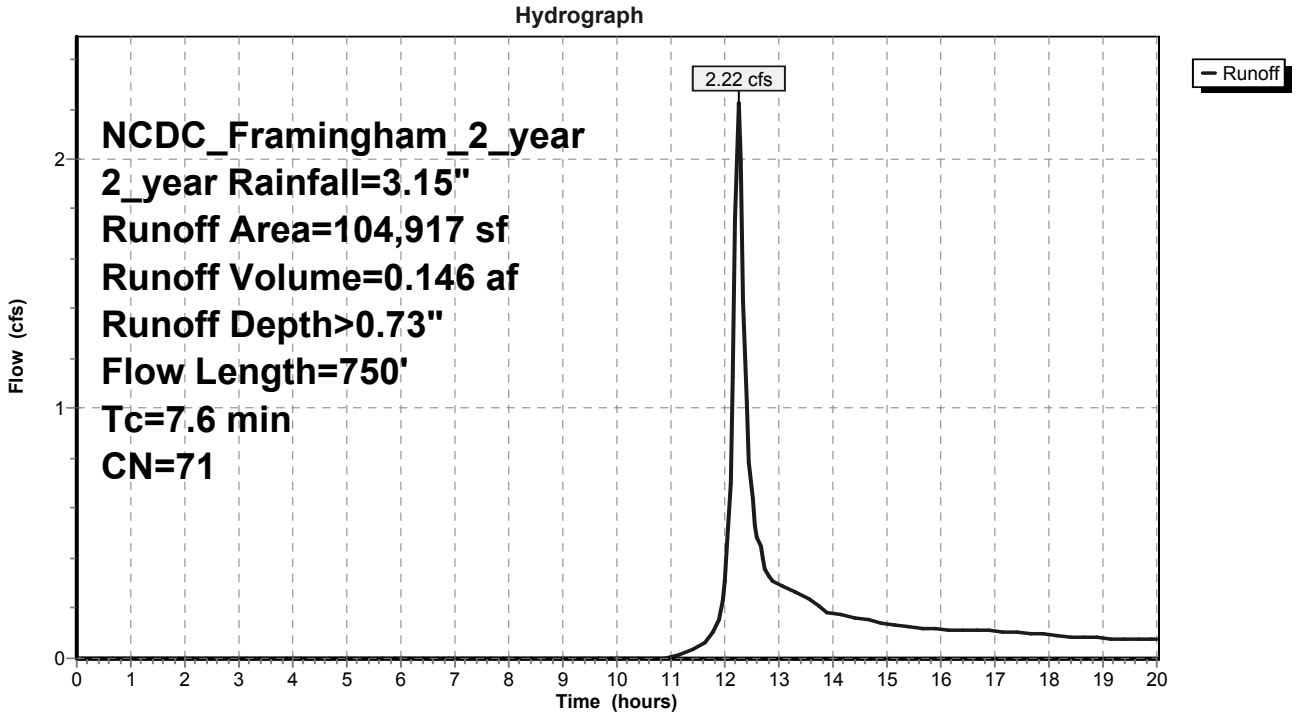
Runoff = 2.22 cfs @ 12.26 hrs, Volume= 0.146 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 54,529 | 61 | GRASS, 0% imperv, HSG B |
| * | 171 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 98 | DECK, 100% imperv, HSG A |
| * | 700 | 98 | DECK, 100% imperv, HSG B |
| * | 3,592 | 98 | IMP, 100% imperv, HSG A |
| * | 29,105 | 98 | IMP, 100% imperv, HSG B |
| * | 27 | 98 | ROOF, 100% imperv, HSG B |
| * | 262 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,962 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 104,917 | 71 | Weighted Average |
| | 104,917 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2000 | 0.36 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.3 | 700 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.6 | 750 | Total | | | |

## Subcatchment RG-E-1: (blank)



## Summary for Subcatchment RG-E-2: (blank)

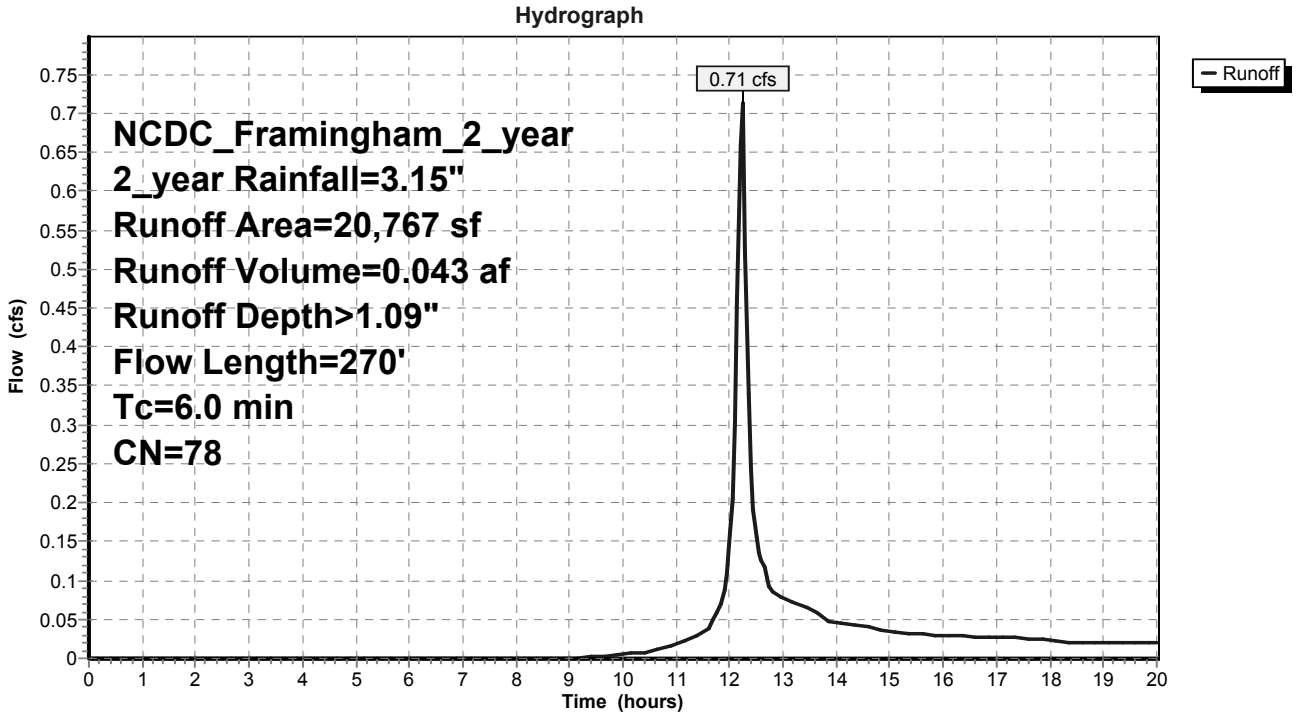
Runoff = 0.71 cfs @ 12.24 hrs, Volume= 0.043 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 11,066 | 61 | GRASS, 0% imperv, HSG B |
| * | 27 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 142 | 98 | DECK, 100% imperv, HSG B |
| * | 9,131 | 98 | IMP, 100% imperv, HSG B |
| * | 402 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 20,767 | 78 | Weighted Average |
| | 20,750 | | 99.92% Pervious Area |
| | 18 | | 0.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0110 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 38 | 0.0310 | 3.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 7 | 0.0034 | 0.41 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.9 | 175 | 0.0486 | 1.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.3 | 270 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-2: (blank)



## Summary for Subcatchment RG-E-4A: (blank)

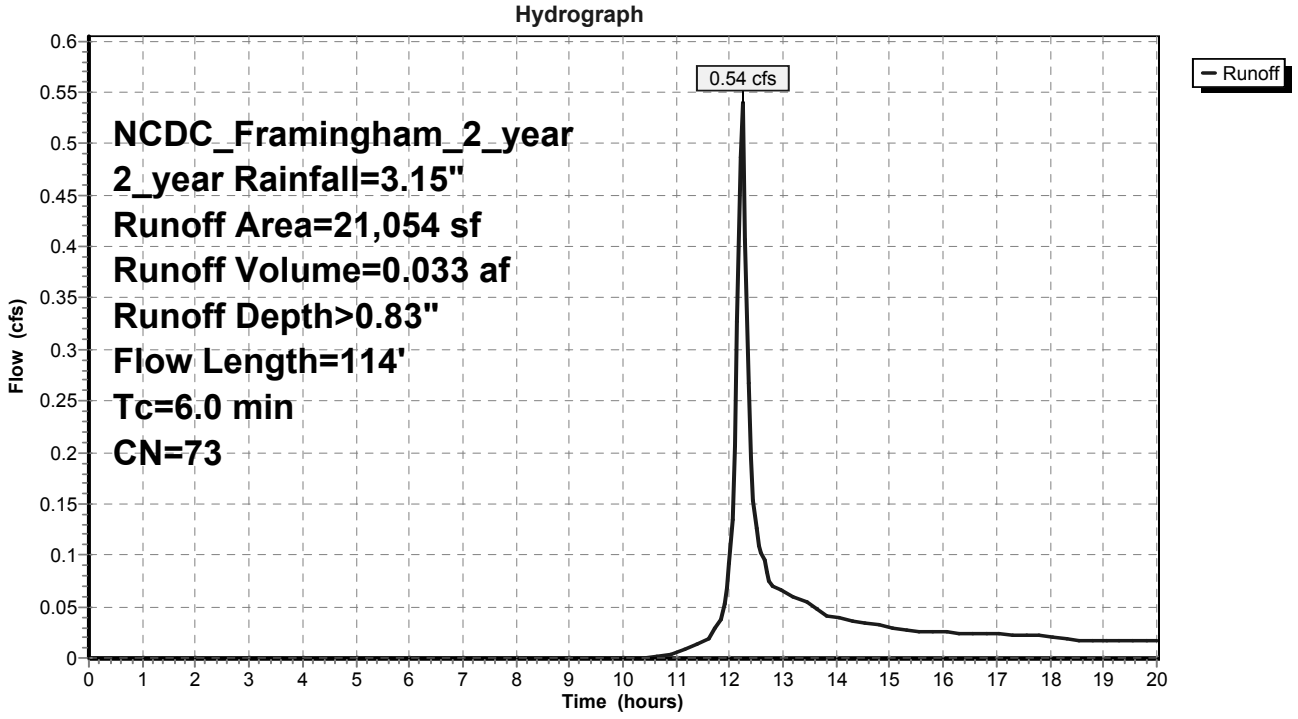
Runoff = 0.54 cfs @ 12.24 hrs, Volume= 0.033 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,476 | 61 | GRASS, 0% imperv, HSG B |
| * | 408 | 98 | DECK, 100% imperv, HSG B |
| * | 4,883 | 98 | IMP, 100% imperv, HSG B |
| * | 1,286 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 21,054 | 73 | Weighted Average |
| | 21,054 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0344 | 1.44 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 2 | 0.0253 | 3.23 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 62 | 0.0359 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.4 | 114 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4A: (blank)



## Summary for Subcatchment RG-E-4B: (blank)

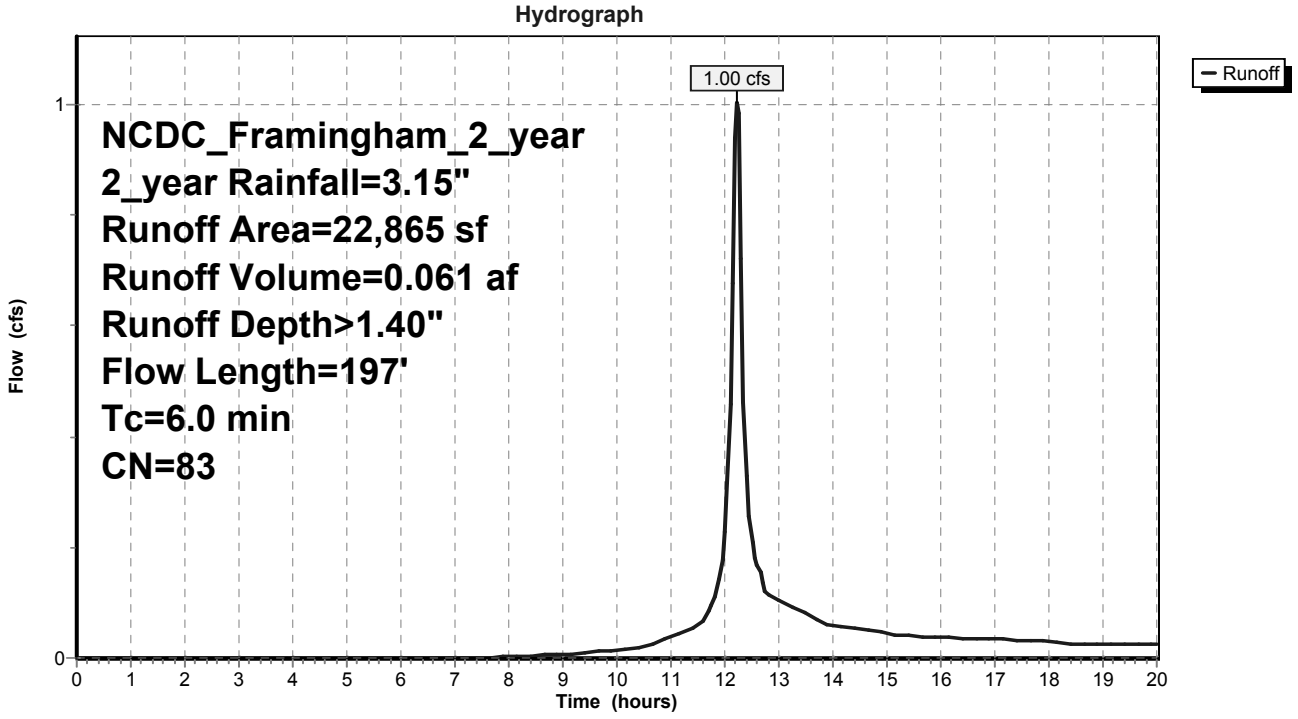
Runoff = 1.00 cfs @ 12.23 hrs, Volume= 0.061 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,428 | 61 | GRASS, 0% imperv, HSG B |
| * | 293 | 98 | DECK, 100% imperv, HSG B |
| * | 11,895 | 98 | IMP, 100% imperv, HSG B |
| * | 1,250 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,865 | 83 | Weighted Average |
| | 22,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.8 | 50 | 0.0137 | 1.00 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.9 | 138 | 0.0142 | 2.42 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.1488 | 2.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.8 | 197 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4B: (blank)



## Summary for Subcatchment RG-E-7: (blank)

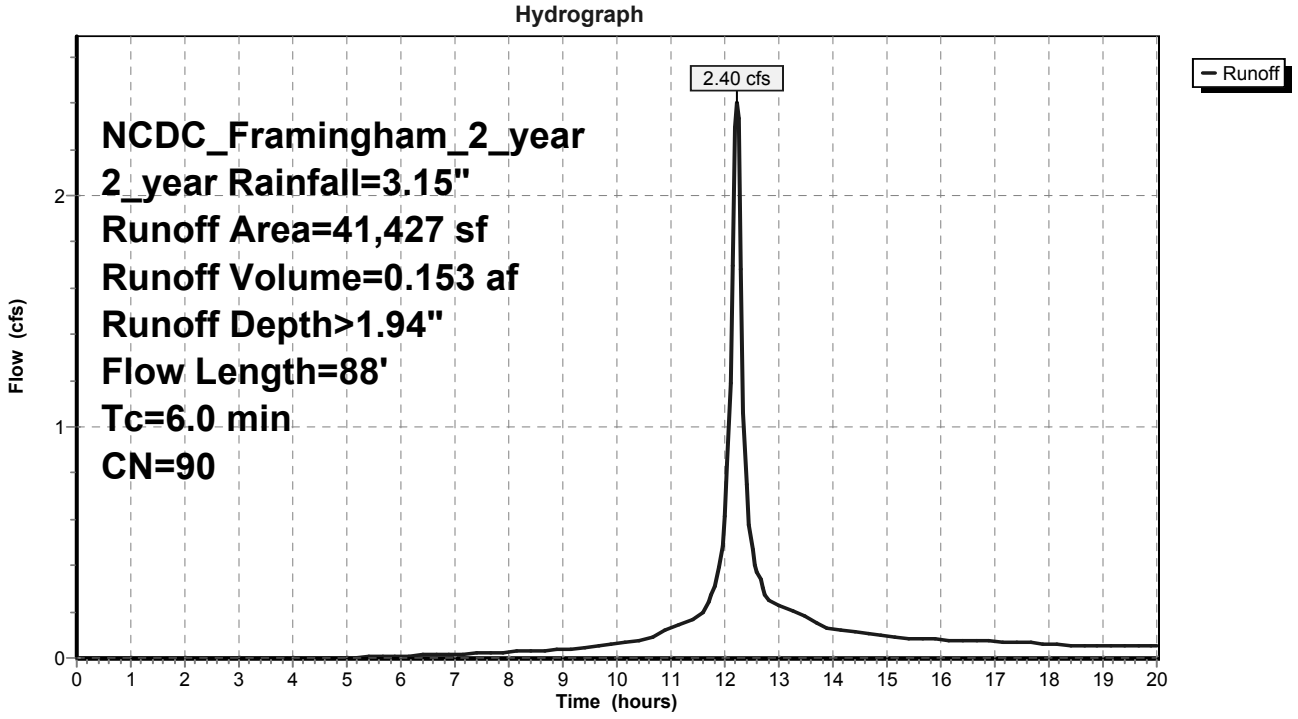
Runoff = 2.40 cfs @ 12.23 hrs, Volume= 0.153 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,373 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,458 | 98 | IMP, 100% imperv, HSG B |
| * | 3,411 | 98 | ROOF, 100% imperv, HSG B |
| * | 185 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 41,427 | 90 | Weighted Average |
| | 41,427 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0269 | 1.31 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 27 | 0.0251 | 3.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 11 | 0.0299 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 88 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-7: (blank)



## Summary for Subcatchment RG-E-8: (blank)

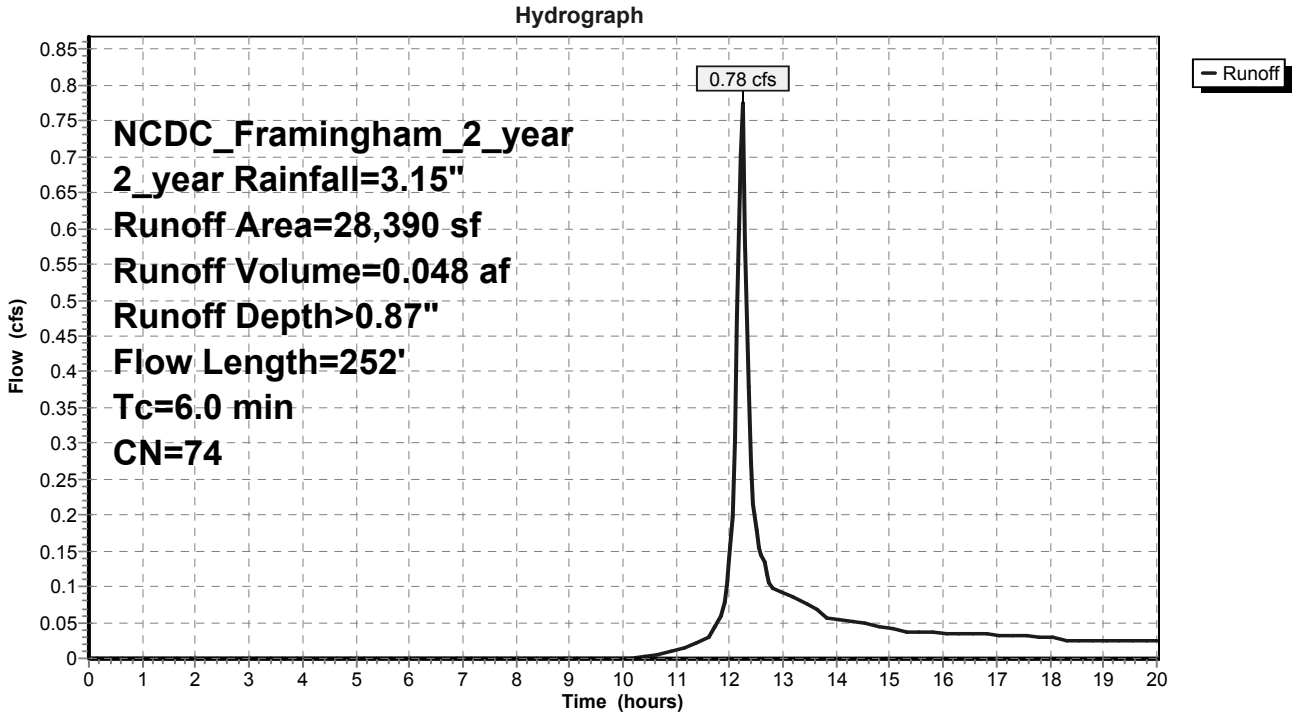
Runoff = 0.78 cfs @ 12.24 hrs, Volume= 0.048 af, Depth> 0.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 18,045 | 61 | GRASS, 0% imperv, HSG B |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 355 | 98 | DECK, 100% imperv, HSG B |
| * | 9,134 | 98 | IMP, 100% imperv, HSG B |
| * | 852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,390 | 74 | Weighted Average |
| | 28,387 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0517 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 32 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0331 | 3.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 51 | 0.0546 | 4.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.1 | 113 | 0.0620 | 1.74 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 252 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-8: (blank)



## Summary for Subcatchment RG-E-9A: (blank)

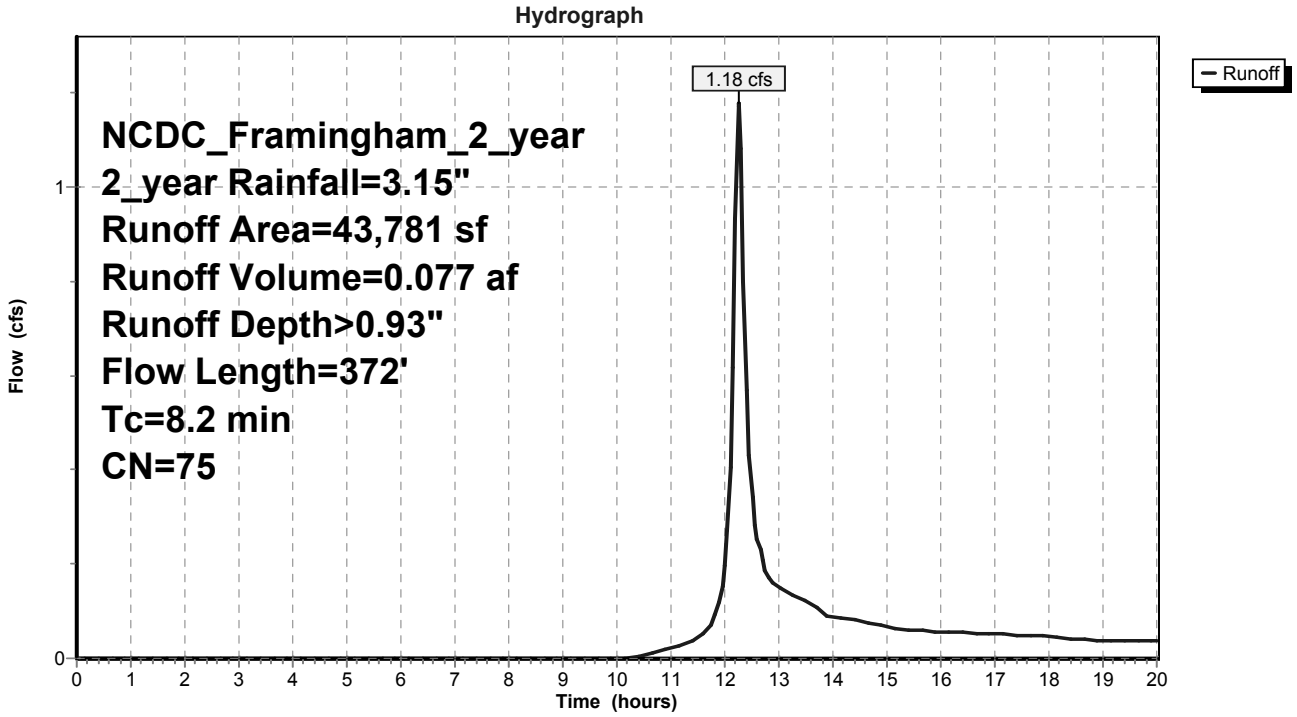
Runoff = 1.18 cfs @ 12.26 hrs, Volume= 0.077 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 10,864 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,515 | 61 | GRASS, 0% imperv, HSG B |
| * | 314 | 98 | DECK, 100% imperv, HSG A |
| * | 336 | 98 | DECK, 100% imperv, HSG B |
| * | 5,552 | 98 | IMP, 100% imperv, HSG A |
| * | 13,443 | 98 | IMP, 100% imperv, HSG B |
| * | 800 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 2,957 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 43,781 | 75 | Weighted Average |
| | 43,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 42 | 0.0271 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 8 | 0.0426 | 1.08 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.0 | 158 | 0.0180 | 2.72 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.9 | 65 | 0.0068 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0114 | 5.72 | 4.49 | **Pipe Channel, Smooth surfaces** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 |
| 0.6 | 66 | 0.0646 | 1.78 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.2 | 372 | Total | | | |

## Subcatchment RG-E-9A: (blank)



## Summary for Subcatchment RG-E-9B: (blank)

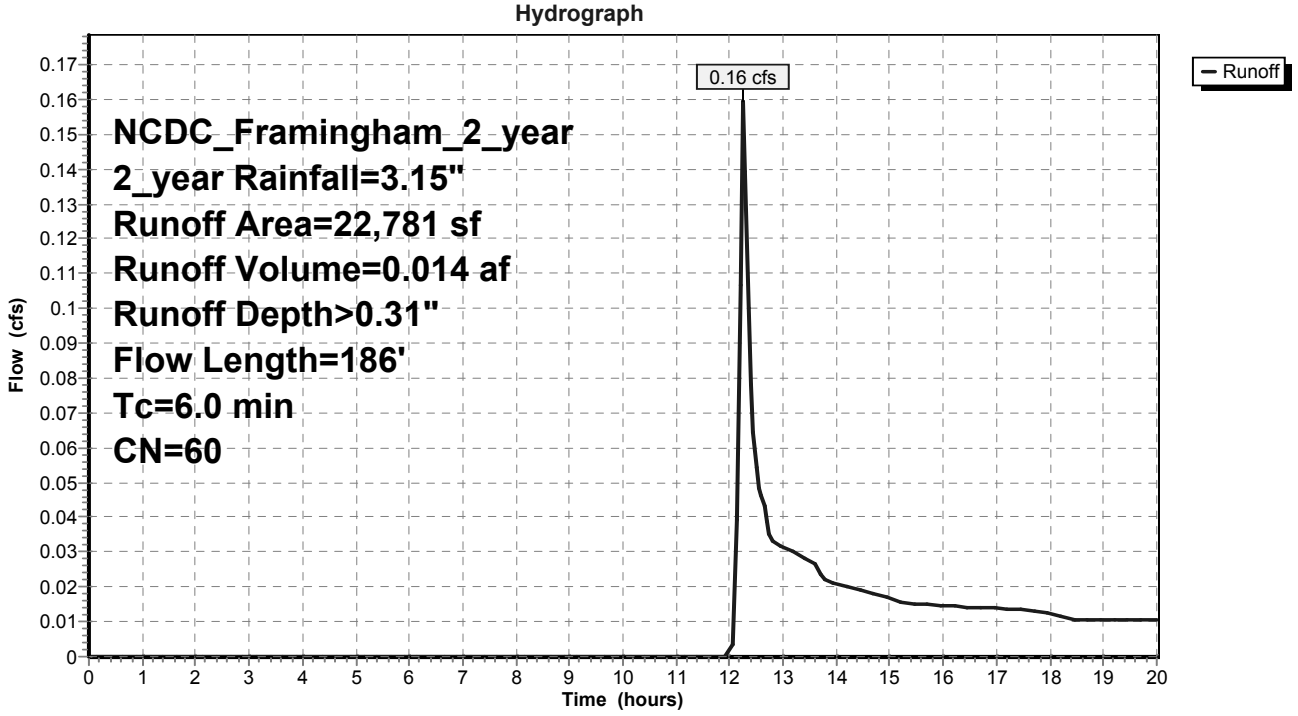
Runoff = 0.16 cfs @ 12.26 hrs, Volume= 0.014 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,064 | 39 | GRASS, 0% imperv, HSG A |
| * | 2,638 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 98 | DECK, 100% imperv, HSG A |
| * | 829 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 6,248 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,781 | 60 | Weighted Average |
| | 22,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.4 | 50 | 0.0010 | 0.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.3 | 80 | 0.3019 | 3.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.3 | 56 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.0 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-9B: (blank)



## Summary for Subcatchment RG-W-1: (blank)

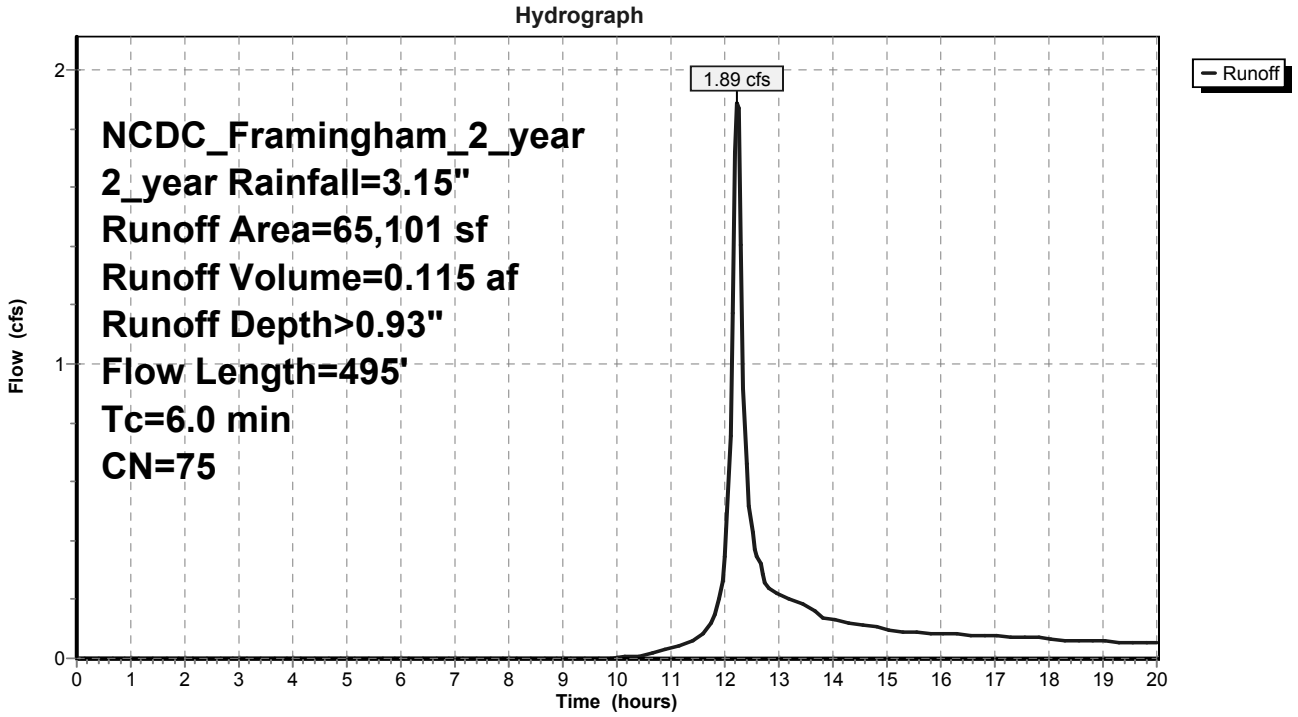
Runoff = 1.89 cfs @ 12.24 hrs, Volume= 0.115 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,550 | 39 | GRASS, 0% imperv, HSG A |
| * | 14,690 | 61 | GRASS, 0% imperv, HSG B |
| * | 733 | 98 | DECK, 100% imperv, HSG A |
| * | 379 | 98 | DECK, 100% imperv, HSG B |
| * | 23,694 | 98 | IMP, 100% imperv, HSG A |
| * | 7,512 | 98 | IMP, 100% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,345 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 194 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 65,101 | 75 | Weighted Average |
| | 65,101 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0185 | 1.12 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.8 | 280 | 0.0159 | 2.56 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.3 | 165 | 0.0281 | 1.17 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.8 | 495 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-1: (blank)



## Summary for Subcatchment RG-W-2: (blank)

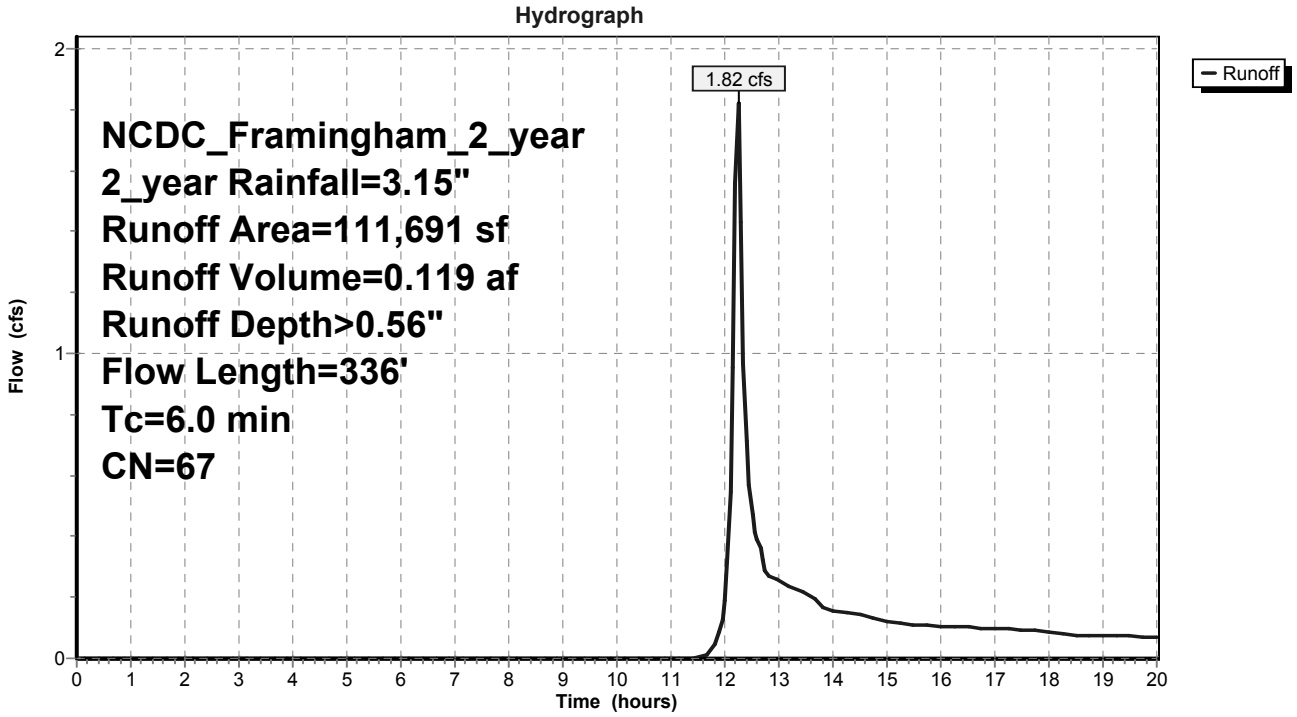
Runoff = 1.82 cfs @ 12.25 hrs, Volume= 0.119 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,818 | 39 | GRASS, 0% imperv, HSG A |
| * | 48,934 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,542 | 98 | DECK, 100% imperv, HSG A |
| * | 2,092 | 98 | DECK, 100% imperv, HSG B |
| * | 10,373 | 98 | IMP, 100% imperv, HSG A |
| * | 19,162 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG A |
| * | 864 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 111,691 | 67 | Weighted Average |
| | 111,691 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.2 | 33 | 0.0376 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 4 | 0.0215 | 0.73 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 13 | 0.0217 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.0 | 274 | 0.0124 | 2.26 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 11 | 0.1347 | 2.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 336 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-2: (blank)



## Summary for Subcatchment RG-W-3: (blank)

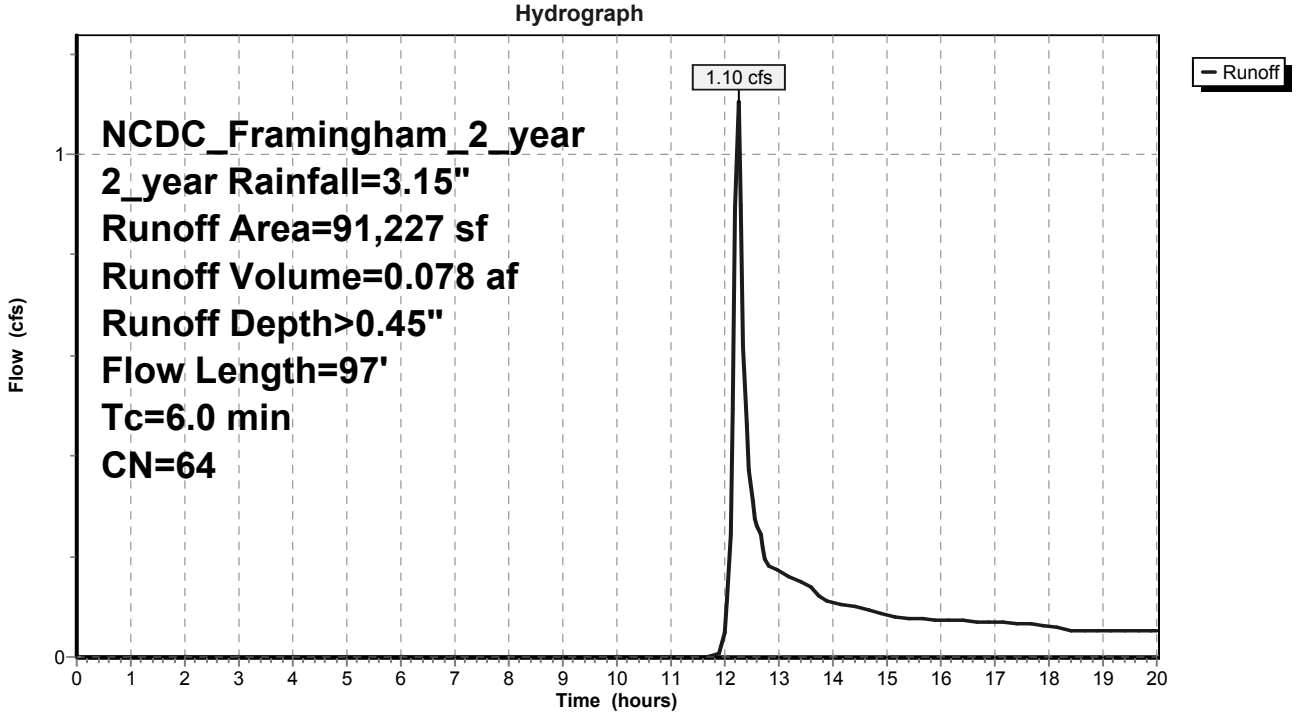
Runoff = 1.10 cfs @ 12.25 hrs, Volume= 0.078 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,998 | 39 | GRASS, 0% imperv, HSG A |
| * | 60,494 | 61 | GRASS, 0% imperv, HSG B |
| * | 751 | 98 | DECK, 100% imperv, HSG A |
| * | 1,912 | 98 | DECK, 100% imperv, HSG B |
| * | 11,505 | 98 | IMP, 100% imperv, HSG A |
| * | 1,575 | 98 | IMP, 100% imperv, HSG B |
| * | 12 | 98 | ROOF, 100% imperv, HSG B |
| * | 980 | 98 | SIDEWALK, 100% imperv, HSG A |
| | 91,227 | 64 | Weighted Average |
| | 91,227 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | 50 | 0.0296 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 47 | 0.2223 | 3.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.2 | 97 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3: (blank)



## Summary for Subcatchment RG-W-3A: (blank)

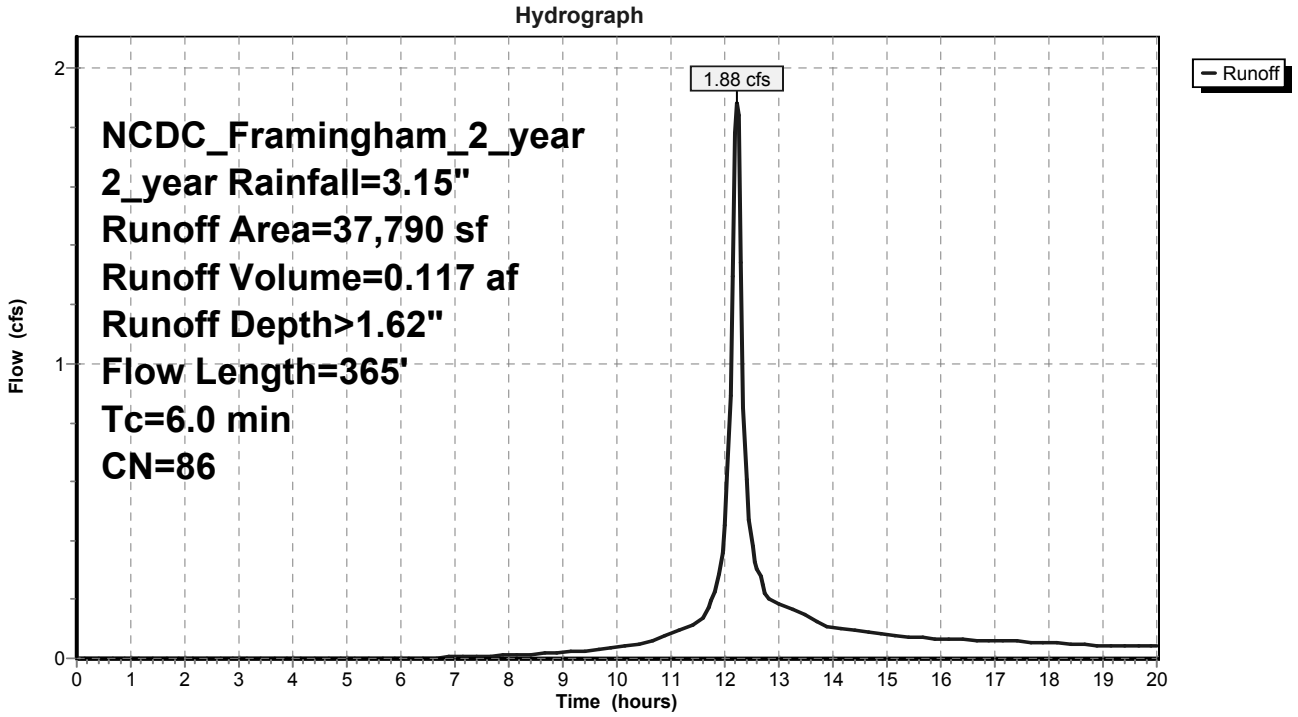
Runoff = 1.88 cfs @ 12.23 hrs, Volume= 0.117 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,877 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,646 | 61 | GRASS, 0% imperv, HSG B |
| * | 52 | 98 | DECK, 100% imperv, HSG A |
| * | 386 | 98 | DECK, 100% imperv, HSG B |
| * | 7,875 | 98 | IMP, 100% imperv, HSG A |
| * | 16,446 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| * | 340 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,166 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 37,790 | 86 | Weighted Average |
| | 37,790 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.4 | 50 | 0.0037 | 0.59 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.1 | 315 | 0.0153 | 2.51 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.5 | 365 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3A: (blank)



## Summary for Subcatchment RG-W-4: (blank)

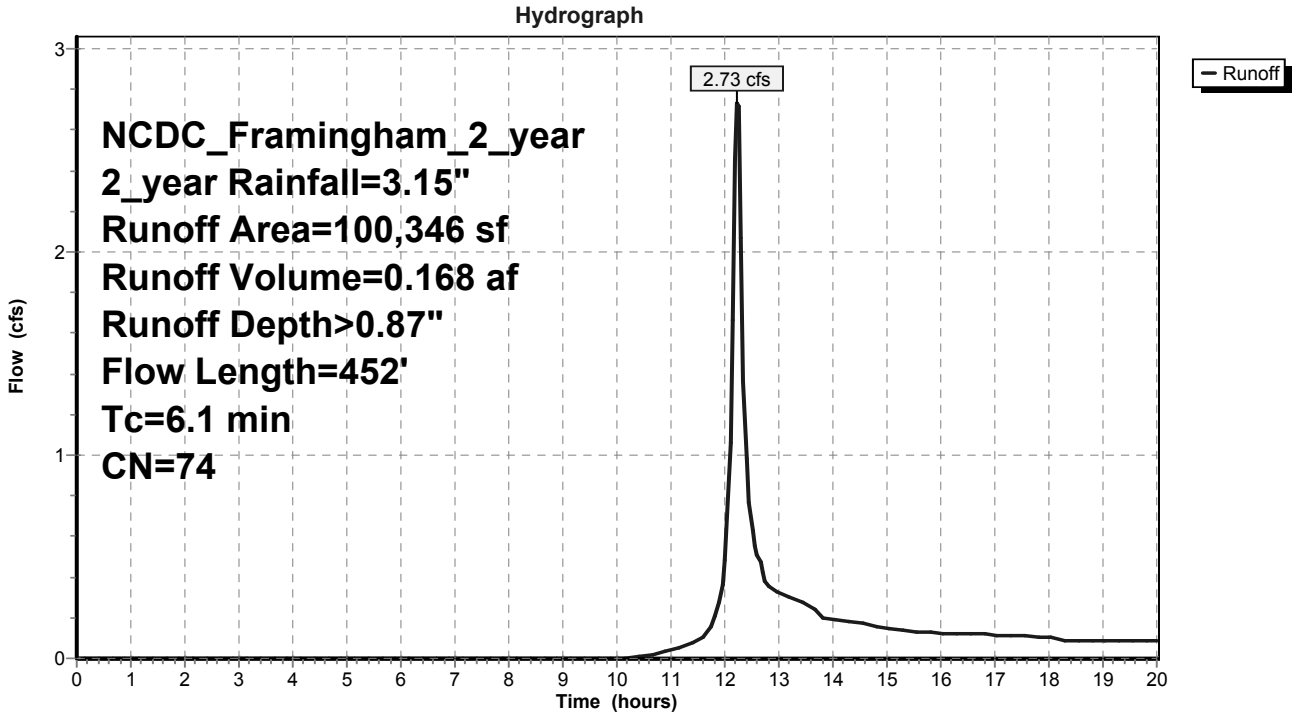
Runoff = 2.73 cfs @ 12.24 hrs, Volume= 0.168 af, Depth> 0.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 820 | 39 | GRASS, 0% imperv, HSG A |
| * | 65,039 | 61 | GRASS, 0% imperv, HSG B |
| * | 108 | 98 | DECK, 100% imperv, HSG A |
| * | 657 | 98 | DECK, 100% imperv, HSG B |
| * | 19 | 98 | IMP, 100% imperv, HSG A |
| * | 32,102 | 98 | IMP, 100% imperv, HSG B |
| * | 76 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,525 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 100,346 | 74 | Weighted Average |
| | 100,346 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0228 | 1.22 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 127 | 0.0184 | 2.76 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.6 | 275 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.1 | 452 | Total | | | |

## Subcatchment RG-W-4: (blank)



## Summary for Subcatchment RG-W-5: (blank)

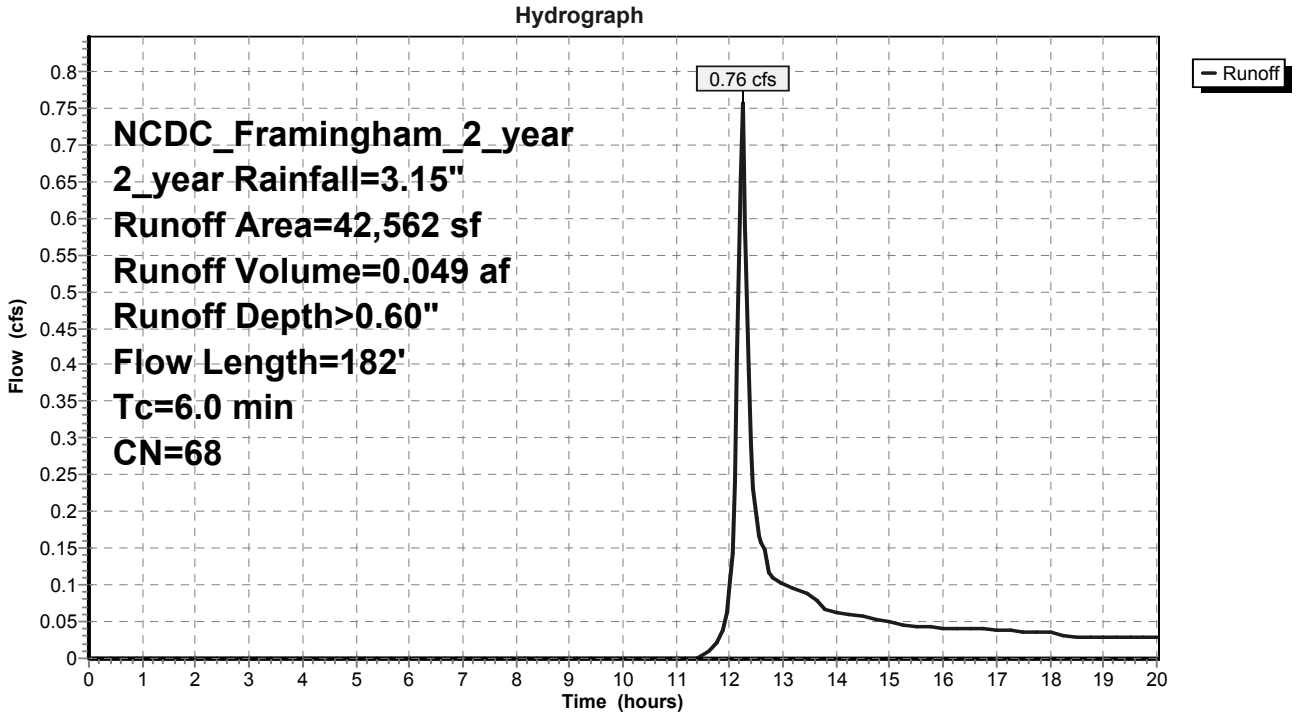
Runoff = 0.76 cfs @ 12.24 hrs, Volume= 0.049 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 723 | 39 | GRASS, 0% imperv, HSG A |
| * | 31,185 | 61 | GRASS, 0% imperv, HSG B |
| * | 704 | 30 | WOODS, 0% imperv, HSG A |
| * | 126 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 219 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,120 | 98 | DECK, 100% imperv, HSG B |
| * | 205 | 98 | IMP, 100% imperv, HSG A |
| * | 7,984 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| | 42,562 | 68 | Weighted Average |
| | 42,227 | | 99.21% Pervious Area |
| | 335 | | 0.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0413 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 38 | 0.0260 | 1.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 24 | 0.0354 | 3.82 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 31 | 0.0362 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 11 | 0.0429 | 4.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.1361 | 2.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 182 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-5: (blank)



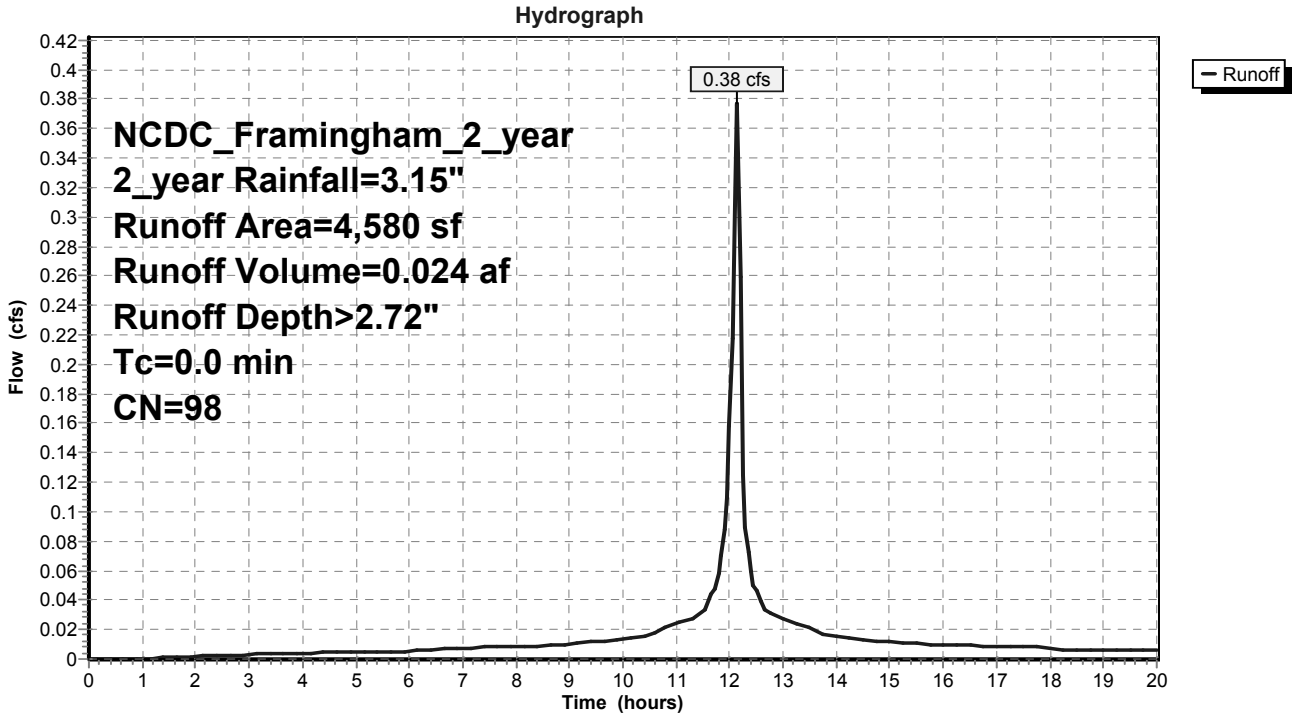
## Summary for Subcatchment ROOF-1: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,478 | 98 | ROOF, 100% imperv, HSG A |
| * | 3,102 | 98 | ROOF, 100% imperv, HSG B |
| | 4,580 | 98 | Weighted Average |
| | 4,580 | | 100.00% Pervious Area |

## Subcatchment ROOF-1: (blank)



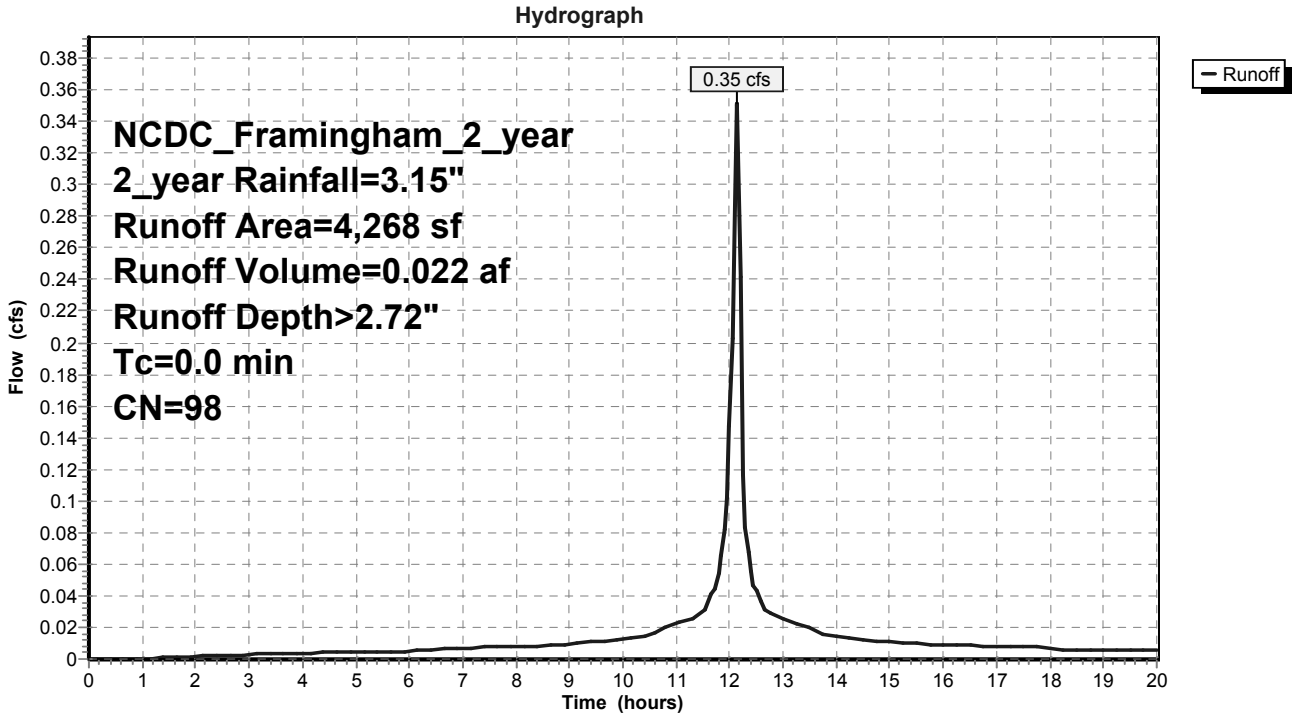
## Summary for Subcatchment ROOF-10: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.022 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 3,776 | 98 | ROOF, 100% imperv, HSG B |
| | 4,268 | 98 | Weighted Average |
| | 4,268 | | 100.00% Pervious Area |

## Subcatchment ROOF-10: (blank)



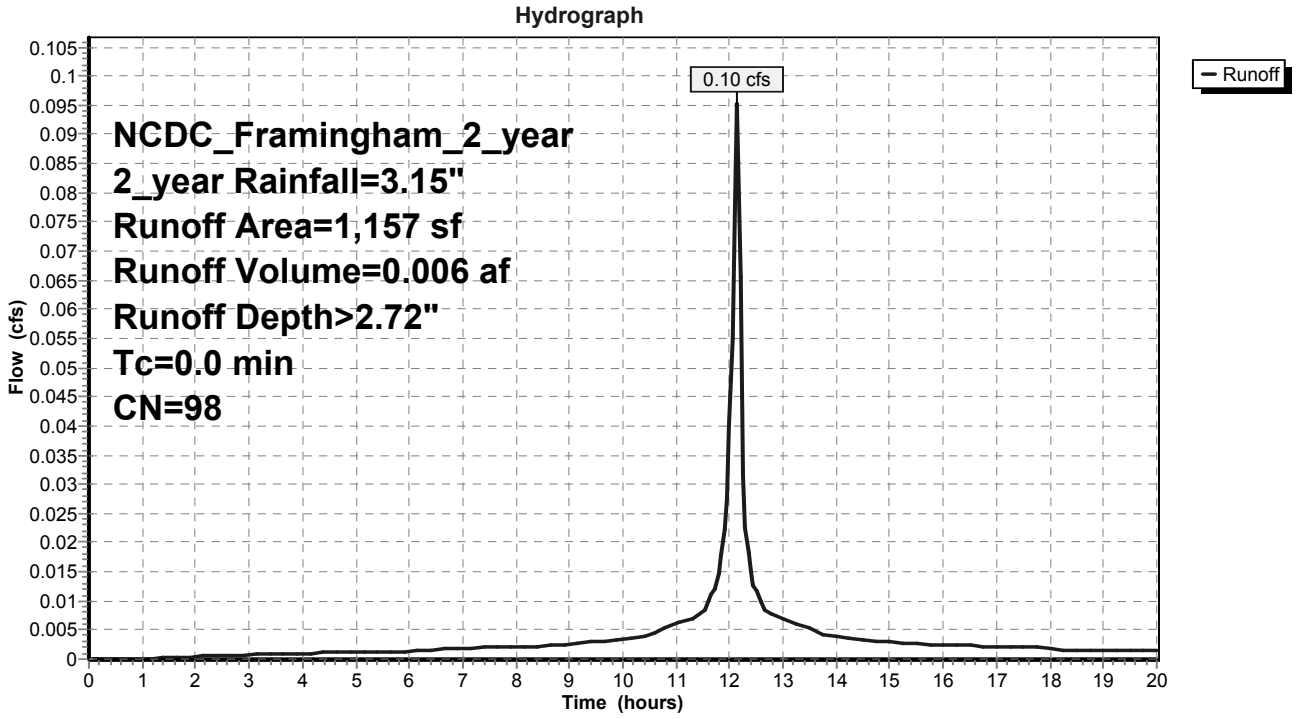
## Summary for Subcatchment ROOF-100: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-100: (blank)



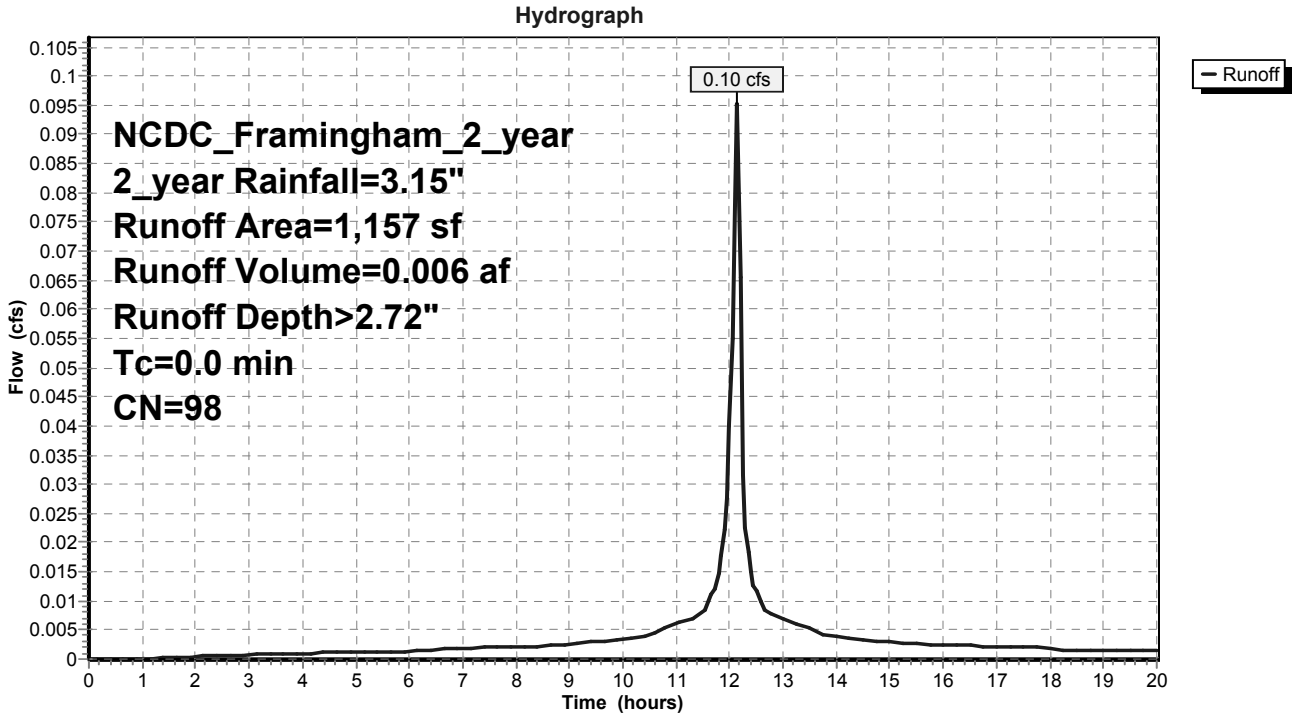
## Summary for Subcatchment ROOF-101: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-101: (blank)



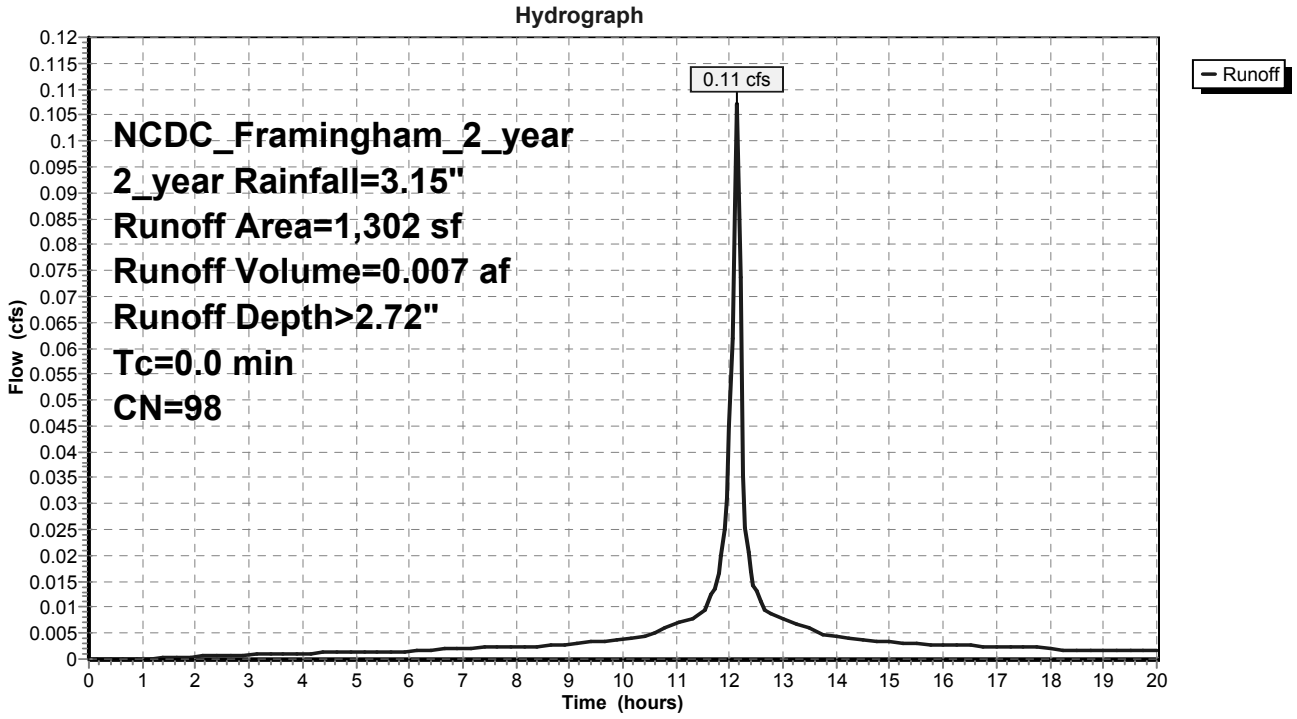
## Summary for Subcatchment ROOF-102: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-102: (blank)



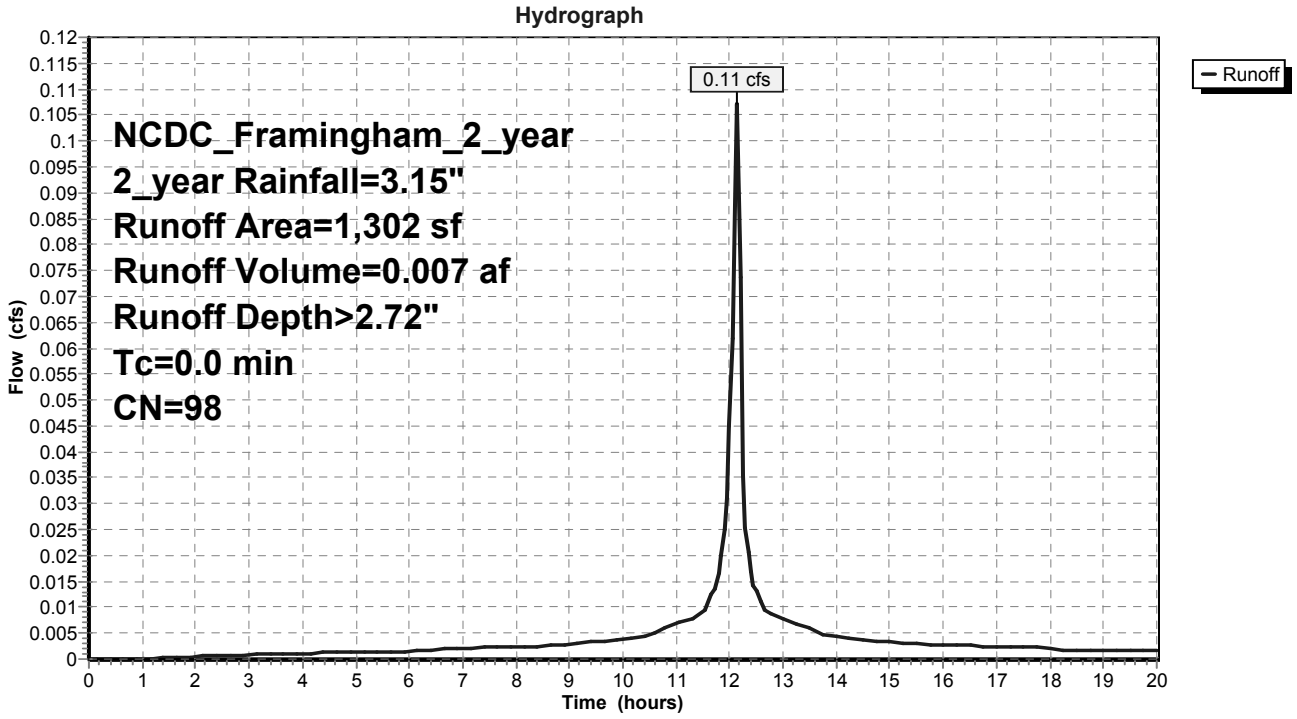
## Summary for Subcatchment ROOF-103: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-103: (blank)



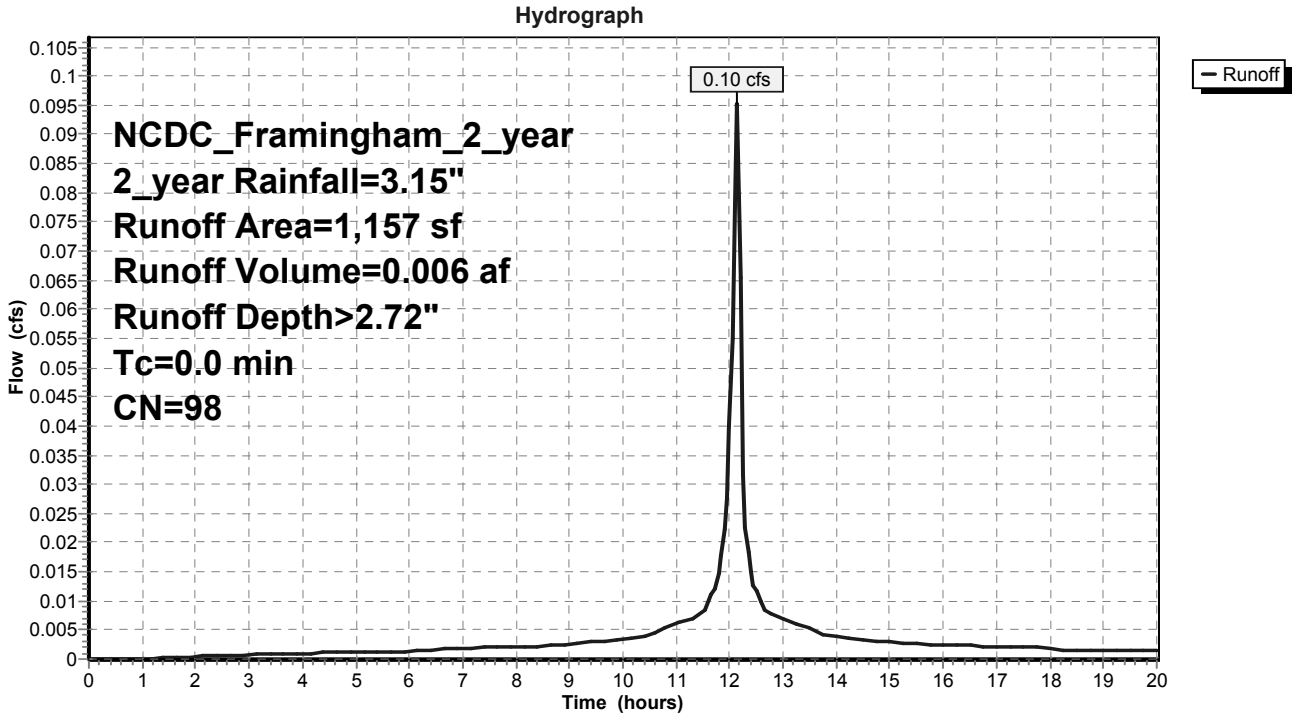
## Summary for Subcatchment ROOF-104: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-104: (blank)



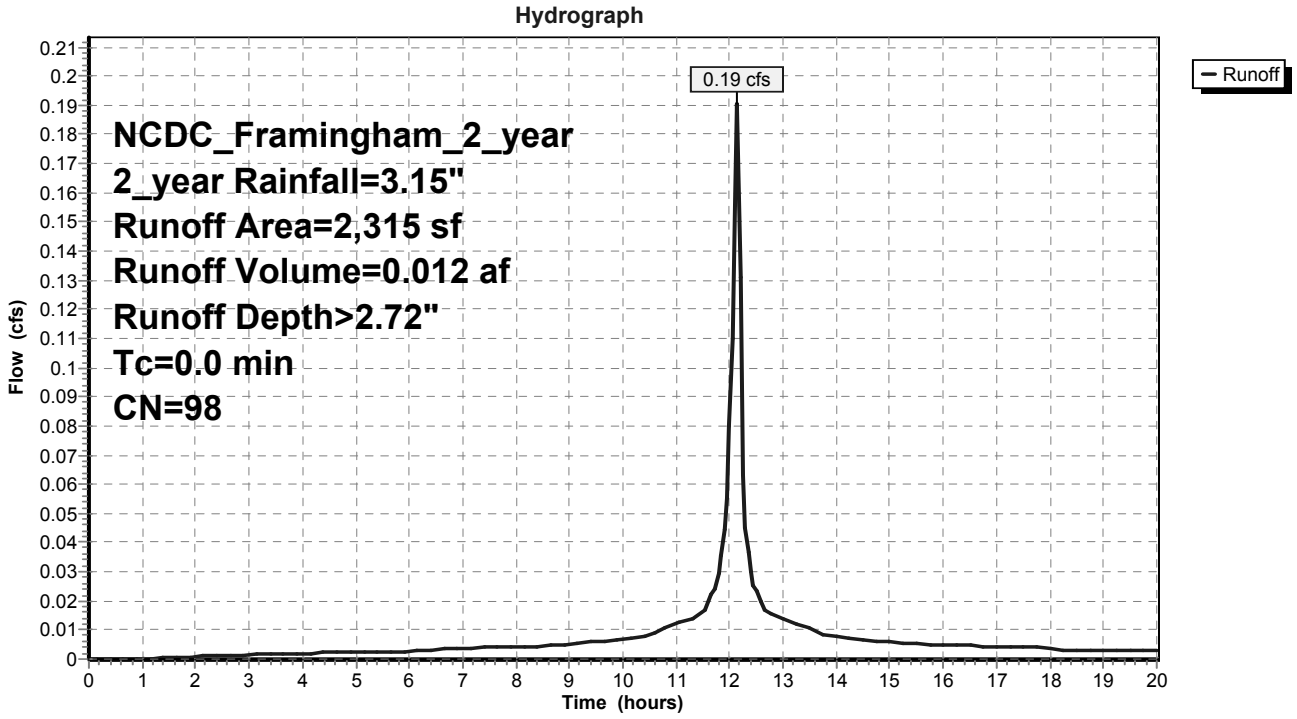
## Summary for Subcatchment ROOF-105: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-105: (blank)



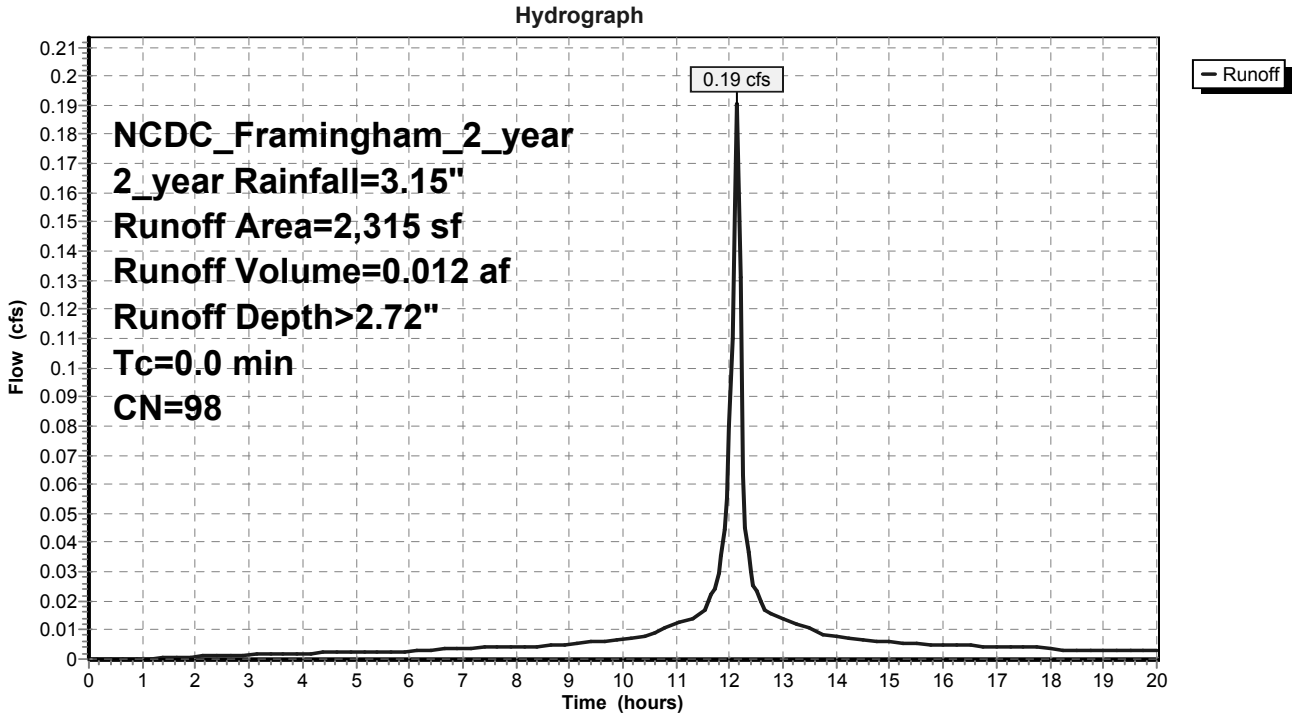
## Summary for Subcatchment ROOF-106: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-106: (blank)



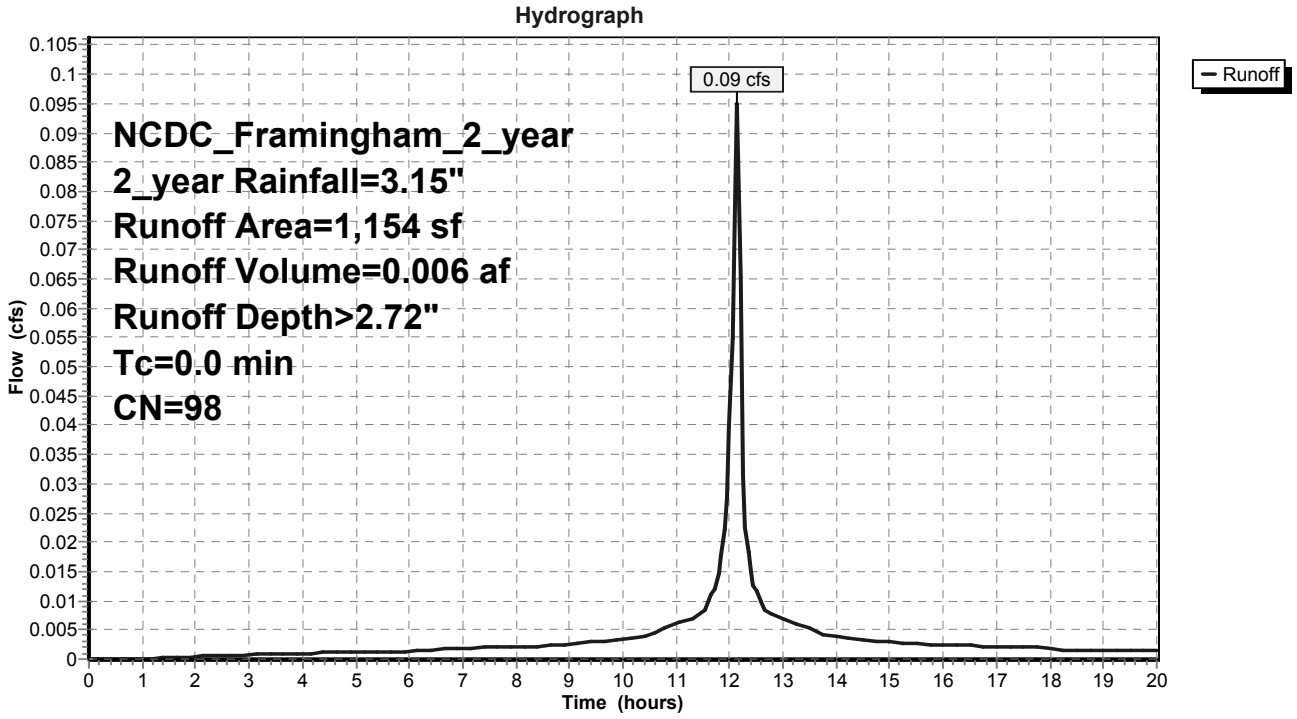
## Summary for Subcatchment ROOF-107: (blank)

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,154 | 98 | ROOF, 100% imperv, HSG B |
| | 1,154 | | 100.00% Pervious Area |

## Subcatchment ROOF-107: (blank)



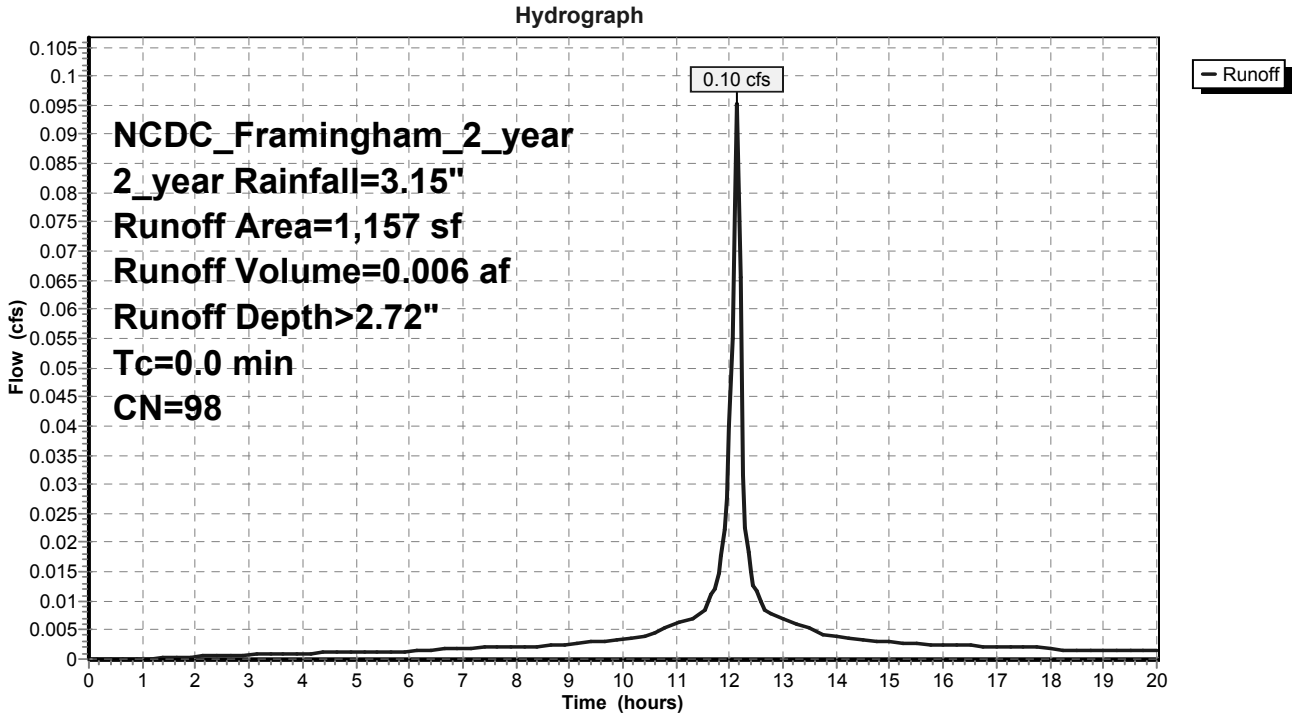
## Summary for Subcatchment ROOF-108: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-108: (blank)



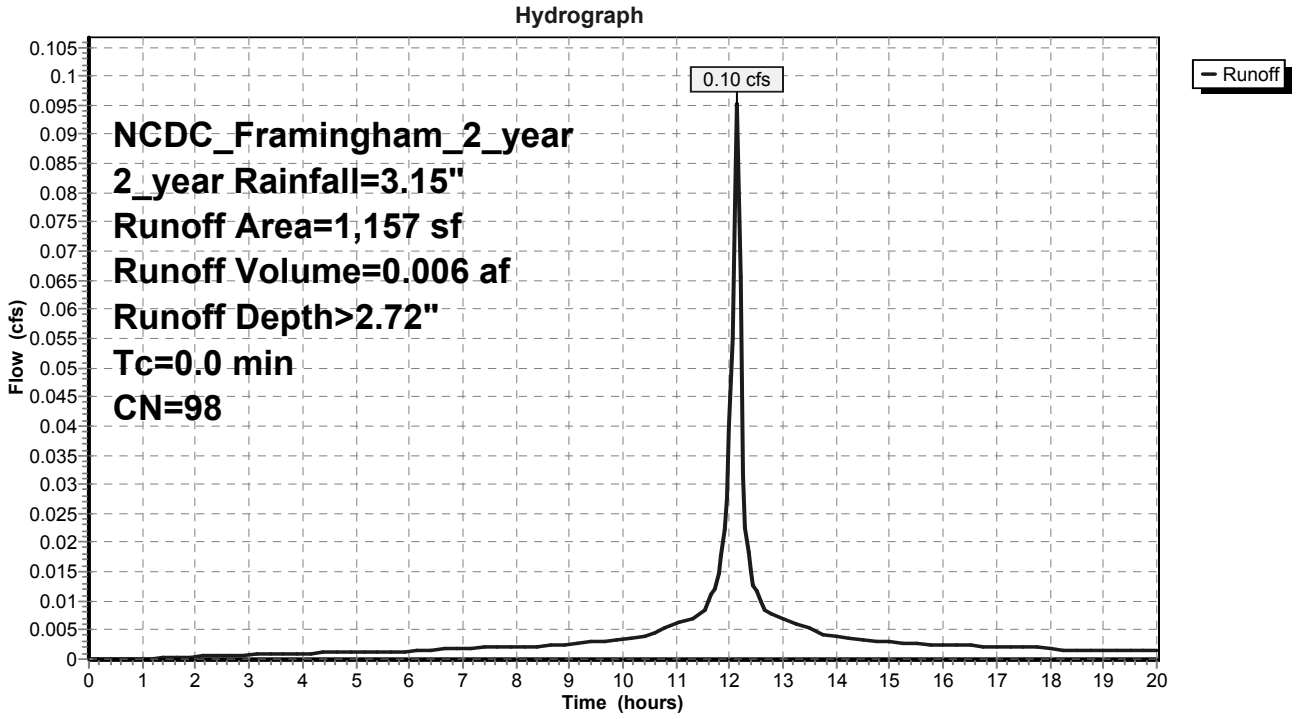
## Summary for Subcatchment ROOF-109: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-109: (blank)



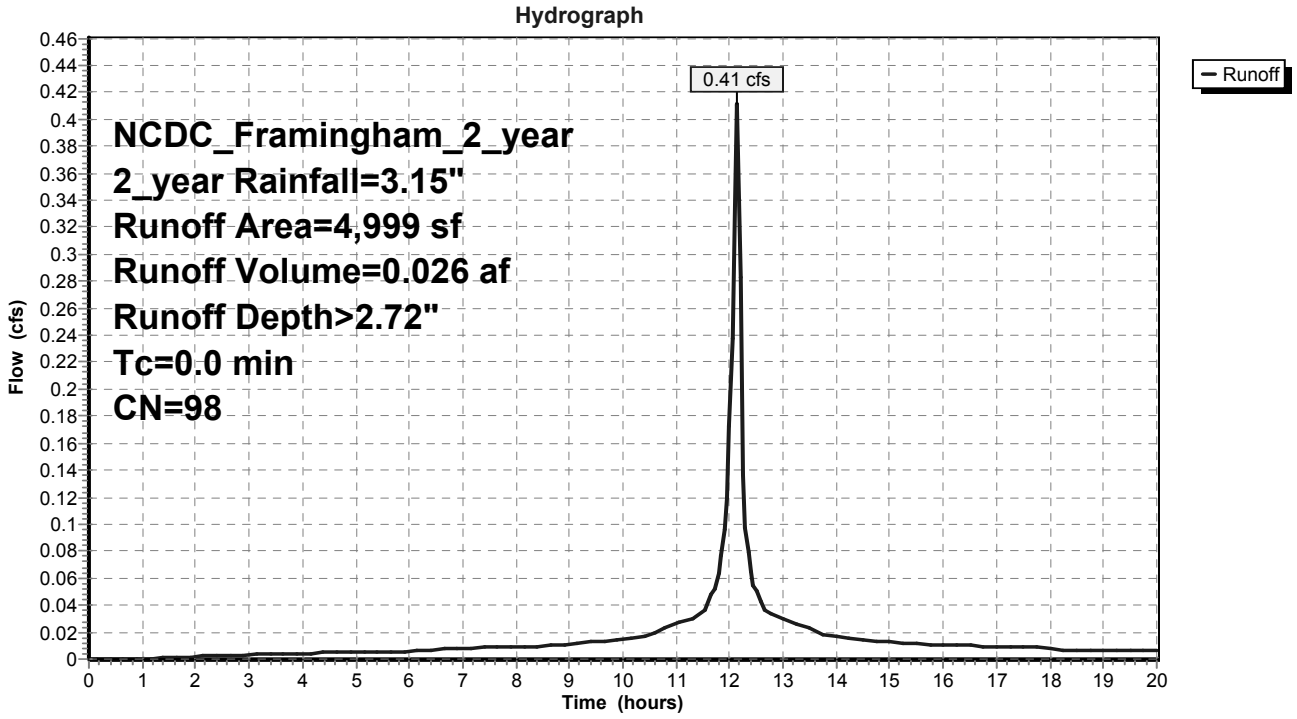
## Summary for Subcatchment ROOF-11: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.026 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-11: (blank)



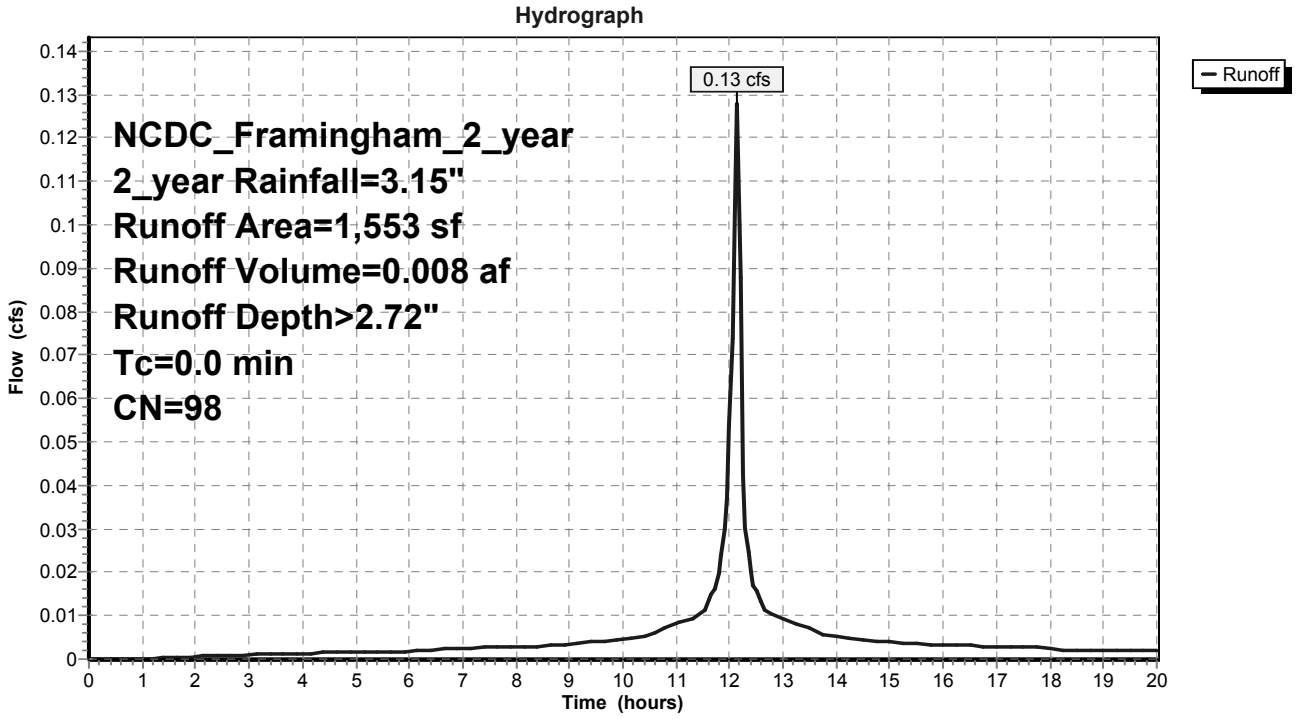
## Summary for Subcatchment ROOF-110: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-110: (blank)



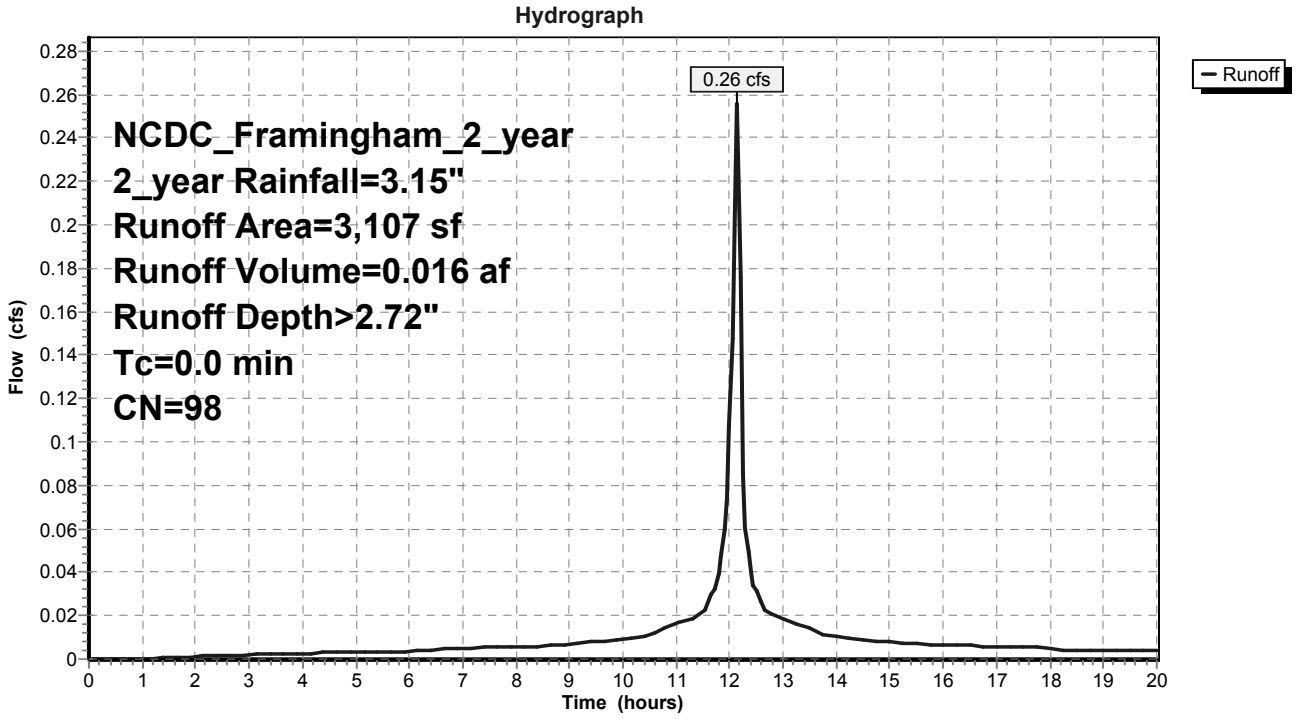
## Summary for Subcatchment ROOF-111: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-111: (blank)



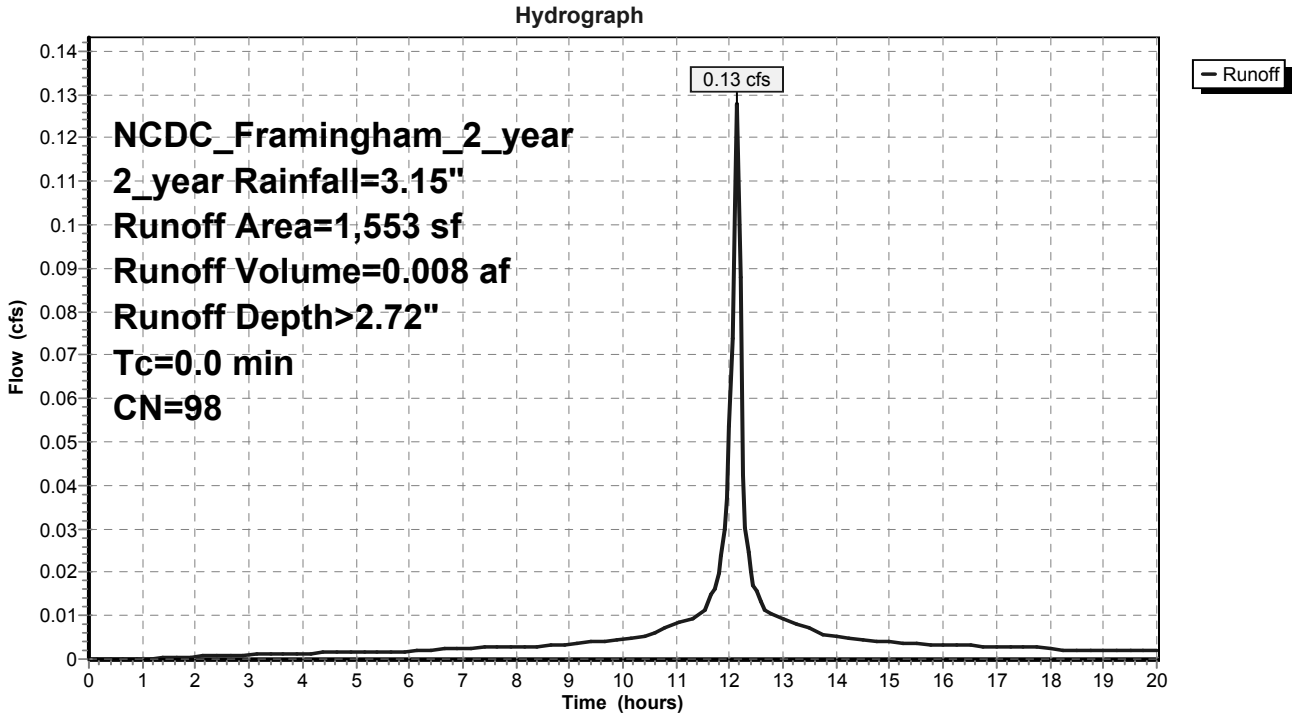
## Summary for Subcatchment ROOF-112: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-112: (blank)



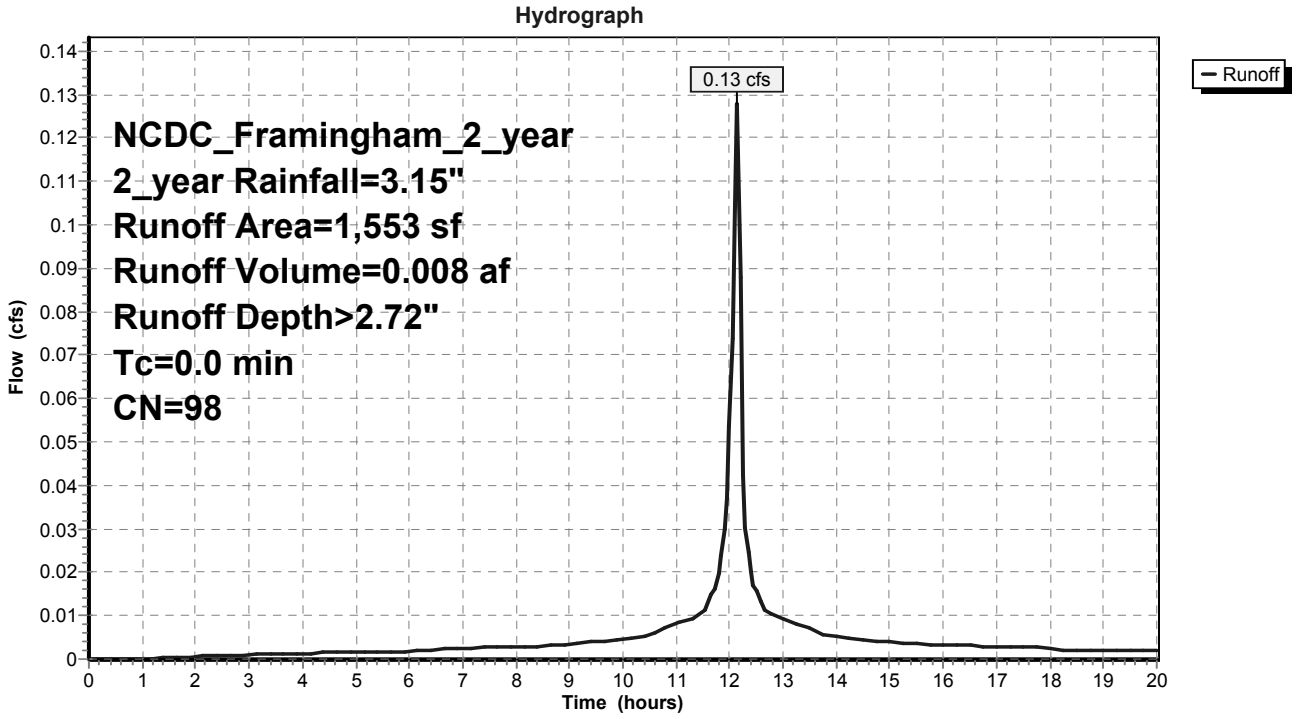
## Summary for Subcatchment ROOF-113: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-113: (blank)



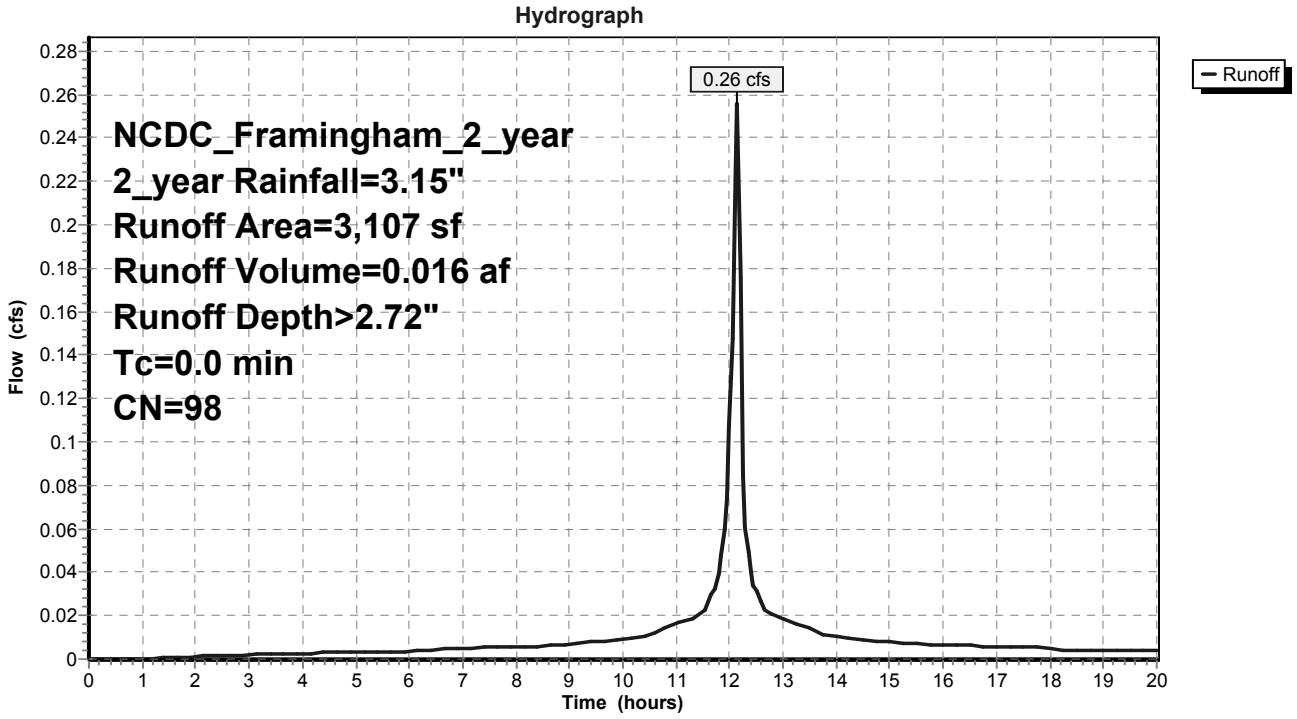
## Summary for Subcatchment ROOF-114: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-114: (blank)



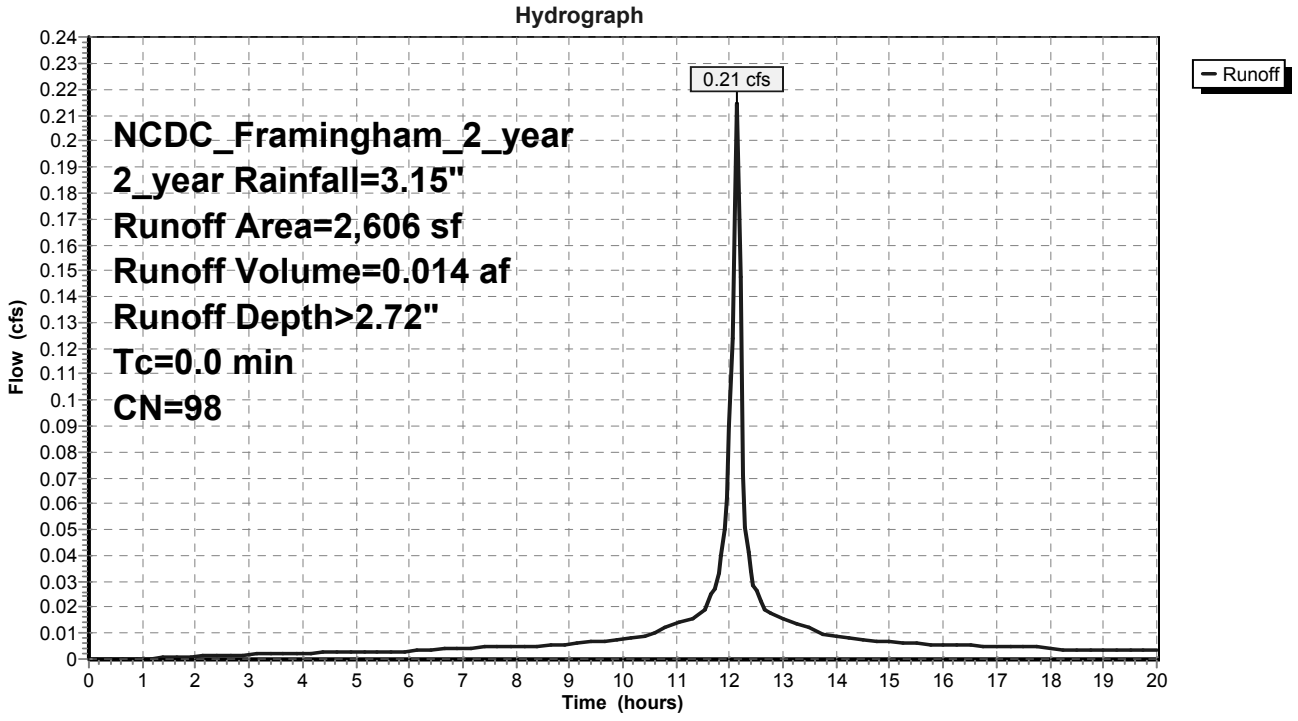
## Summary for Subcatchment ROOF-115: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.014 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,602 | 98 | ROOF, 100% imperv, HSG B |
| | 2,606 | 98 | Weighted Average |
| | 2,606 | | 100.00% Pervious Area |

## Subcatchment ROOF-115: (blank)



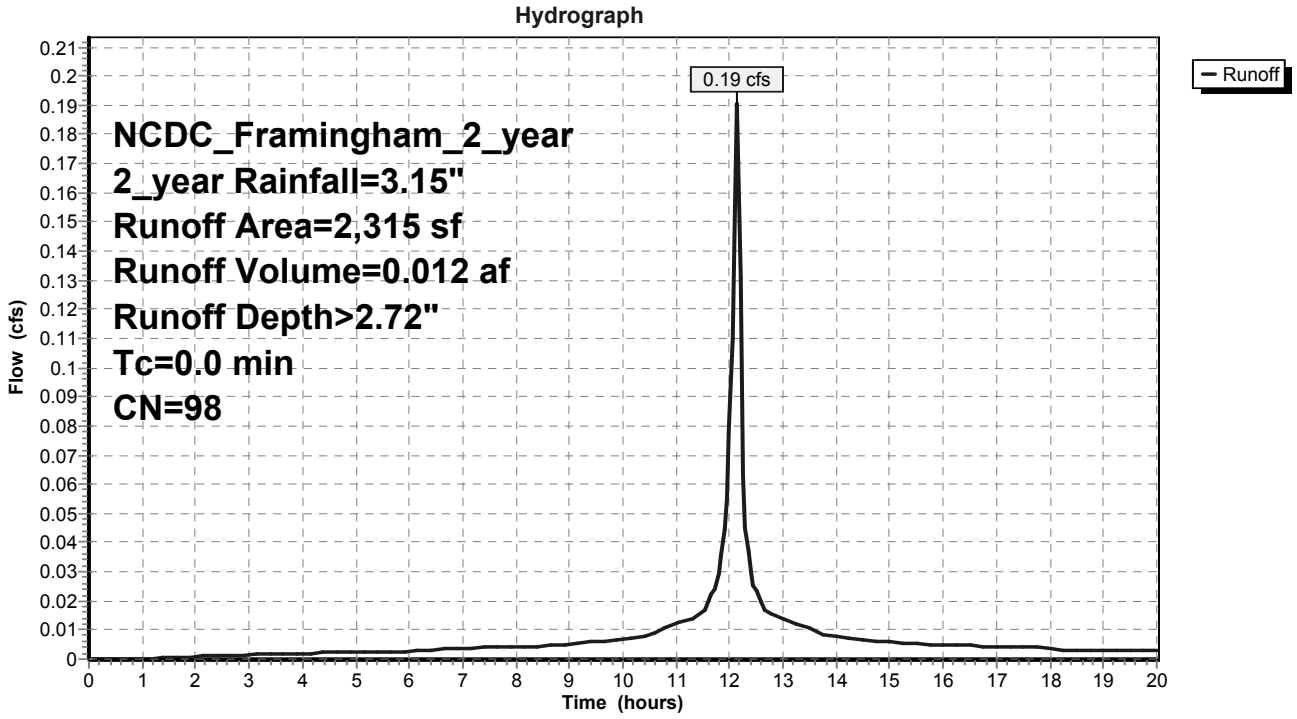
## Summary for Subcatchment ROOF-117: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-117: (blank)



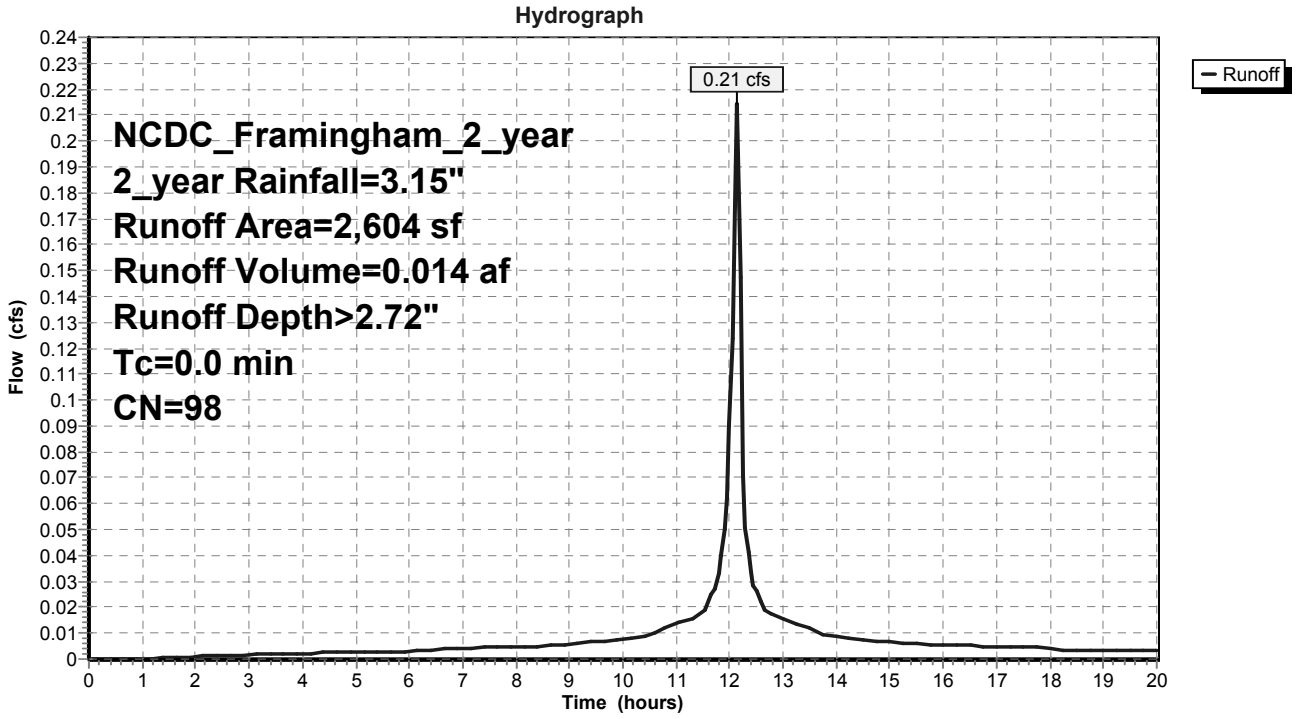
## Summary for Subcatchment ROOF-118: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.014 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-118: (blank)



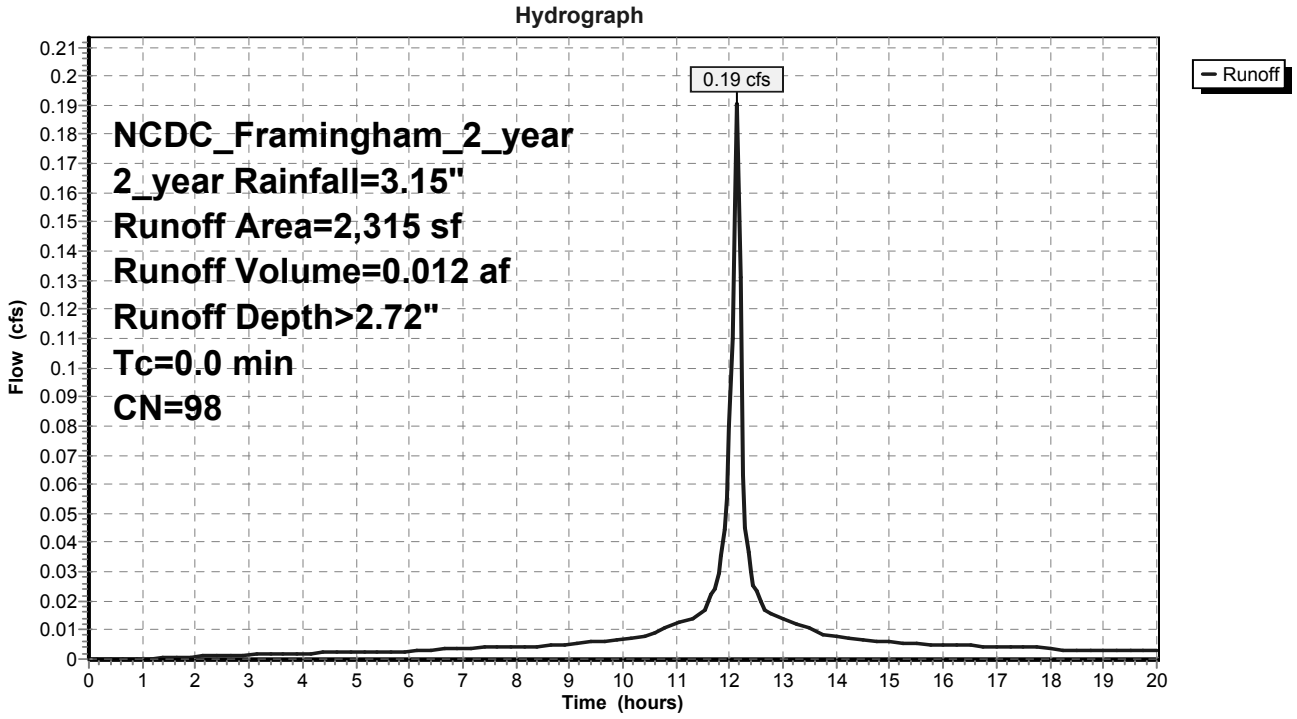
## Summary for Subcatchment ROOF-119: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-119: (blank)



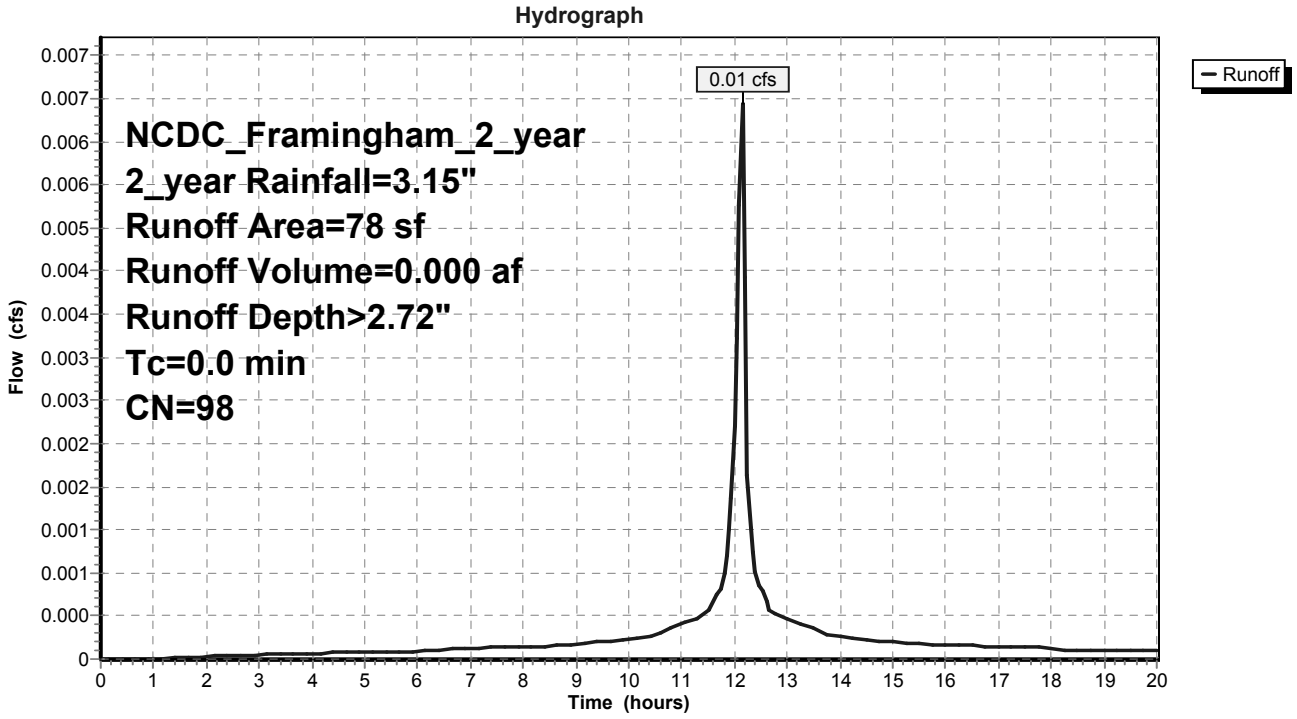
## Summary for Subcatchment ROOF-11MAIL: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.000 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-11MAIL: (blank)



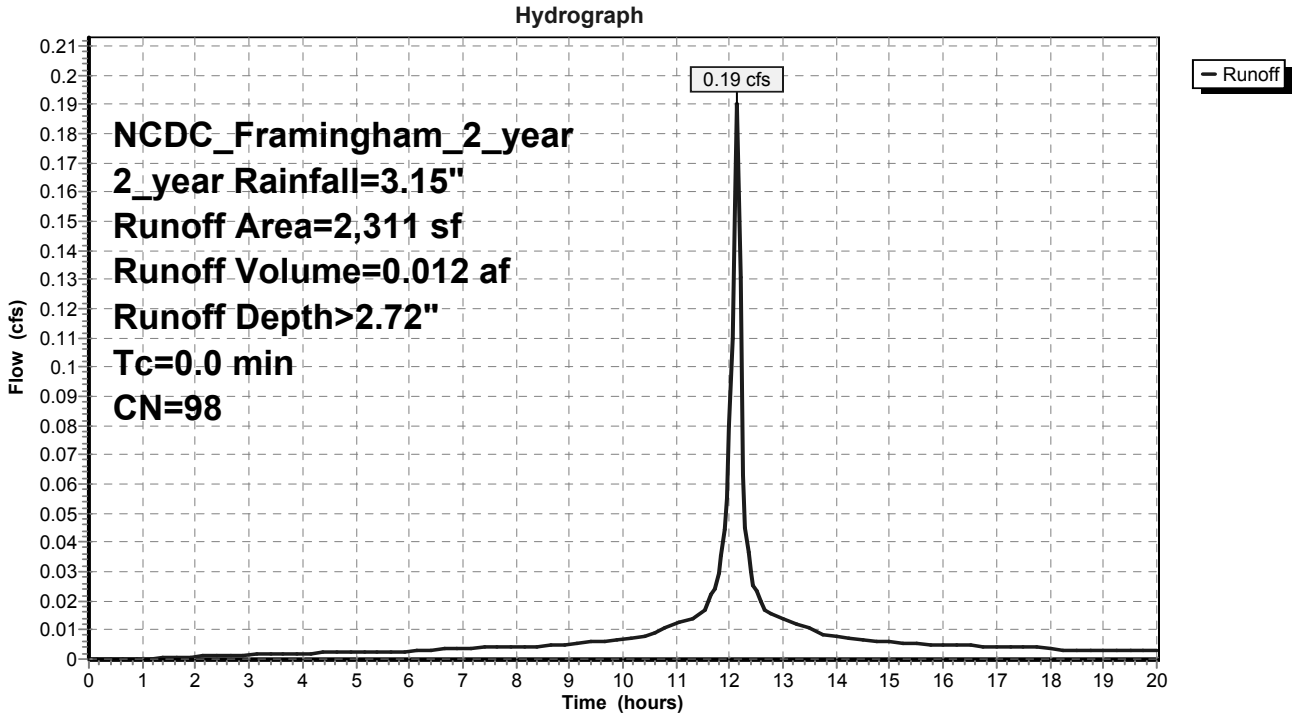
## Summary for Subcatchment ROOF-12: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,311 | 98 | ROOF, 100% imperv, HSG B |
| | 2,311 | | 100.00% Pervious Area |

## Subcatchment ROOF-12: (blank)



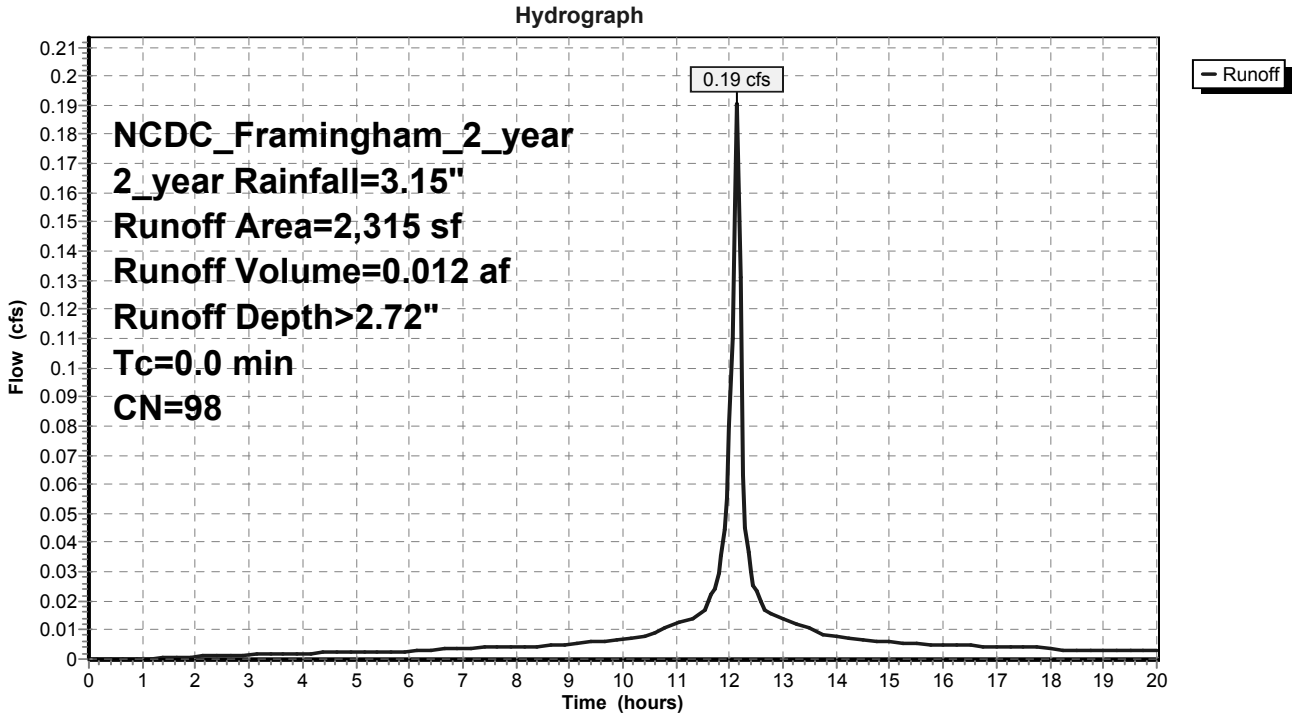
## Summary for Subcatchment ROOF-120: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-120: (blank)



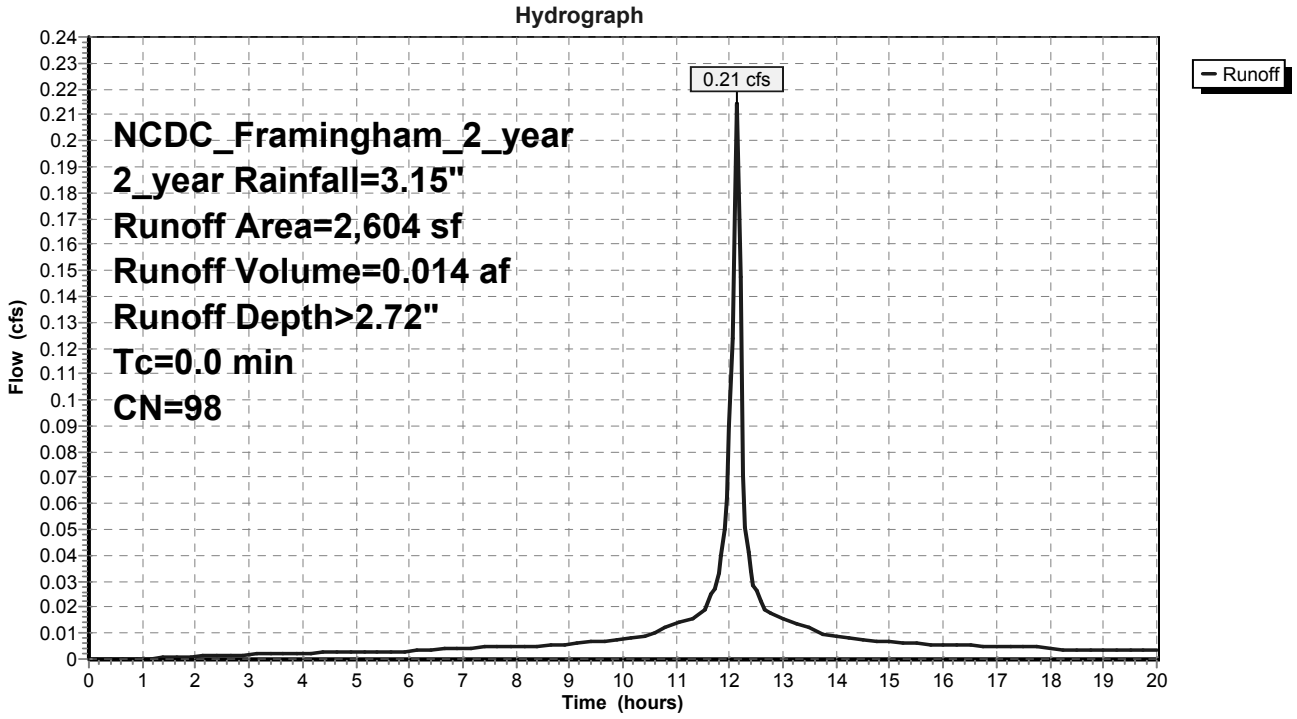
## Summary for Subcatchment ROOF-121: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.014 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 138 | 98 | ROOF, 100% imperv, HSG A |
| * | 2,467 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-121: (blank)



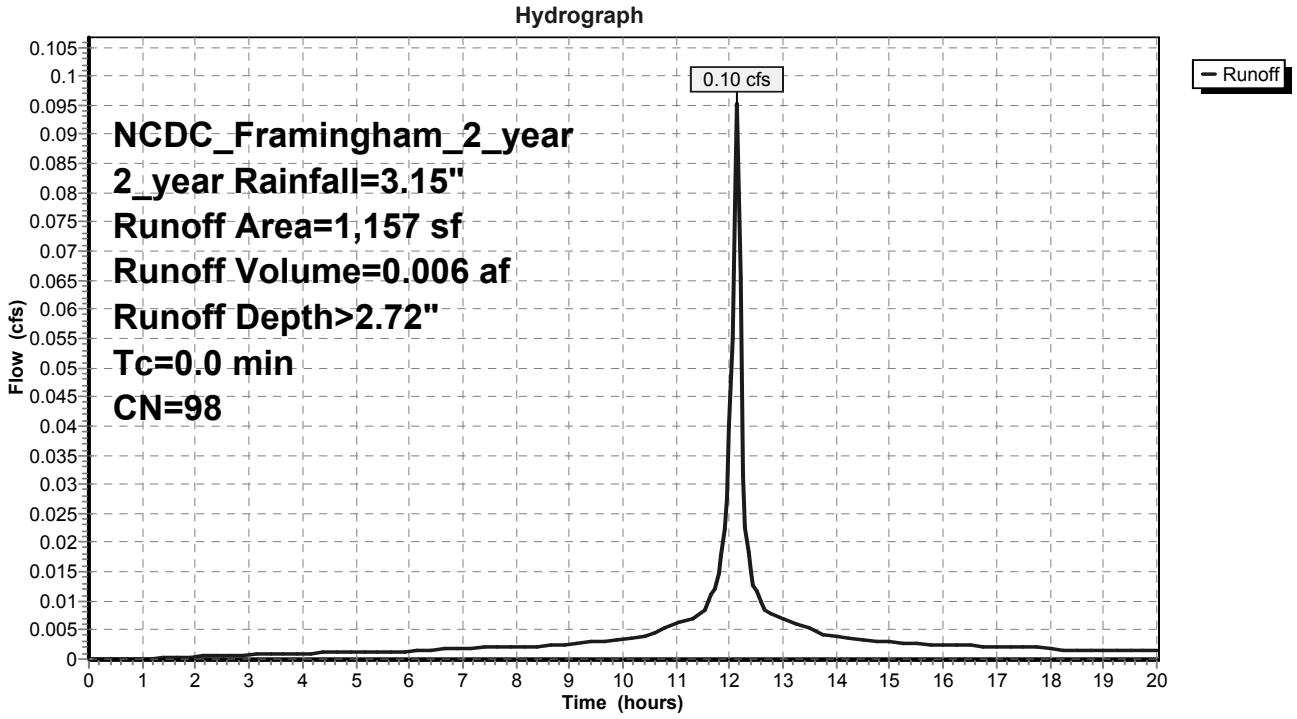
## Summary for Subcatchment ROOF-122: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-122: (blank)



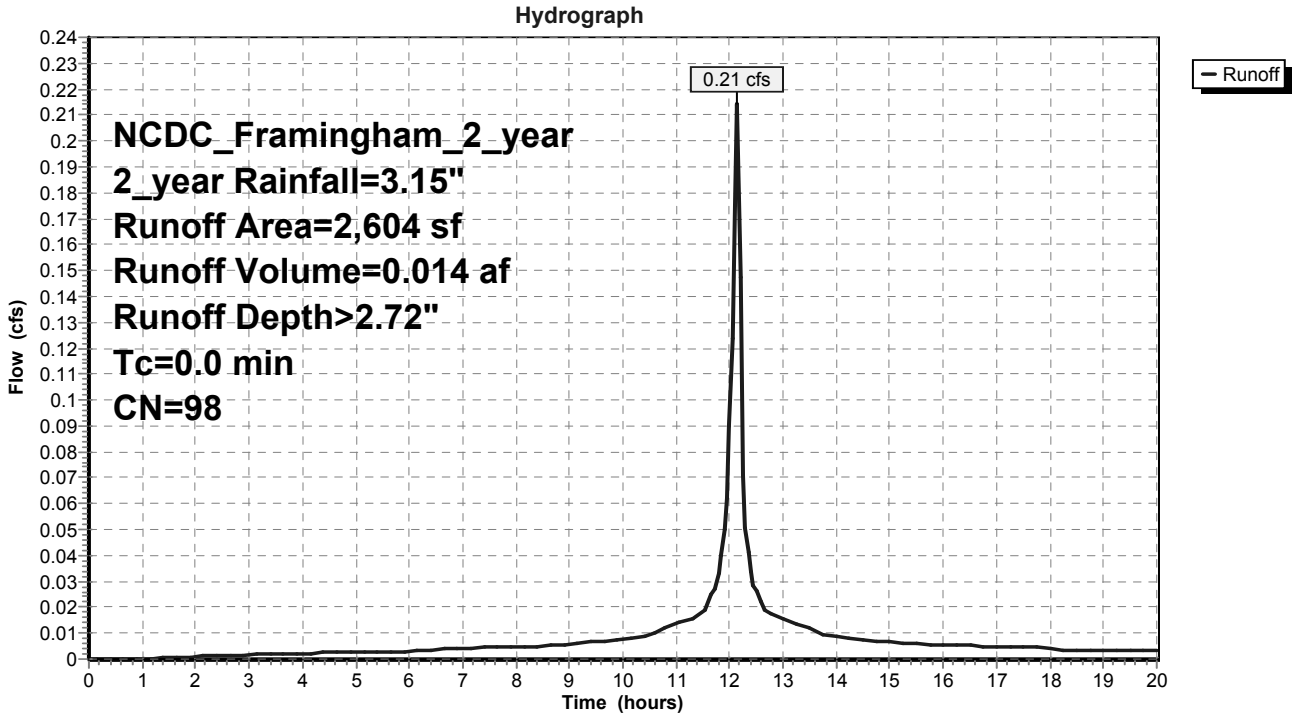
## Summary for Subcatchment ROOF-123: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.014 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG A |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-123: (blank)



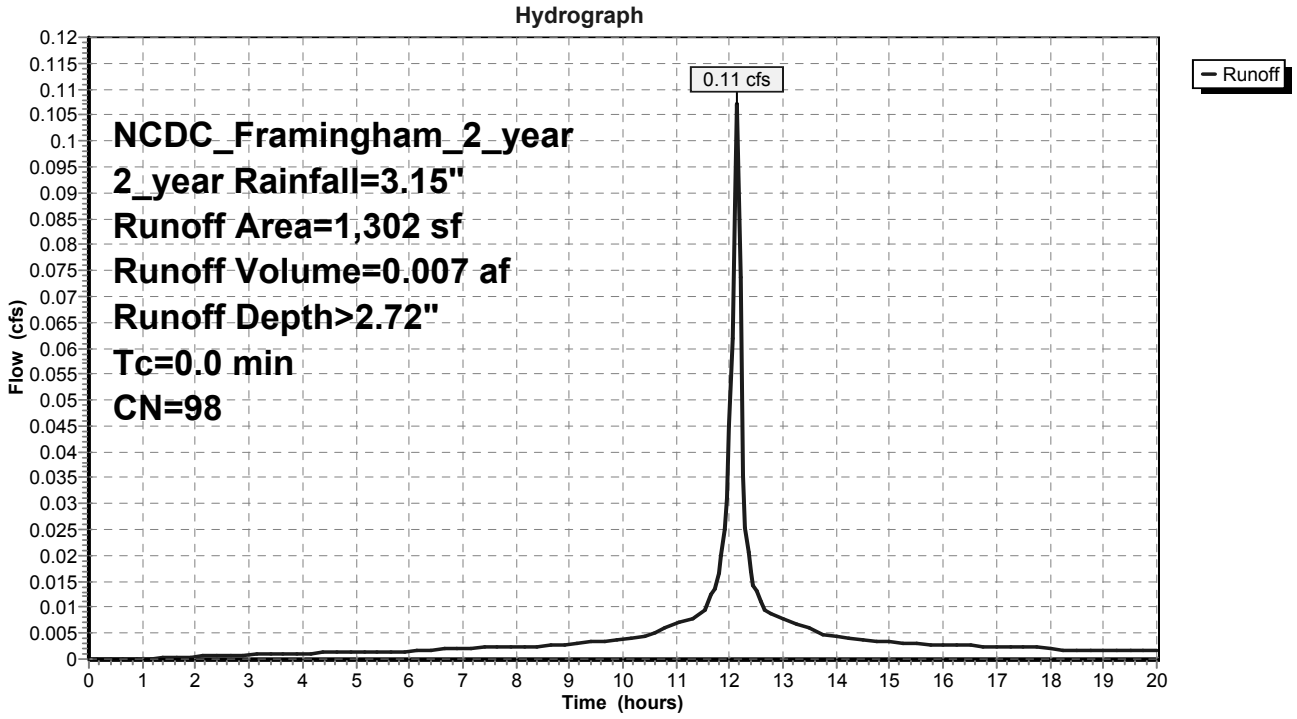
## Summary for Subcatchment ROOF-13: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-13: (blank)



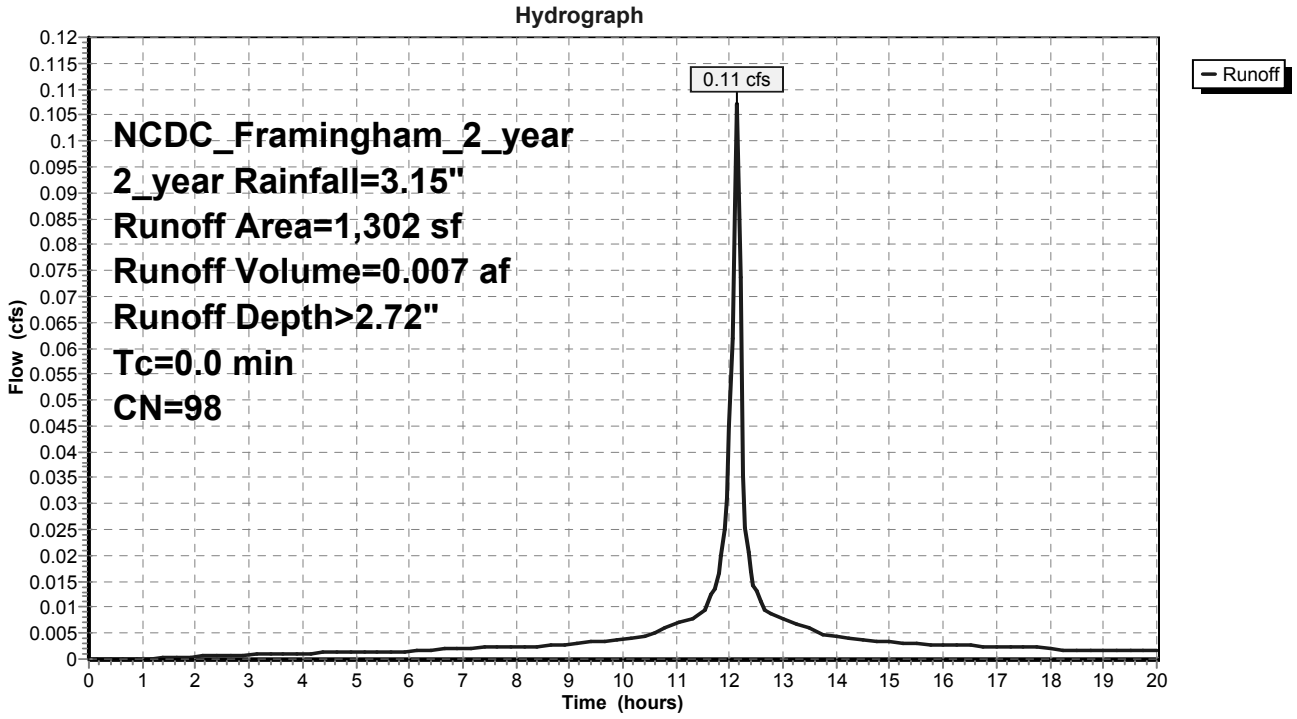
## Summary for Subcatchment ROOF-14: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-14: (blank)



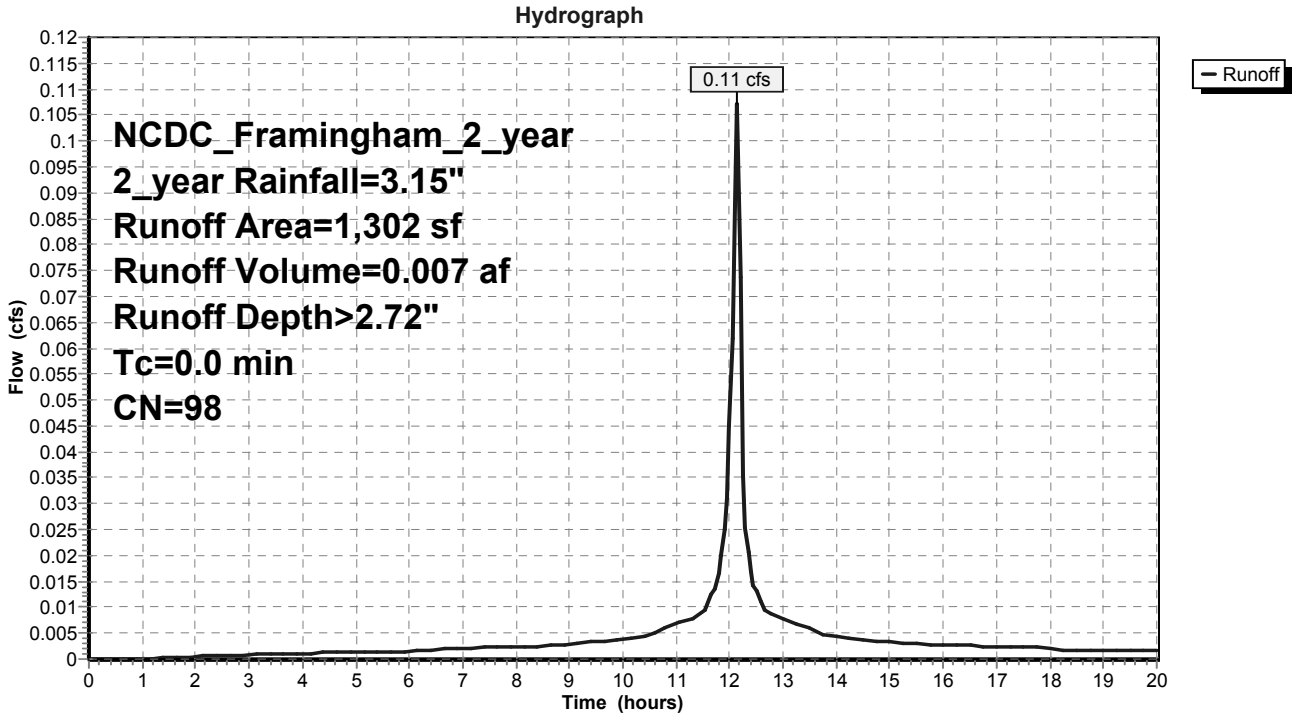
## Summary for Subcatchment ROOF-15: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-15: (blank)



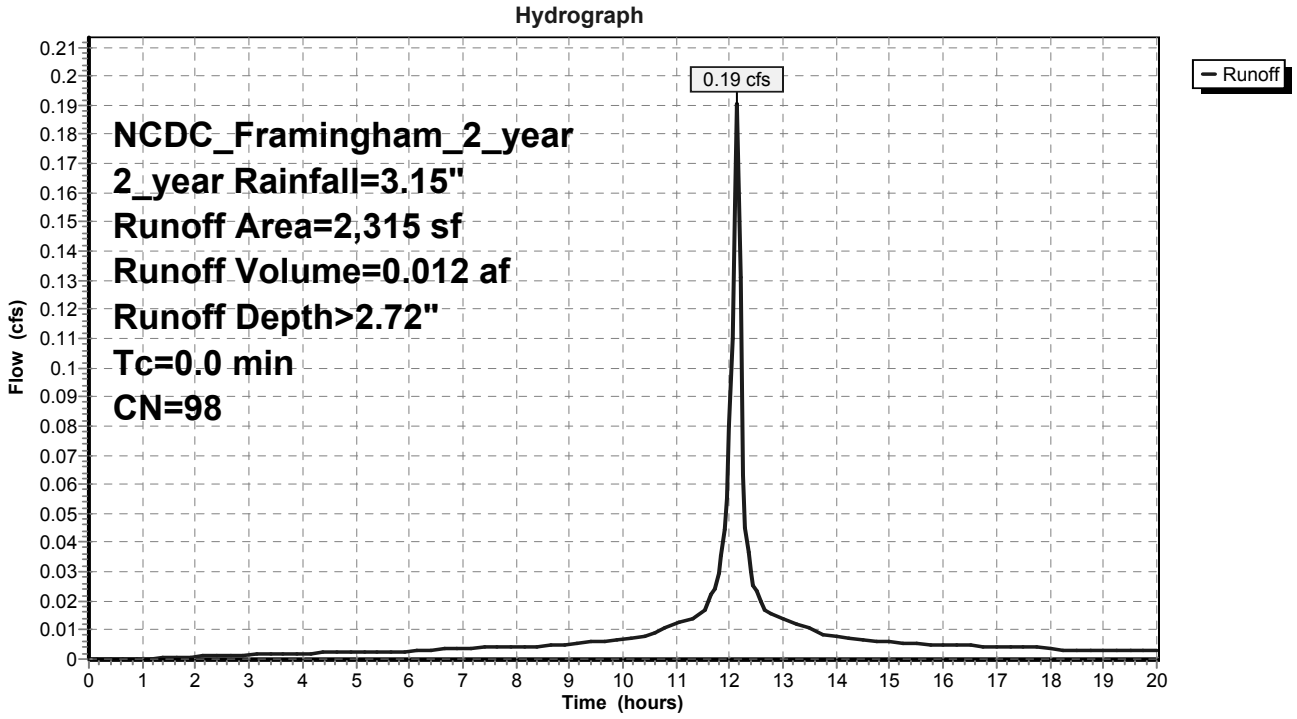
## Summary for Subcatchment ROOF-16: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-16: (blank)



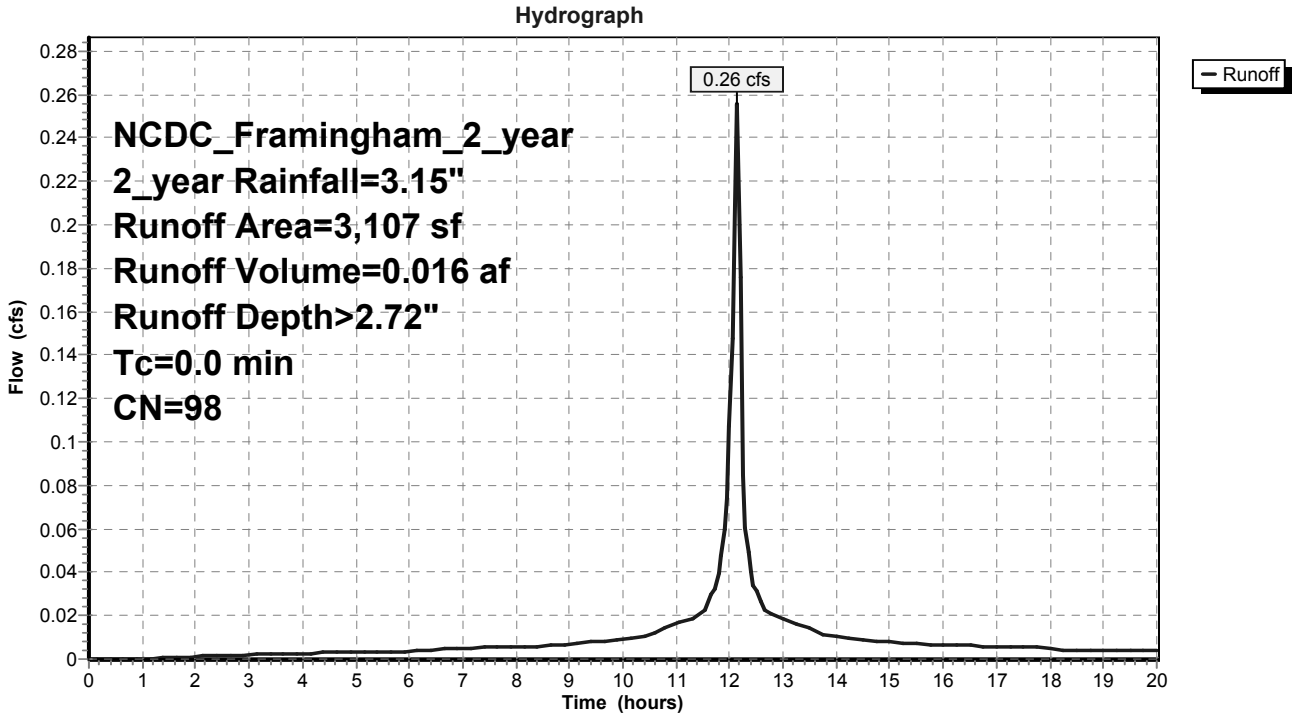
## Summary for Subcatchment ROOF-17: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-17: (blank)



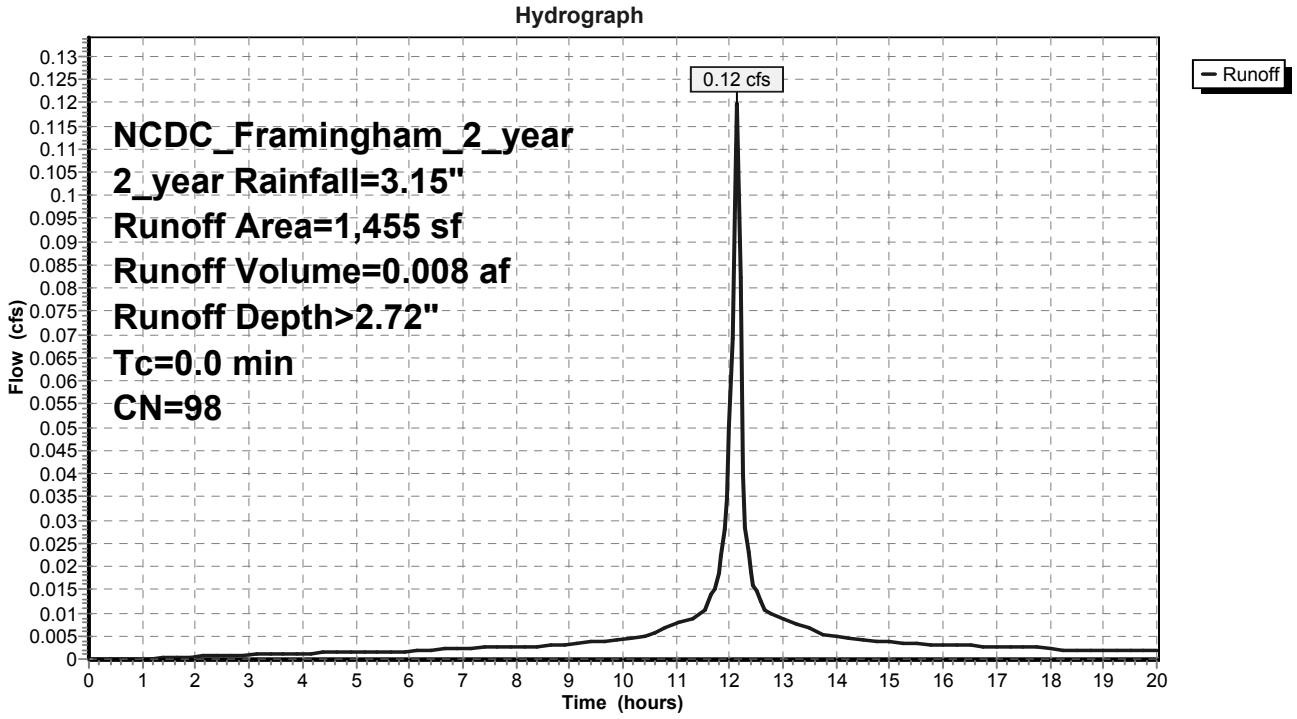
## Summary for Subcatchment ROOF-18: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-18: (blank)



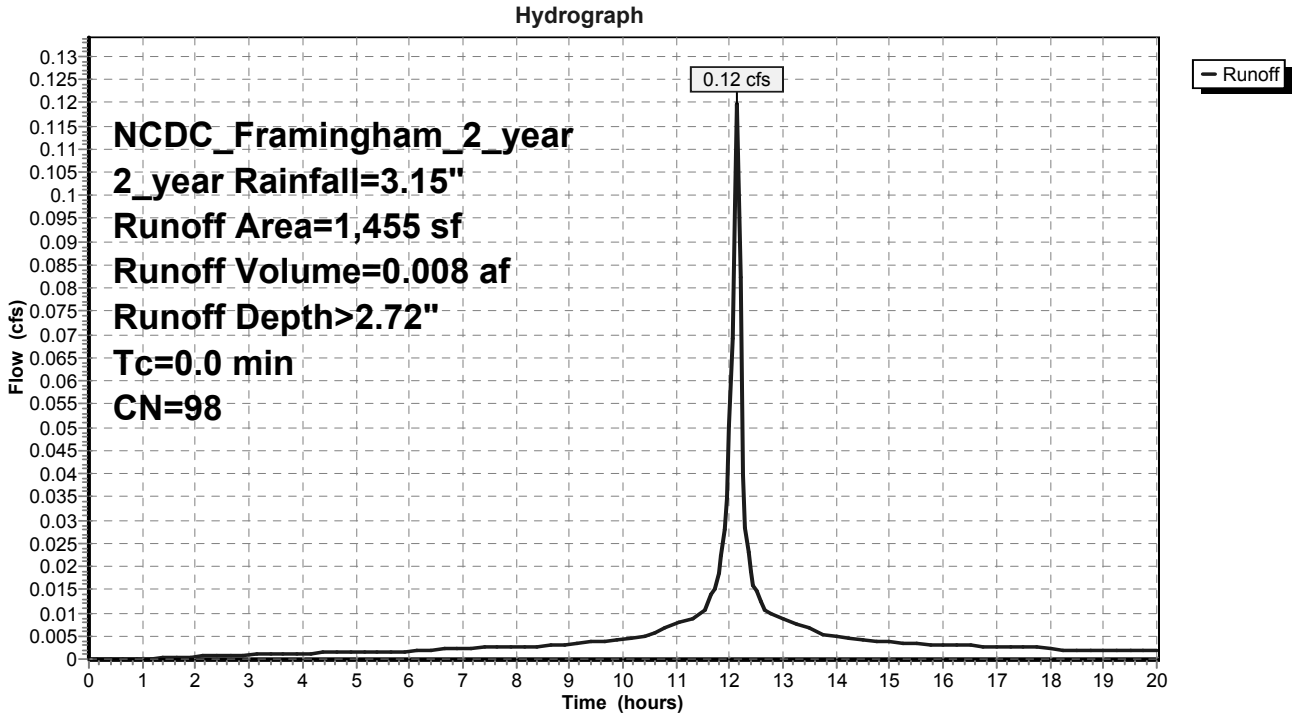
## Summary for Subcatchment ROOF-19: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-19: (blank)



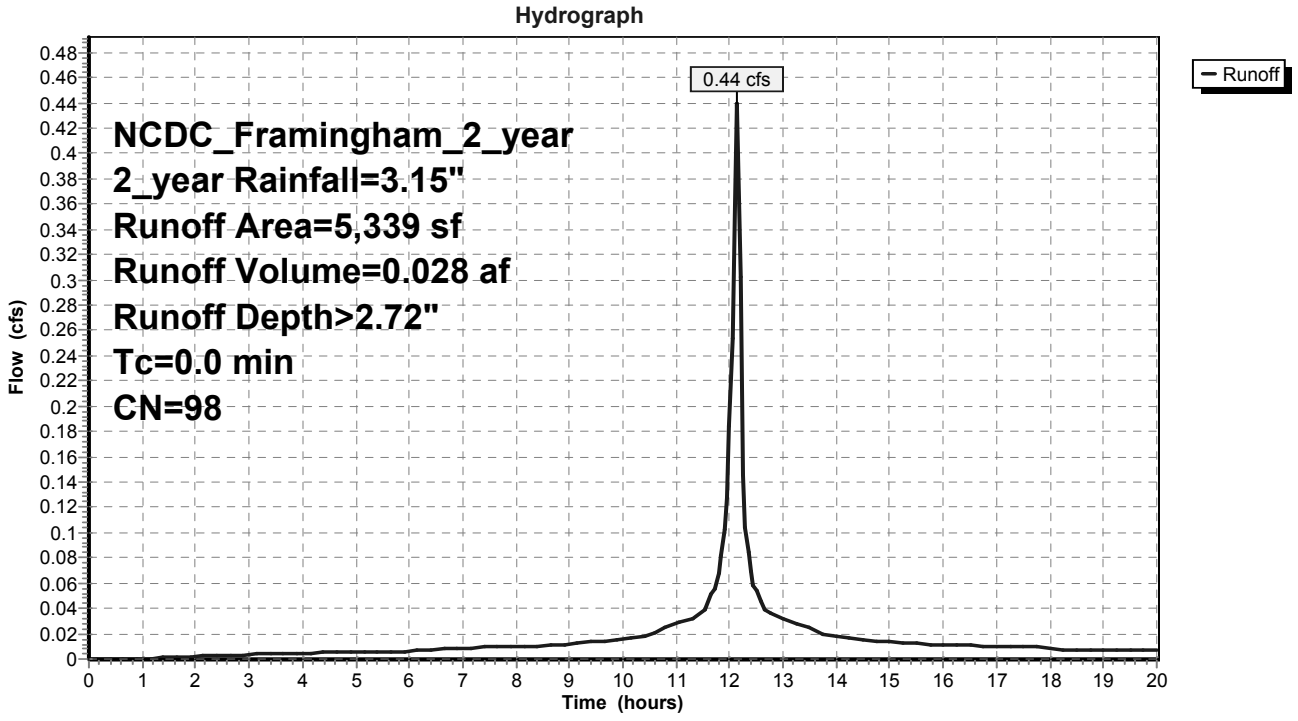
## Summary for Subcatchment ROOF-2: (blank)

Runoff = 0.44 cfs @ 12.14 hrs, Volume= 0.028 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 5,339 | 98 | ROOF, 100% imperv, HSG B |
| | 5,339 | 98 | Weighted Average |
| | 5,339 | | 100.00% Pervious Area |

## Subcatchment ROOF-2: (blank)



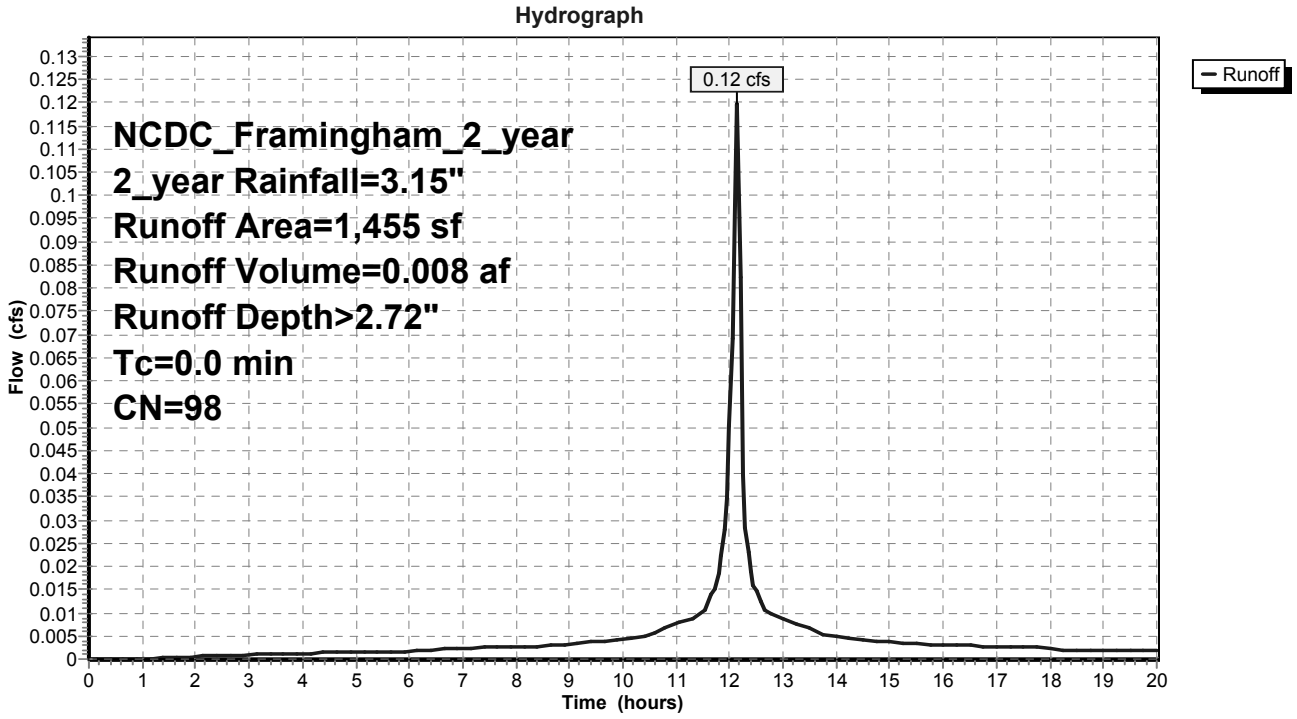
## Summary for Subcatchment ROOF-20: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-20: (blank)



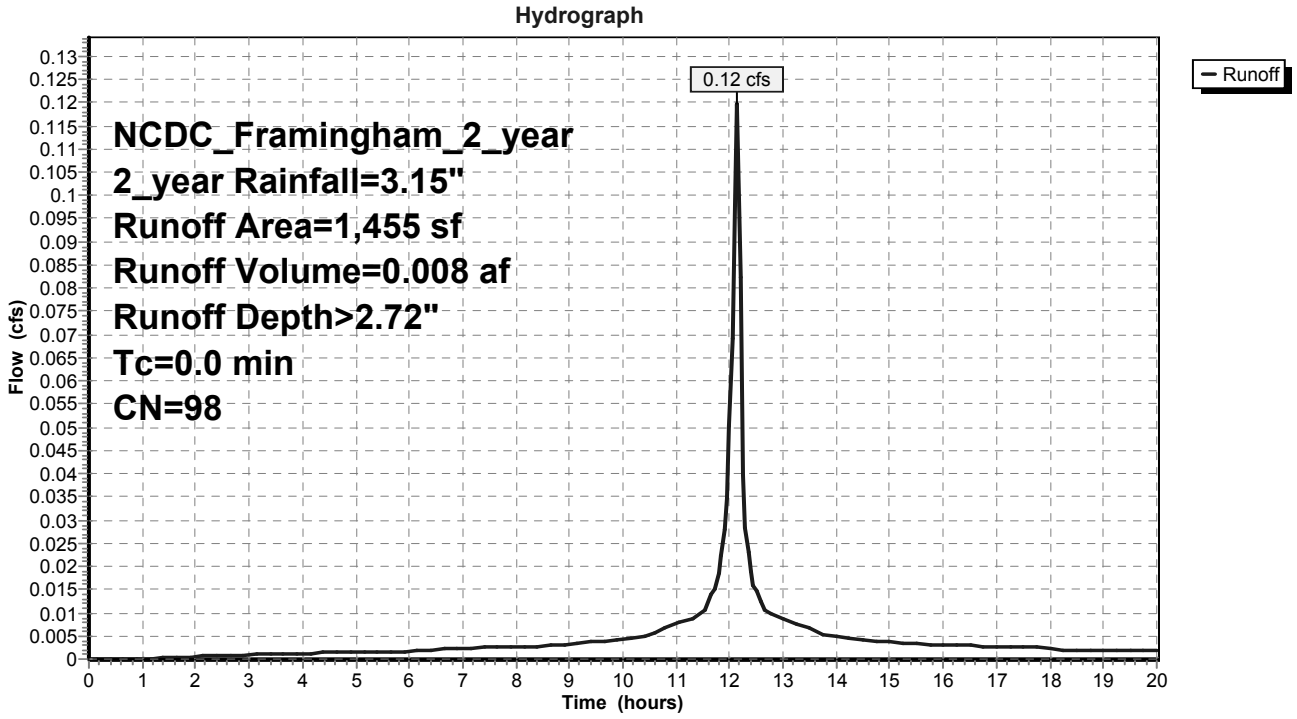
## Summary for Subcatchment ROOF-21: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-21: (blank)



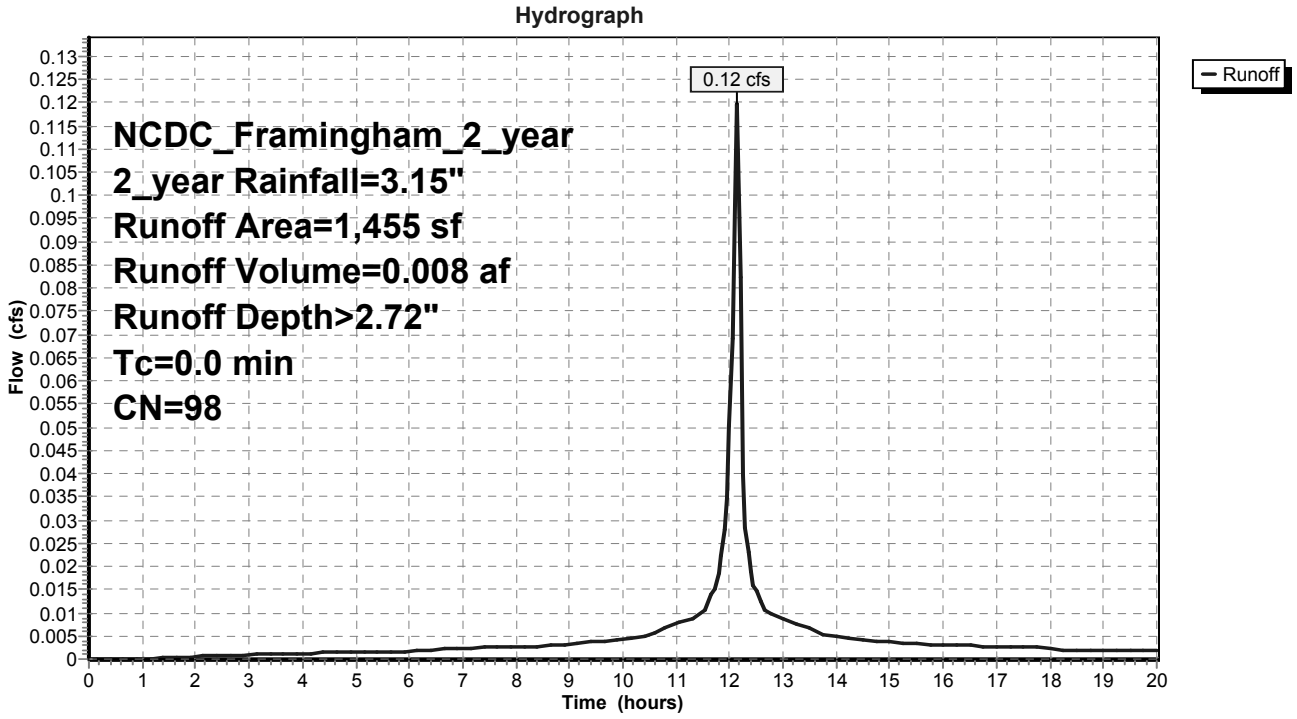
## Summary for Subcatchment ROOF-22: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-22: (blank)



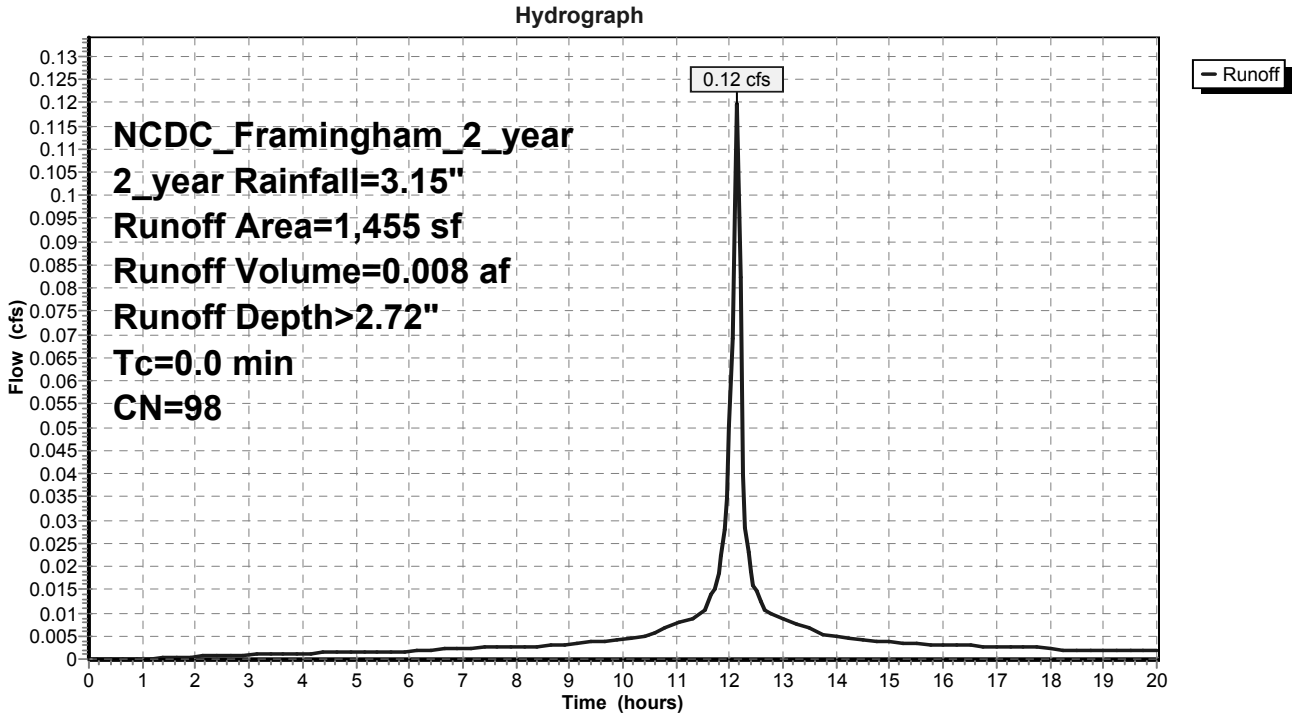
## Summary for Subcatchment ROOF-23: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-23: (blank)



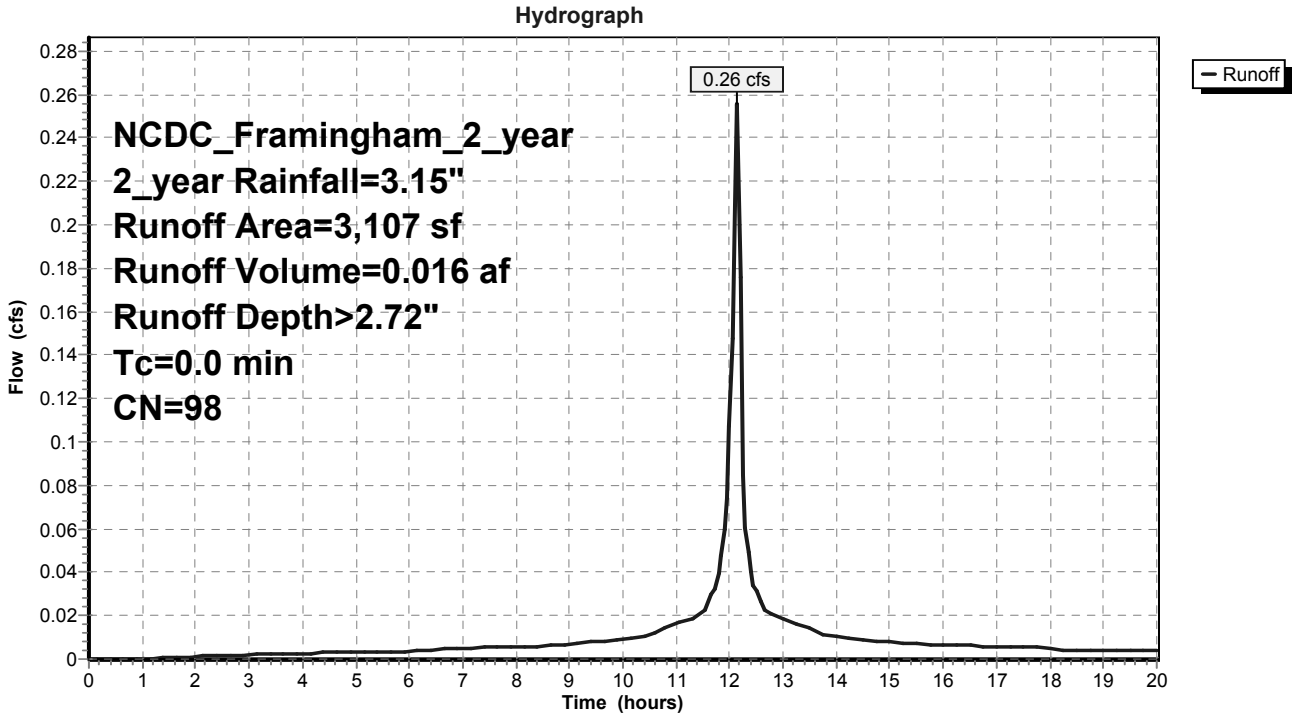
## Summary for Subcatchment ROOF-24: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-24: (blank)



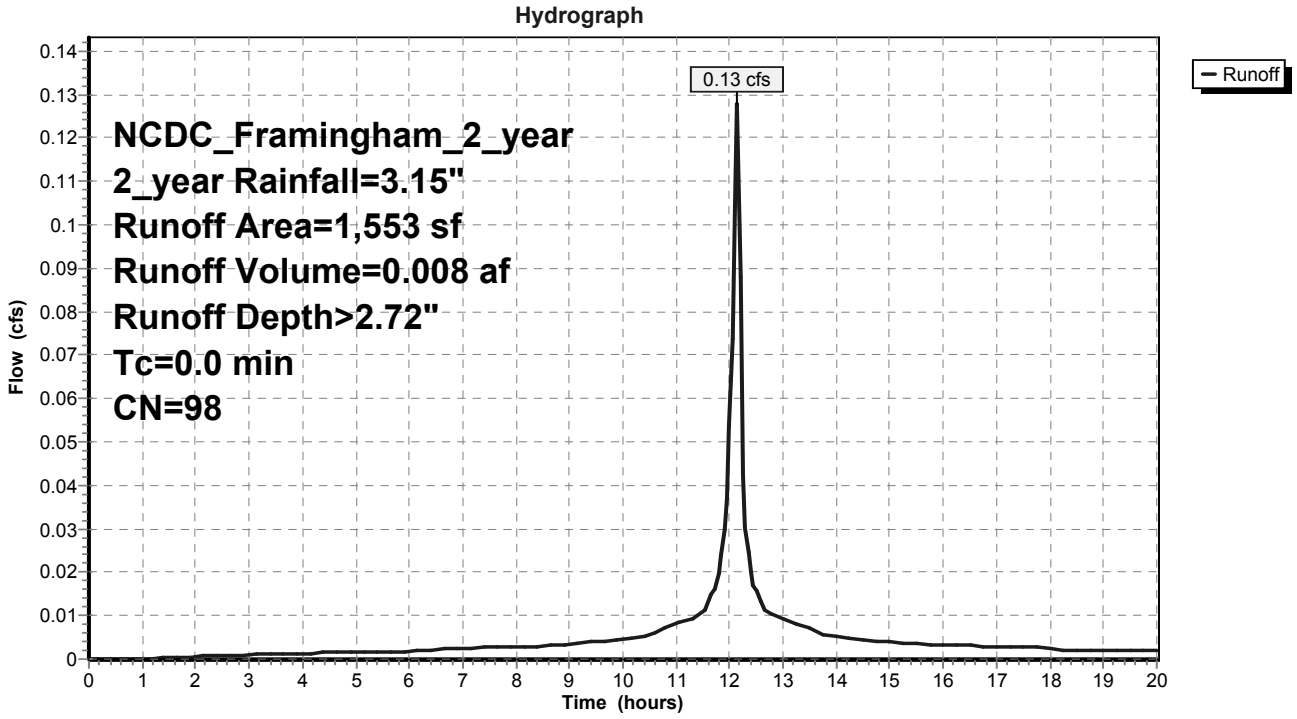
## Summary for Subcatchment ROOF-25: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-25: (blank)



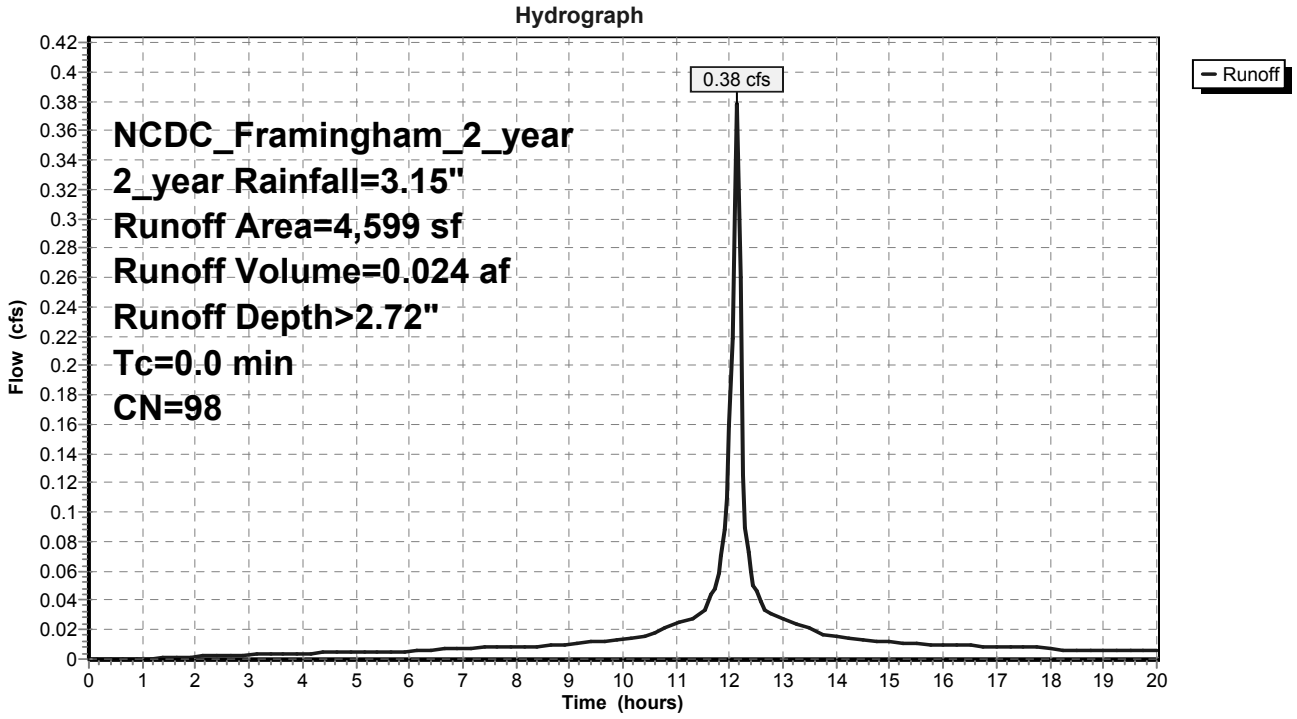
## Summary for Subcatchment ROOF-26: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-26: (blank)



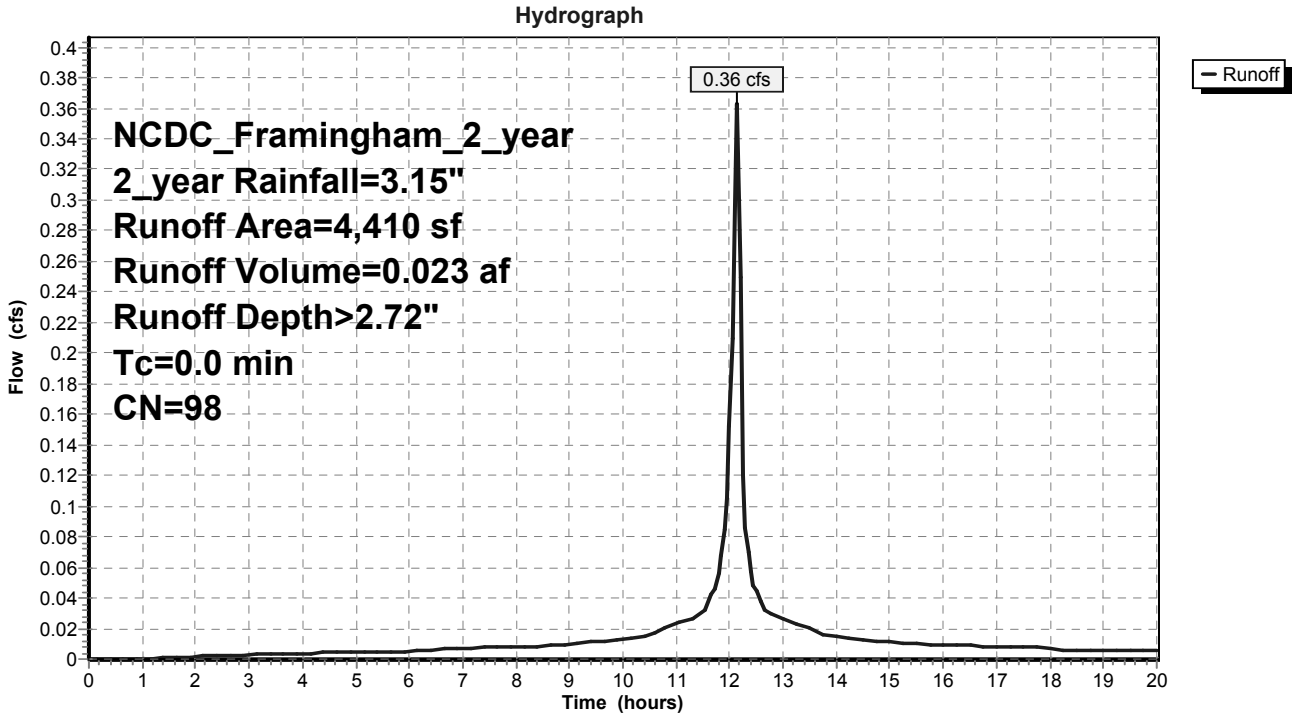
## Summary for Subcatchment ROOF-27: (blank)

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-27: (blank)



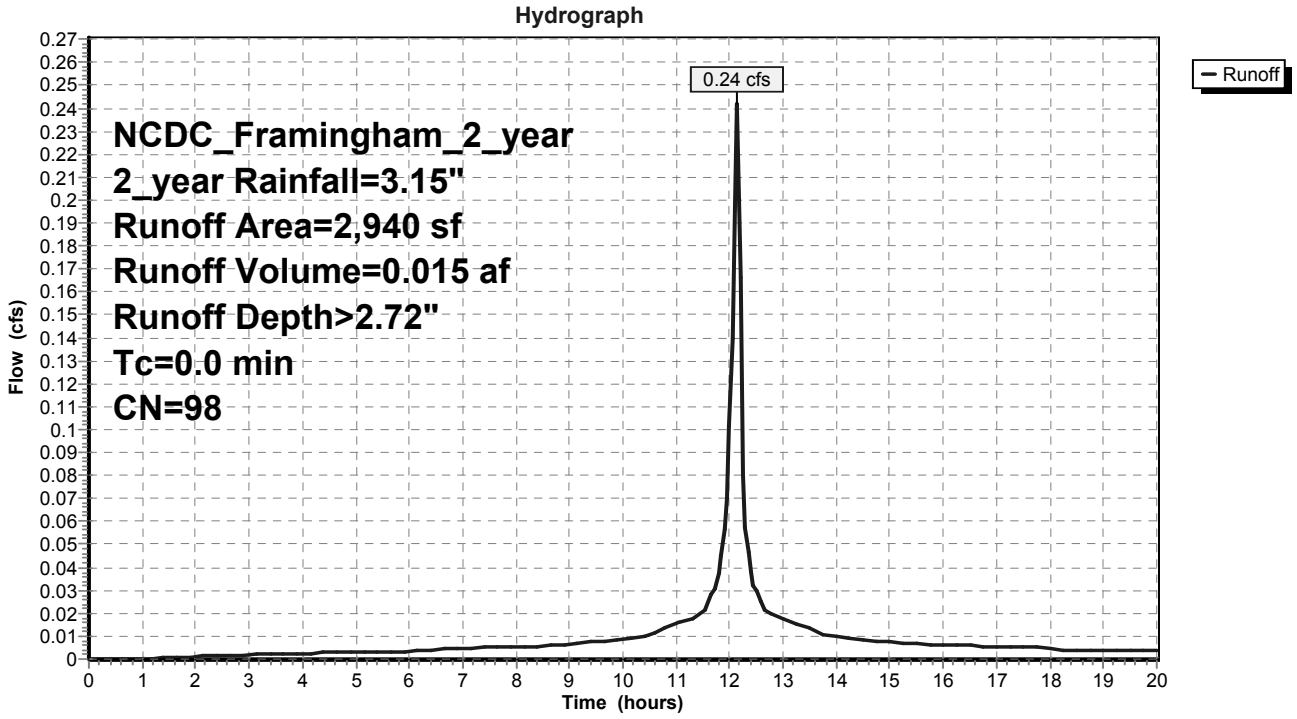
## Summary for Subcatchment ROOF-28: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-28: (blank)



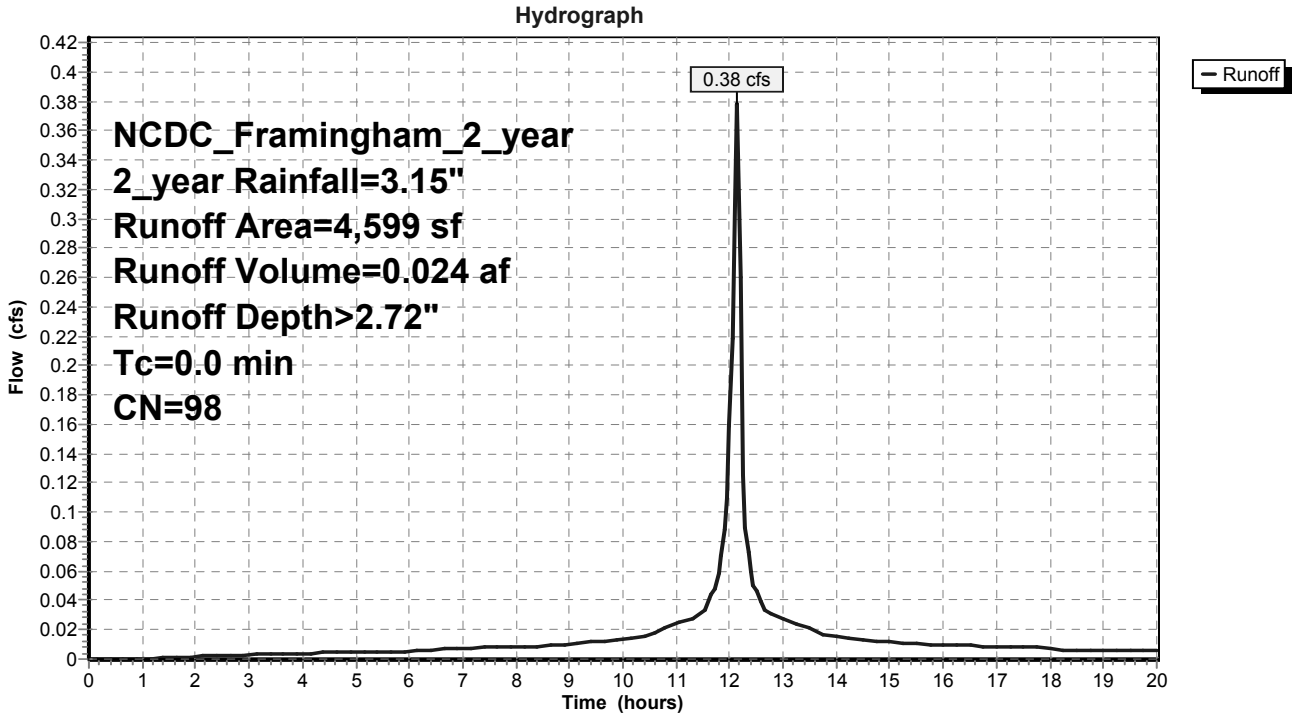
## Summary for Subcatchment ROOF-29: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-29: (blank)



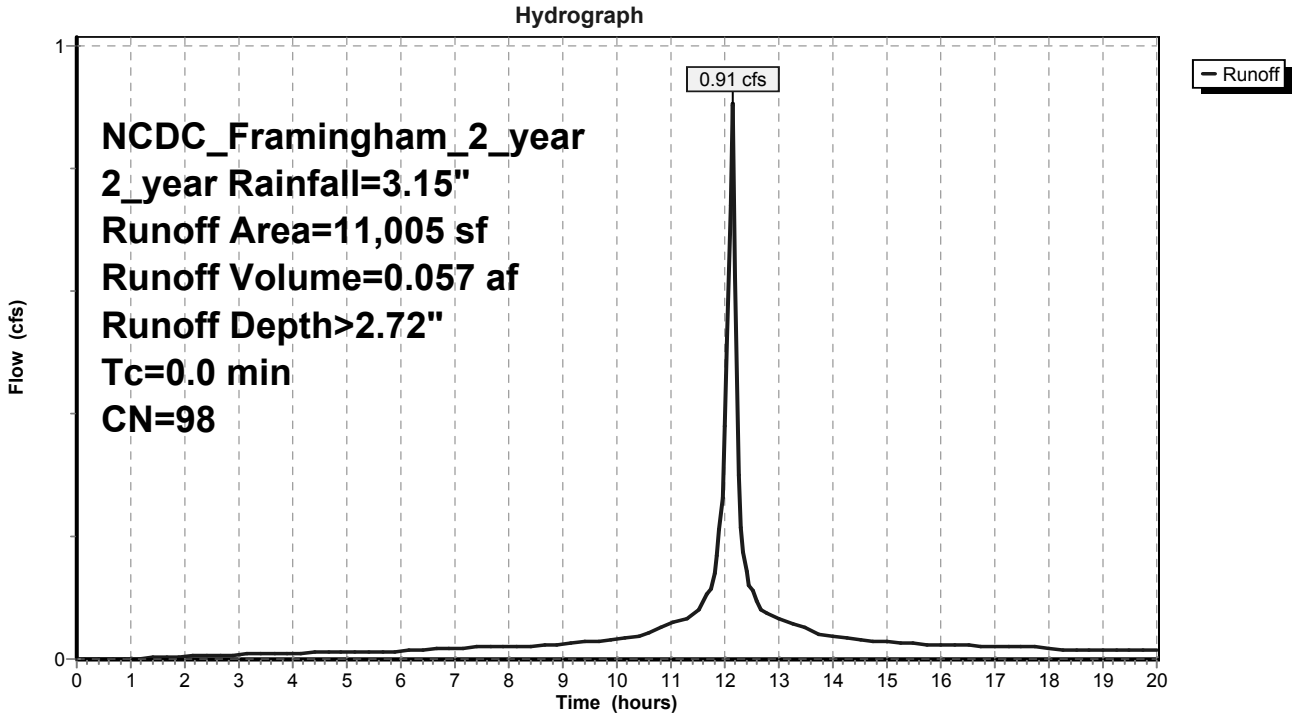
## Summary for Subcatchment ROOF-3: (blank)

Runoff = 0.91 cfs @ 12.14 hrs, Volume= 0.057 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 98 | DECK, 100% imperv, HSG B |
| * | 11,004 | 98 | ROOF, 100% imperv, HSG B |
| | 11,005 | 98 | Weighted Average |
| | 11,005 | | 100.00% Pervious Area |

## Subcatchment ROOF-3: (blank)



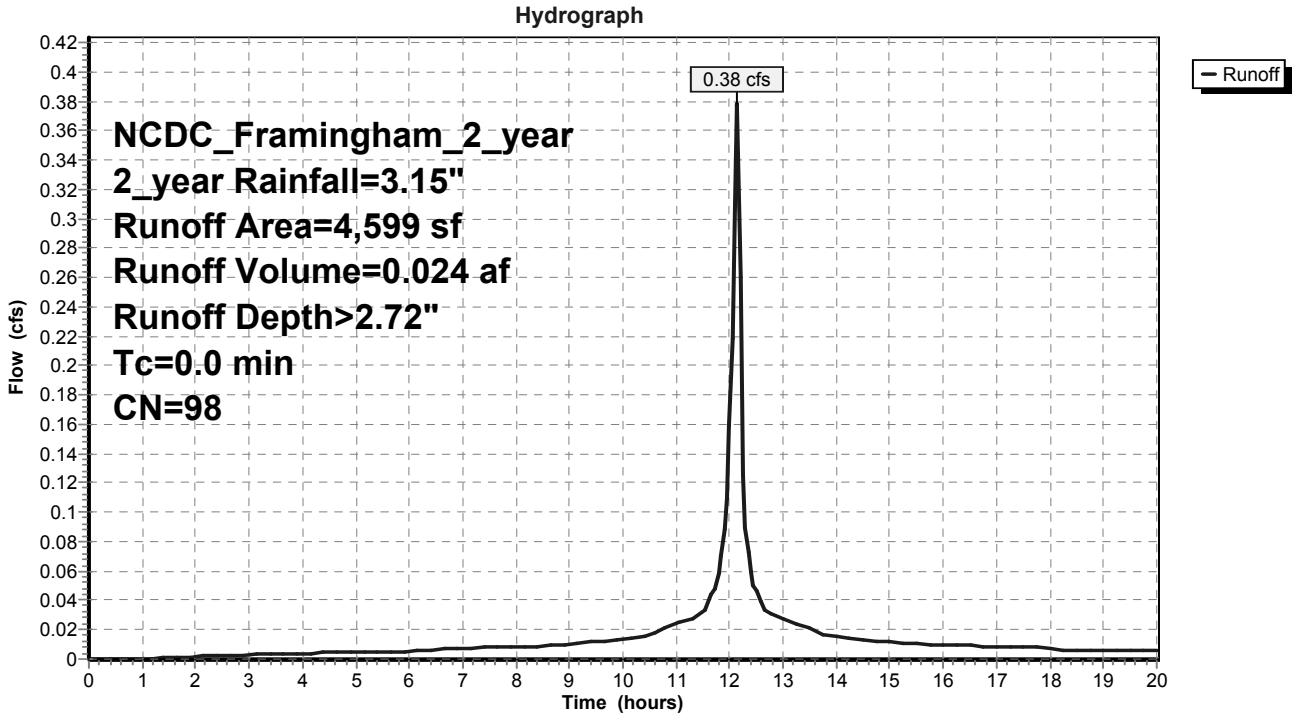
## Summary for Subcatchment ROOF-30: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-30: (blank)



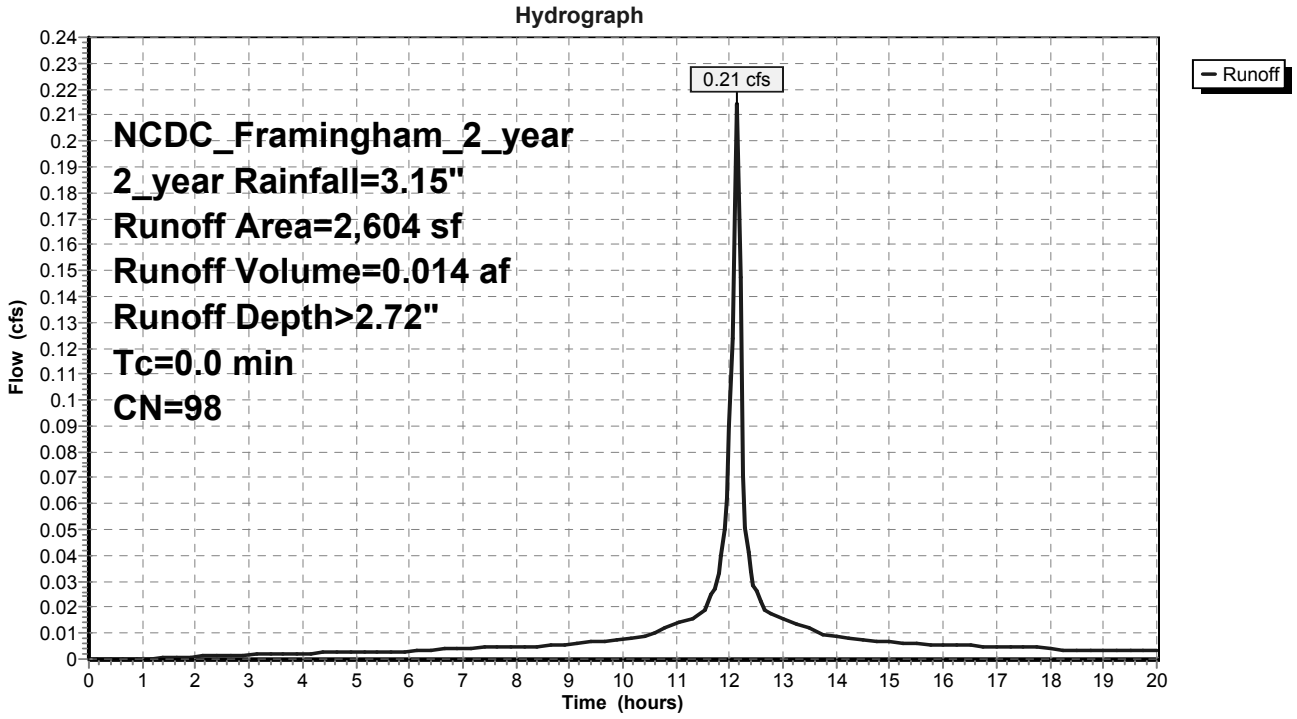
## Summary for Subcatchment ROOF-31: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.014 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-31: (blank)



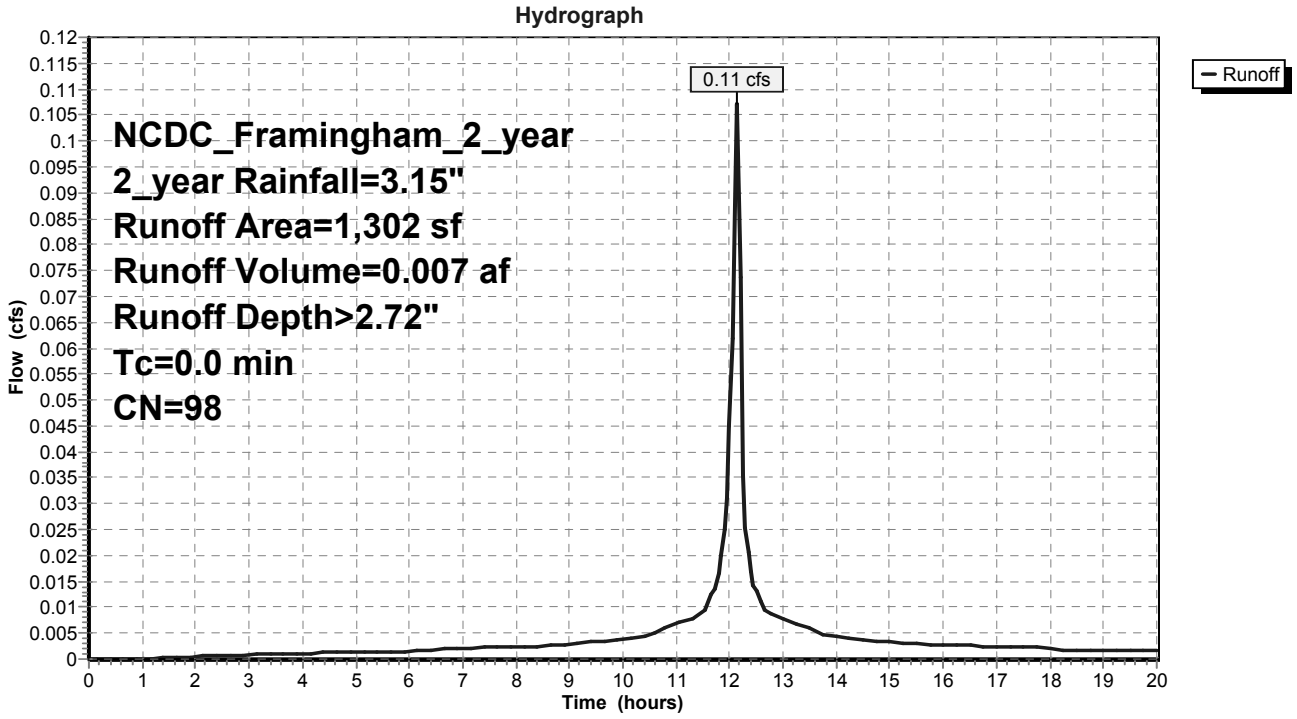
## Summary for Subcatchment ROOF-32: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-32: (blank)



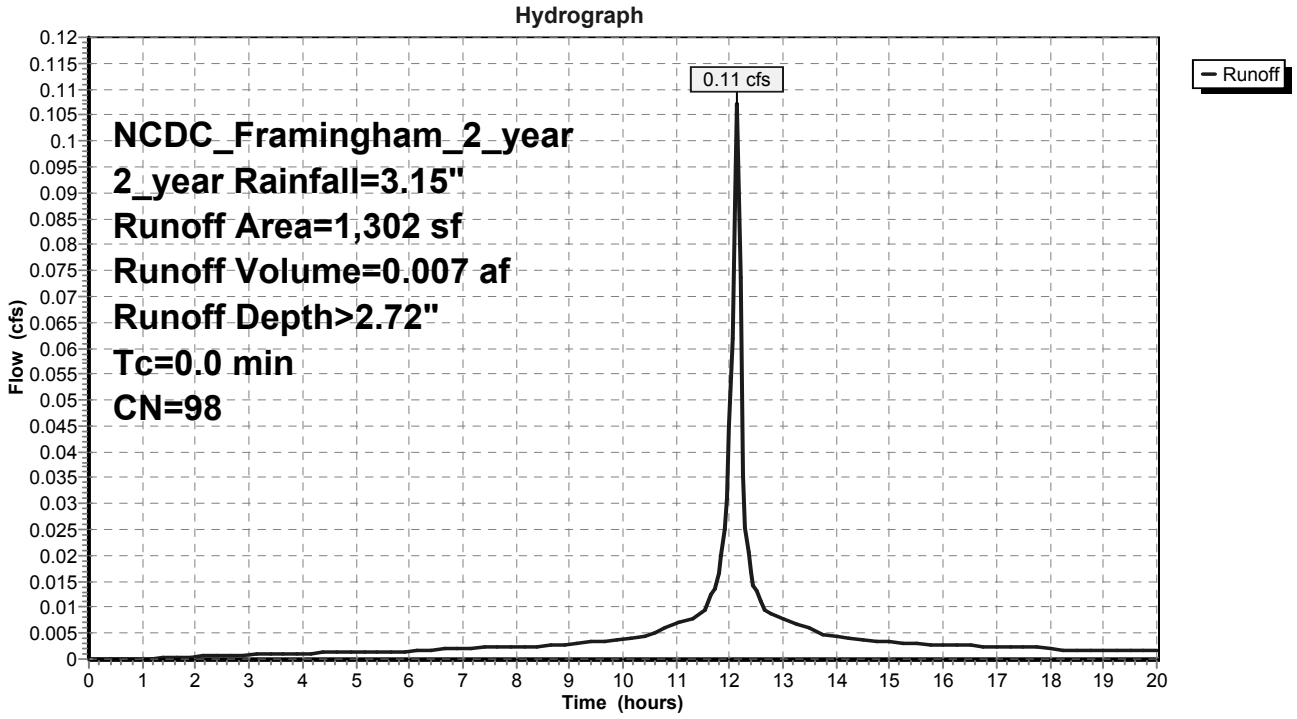
## Summary for Subcatchment ROOF-33: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-33: (blank)



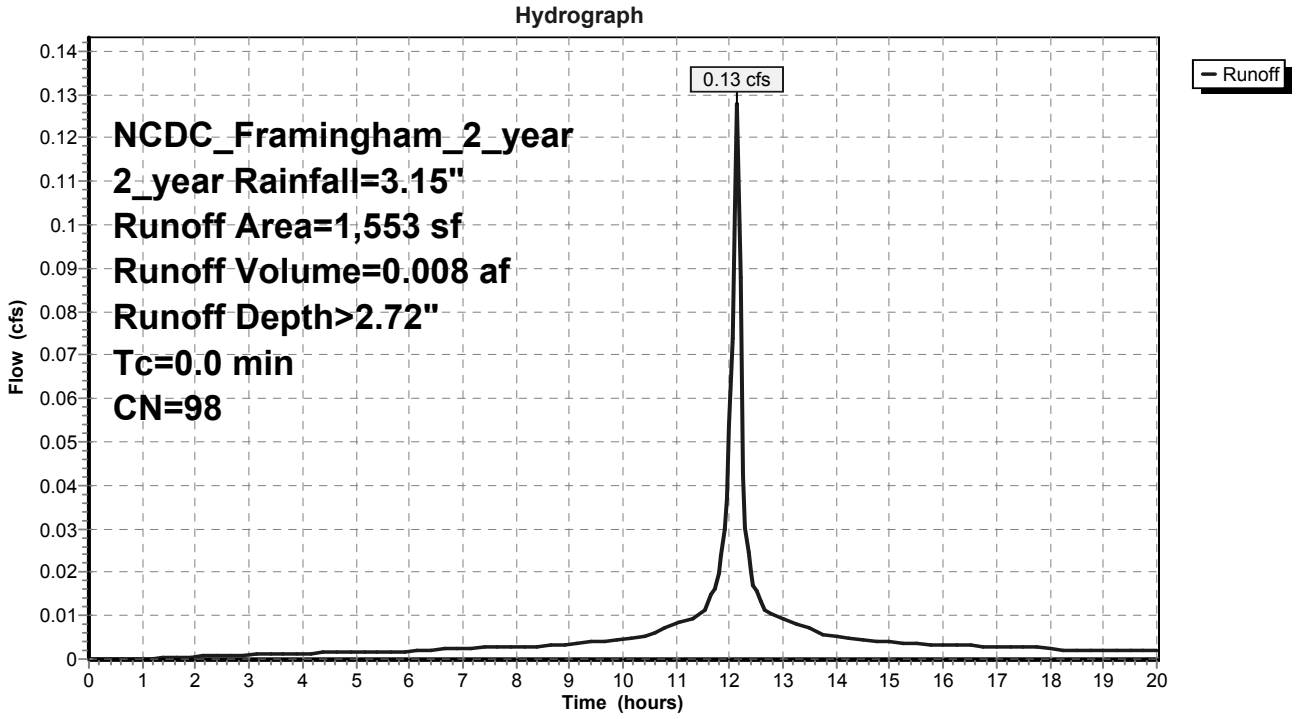
## Summary for Subcatchment ROOF-34: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-34: (blank)



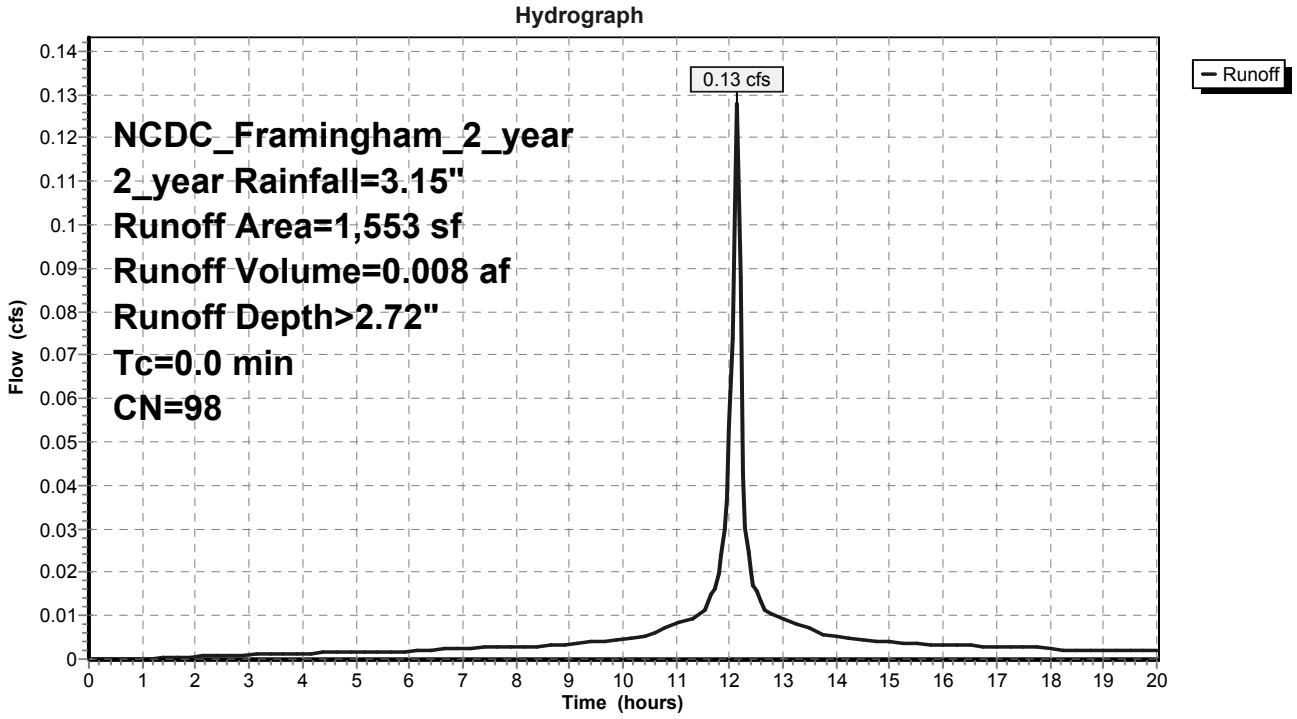
## Summary for Subcatchment ROOF-35: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-35: (blank)



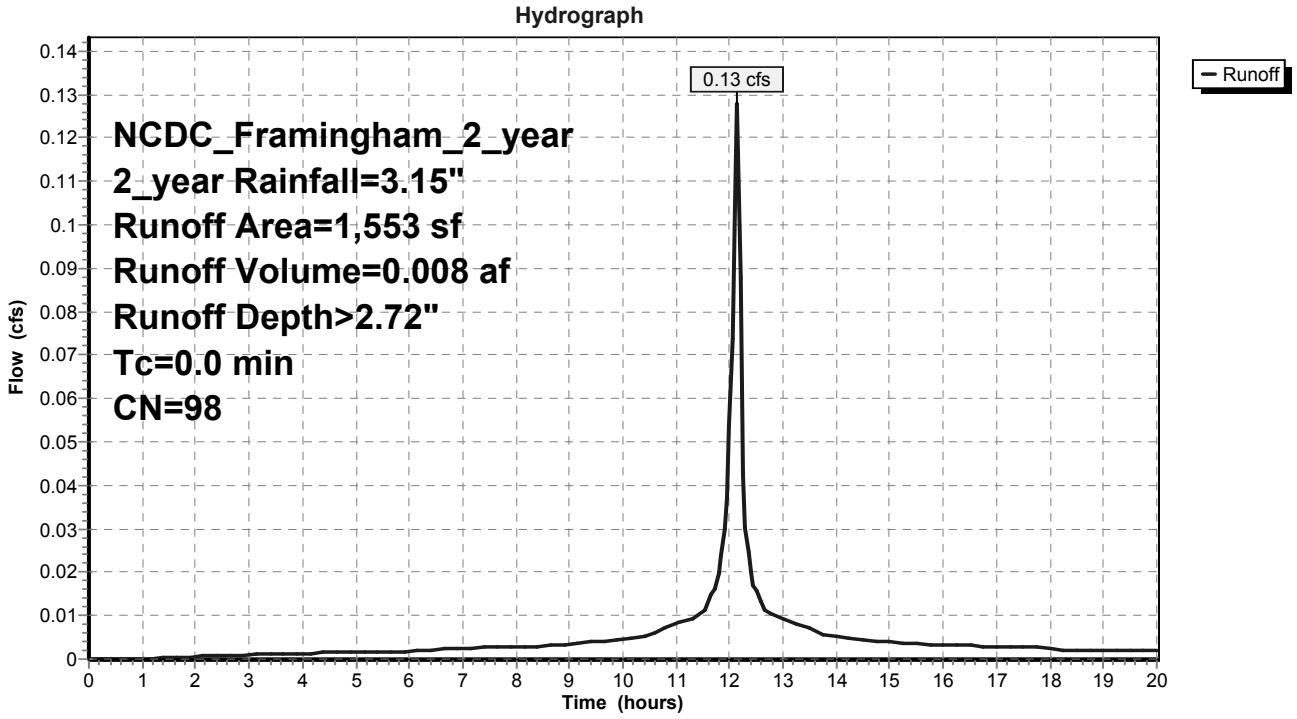
## Summary for Subcatchment ROOF-36: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-36: (blank)



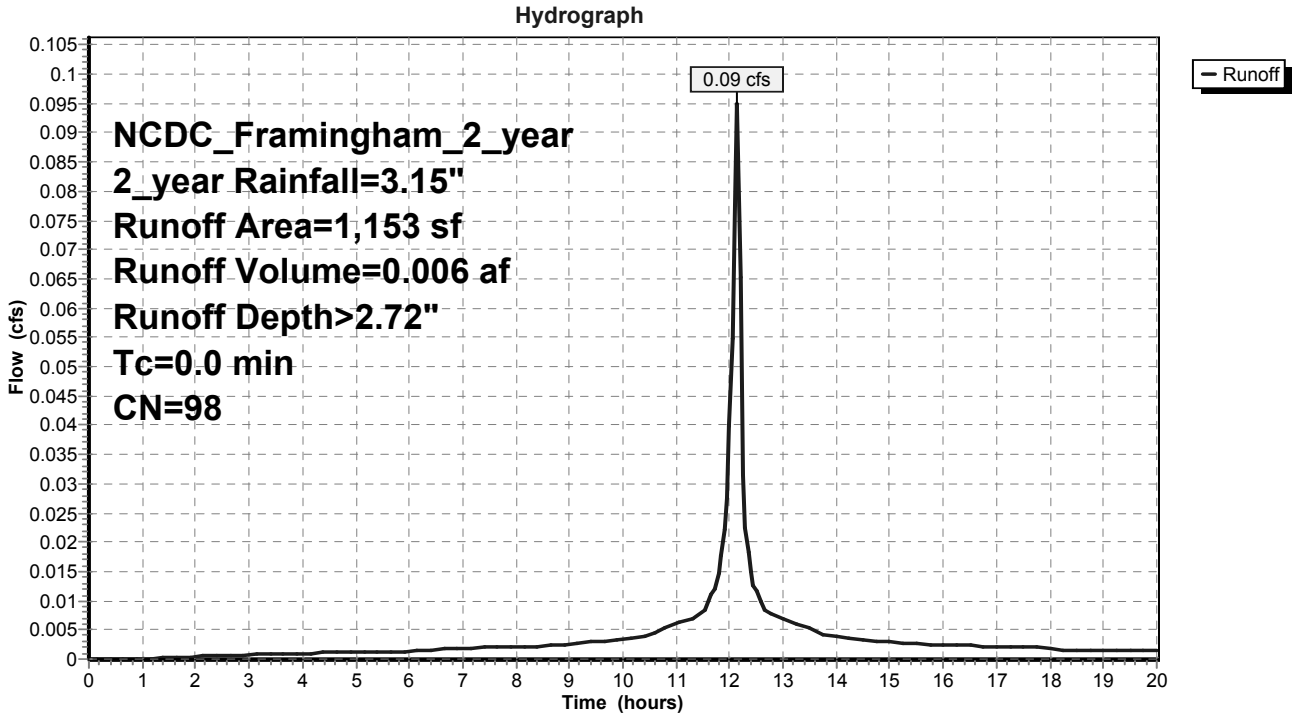
## Summary for Subcatchment ROOF-37: (blank)

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,153 | 98 | ROOF, 100% imperv, HSG B |
| | 1,153 | | 100.00% Pervious Area |

## Subcatchment ROOF-37: (blank)



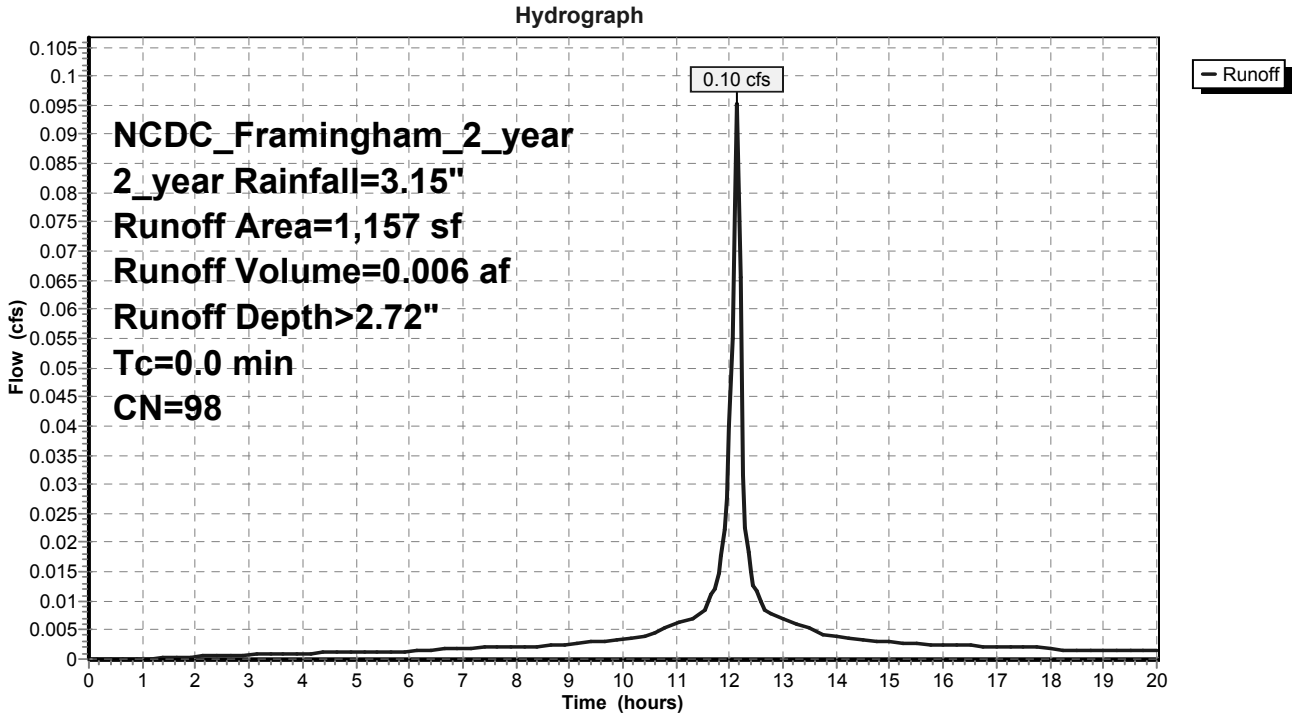
## Summary for Subcatchment ROOF-38: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-38: (blank)



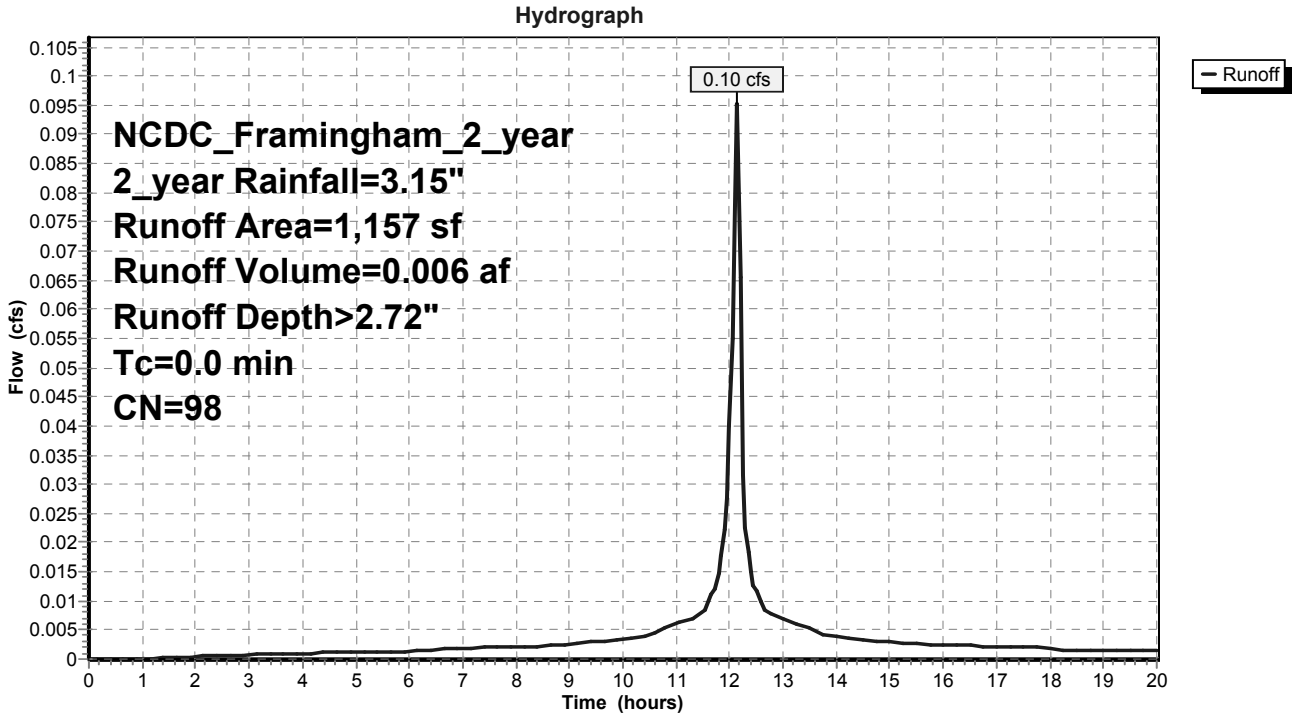
## Summary for Subcatchment ROOF-39: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-39: (blank)



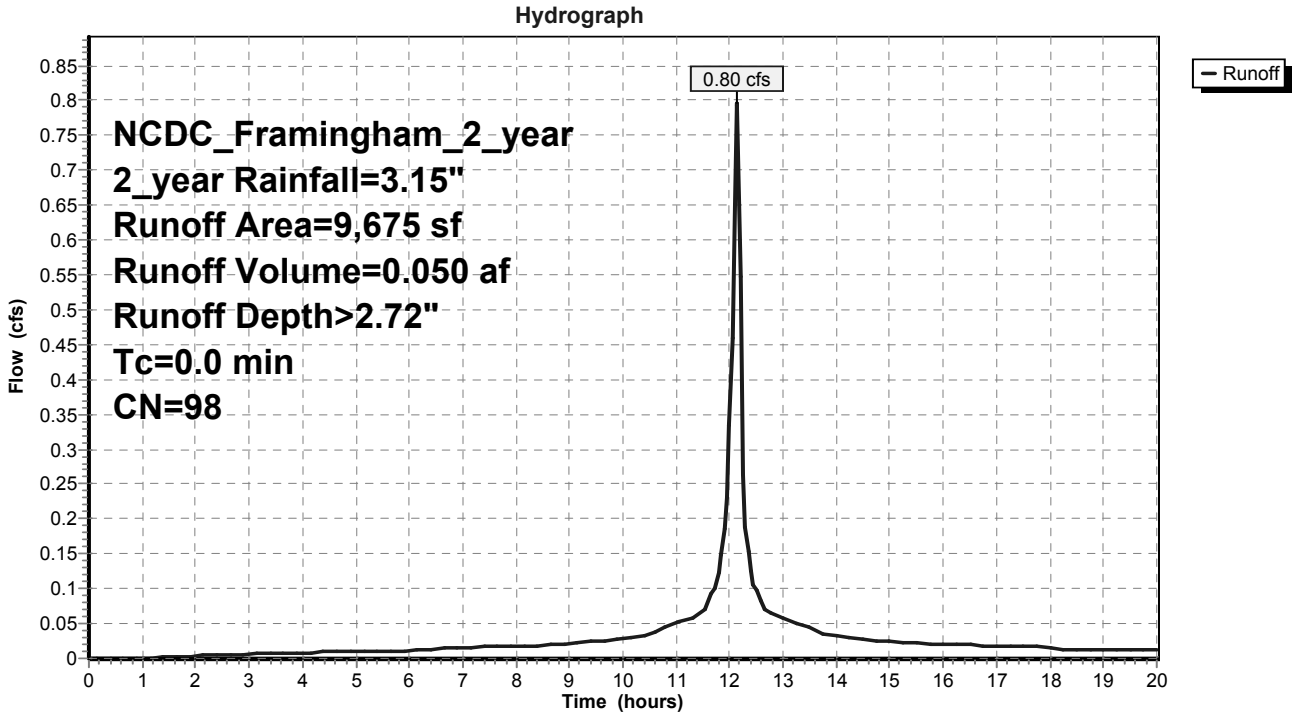
## Summary for Subcatchment ROOF-4: (blank)

Runoff = 0.80 cfs @ 12.14 hrs, Volume= 0.050 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 61 | GRASS, 0% imperv, HSG B |
| * | 72 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,675 | 98 | Weighted Average |
| | 9,675 | | 100.00% Pervious Area |

## Subcatchment ROOF-4: (blank)



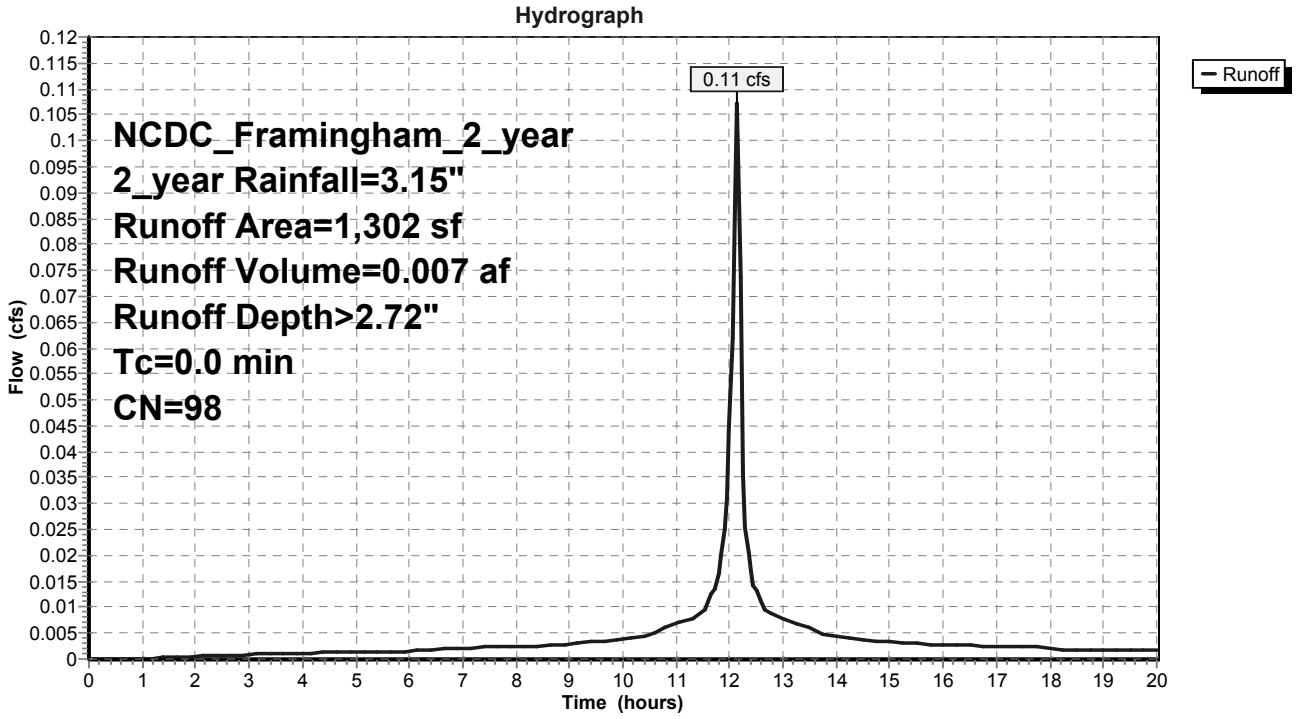
## Summary for Subcatchment ROOF-40: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 639 | 98 | ROOF, 100% imperv, HSG A |
| * | 663 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-40: (blank)



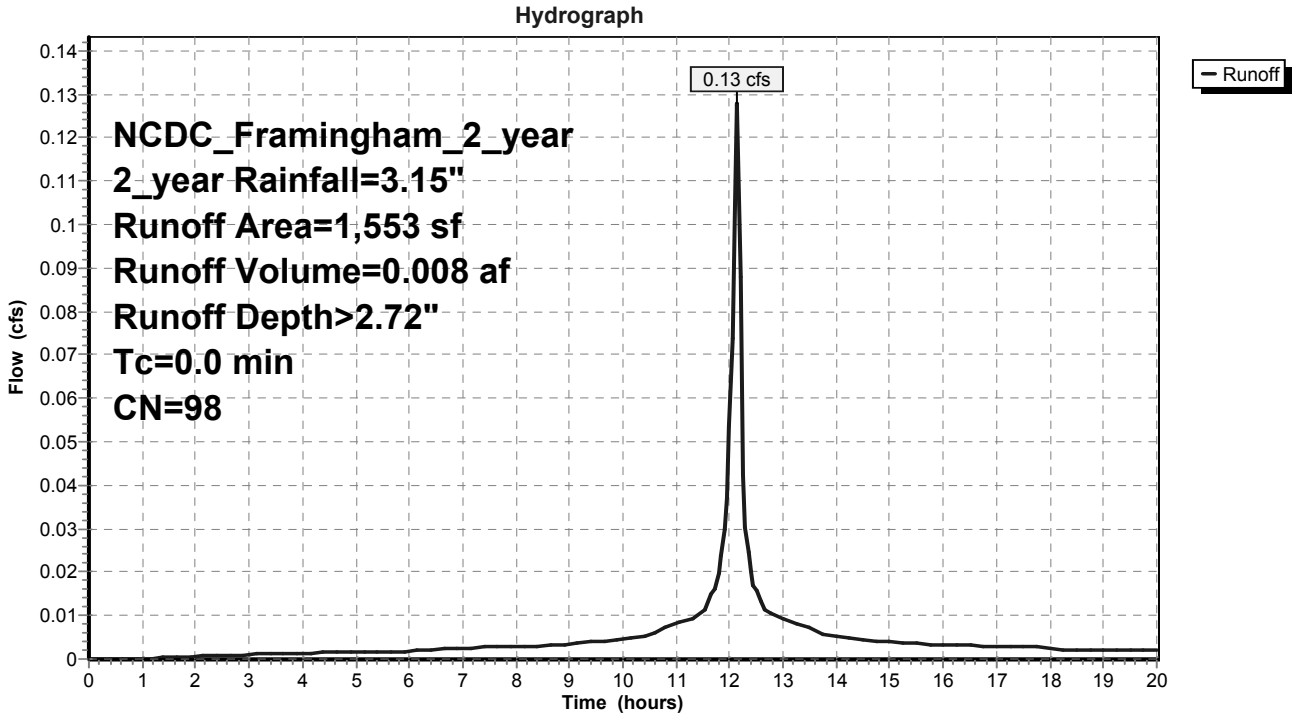
## Summary for Subcatchment ROOF-41: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,090 | 98 | ROOF, 100% imperv, HSG A |
| * | 463 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-41: (blank)



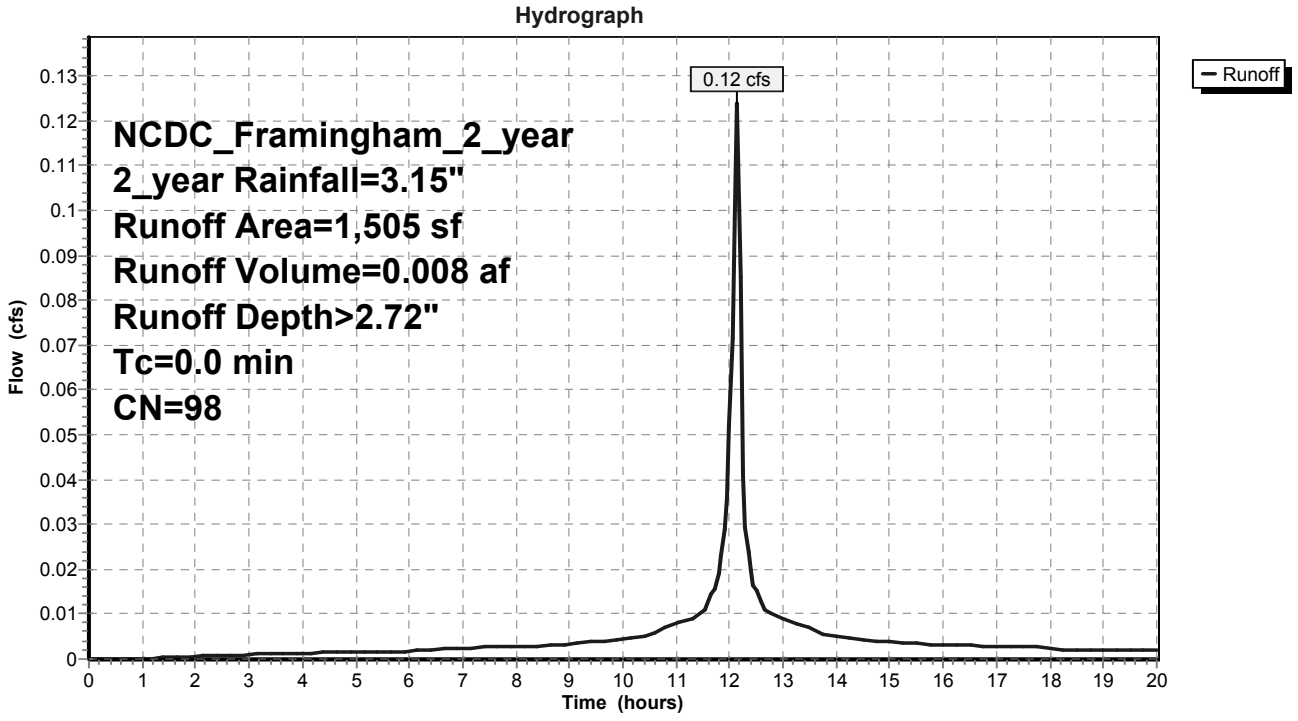
## Summary for Subcatchment ROOF-42: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 699 | 98 | ROOF, 100% imperv, HSG A |
| * | 806 | 98 | ROOF, 100% imperv, HSG B |
| | 1,505 | 98 | Weighted Average |
| | 1,505 | | 100.00% Pervious Area |

## Subcatchment ROOF-42: (blank)



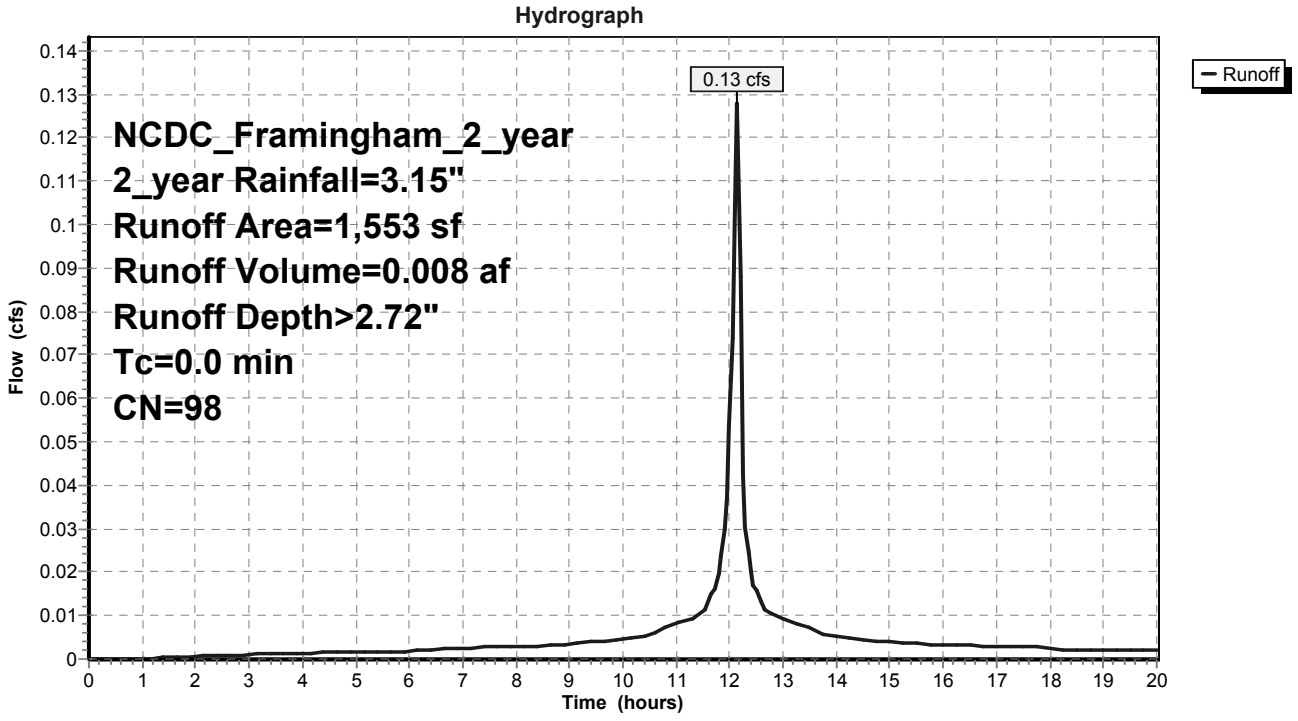
## Summary for Subcatchment ROOF-43: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.008 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 486 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,067 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-43: (blank)



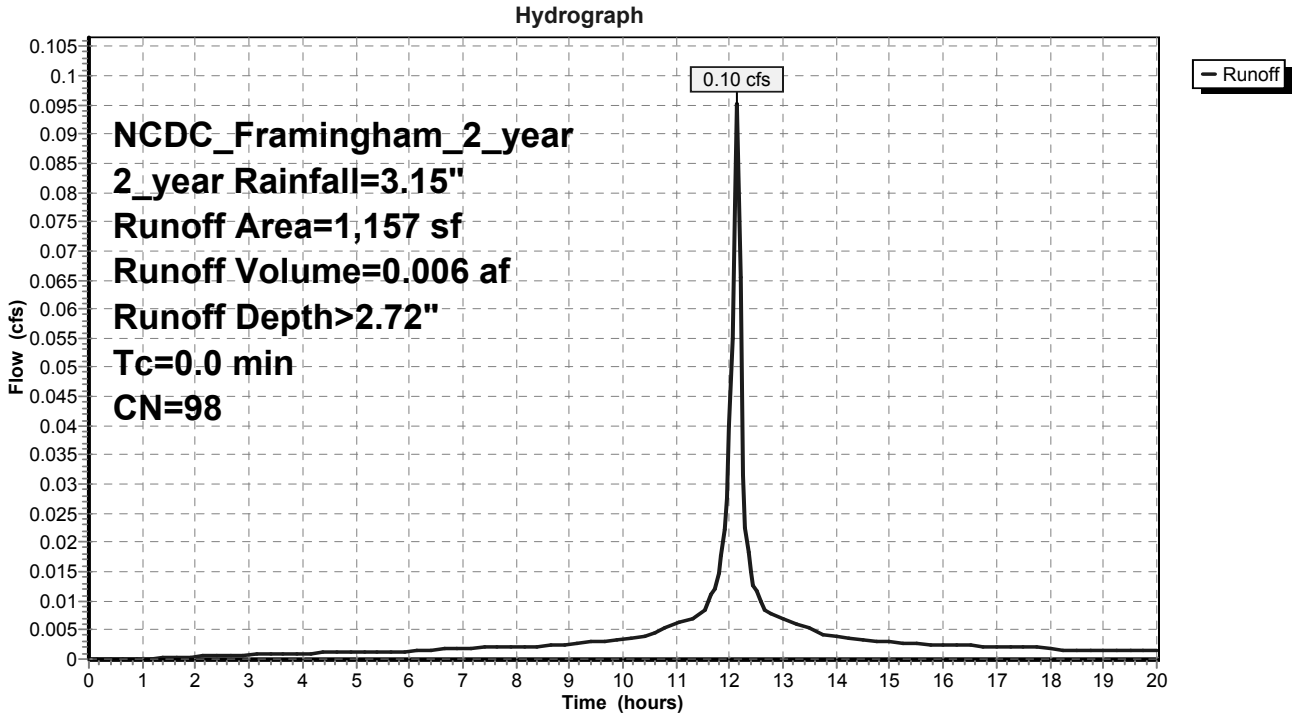
## Summary for Subcatchment ROOF-44: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-44: (blank)



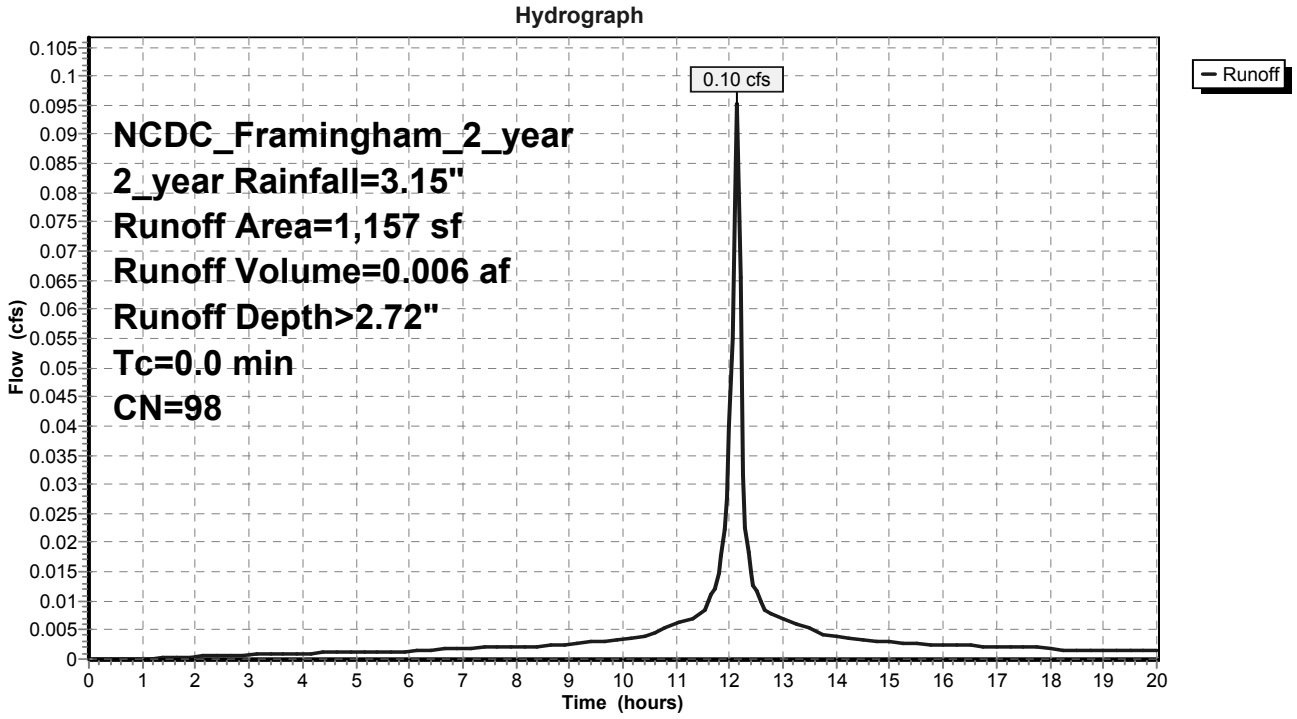
## Summary for Subcatchment ROOF-45: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-45: (blank)



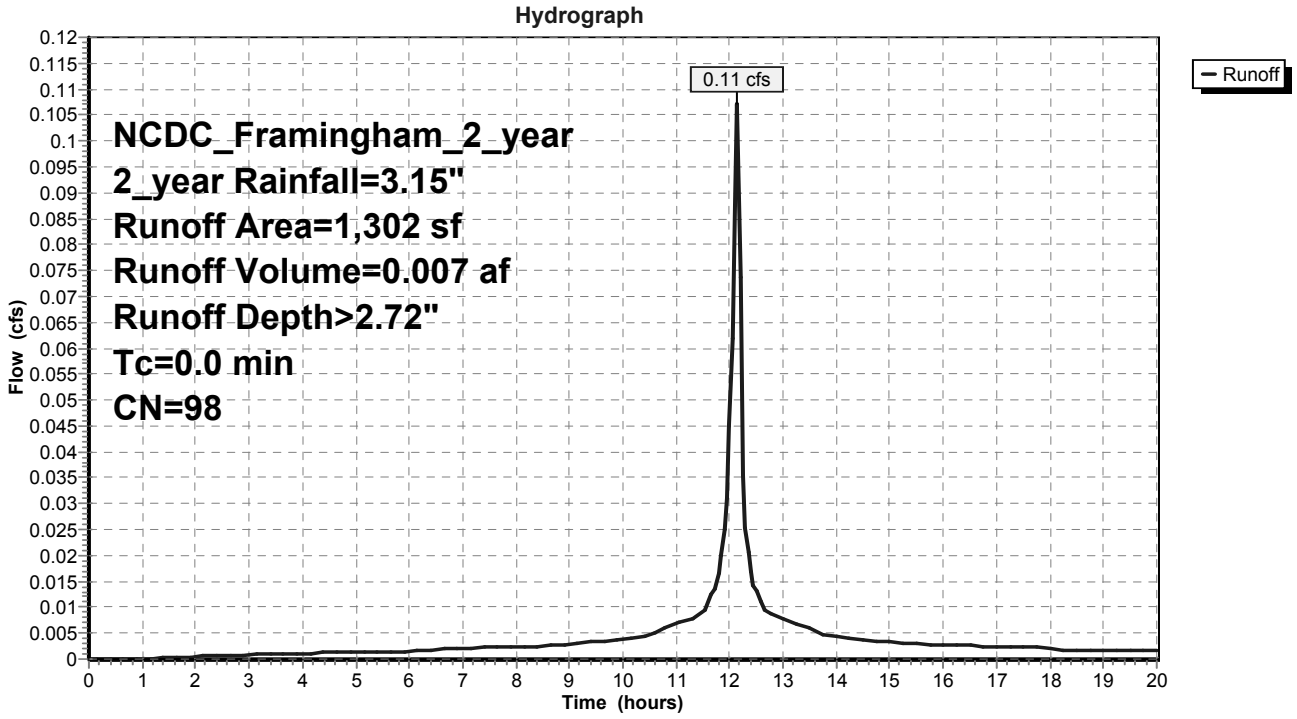
## Summary for Subcatchment ROOF-46: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-46: (blank)



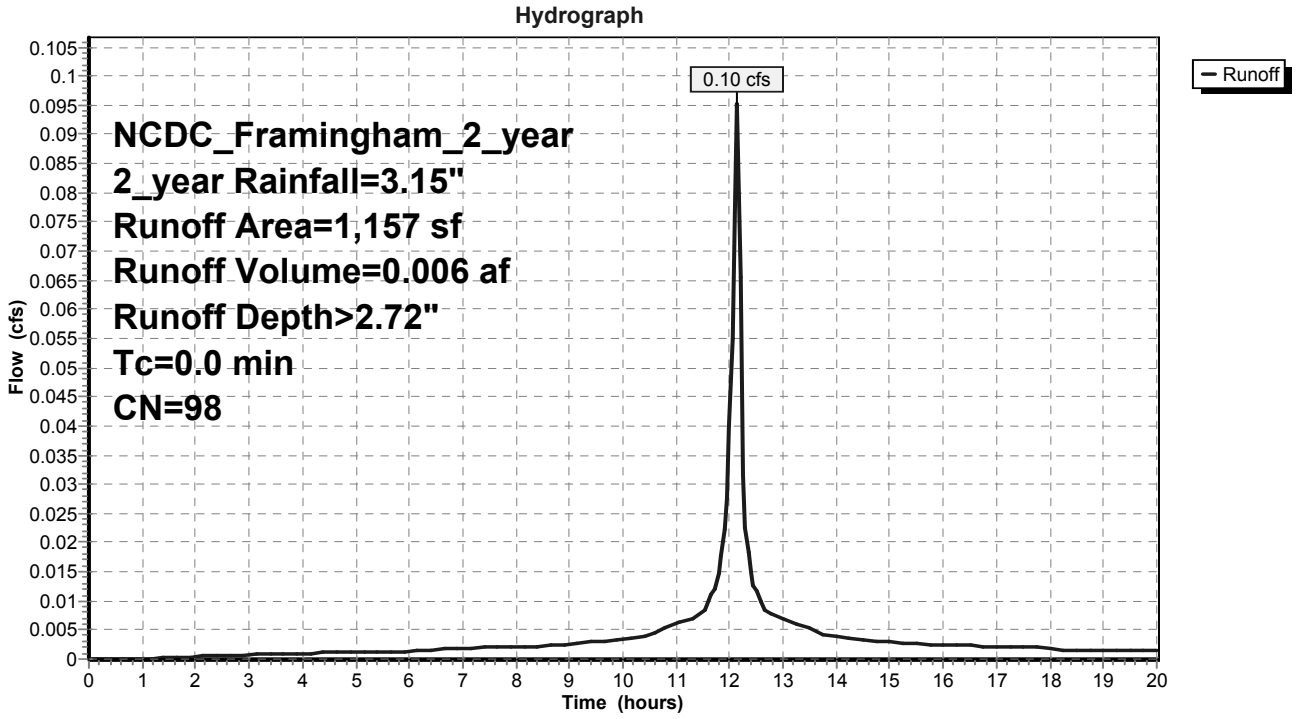
## Summary for Subcatchment ROOF-47: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-47: (blank)



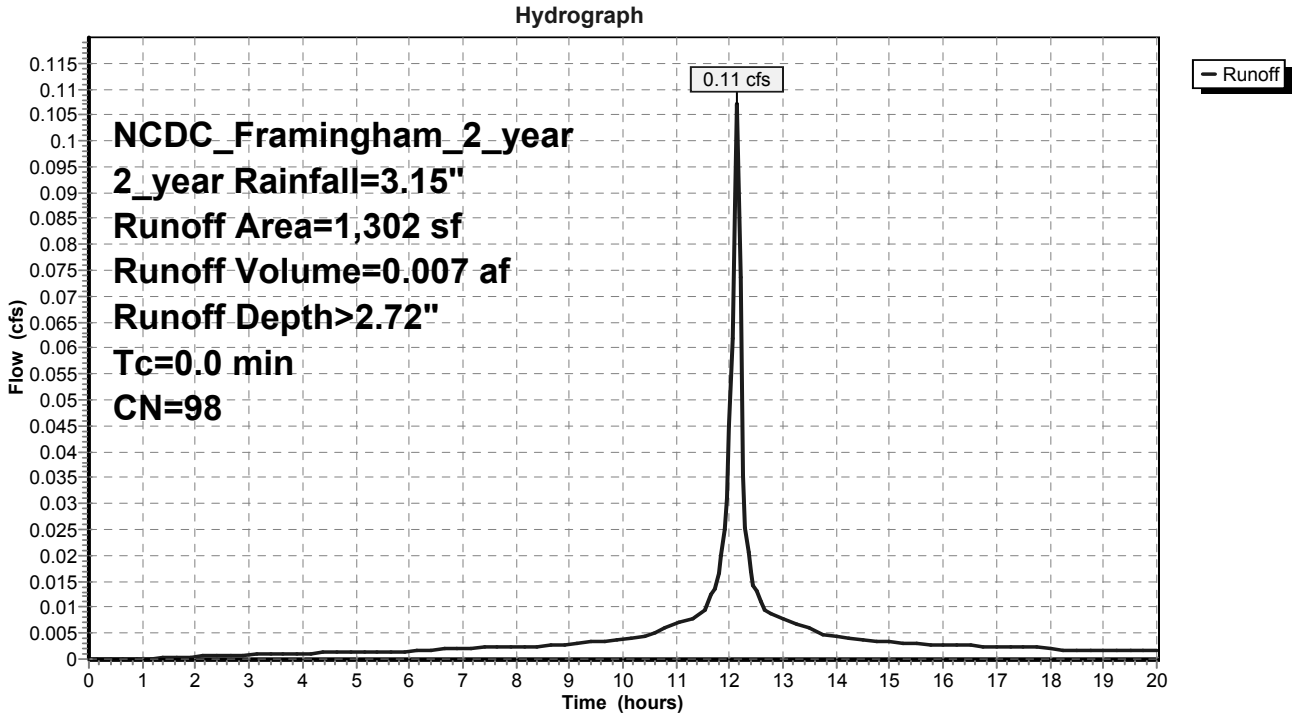
## Summary for Subcatchment ROOF-48: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-48: (blank)



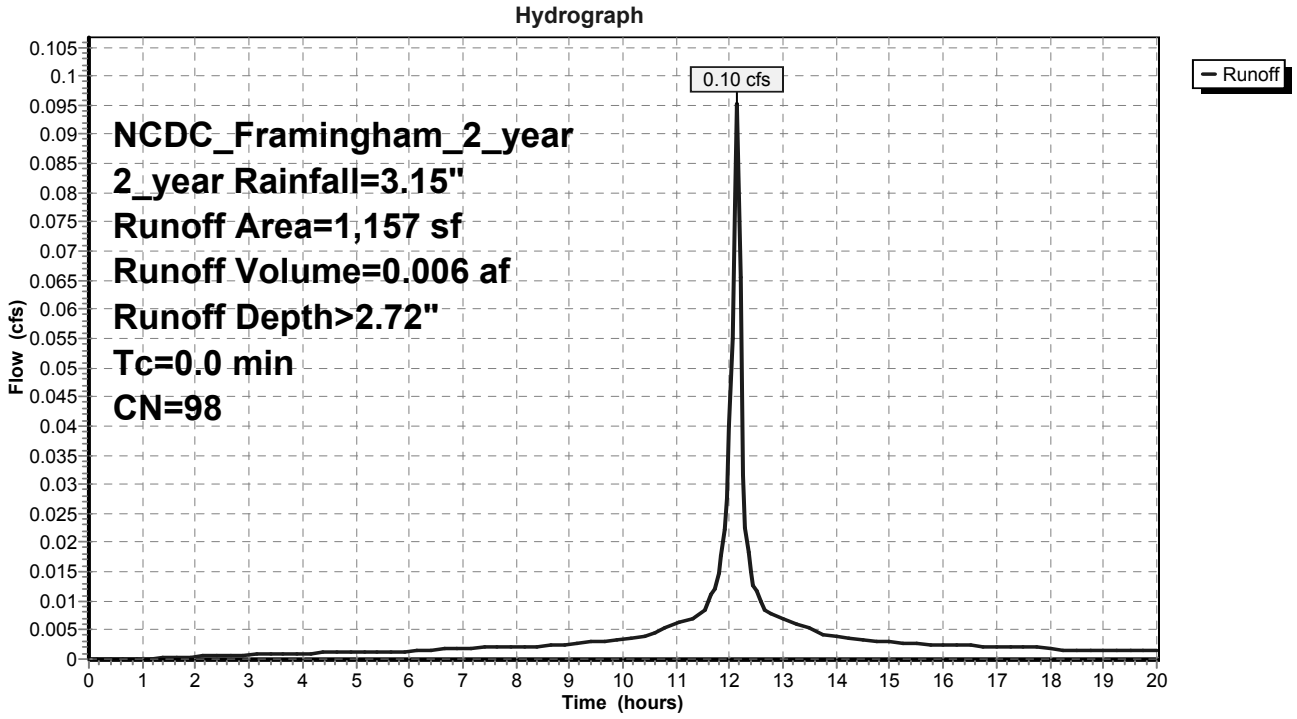
## Summary for Subcatchment ROOF-49: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-49: (blank)



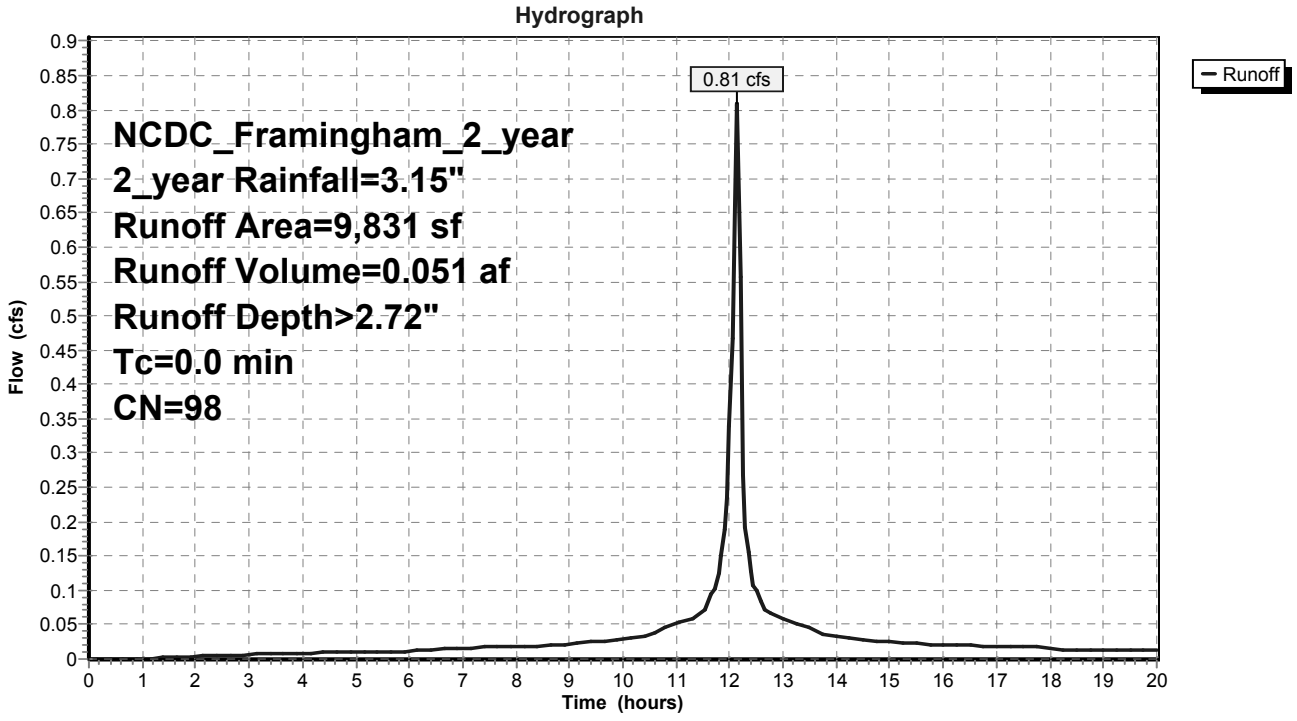
## Summary for Subcatchment ROOF-5: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.051 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 230 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,831 | 98 | Weighted Average |
| | 9,831 | | 100.00% Pervious Area |

## Subcatchment ROOF-5: (blank)



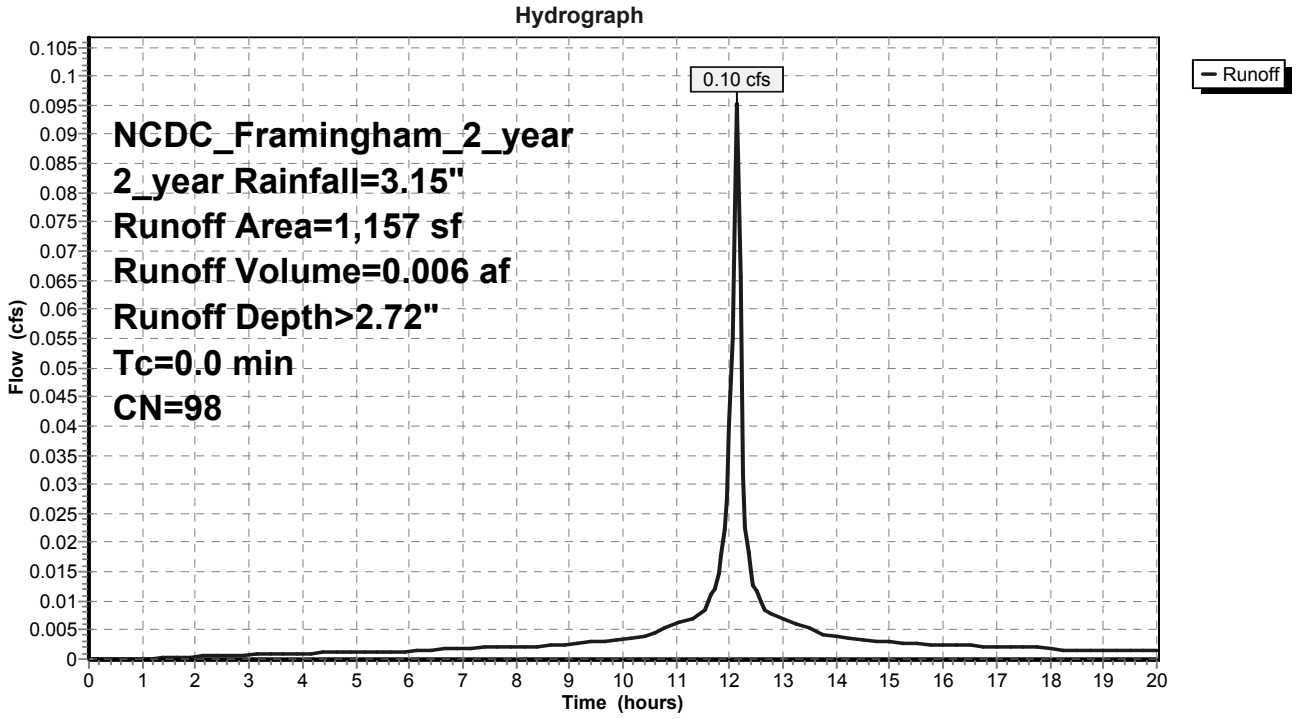
## Summary for Subcatchment ROOF-50: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-50: (blank)



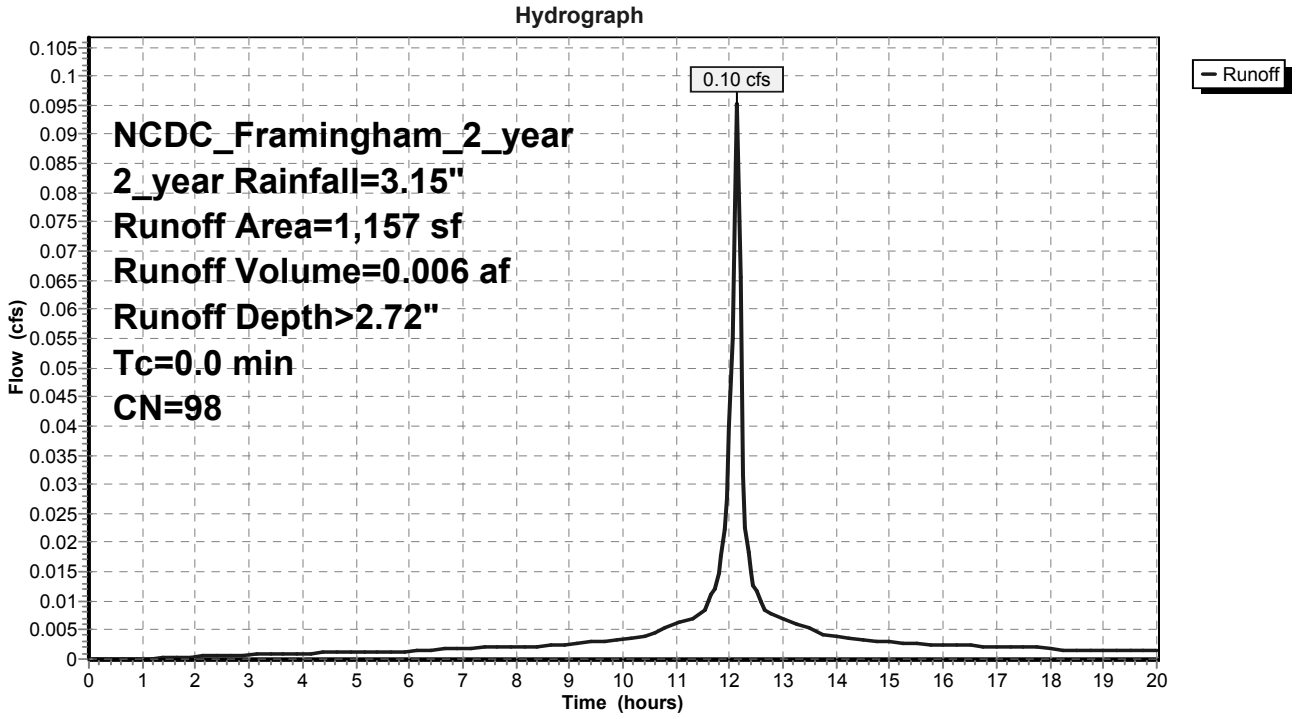
## Summary for Subcatchment ROOF-51: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-51: (blank)



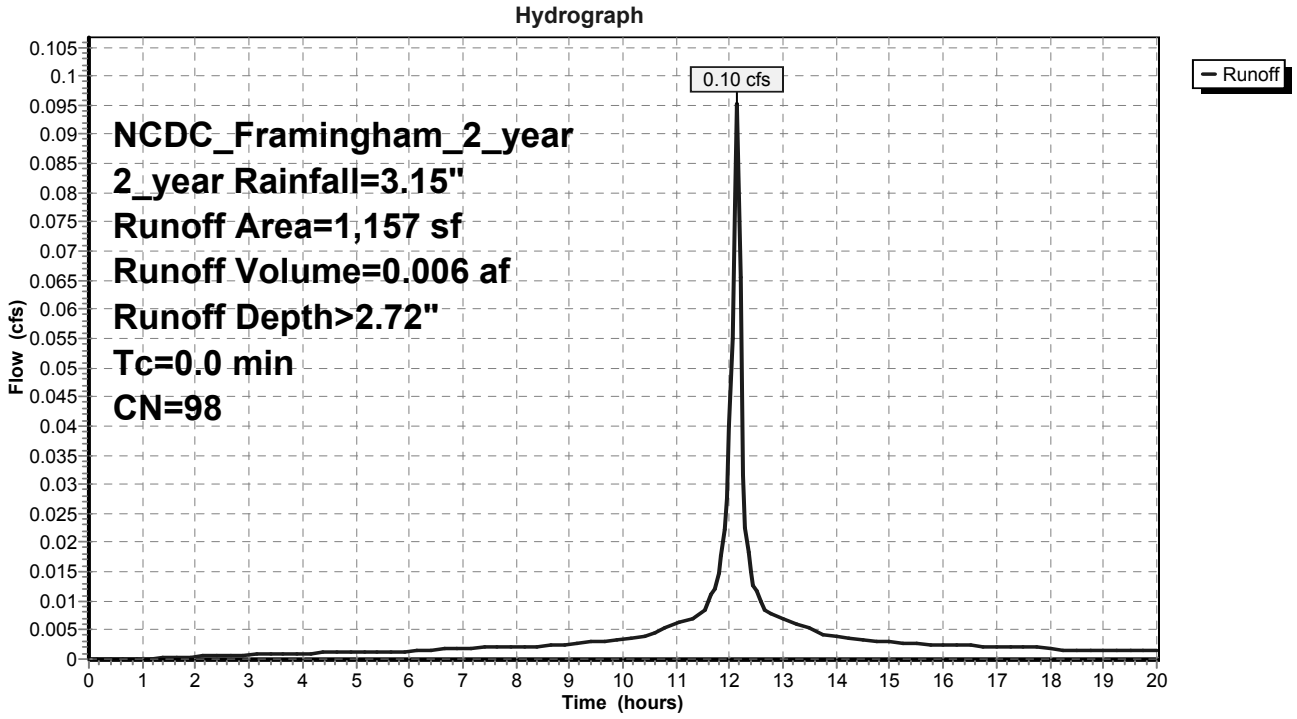
## Summary for Subcatchment ROOF-52: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-52: (blank)



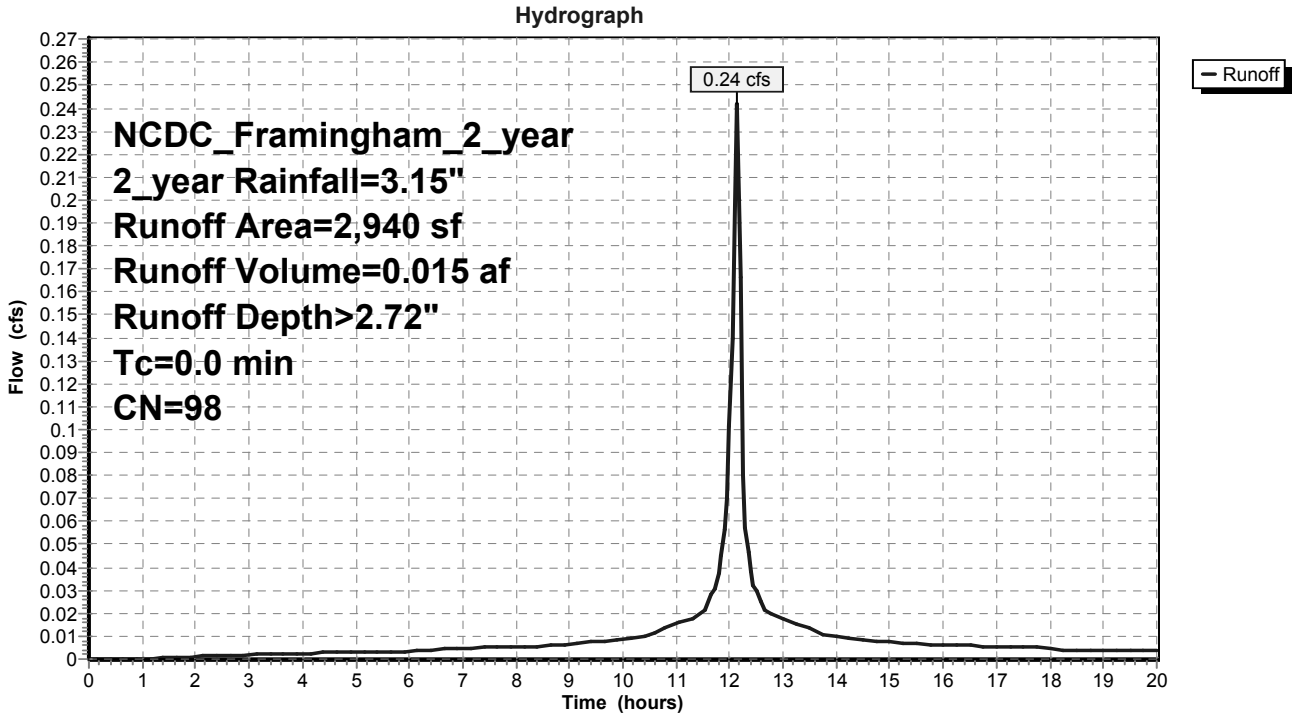
## Summary for Subcatchment ROOF-53: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-53: (blank)



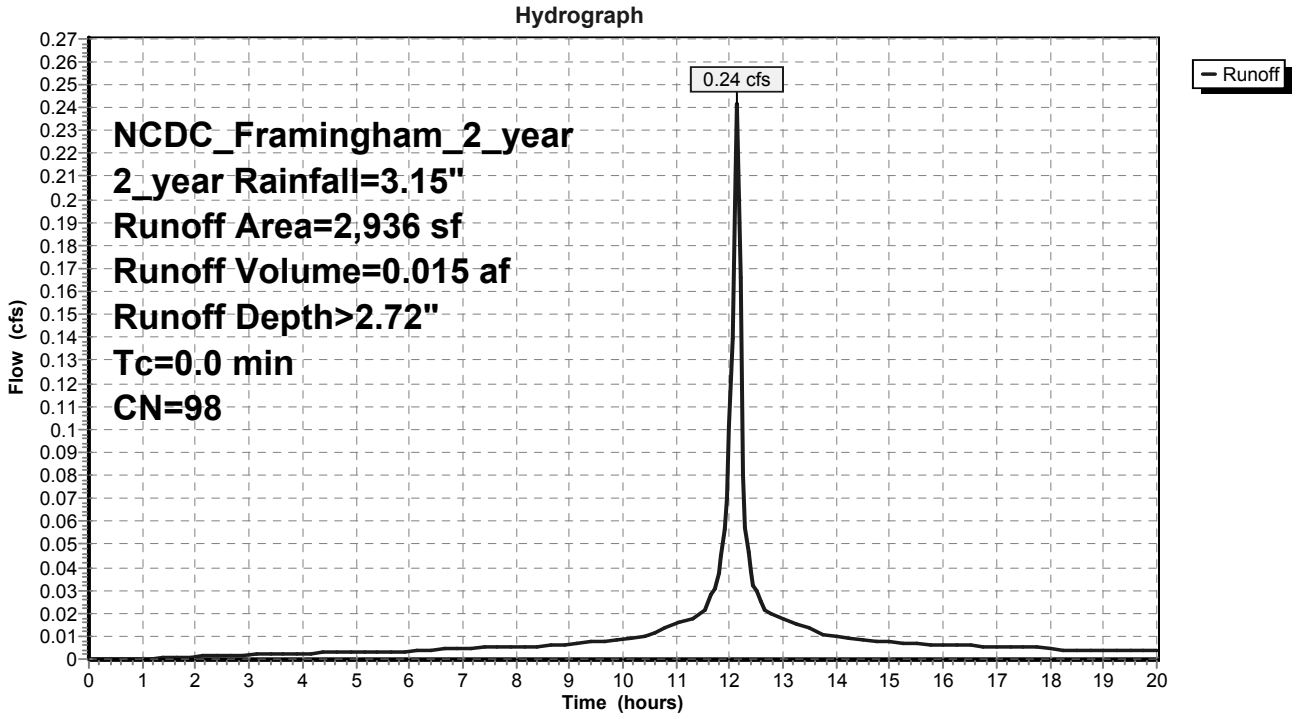
## Summary for Subcatchment ROOF-54: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,936 | 98 | ROOF, 100% imperv, HSG A |
| | 2,936 | | 100.00% Pervious Area |

## Subcatchment ROOF-54: (blank)



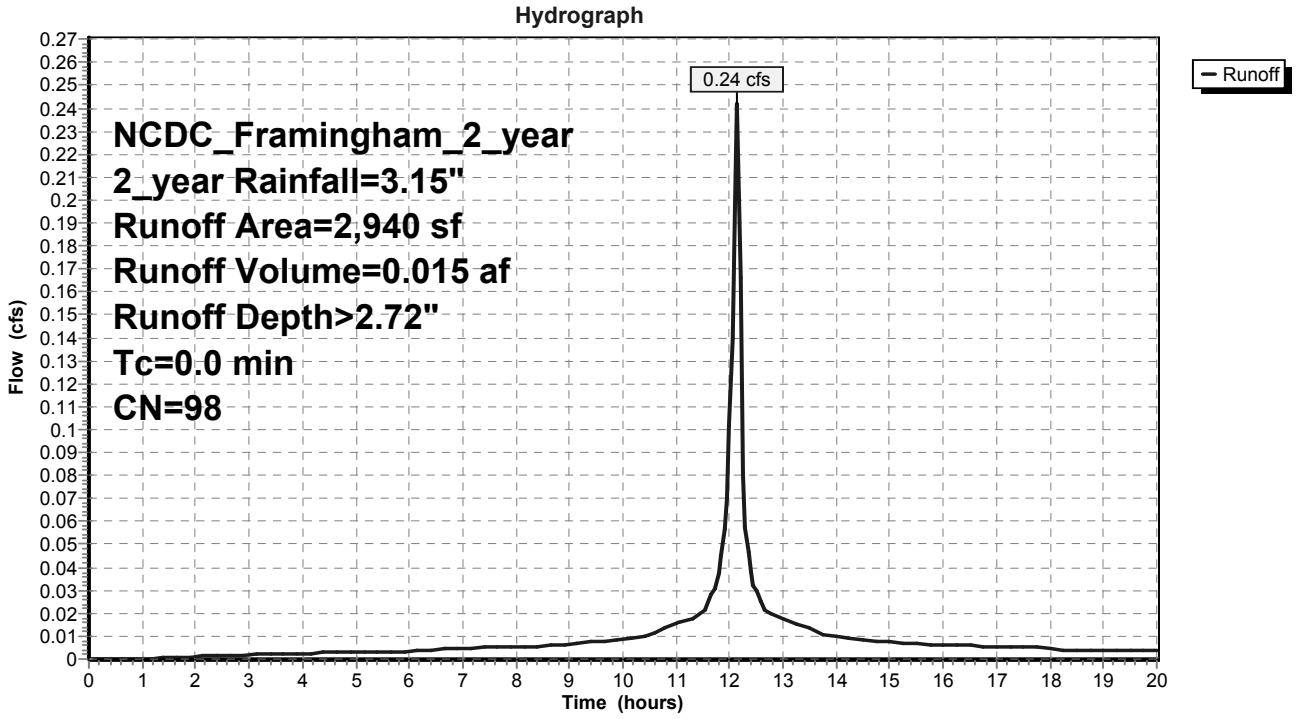
## Summary for Subcatchment ROOF-55: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-55: (blank)



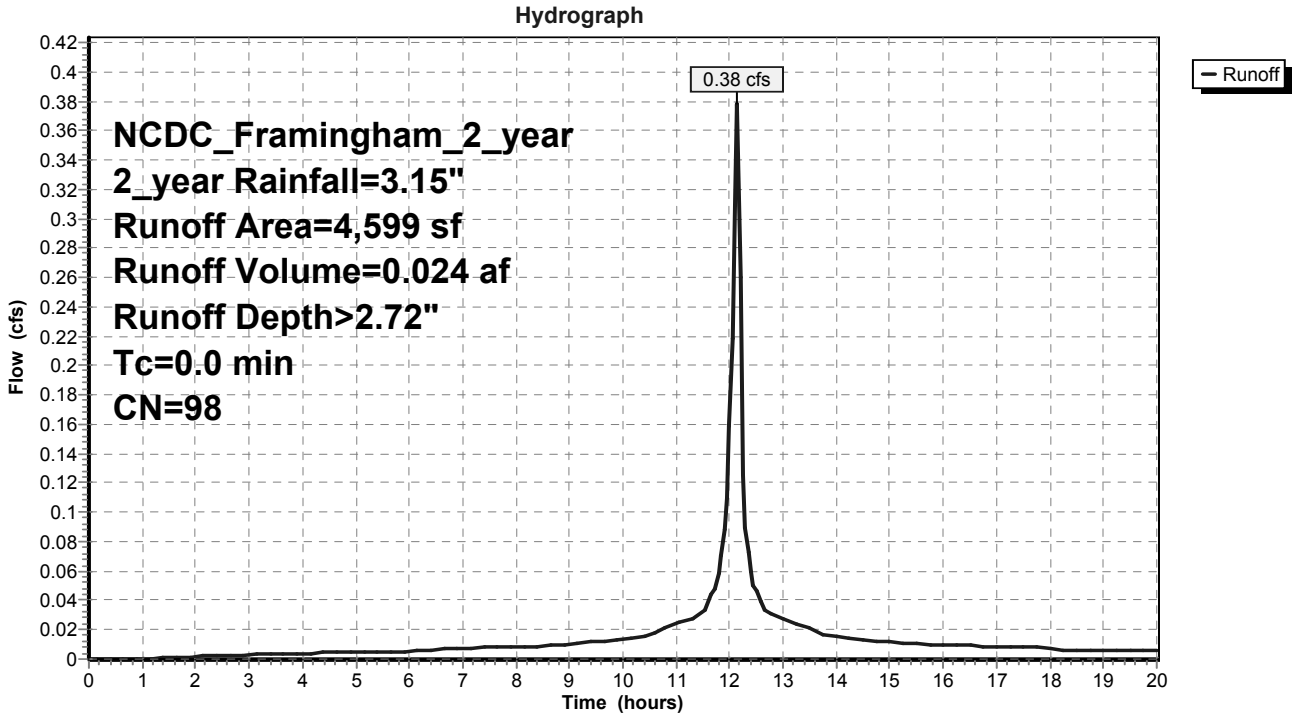
## Summary for Subcatchment ROOF-56: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG A |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-56: (blank)



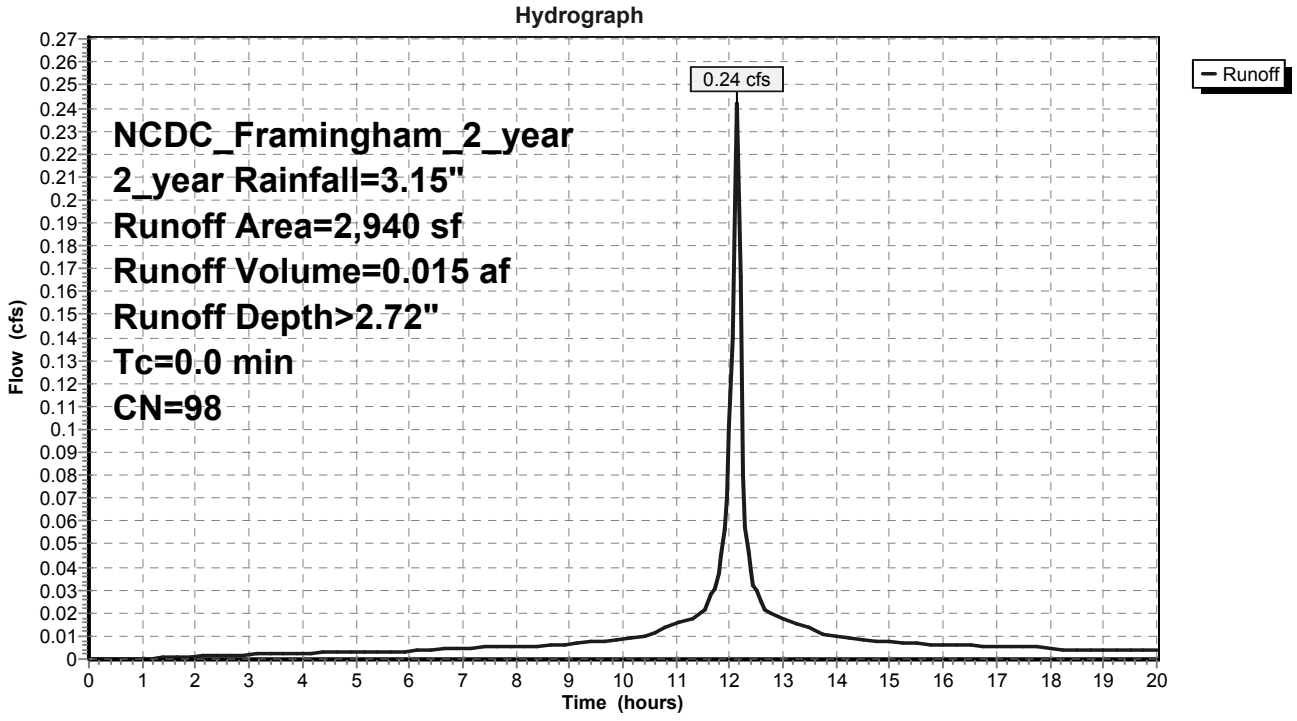
## Summary for Subcatchment ROOF-57: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,911 | 98 | ROOF, 100% imperv, HSG A |
| * | 29 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-57: (blank)



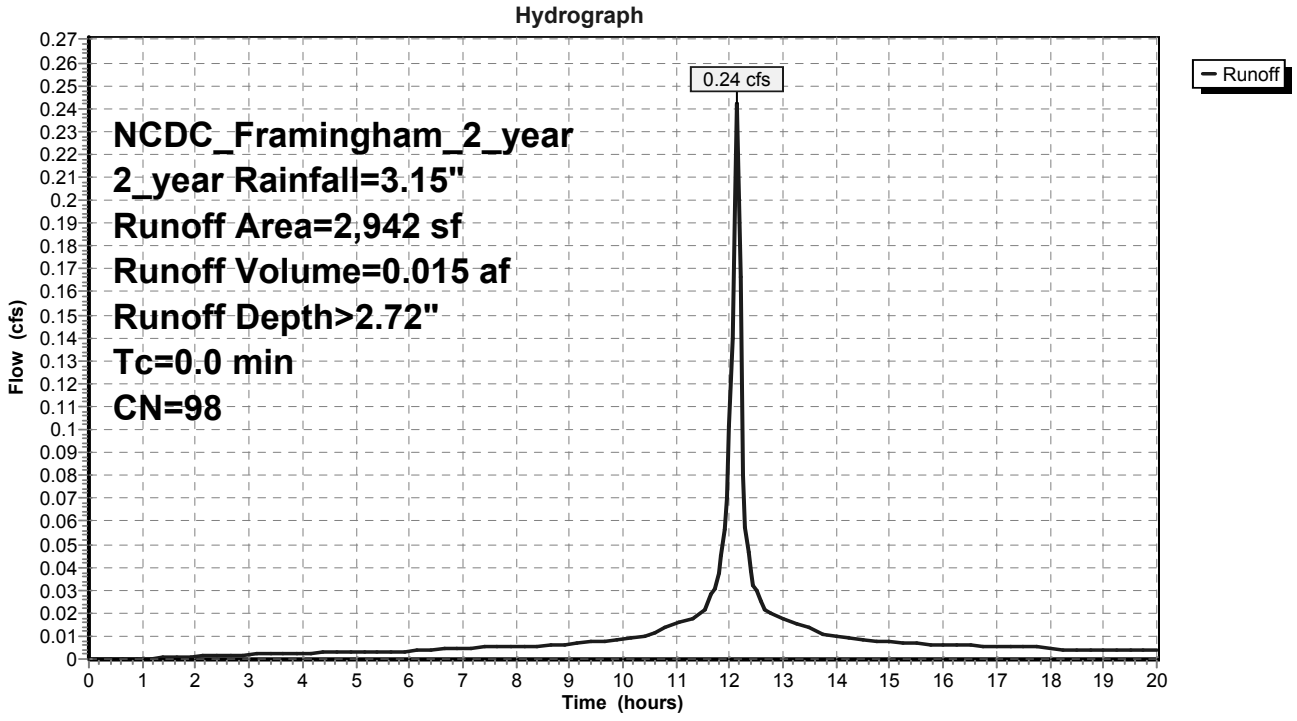
## Summary for Subcatchment ROOF-58: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22 | 98 | DECK, 100% imperv, HSG A |
| * | 2,919 | 98 | ROOF, 100% imperv, HSG A |
| | 2,942 | 98 | Weighted Average |
| | 2,942 | | 100.00% Pervious Area |

## Subcatchment ROOF-58: (blank)



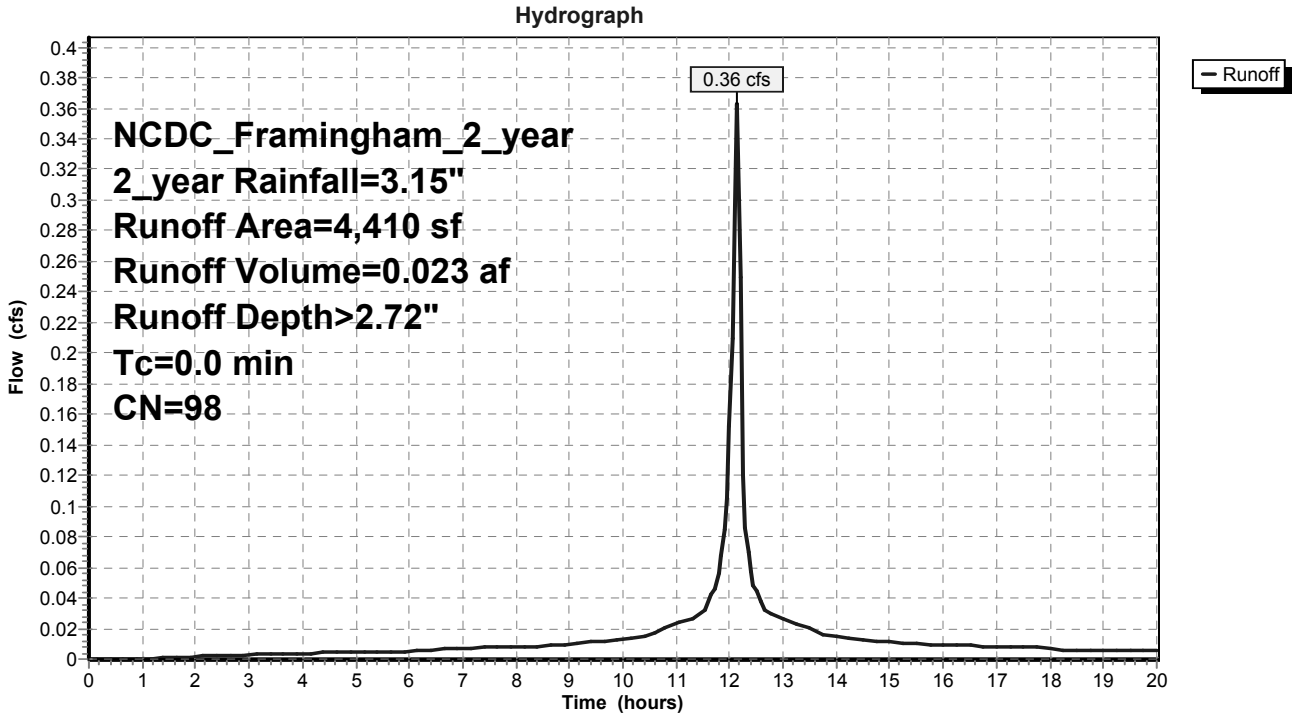
## Summary for Subcatchment ROOF-59: (blank)

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-59: (blank)



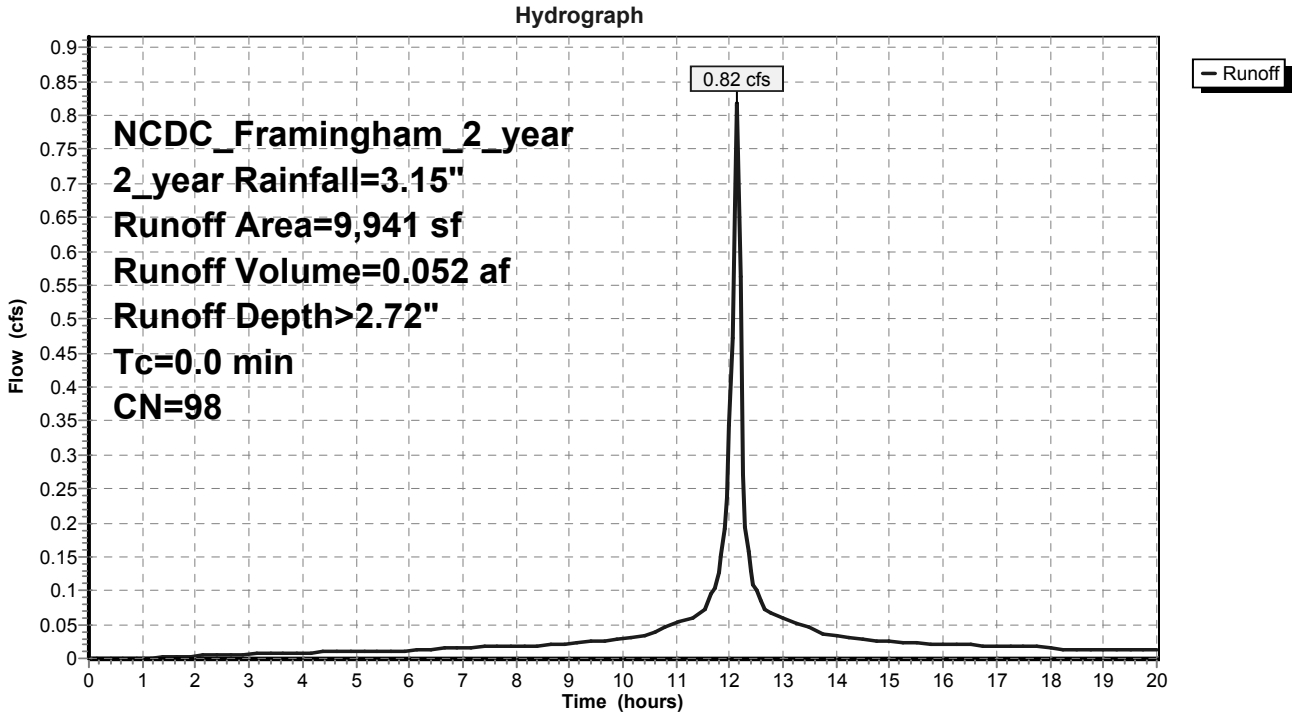
## Summary for Subcatchment ROOF-6: (blank)

Runoff = 0.82 cfs @ 12.14 hrs, Volume= 0.052 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 340 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,941 | 98 | Weighted Average |
| | 9,941 | | 100.00% Pervious Area |

## Subcatchment ROOF-6: (blank)



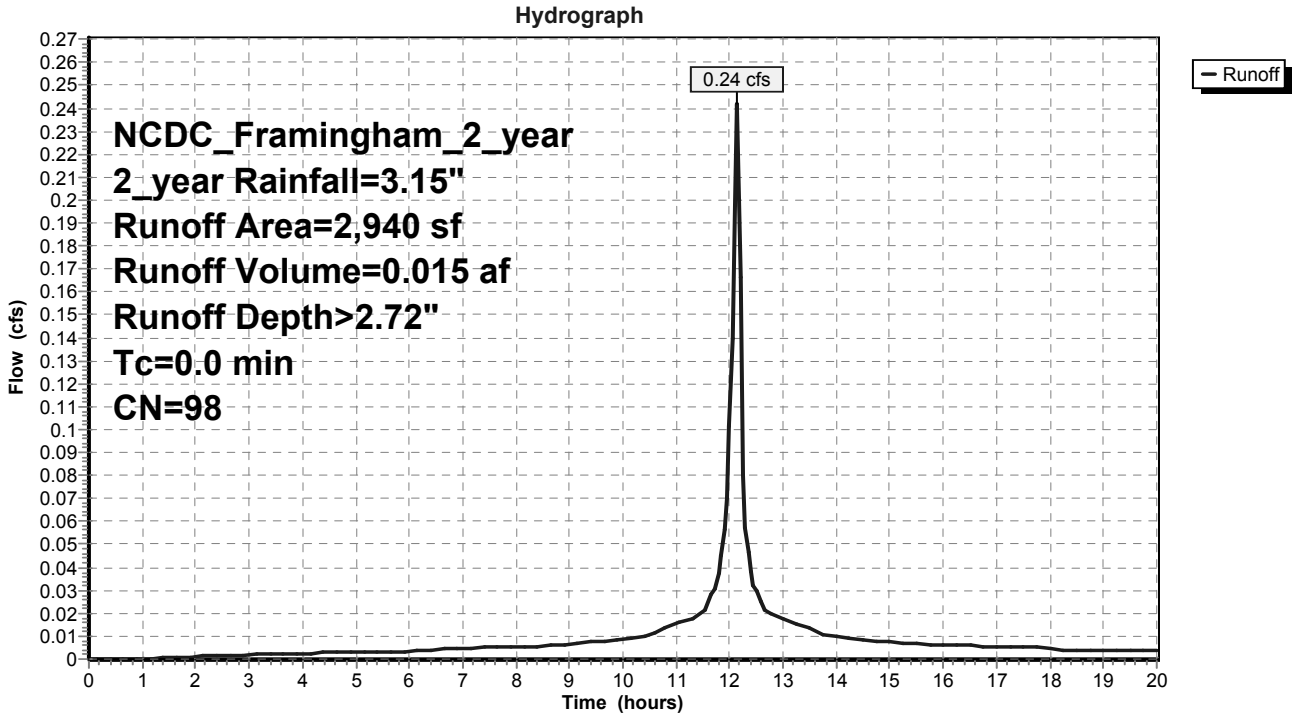
## Summary for Subcatchment ROOF-60: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-60: (blank)



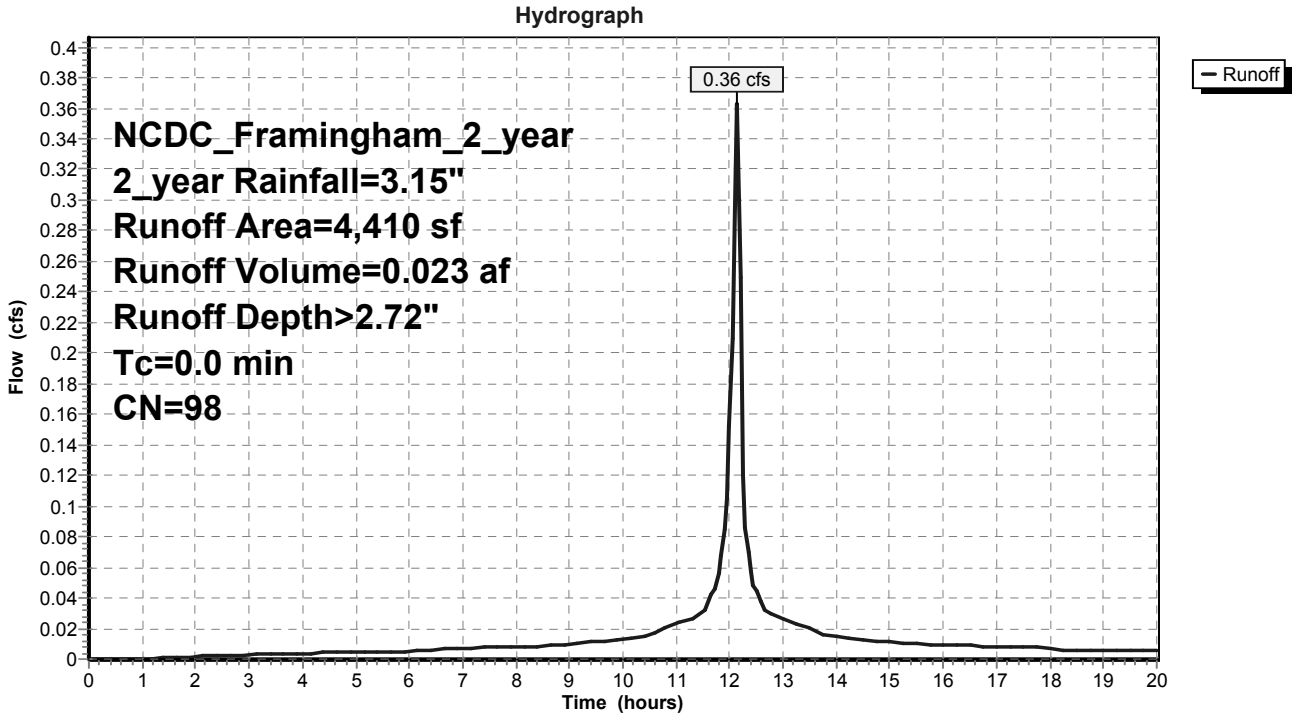
## Summary for Subcatchment ROOF-61: (blank)

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-61: (blank)



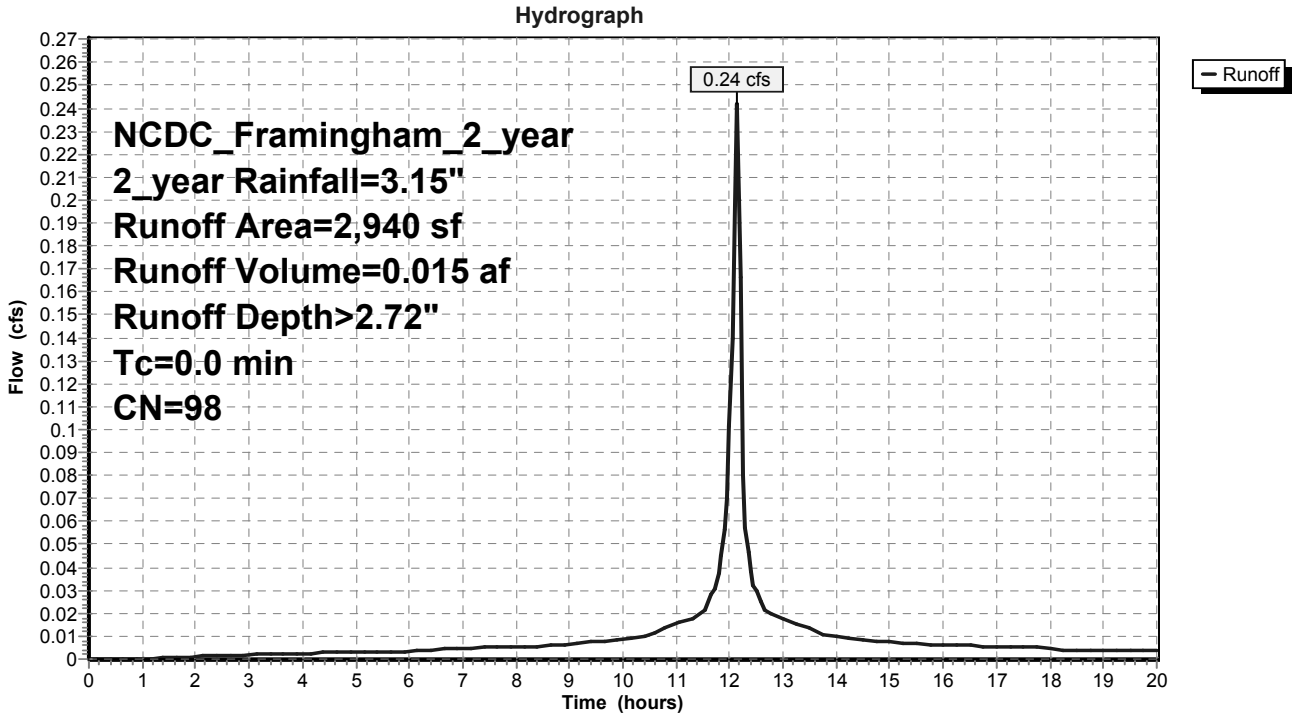
## Summary for Subcatchment ROOF-62: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-62: (blank)



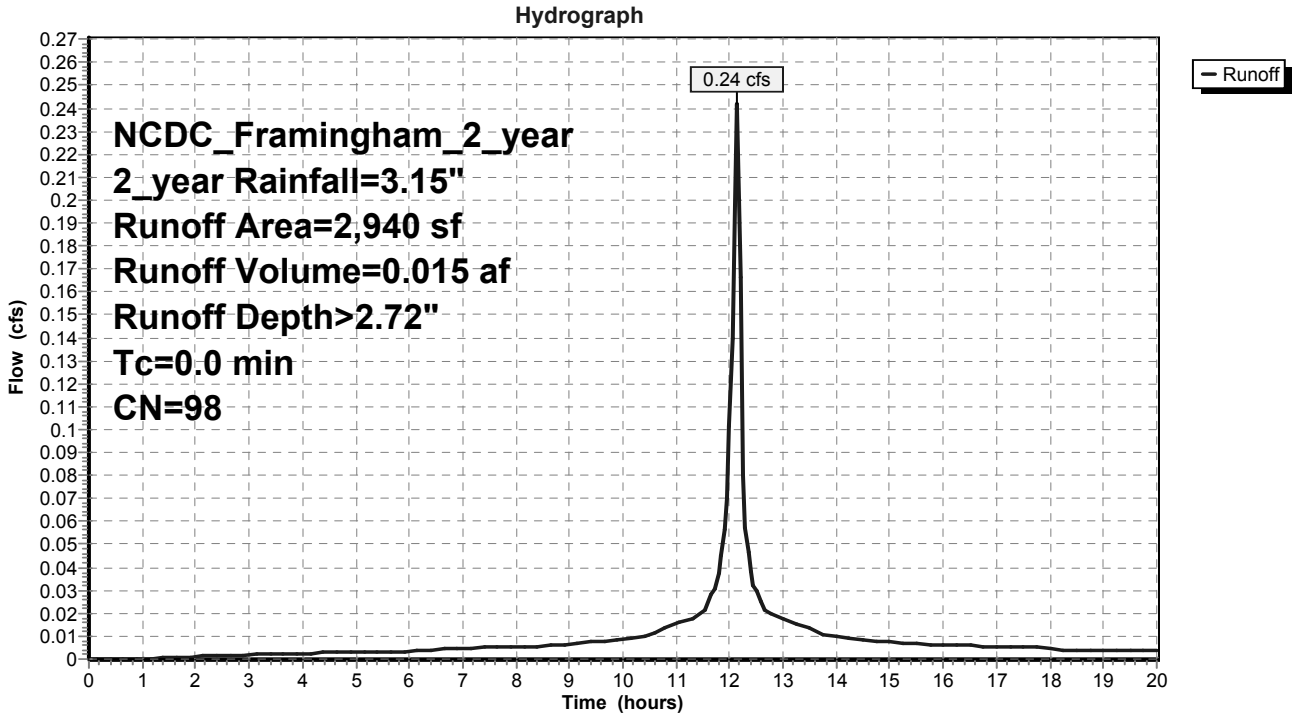
## Summary for Subcatchment ROOF-63: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-63: (blank)



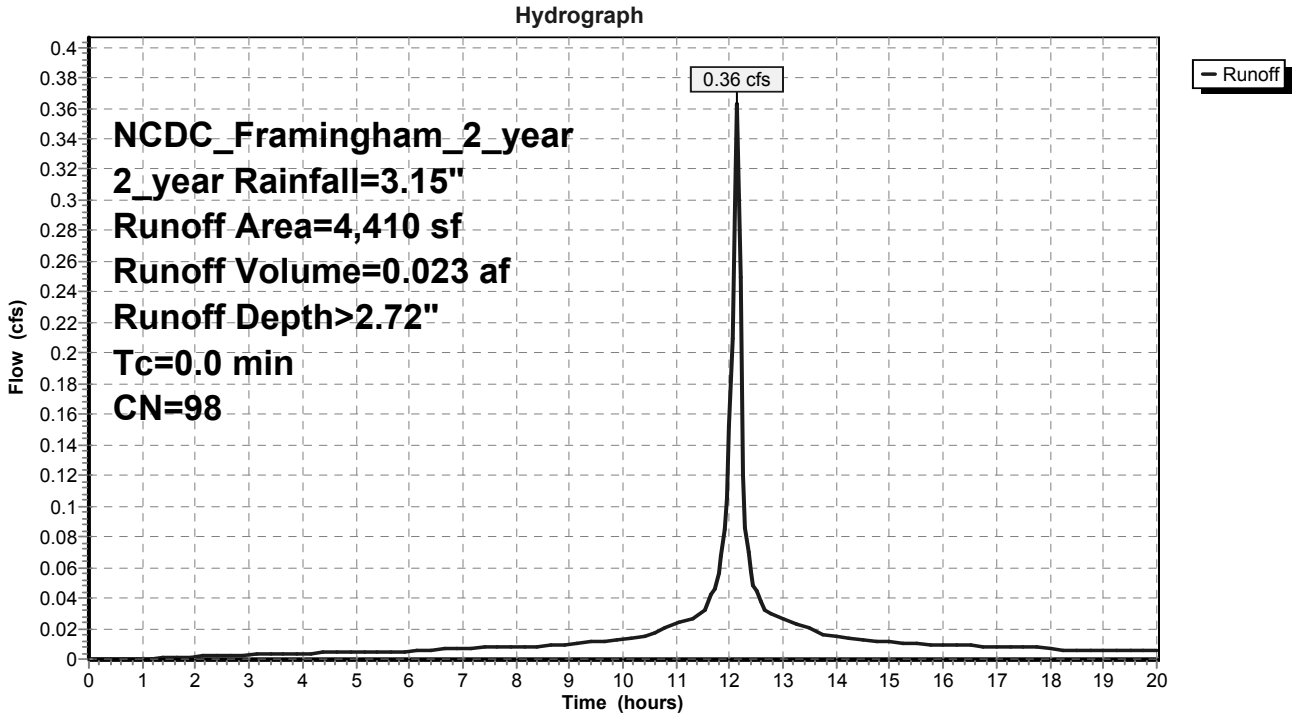
## Summary for Subcatchment ROOF-64: (blank)

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-64: (blank)



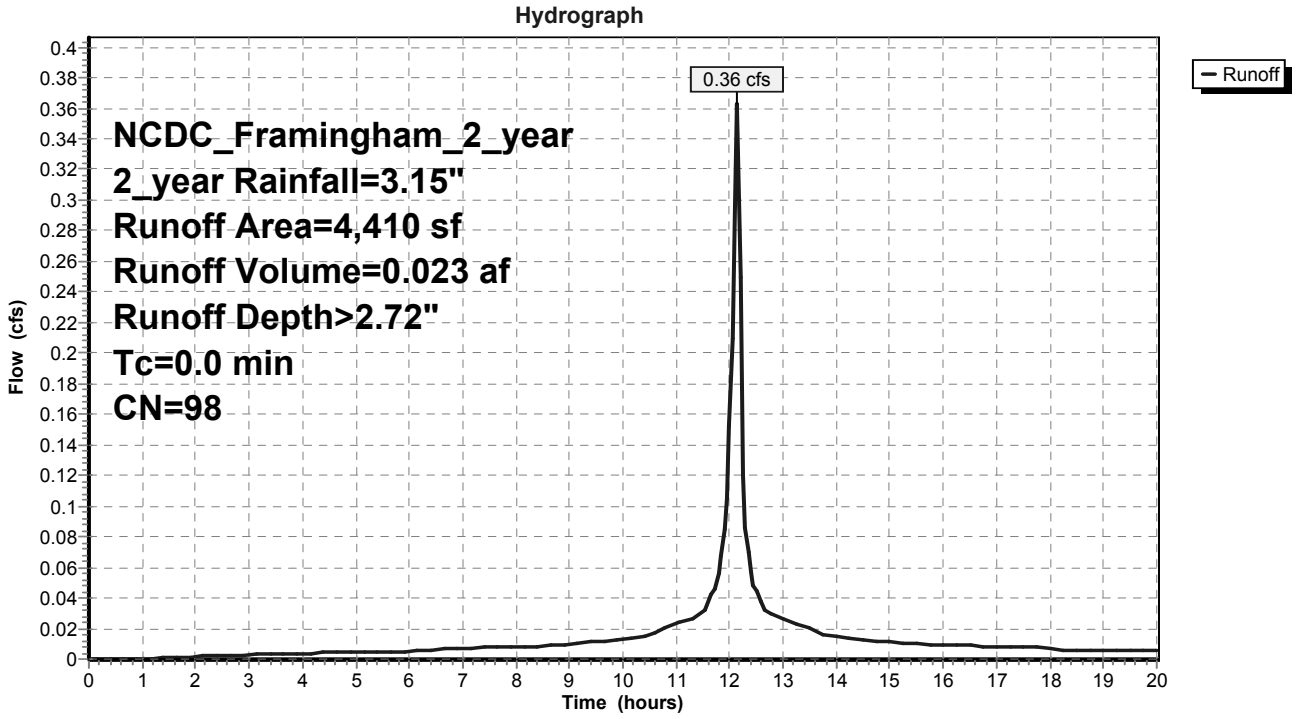
## Summary for Subcatchment ROOF-65: (blank)

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-65: (blank)



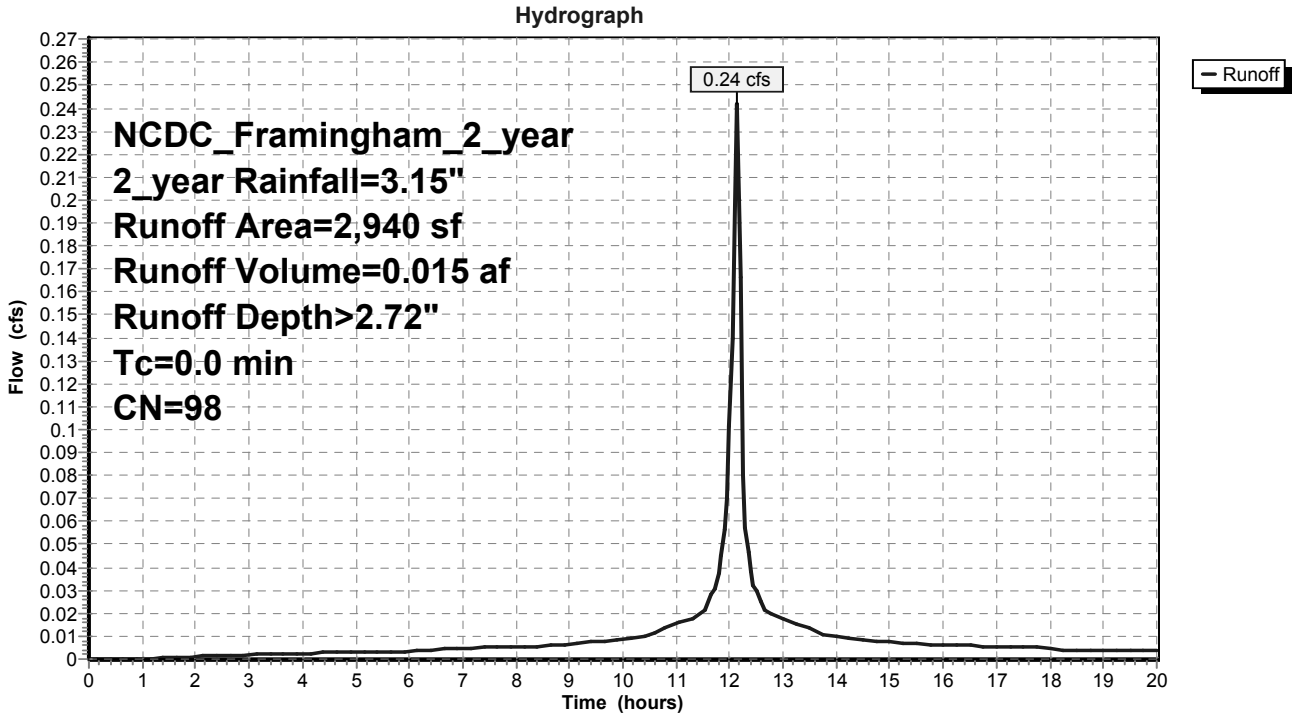
## Summary for Subcatchment ROOF-66: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-66: (blank)



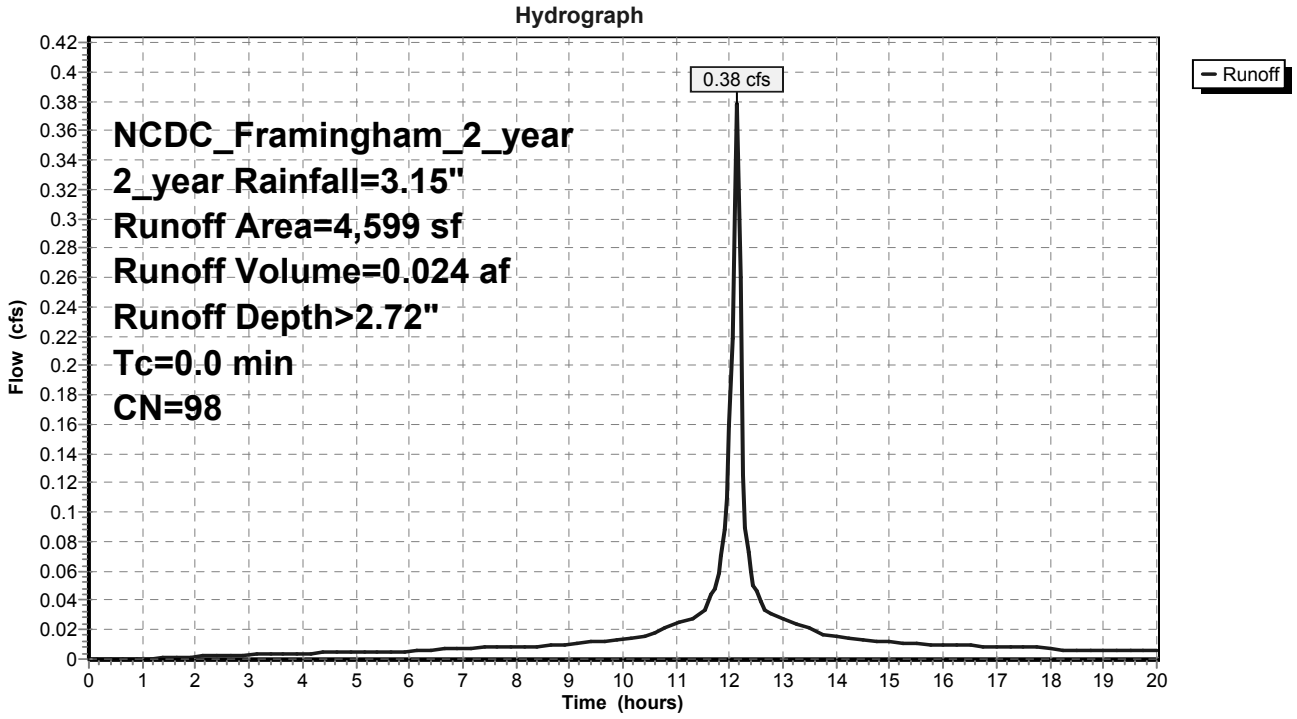
## Summary for Subcatchment ROOF-67: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-67: (blank)



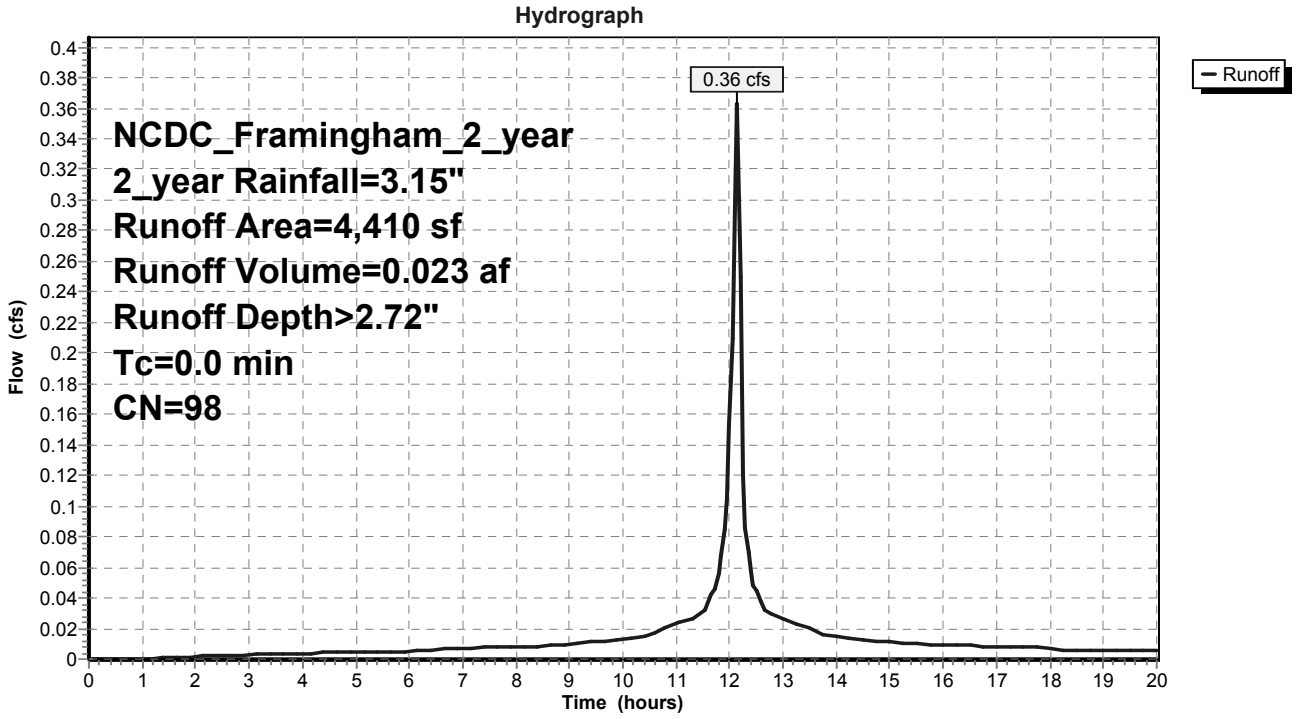
## Summary for Subcatchment ROOF-68: (blank)

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-68: (blank)



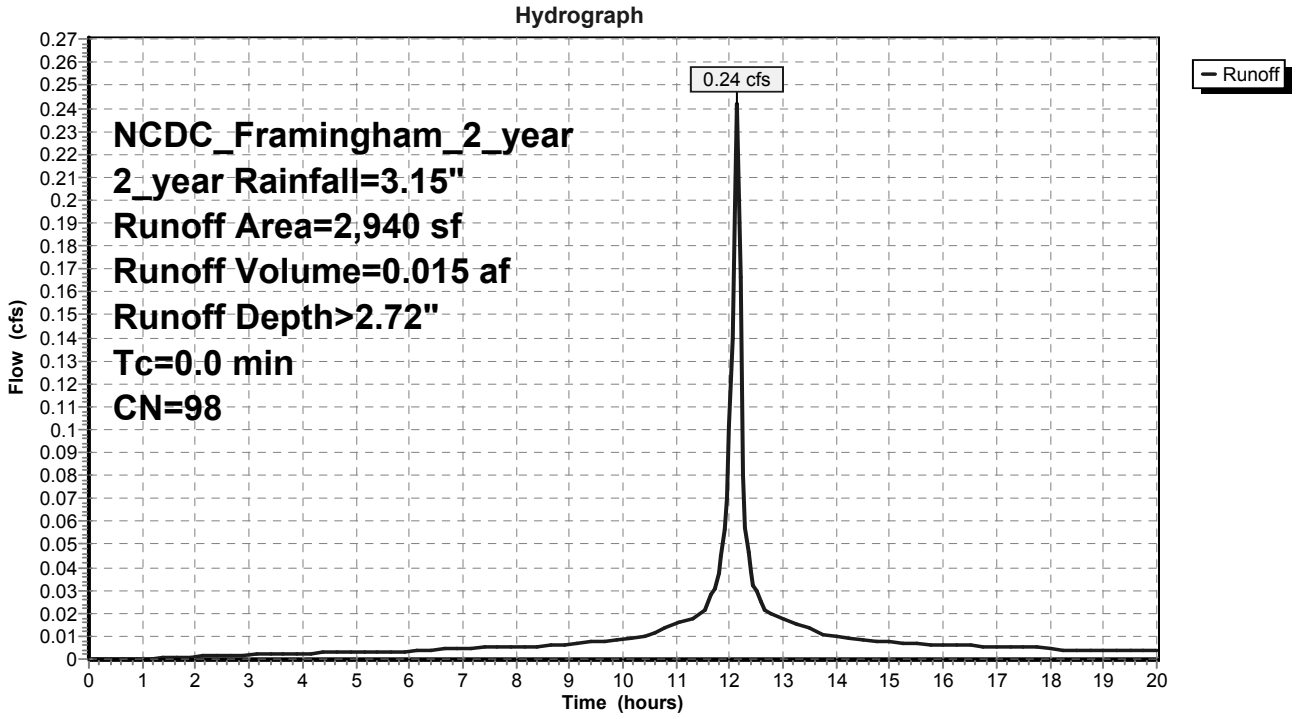
## Summary for Subcatchment ROOF-69: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-69: (blank)



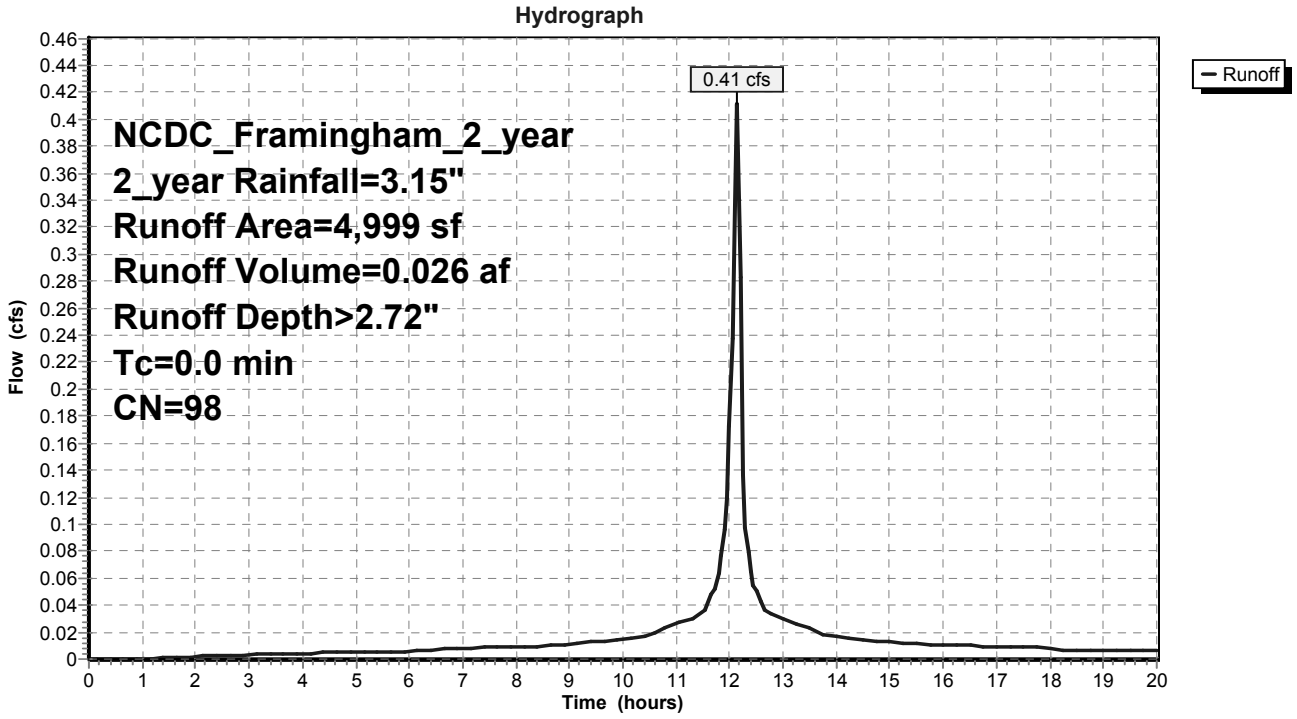
## Summary for Subcatchment ROOF-7: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.026 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-7: (blank)



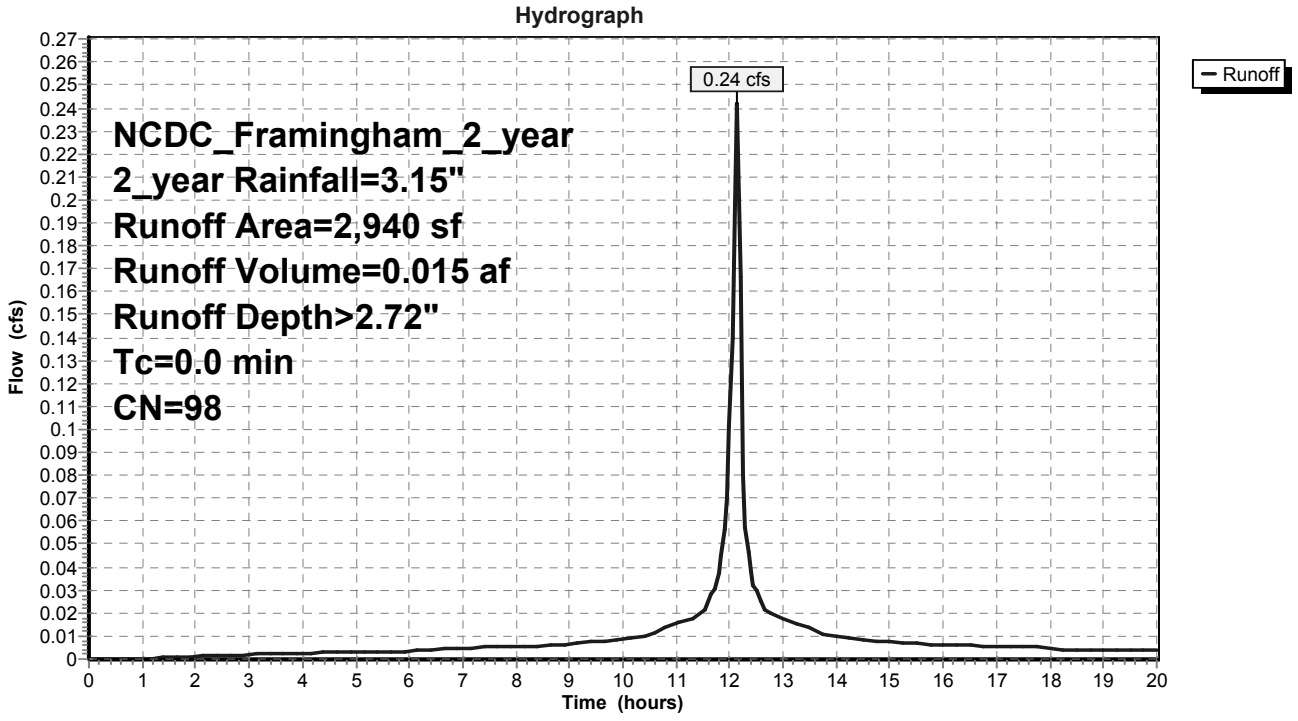
## Summary for Subcatchment ROOF-70: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,017 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,923 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-70: (blank)



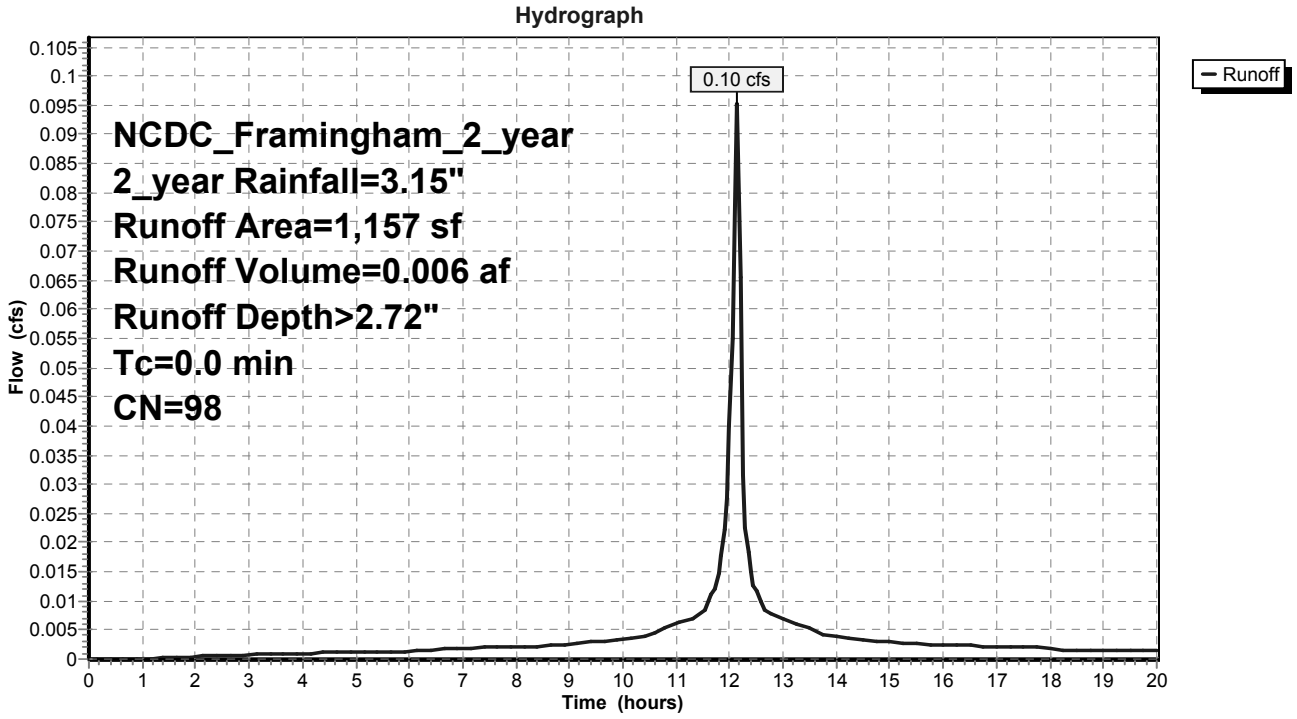
## Summary for Subcatchment ROOF-71: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-71: (blank)



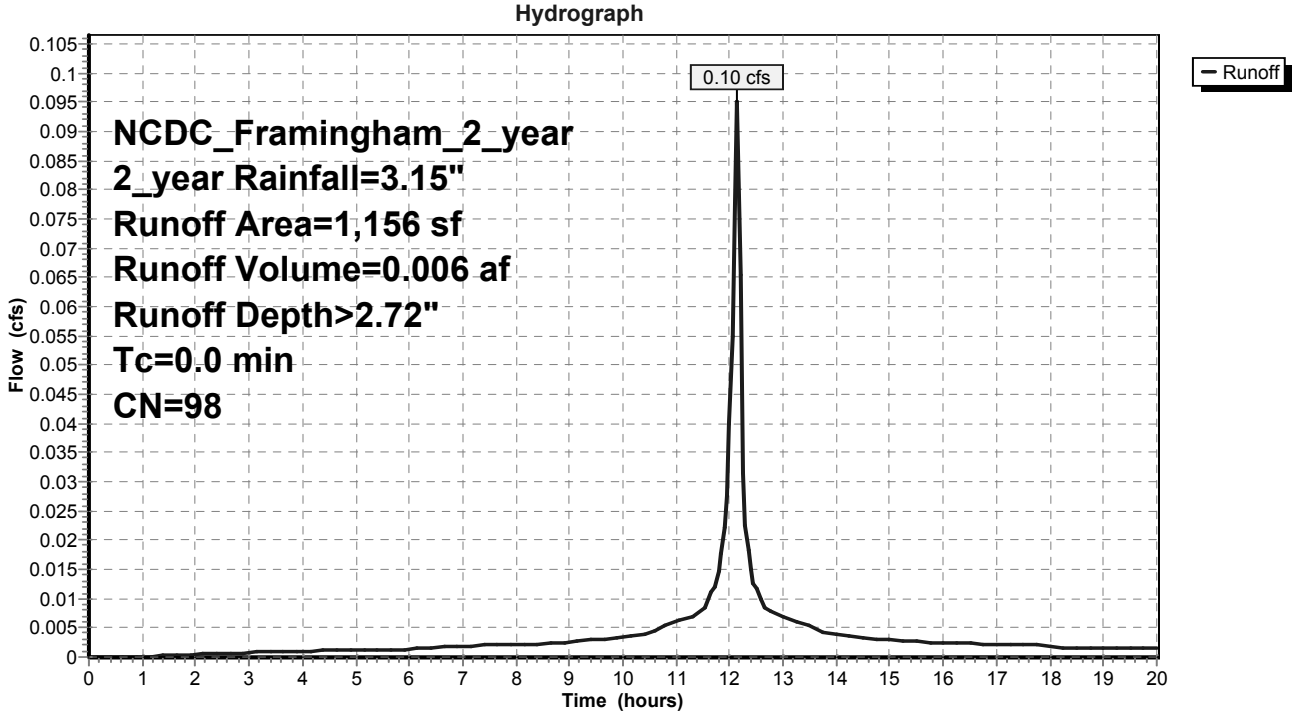
## Summary for Subcatchment ROOF-72: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 106 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,050 | 98 | ROOF, 100% imperv, HSG B |
| | 1,156 | 98 | Weighted Average |
| | 1,156 | | 100.00% Pervious Area |

## Subcatchment ROOF-72: (blank)



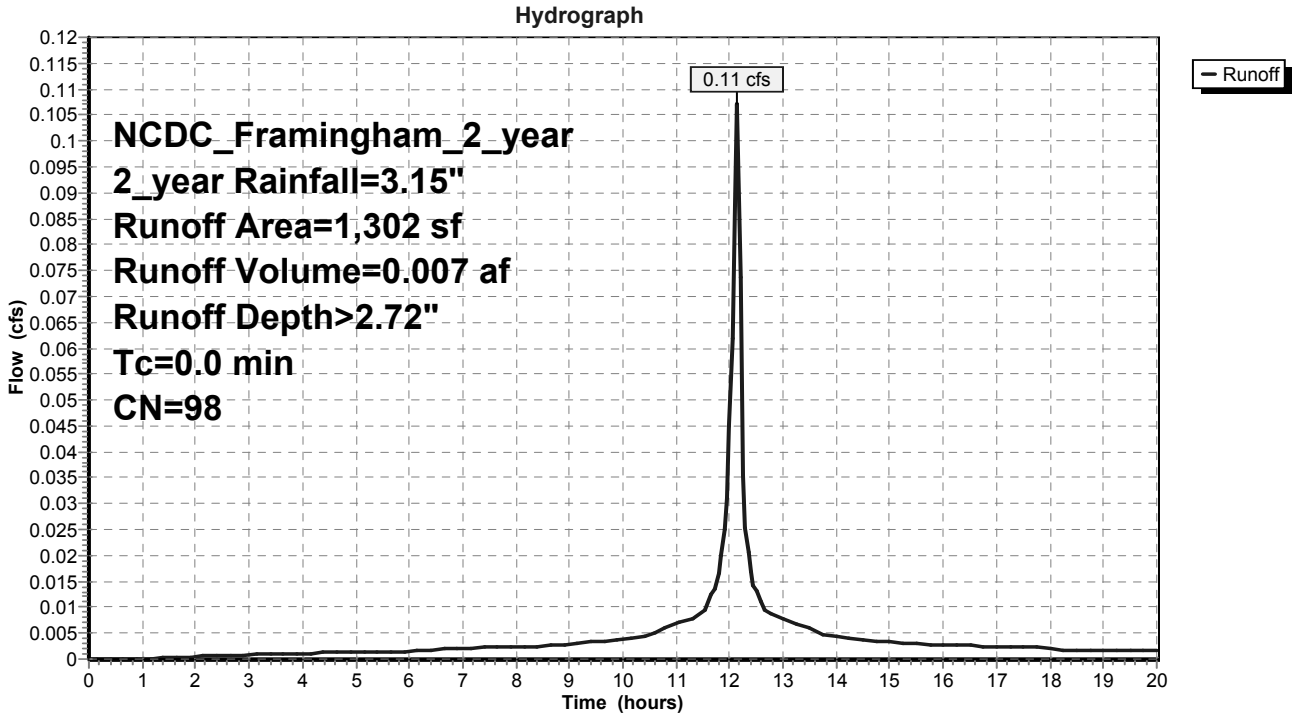
## Summary for Subcatchment ROOF-73: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-73: (blank)



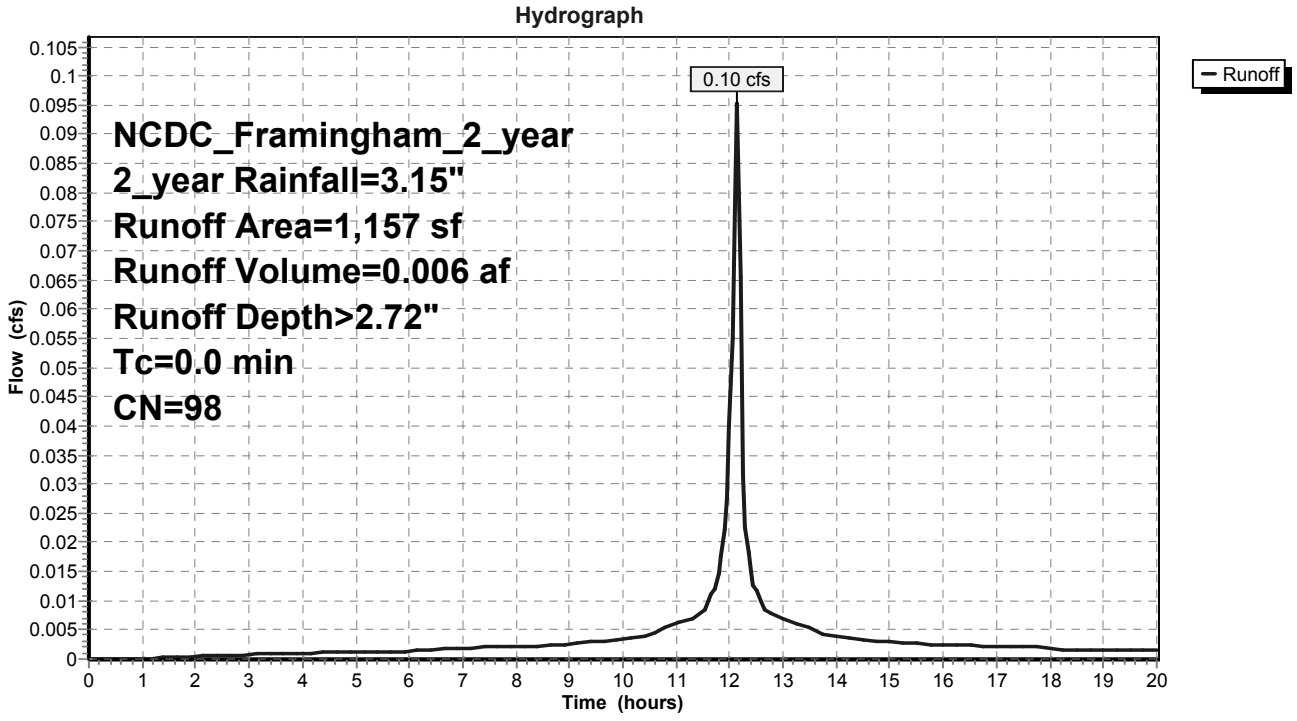
## Summary for Subcatchment ROOF-74: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 465 | 98 | ROOF, 100% imperv, HSG A |
| * | 693 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-74: (blank)



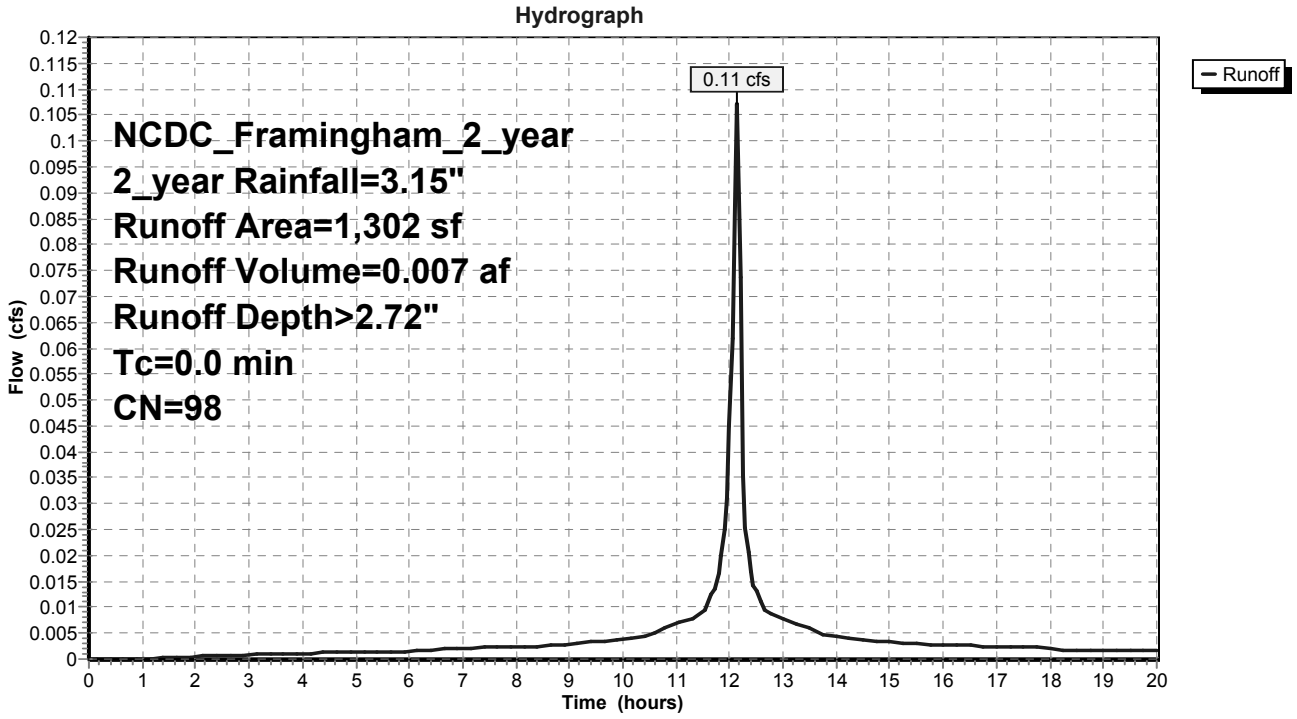
## Summary for Subcatchment ROOF-75: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-75: (blank)



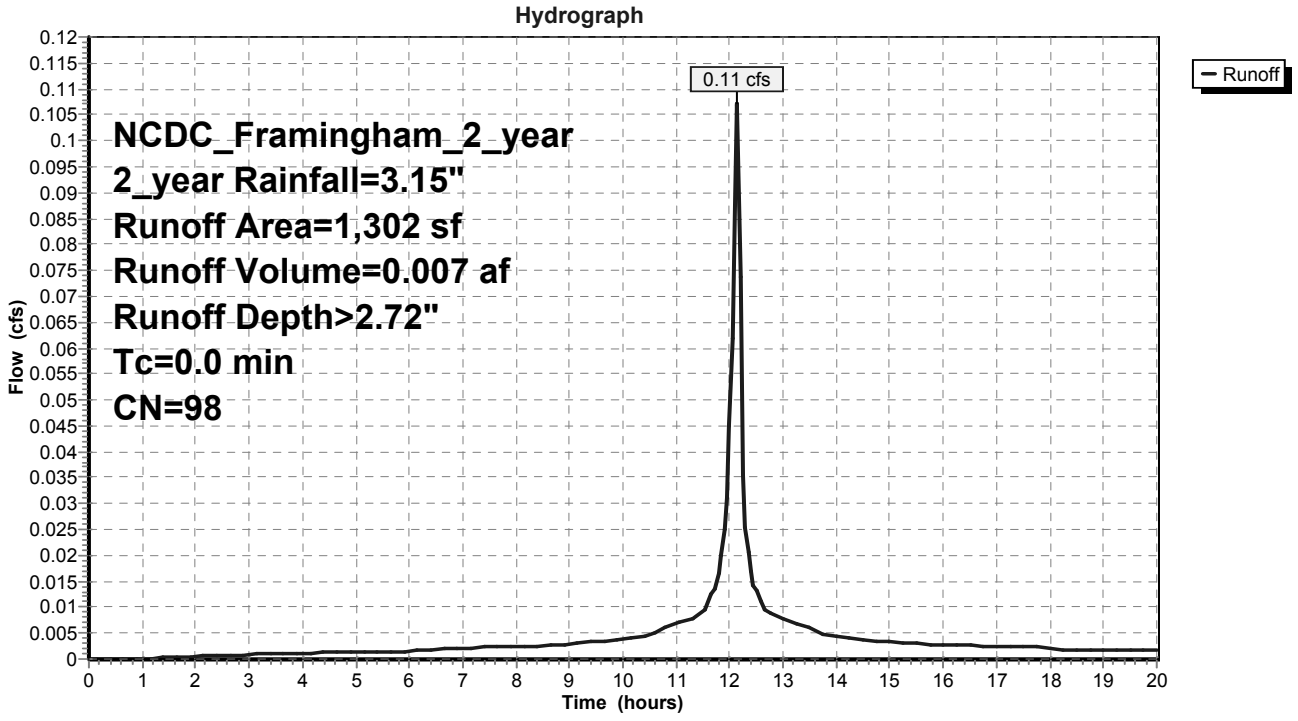
## Summary for Subcatchment ROOF-76: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 643 | 98 | ROOF, 100% imperv, HSG A |
| * | 659 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-76: (blank)



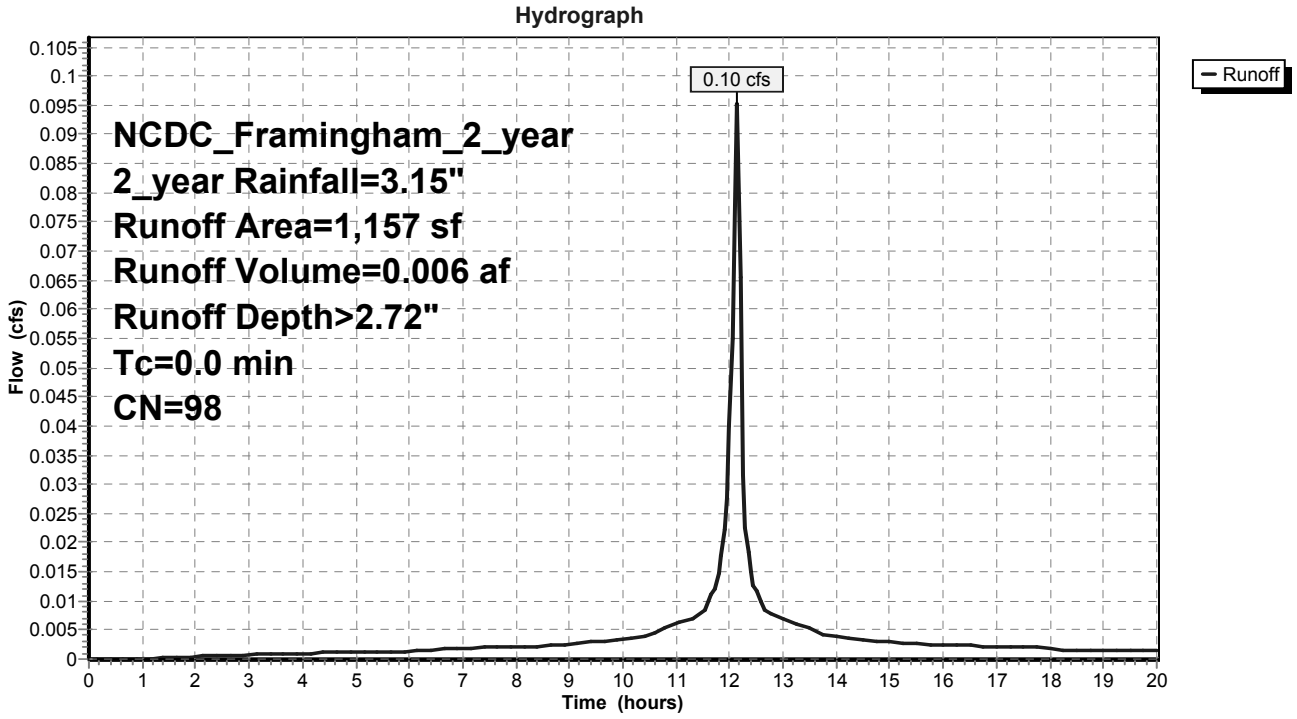
## Summary for Subcatchment ROOF-77: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-77: (blank)



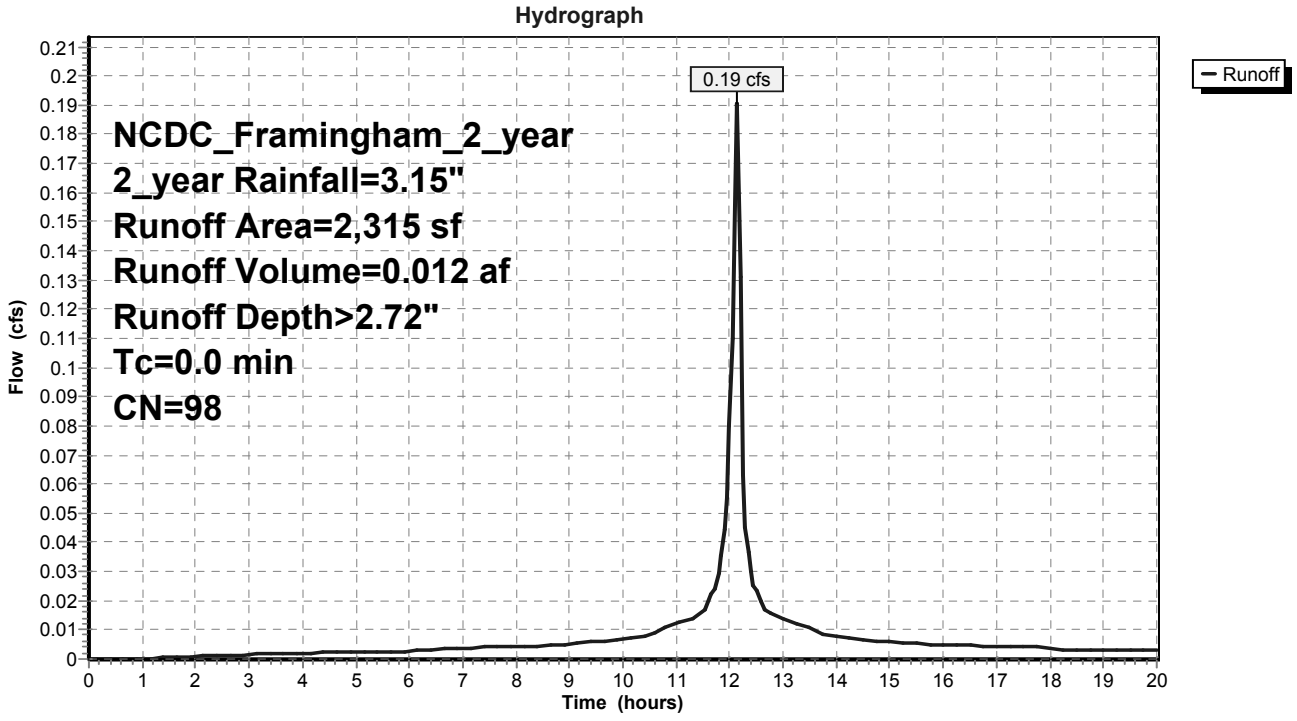
## Summary for Subcatchment ROOF-78: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,443 | 98 | ROOF, 100% imperv, HSG A |
| * | 872 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | 98 | Weighted Average |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-78: (blank)



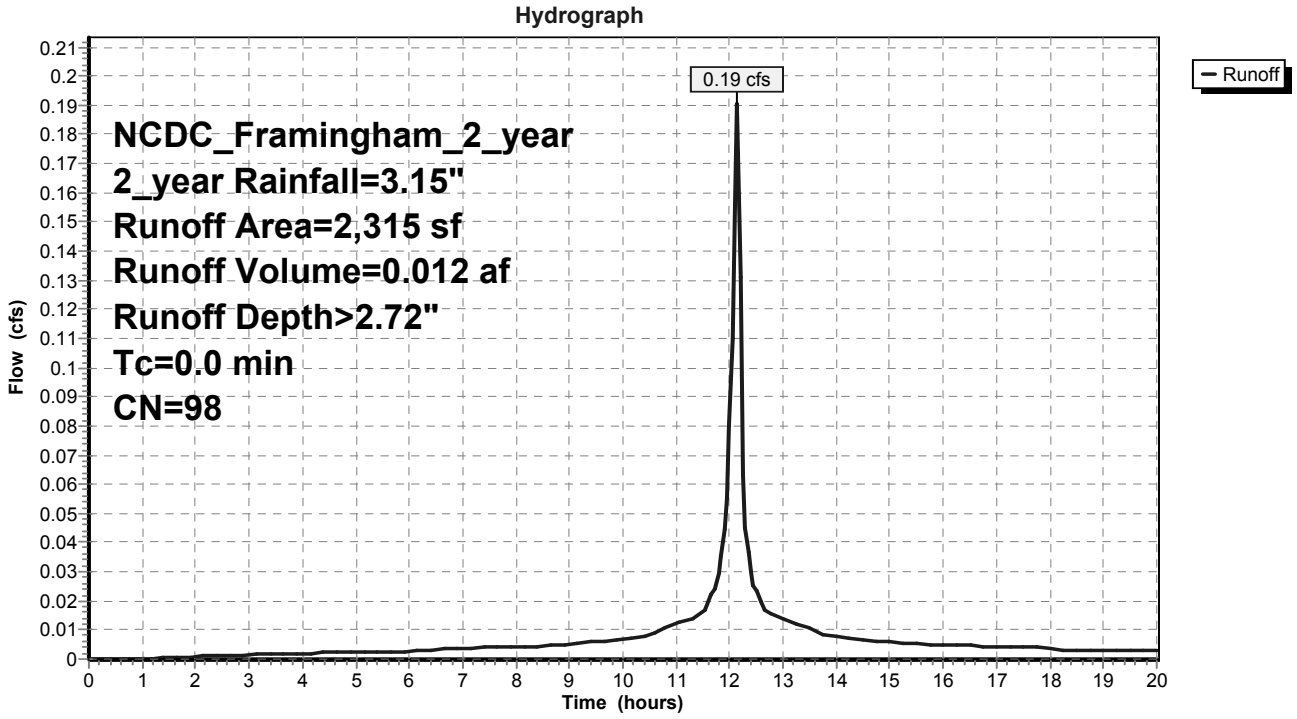
## Summary for Subcatchment ROOF-79: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG A |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-79: (blank)



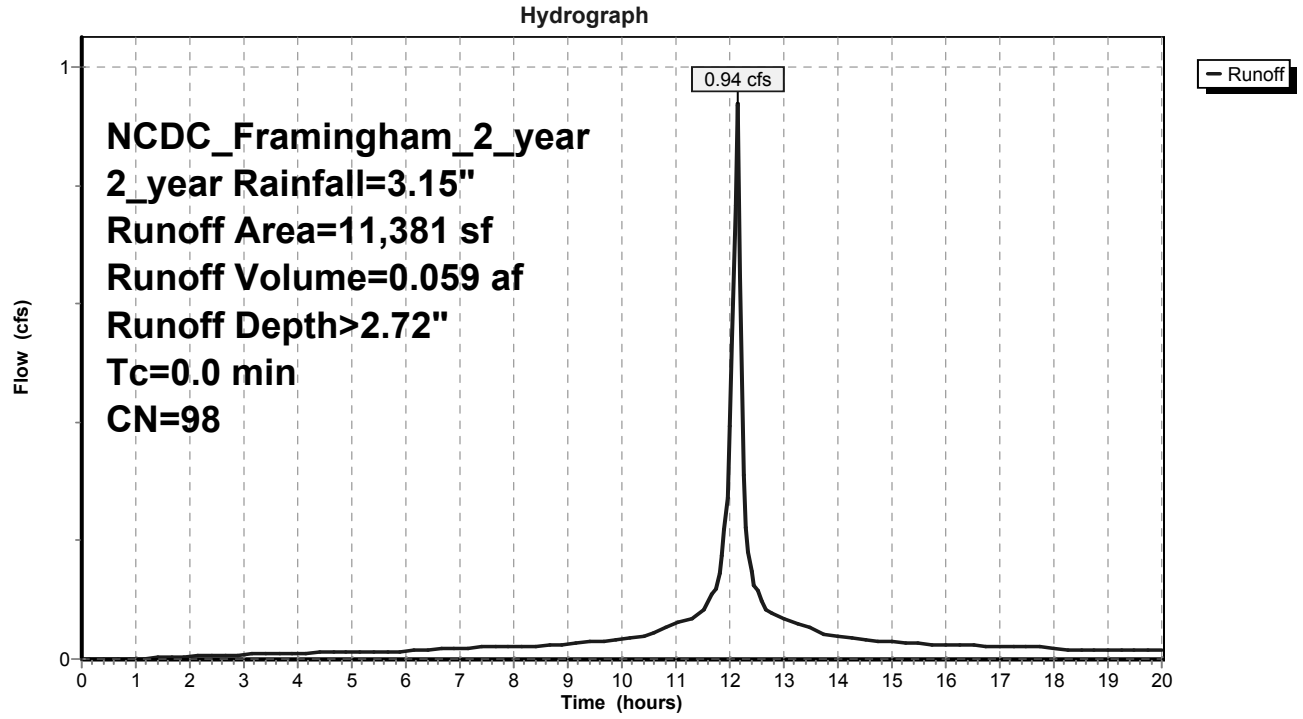
## Summary for Subcatchment ROOF-8: (blank)

Runoff = 0.94 cfs @ 12.14 hrs, Volume= 0.059 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 376 | 98 | DECK, 100% imperv, HSG B |
| * | 11,005 | 98 | ROOF, 100% imperv, HSG B |
| | 11,381 | 98 | Weighted Average |
| | 11,381 | | 100.00% Pervious Area |

## Subcatchment ROOF-8: (blank)



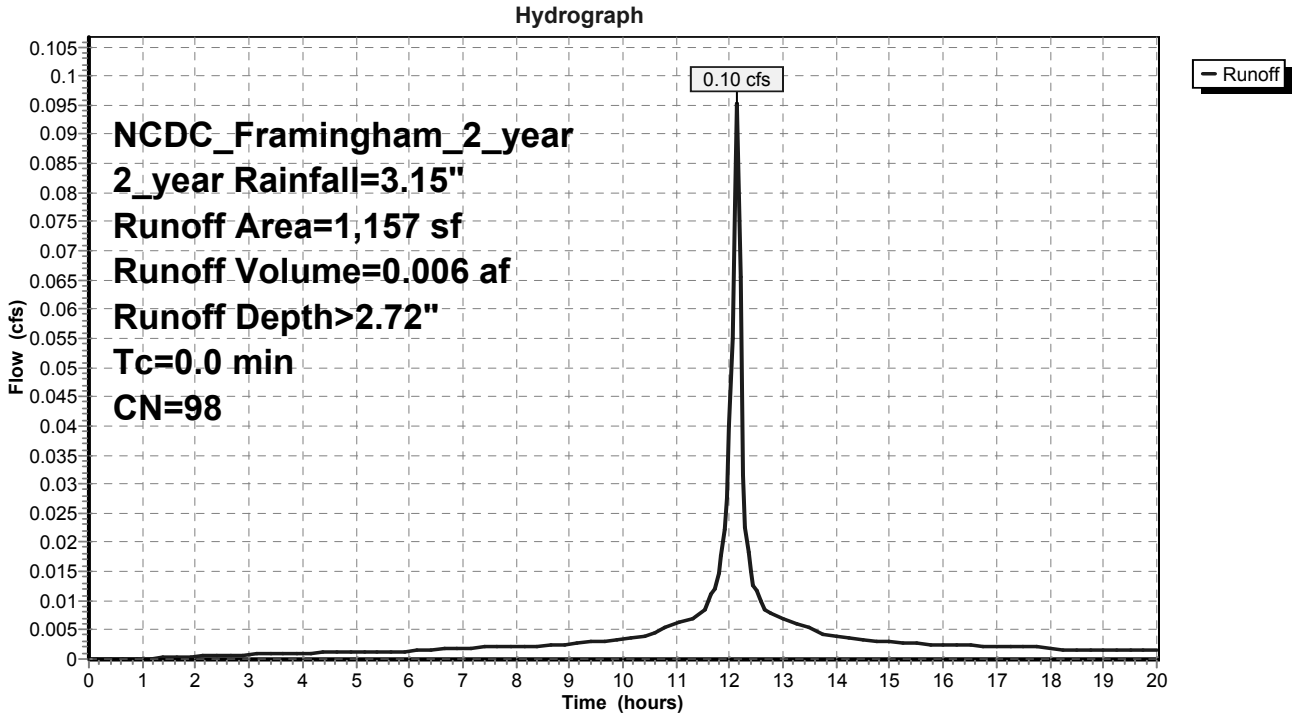
## Summary for Subcatchment ROOF-80: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 548 | 98 | ROOF, 100% imperv, HSG A |
| * | 609 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-80: (blank)



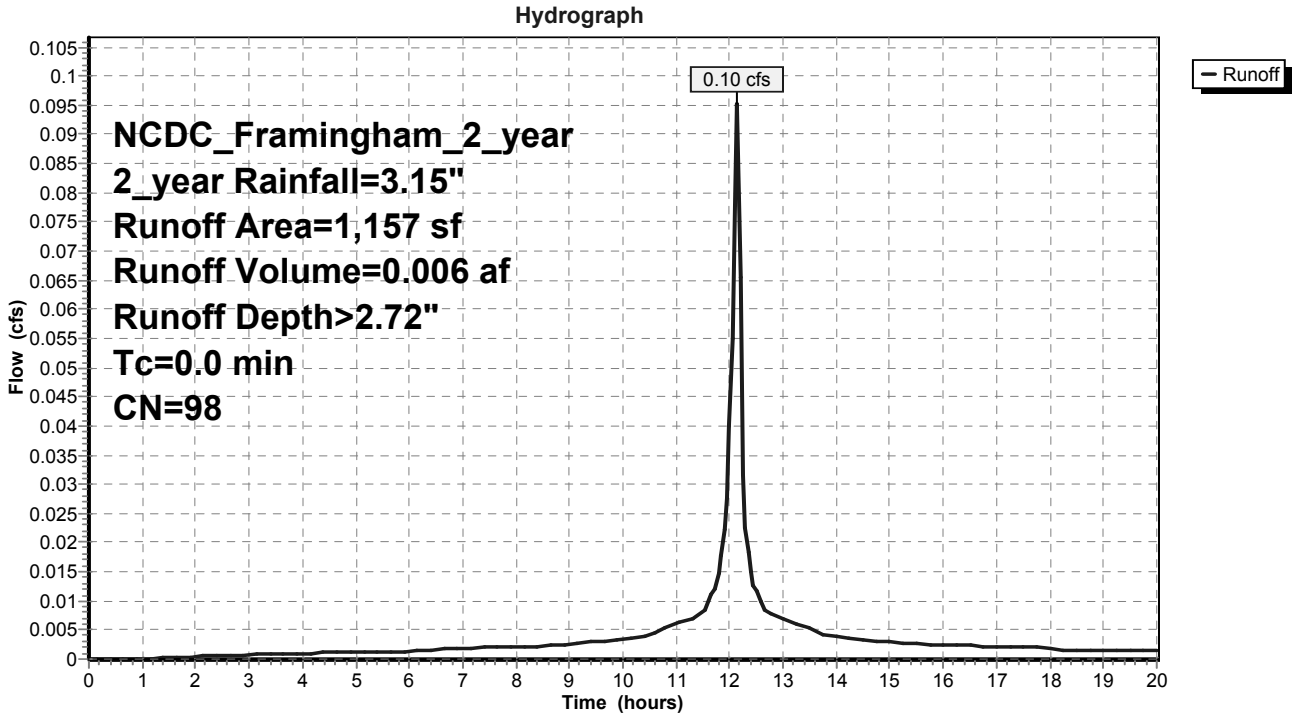
## Summary for Subcatchment ROOF-81: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-81: (blank)



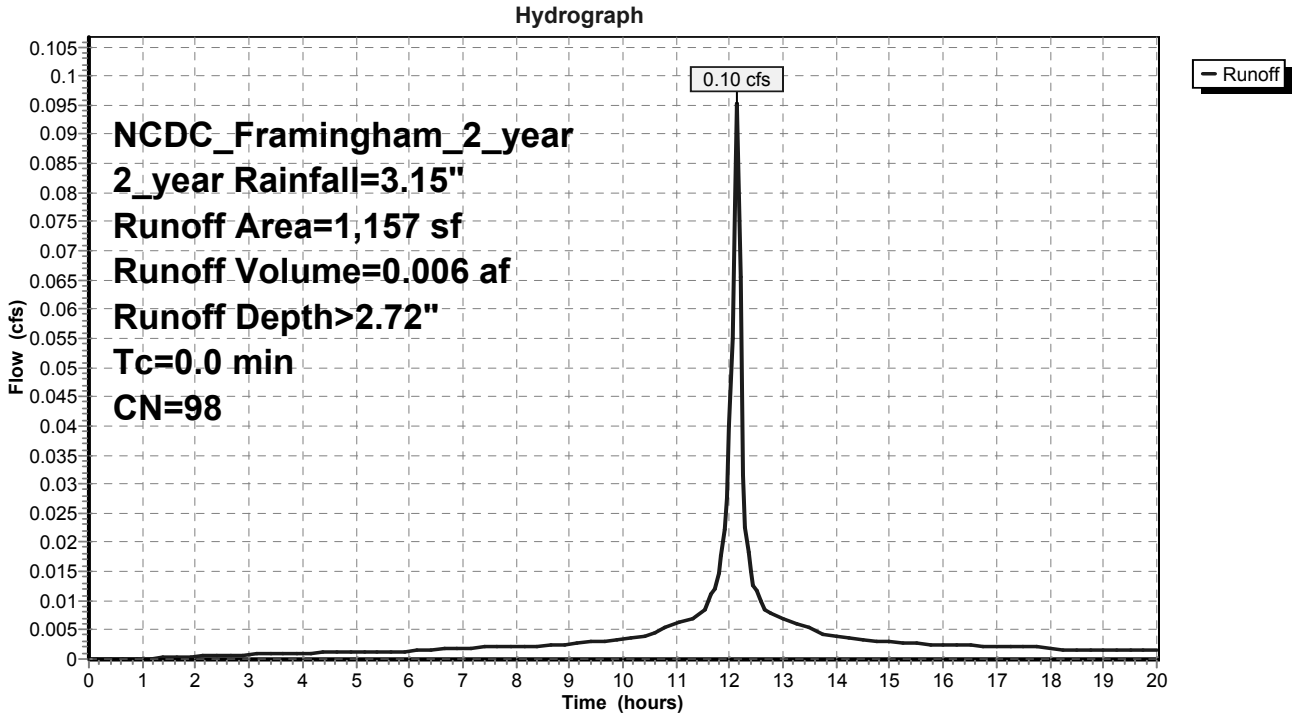
## Summary for Subcatchment ROOF-82: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 234 | 98 | ROOF, 100% imperv, HSG A |
| * | 924 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-82: (blank)



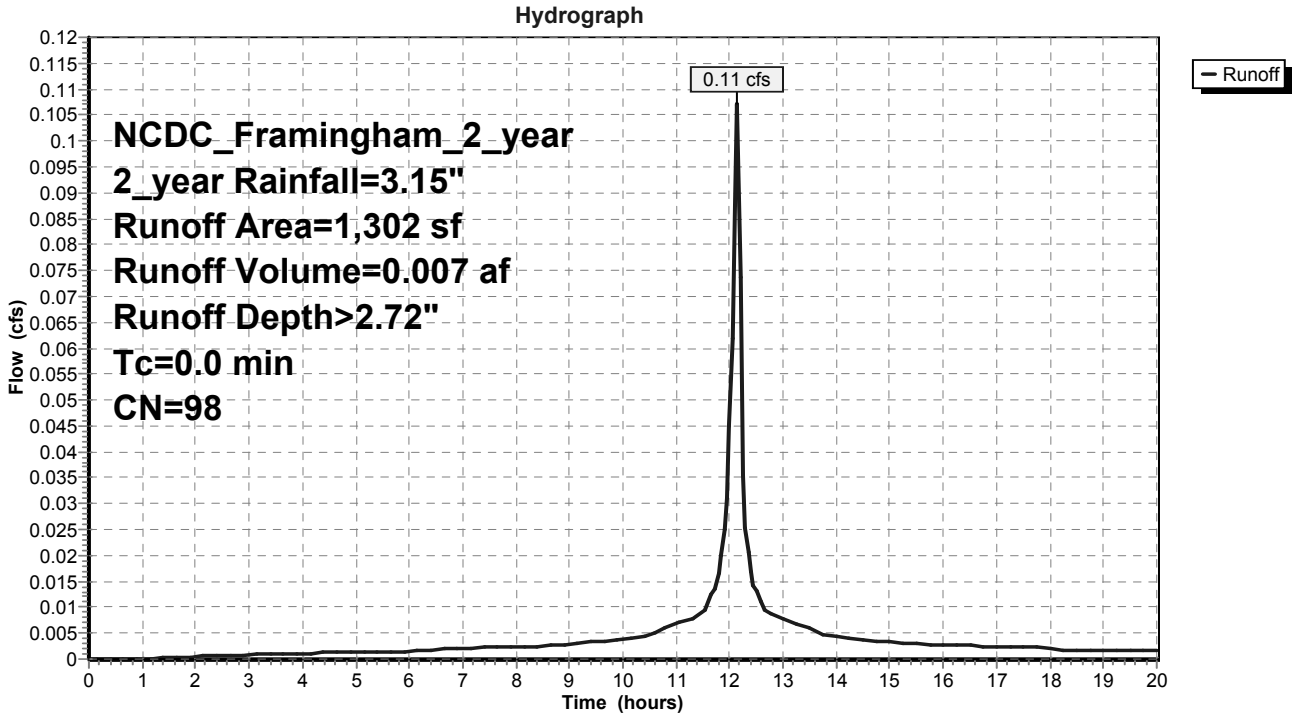
## Summary for Subcatchment ROOF-83: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-83: (blank)



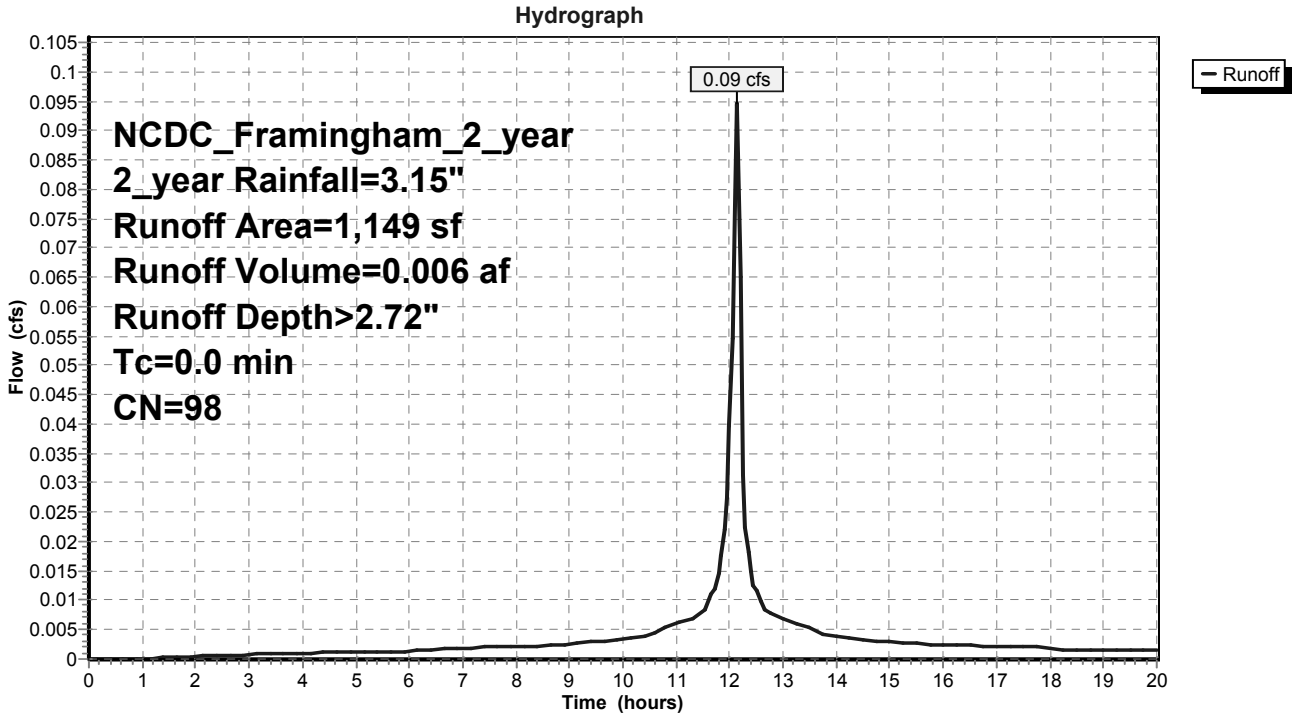
## Summary for Subcatchment ROOF-84: (blank)

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,143 | 98 | ROOF, 100% imperv, HSG B |
| | 1,149 | 98 | Weighted Average |
| | 1,149 | | 100.00% Pervious Area |

## Subcatchment ROOF-84: (blank)



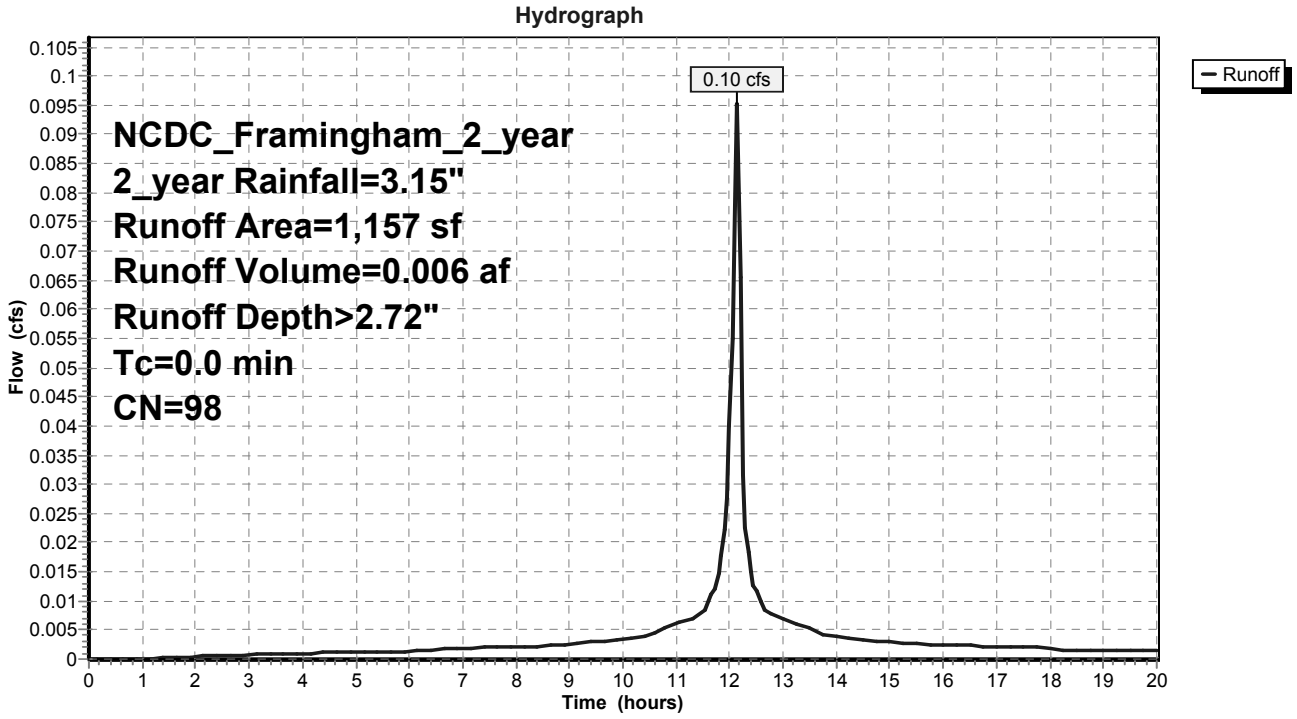
## Summary for Subcatchment ROOF-85: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-85: (blank)



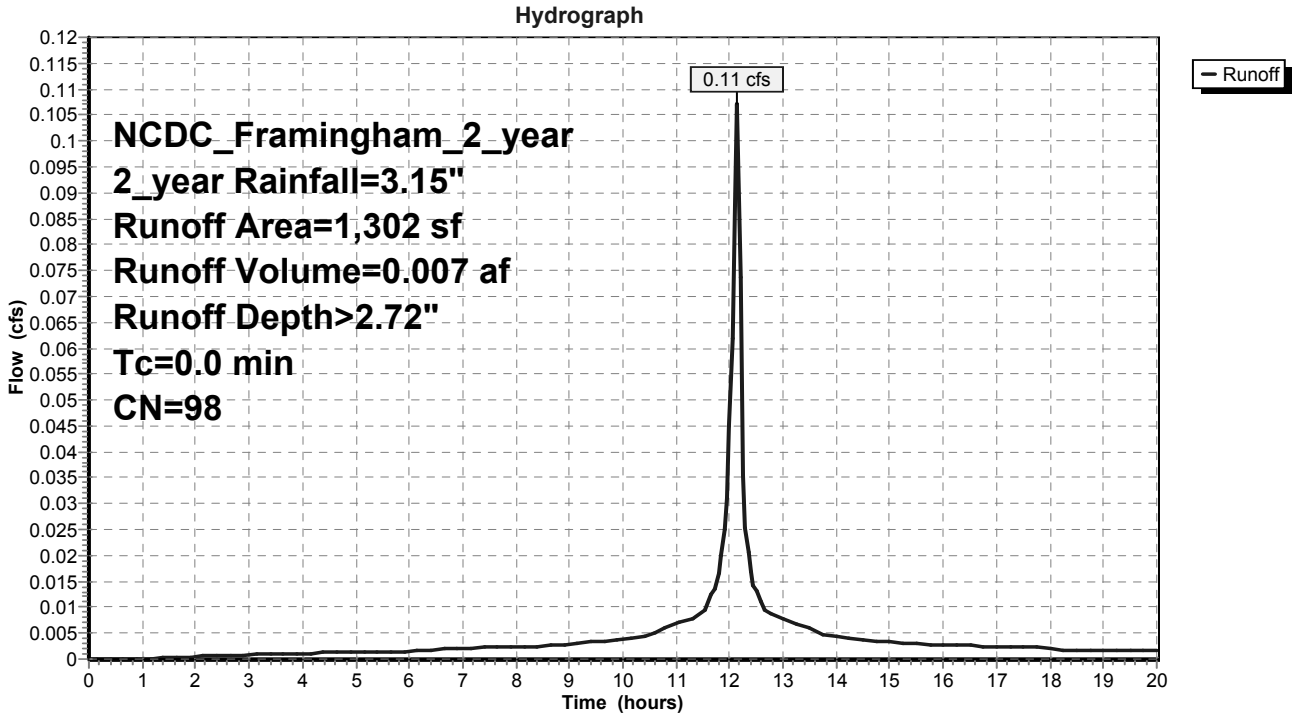
## Summary for Subcatchment ROOF-86: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-86: (blank)



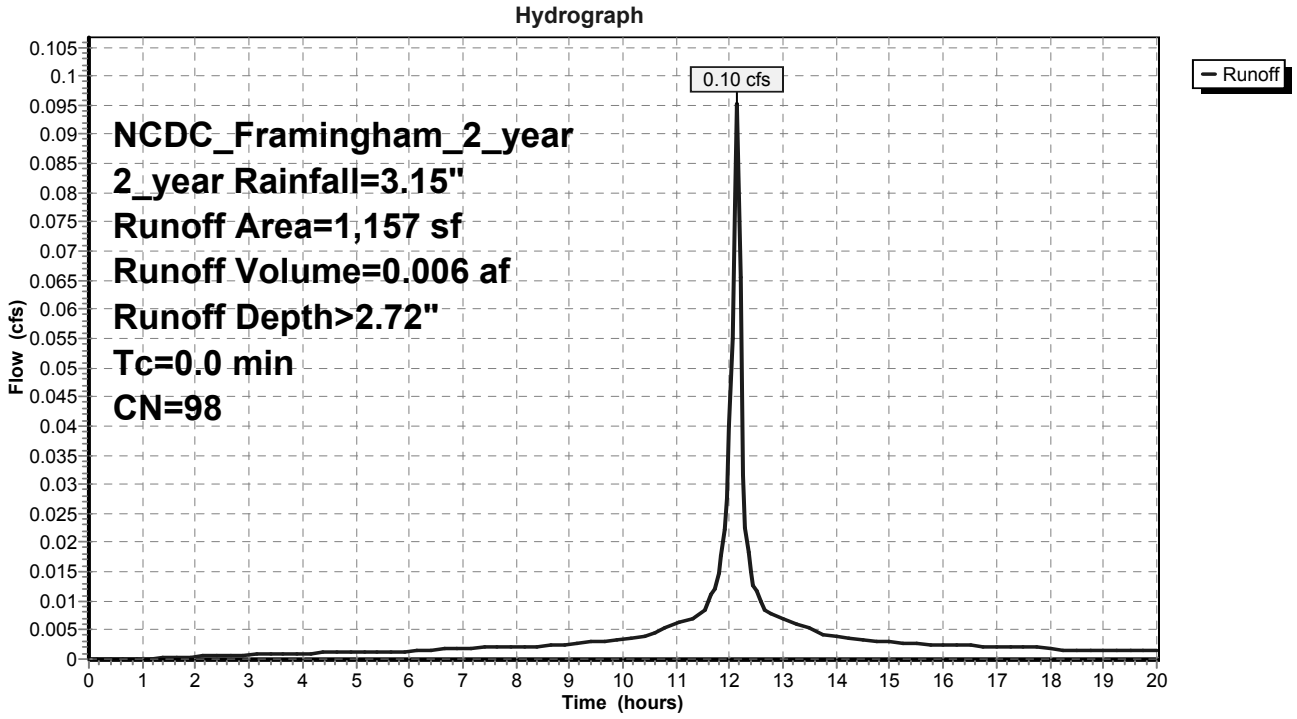
## Summary for Subcatchment ROOF-87: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-87: (blank)



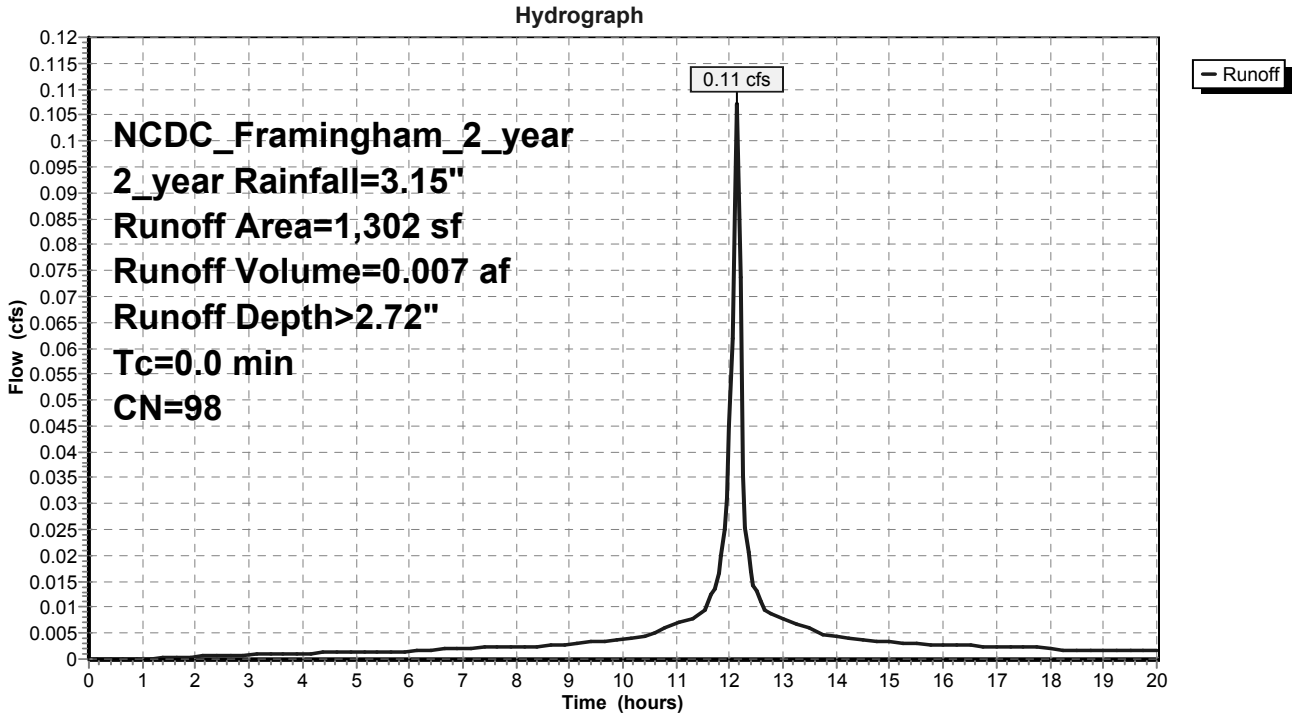
## Summary for Subcatchment ROOF-88: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-88: (blank)



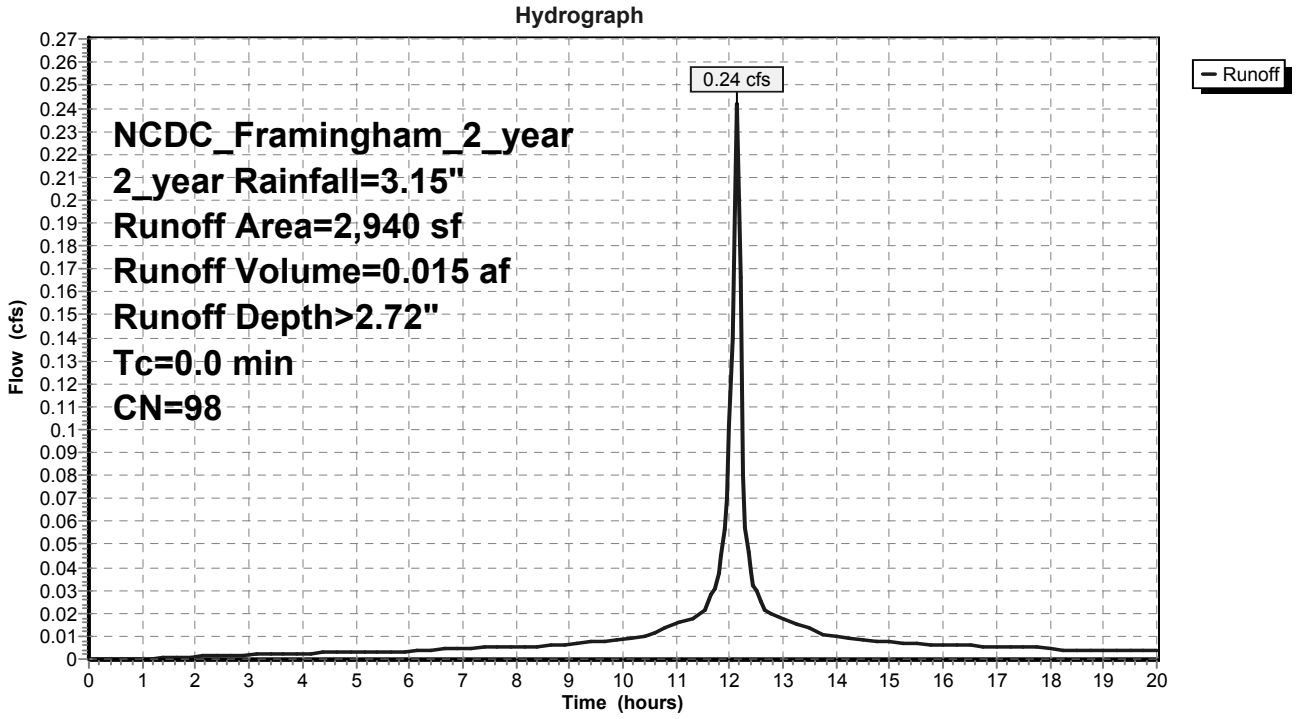
## Summary for Subcatchment ROOF-89: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-89: (blank)



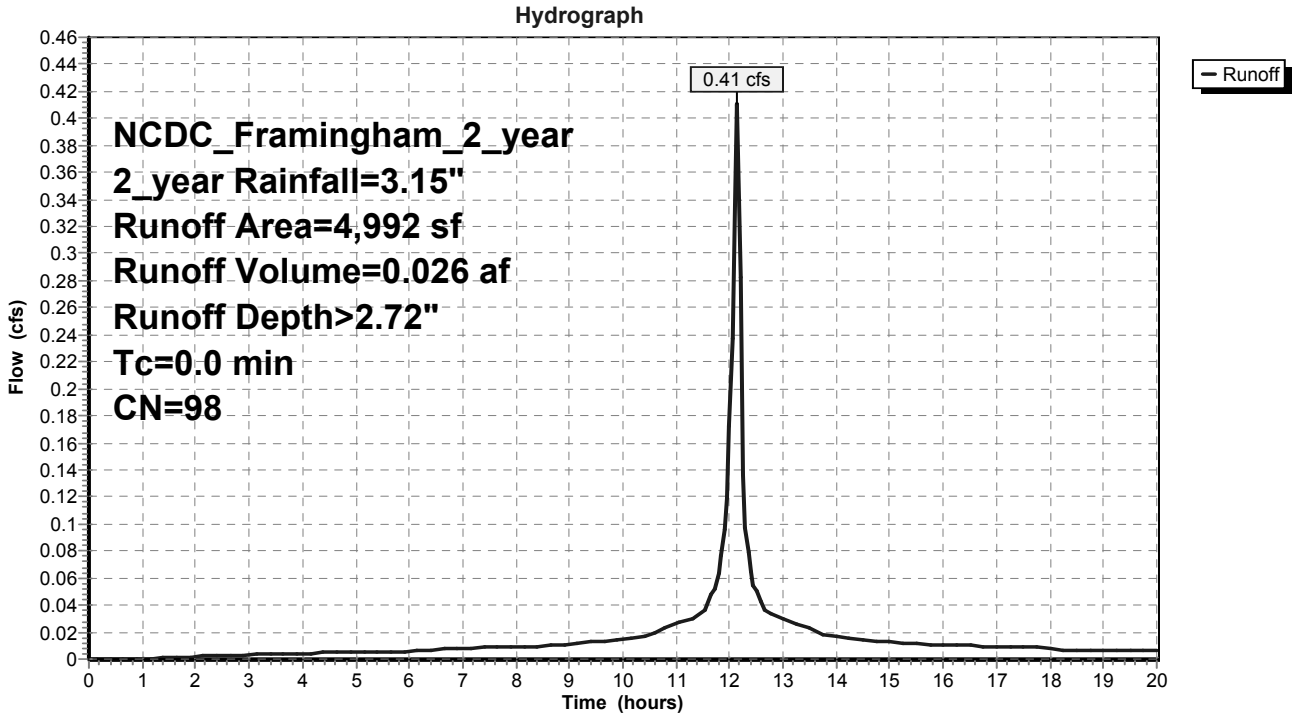
## Summary for Subcatchment ROOF-9: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.026 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,992 | 98 | ROOF, 100% imperv, HSG B |
| | 4,992 | | 100.00% Pervious Area |

## Subcatchment ROOF-9: (blank)



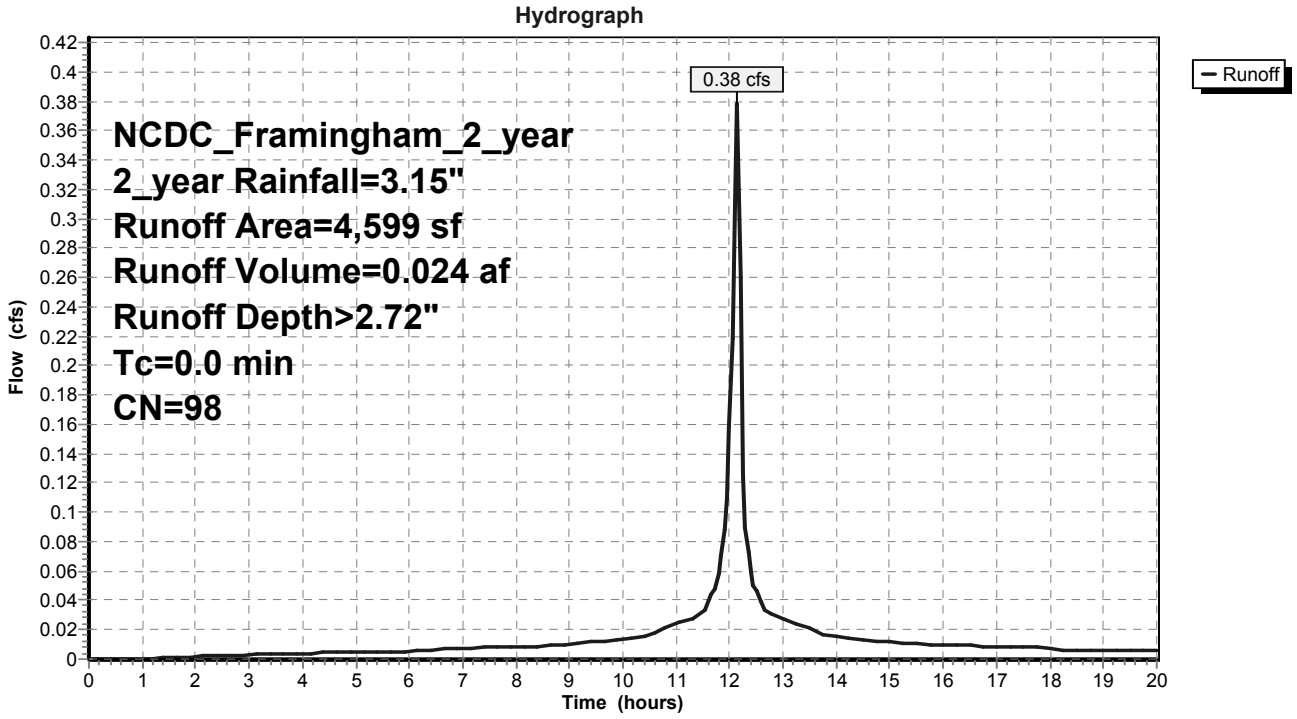
## Summary for Subcatchment ROOF-90: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-90: (blank)



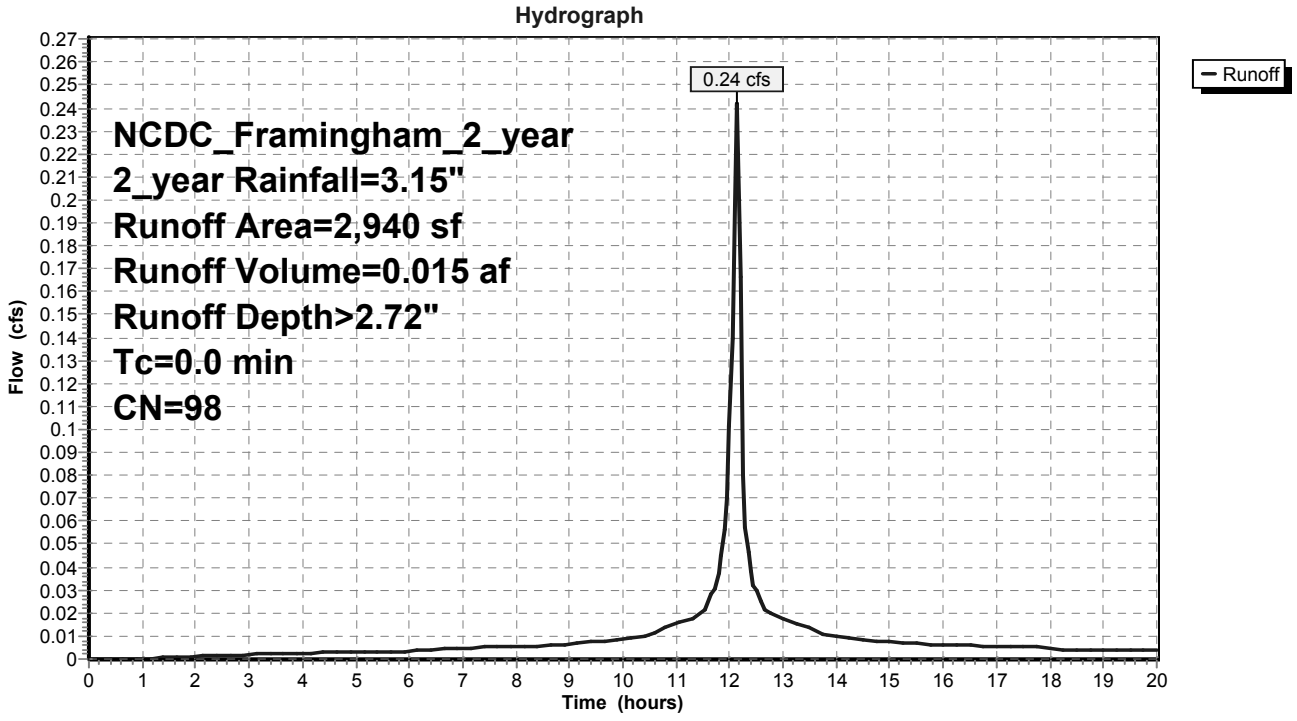
## Summary for Subcatchment ROOF-91: (blank)

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,215 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,725 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-91: (blank)



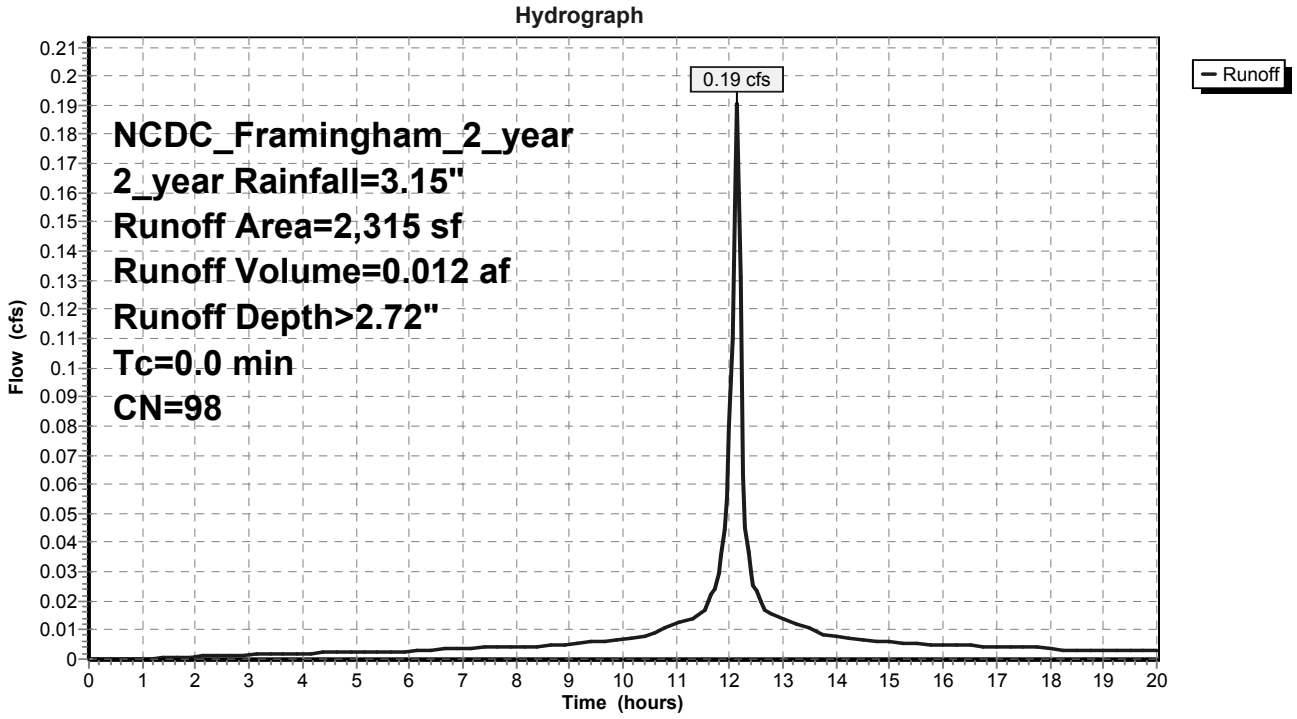
## Summary for Subcatchment ROOF-92: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-92: (blank)



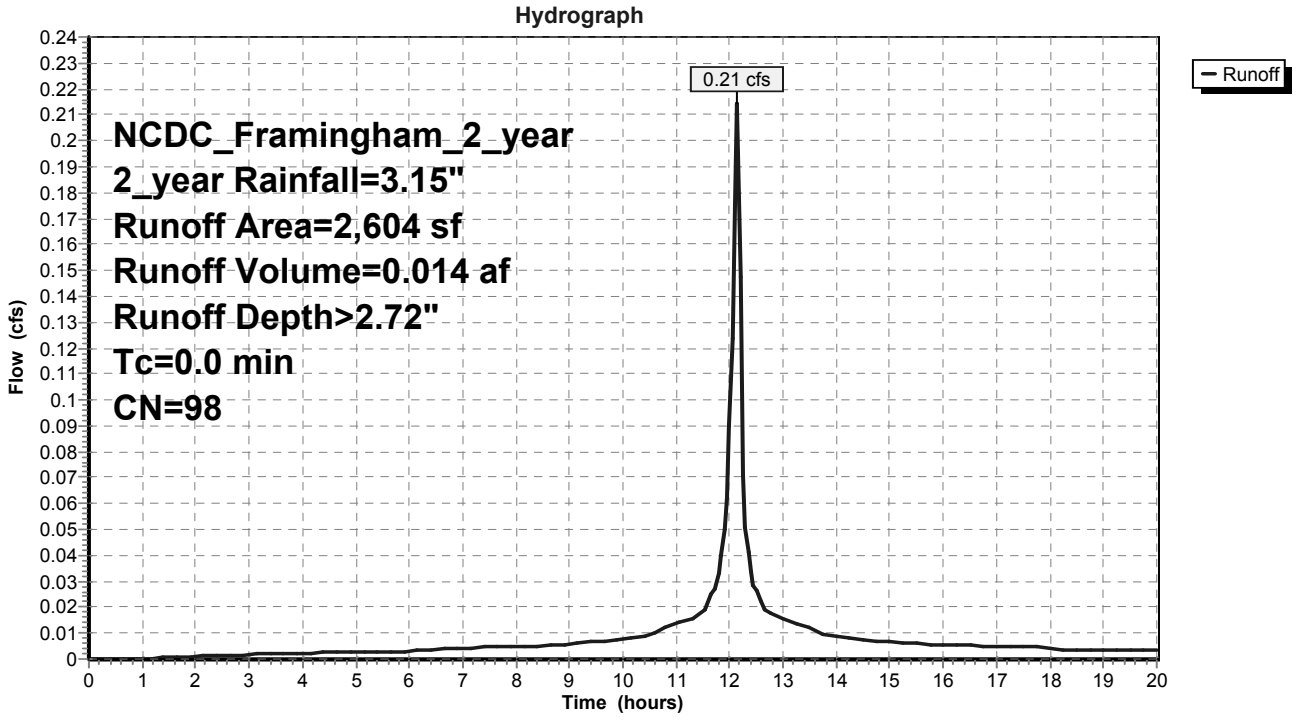
## Summary for Subcatchment ROOF-93: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.014 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,102 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,502 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-93: (blank)



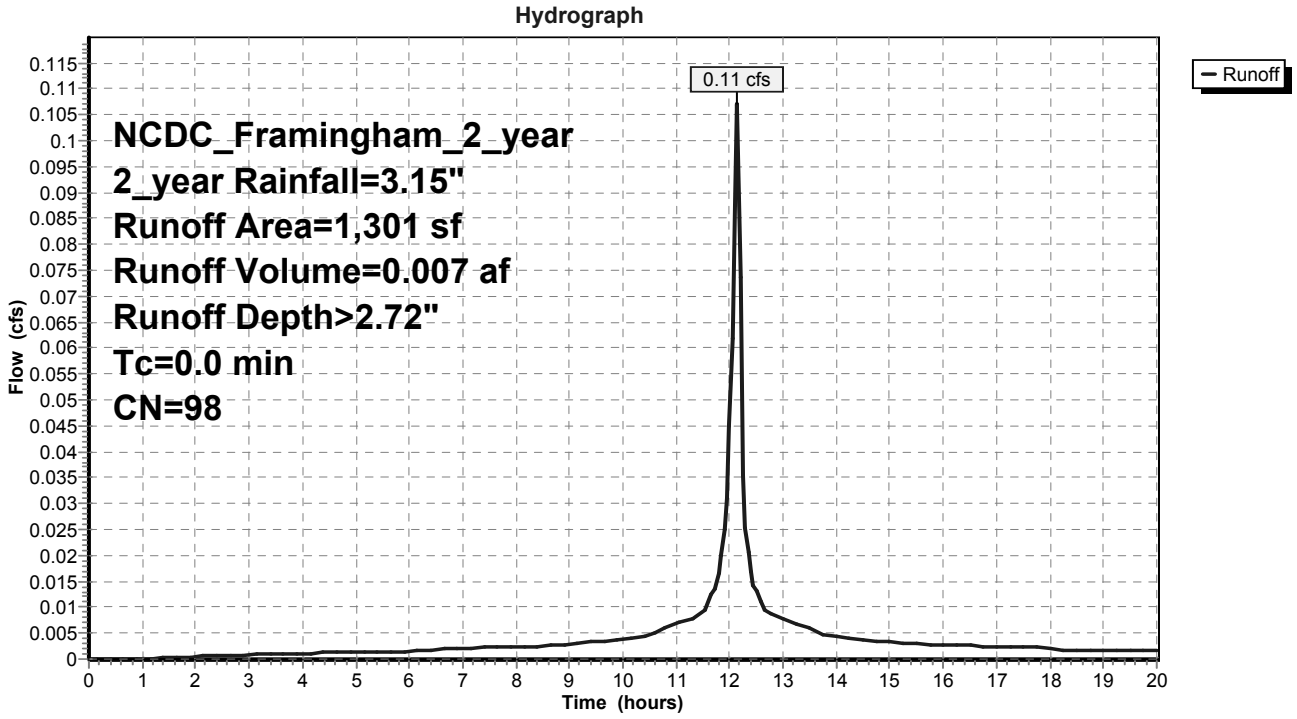
## Summary for Subcatchment ROOF-94: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,301 | 98 | ROOF, 100% imperv, HSG B |
| | 1,301 | | 100.00% Pervious Area |

## Subcatchment ROOF-94: (blank)



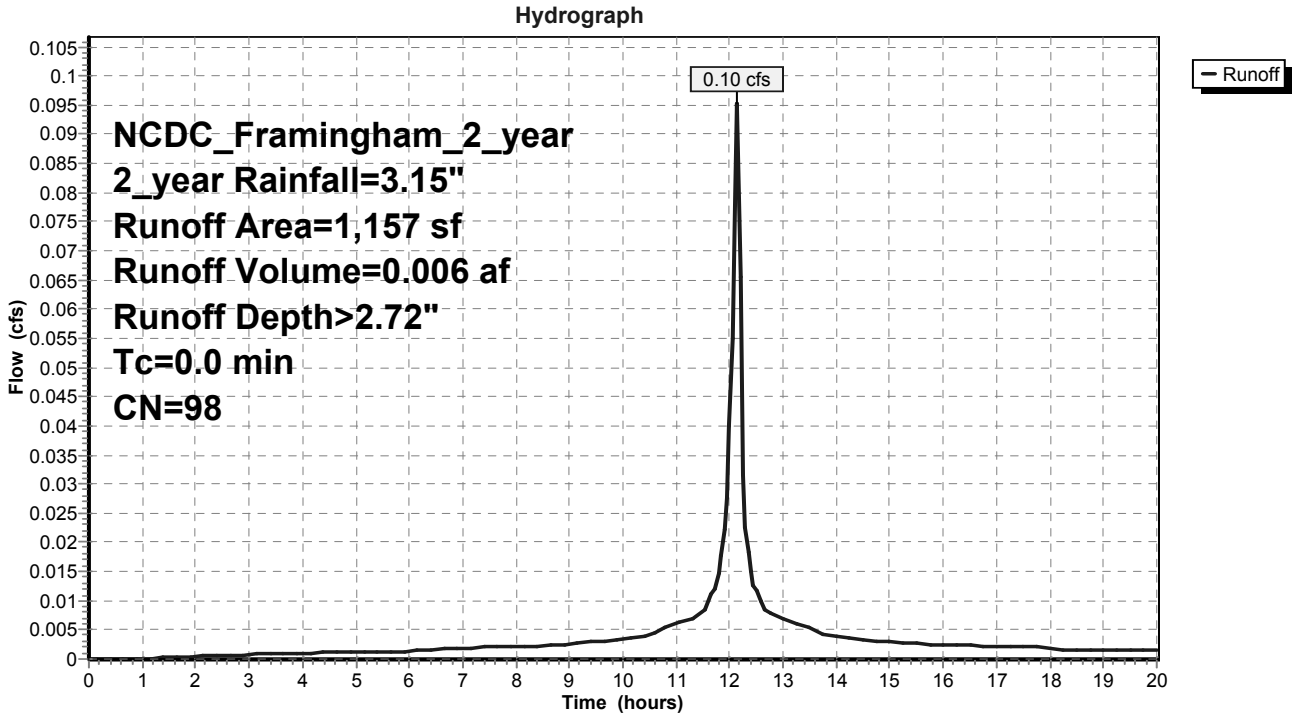
## Summary for Subcatchment ROOF-95: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 986 | 98 | ROOF, 100% imperv, HSG A |
| * | 171 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-95: (blank)



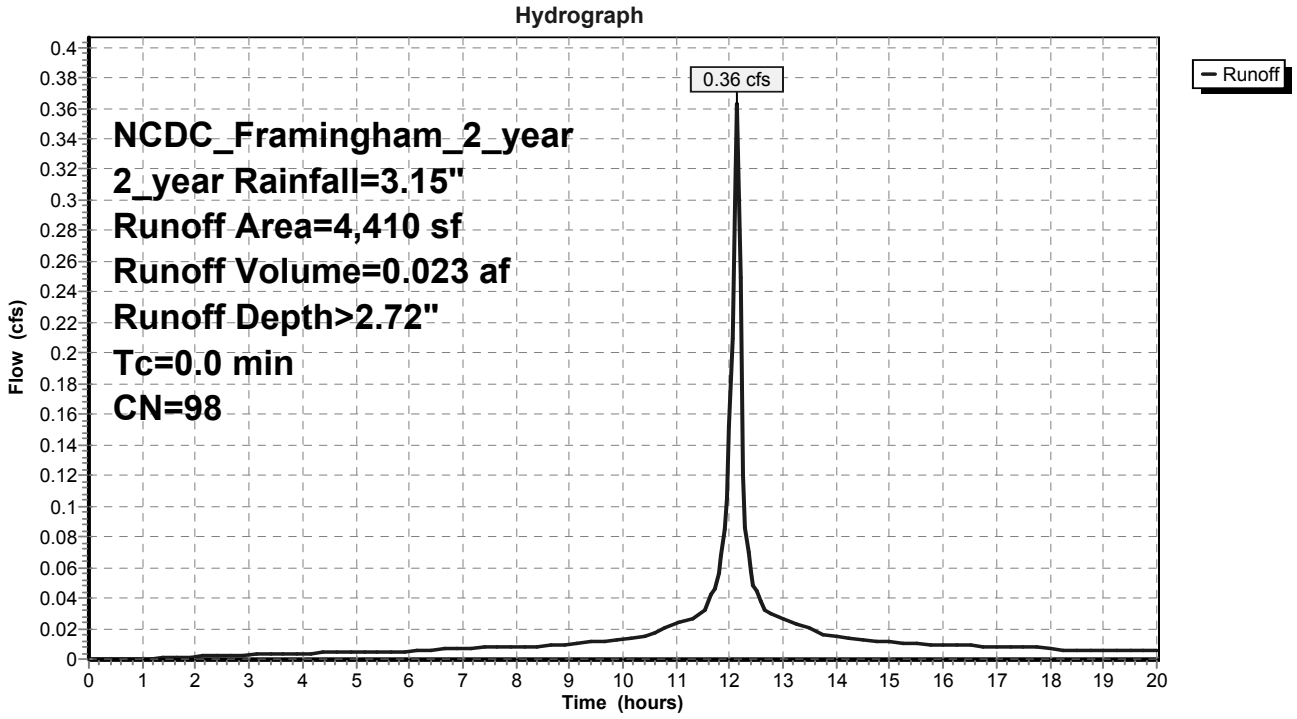
## Summary for Subcatchment ROOF-96: (blank)

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-96: (blank)



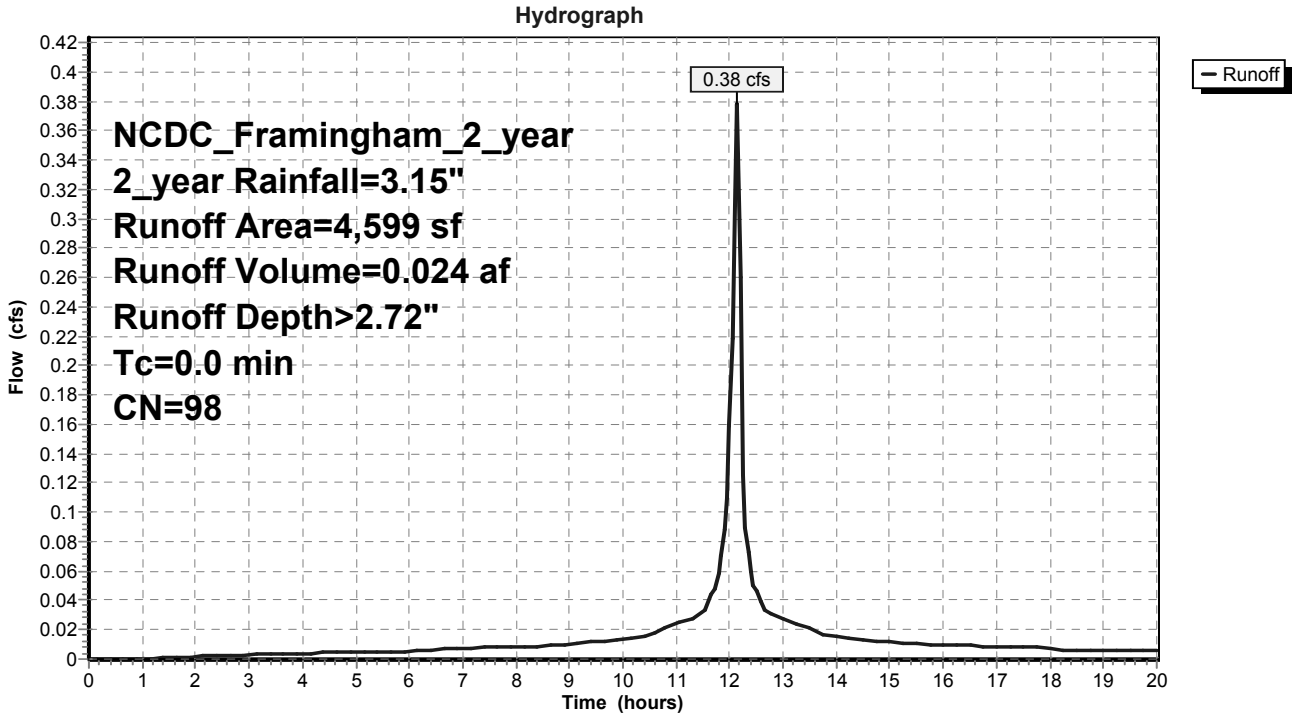
## Summary for Subcatchment ROOF-97: (blank)

Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-97: (blank)



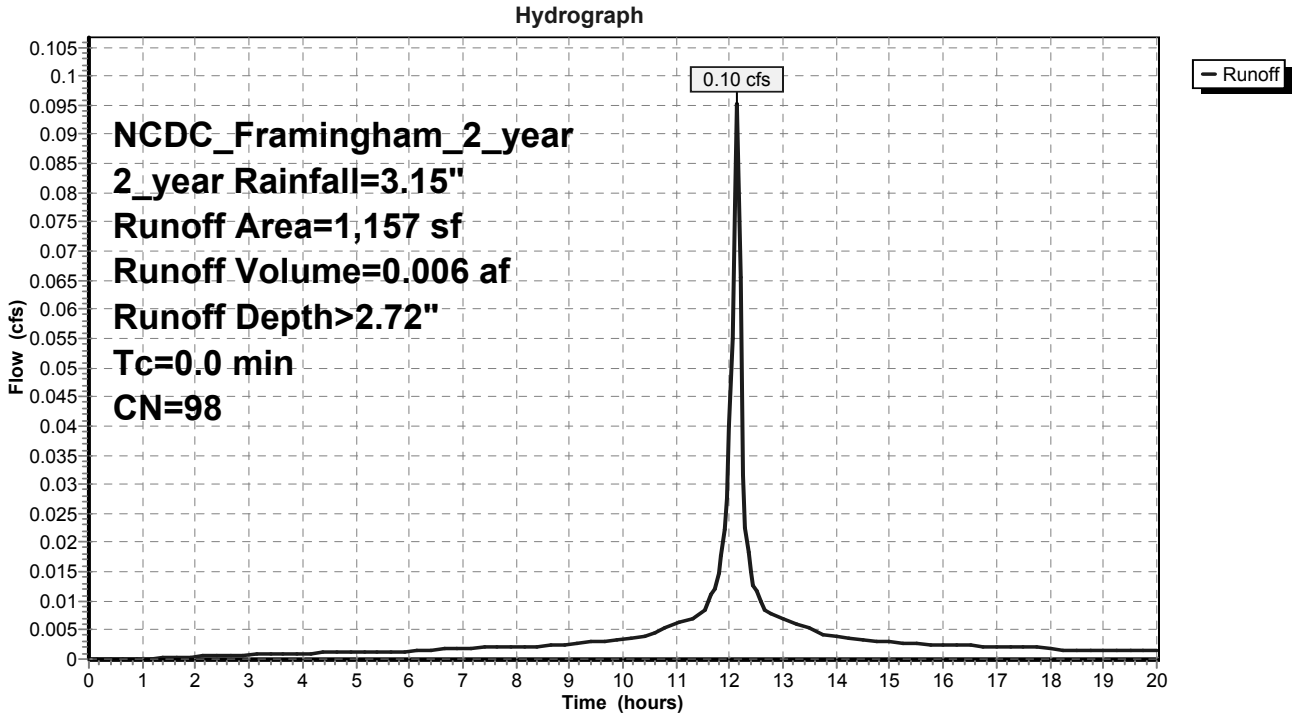
## Summary for Subcatchment ROOF-98: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-98: (blank)



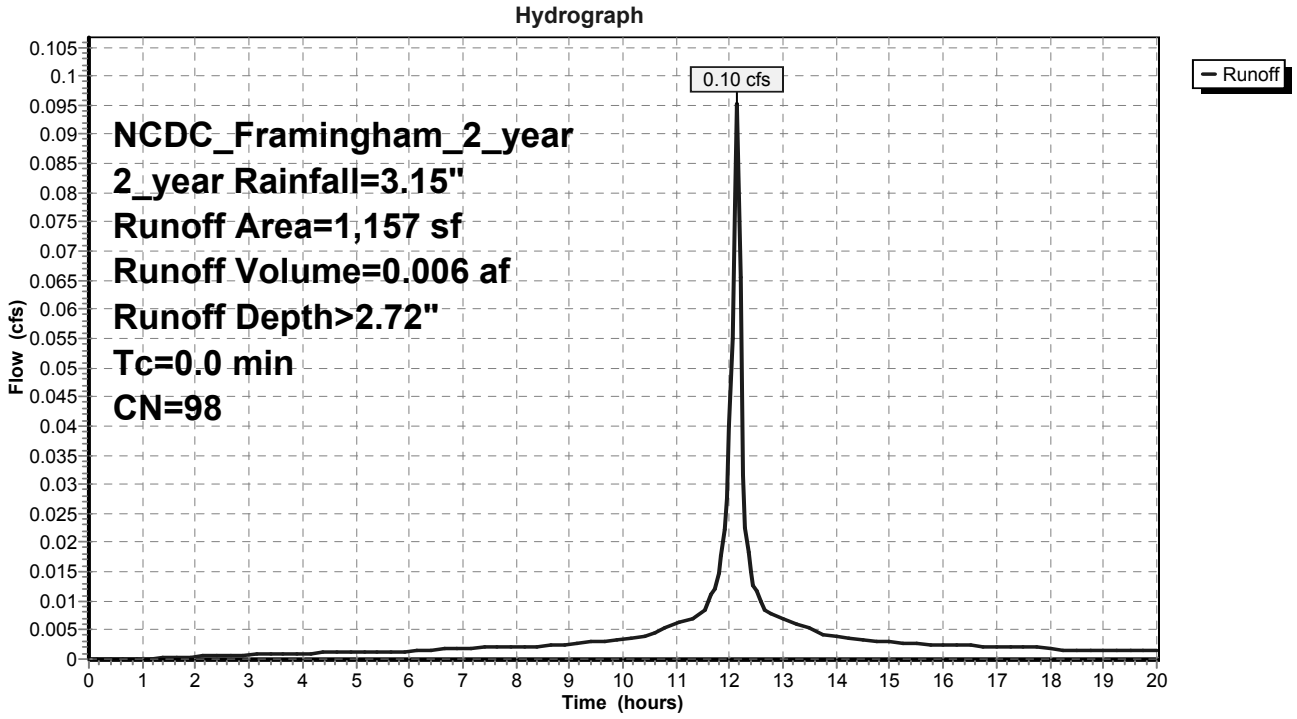
## Summary for Subcatchment ROOF-99: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-99: (blank)



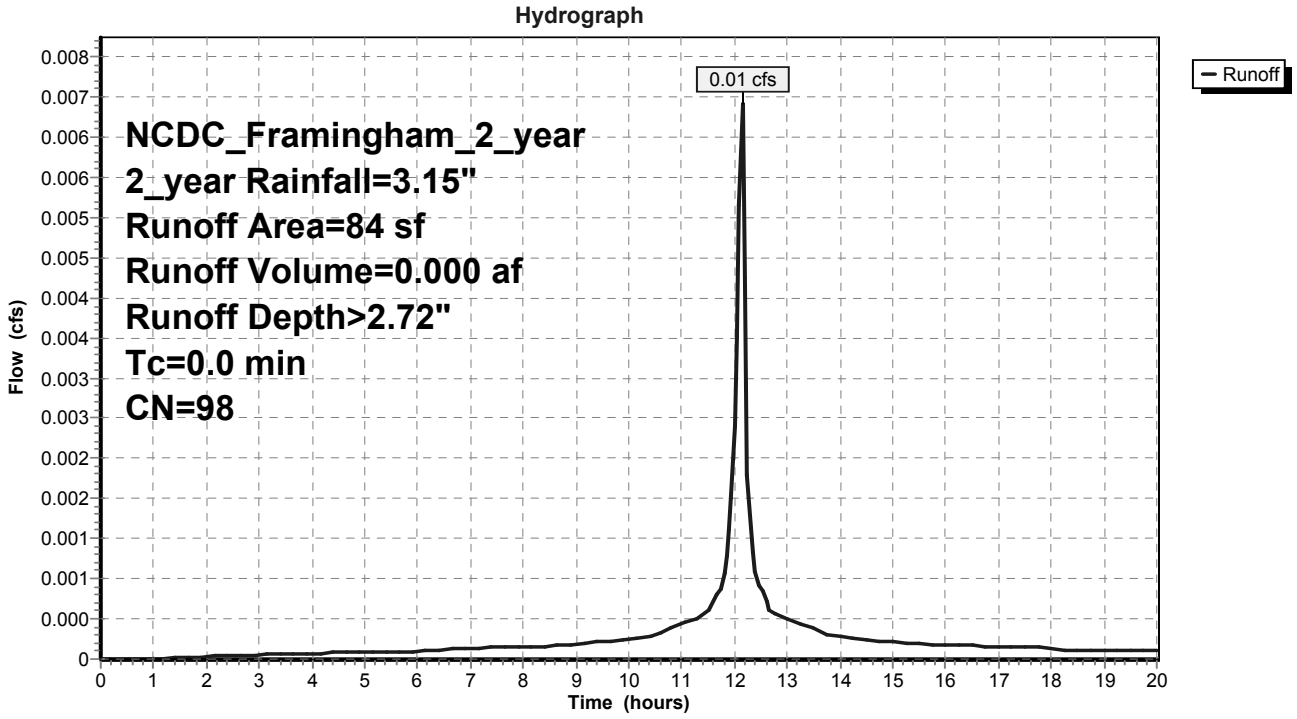
## Summary for Subcatchment ROOF-BS1: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.000 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 84 | 98 | ROOF, 100% imperv, HSG B |
| | 84 | | 100.00% Pervious Area |

## Subcatchment ROOF-BS1: (blank)



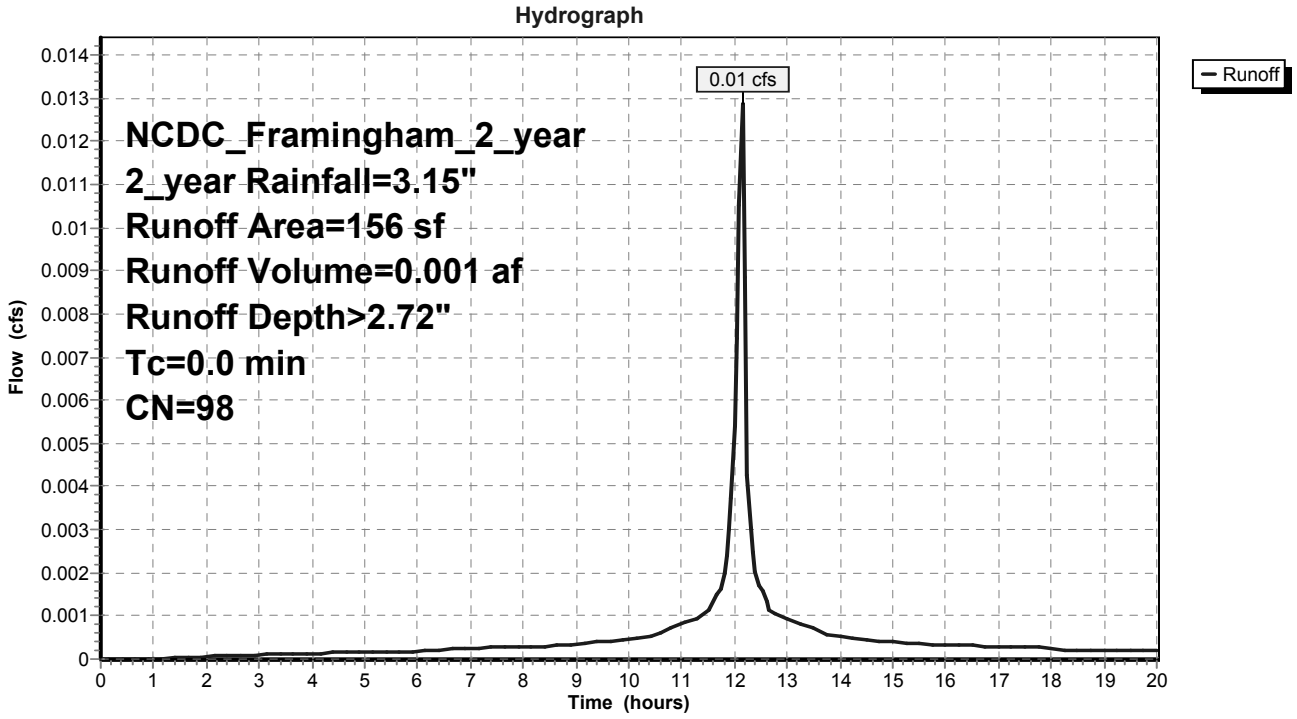
## Summary for Subcatchment ROOF-MAIL20: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL20: (blank)



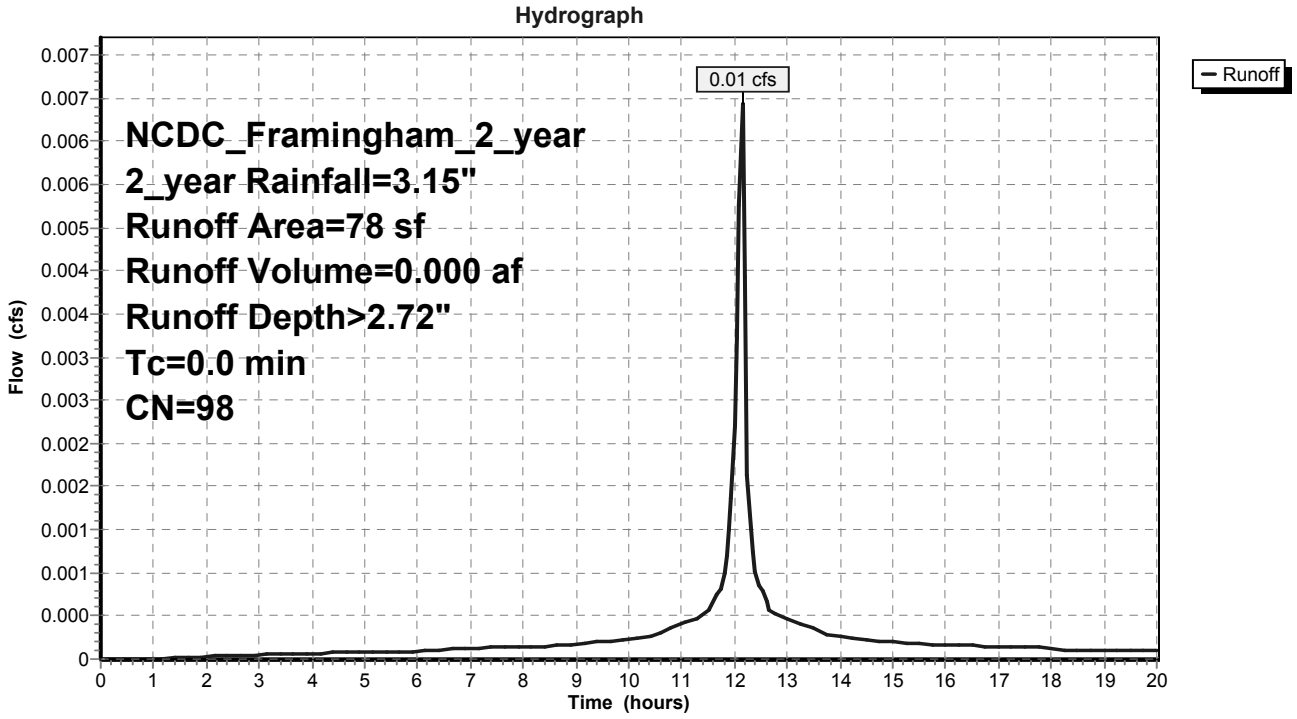
## Summary for Subcatchment ROOF-MAIL29: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.000 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL29: (blank)



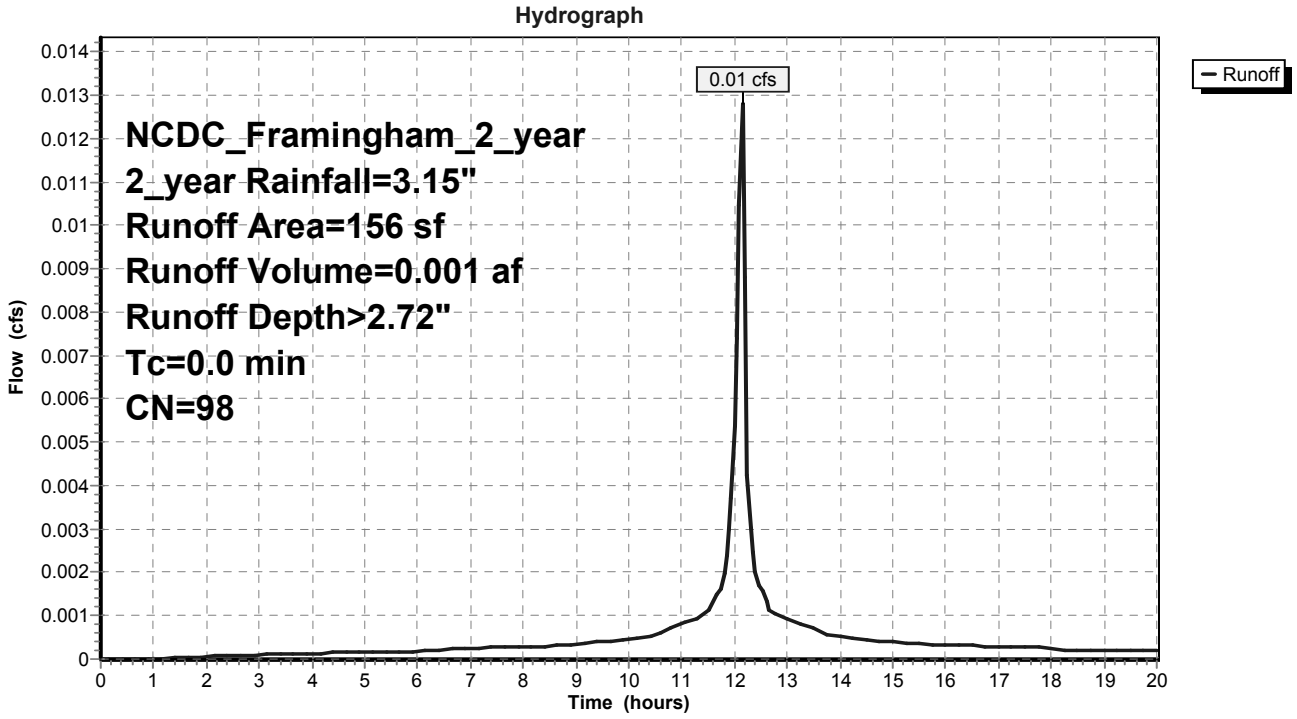
## Summary for Subcatchment ROOF-MAIL5: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL5: (blank)



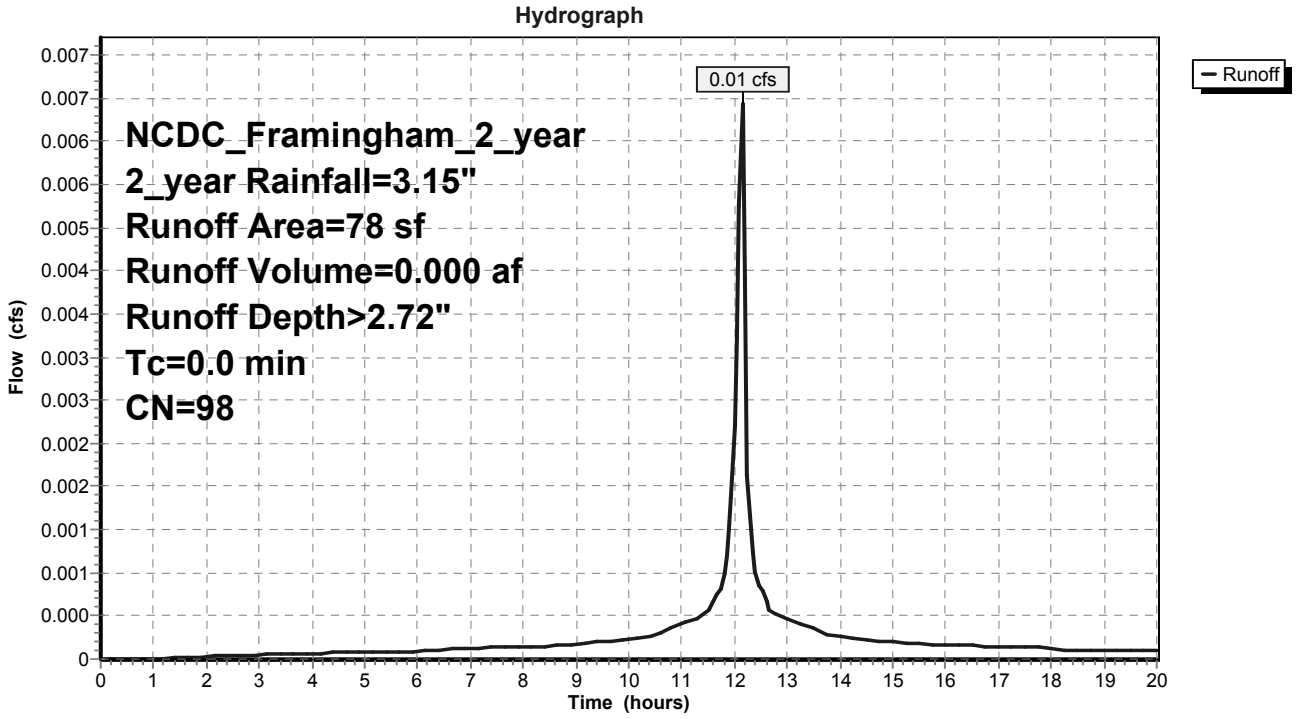
## Summary for Subcatchment ROOF-MAIL64: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.000 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL64: (blank)



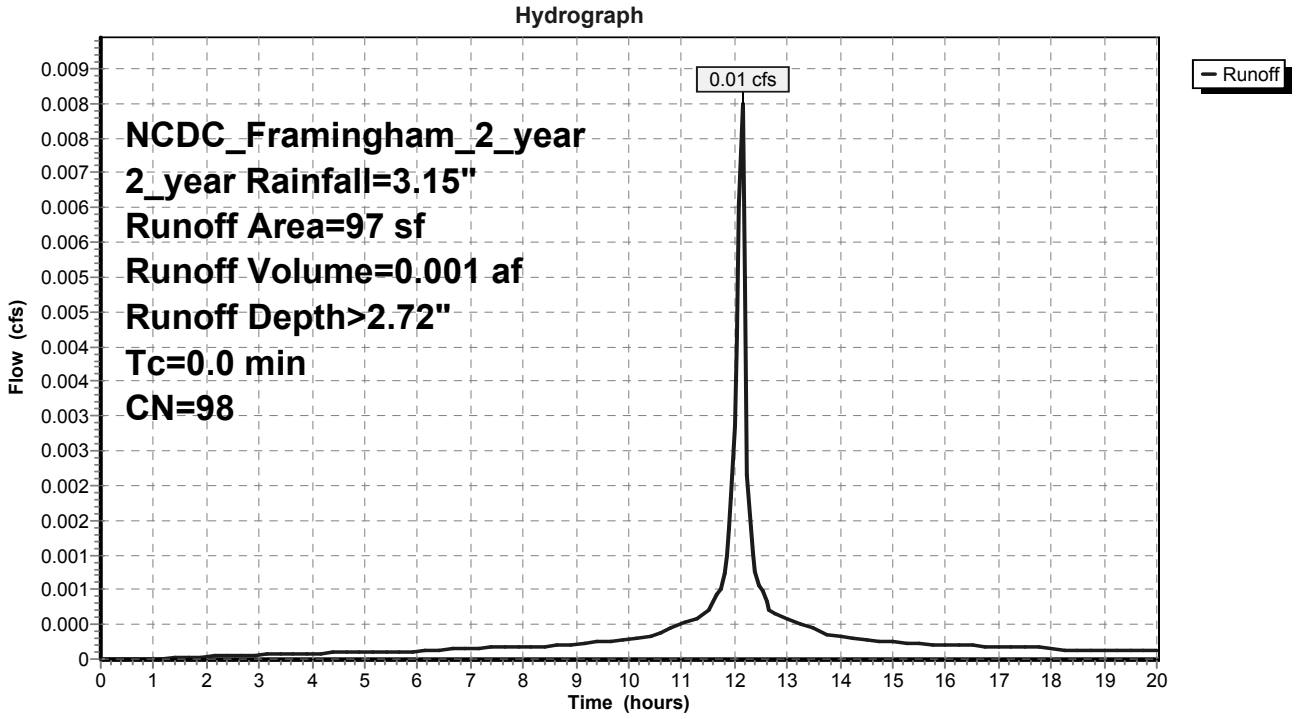
## Summary for Subcatchment ROOF-MAIL8: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 97 | 98 | ROOF, 100% imperv, HSG B |
| | 97 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL8: (blank)



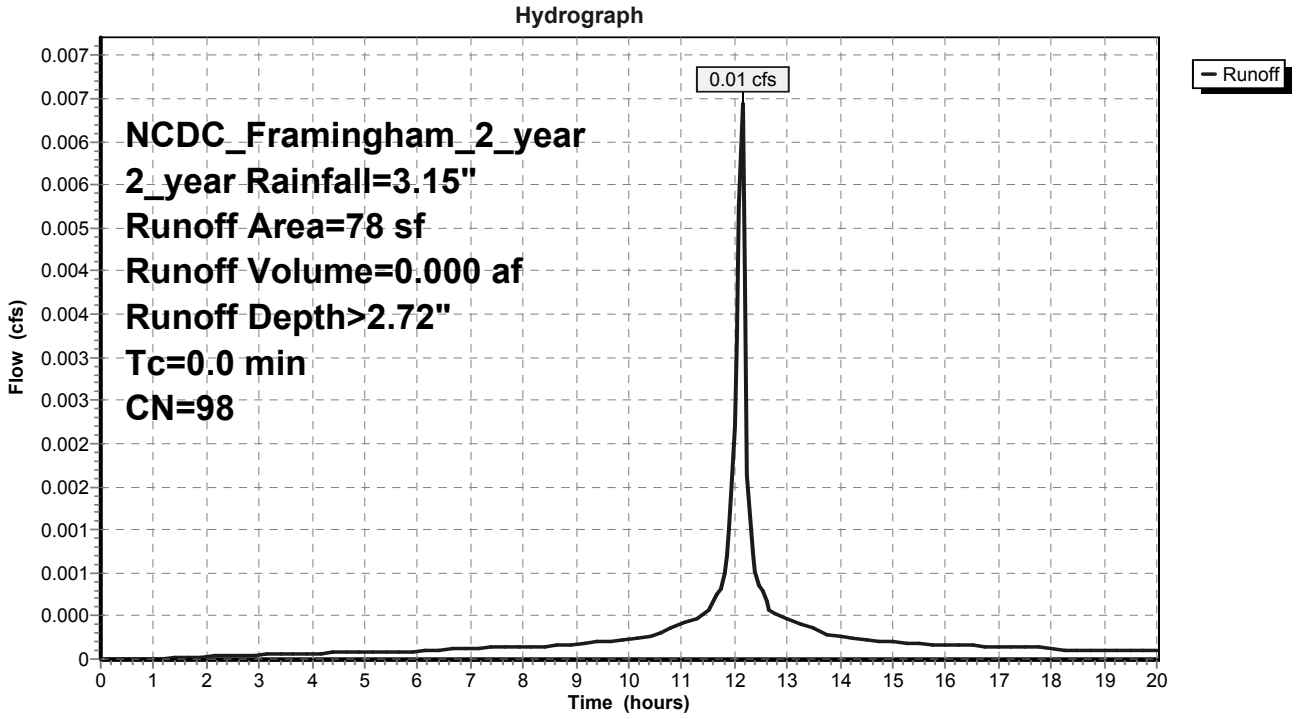
## Summary for Subcatchment ROOF-MAIL91: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.000 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL91: (blank)



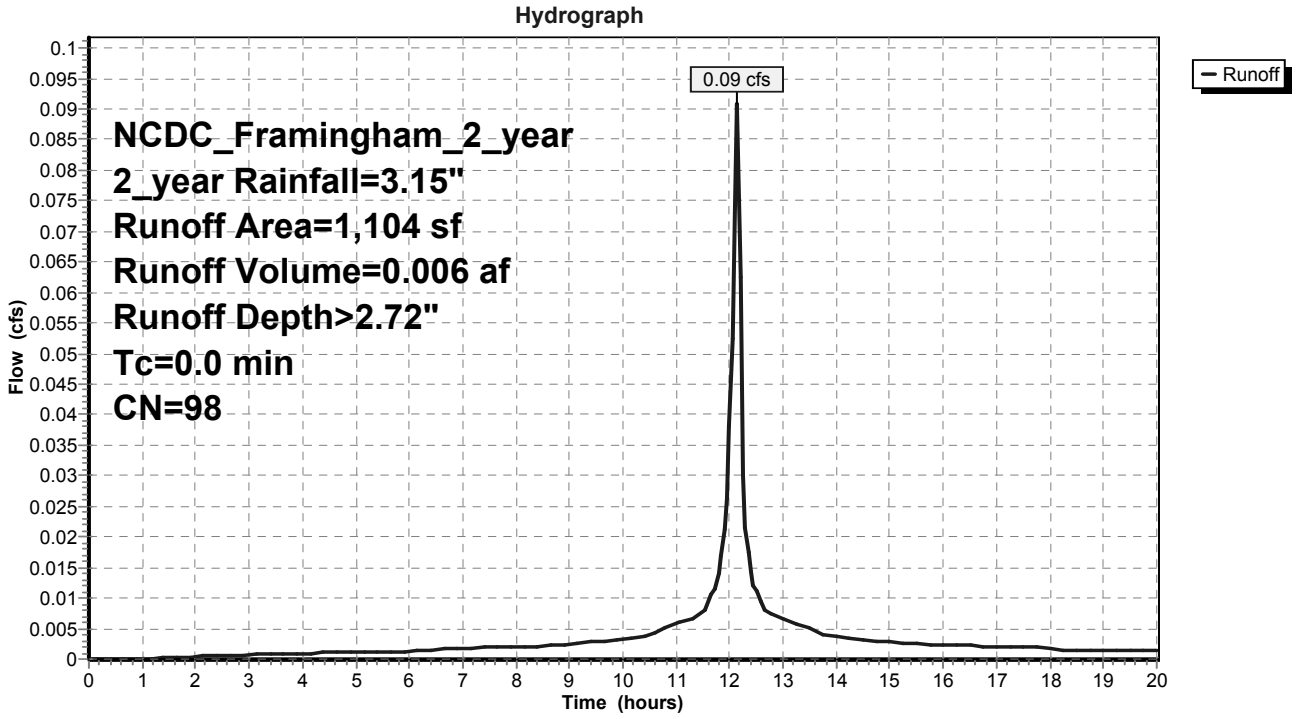
## Summary for Subcatchment ROOF-MAINT11: (blank)

Runoff = 0.09 cfs @ 12.14 hrs, Volume= 0.006 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,104 | 98 | ROOF, 100% imperv, HSG B |
| | 1,104 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAINT11: (blank)



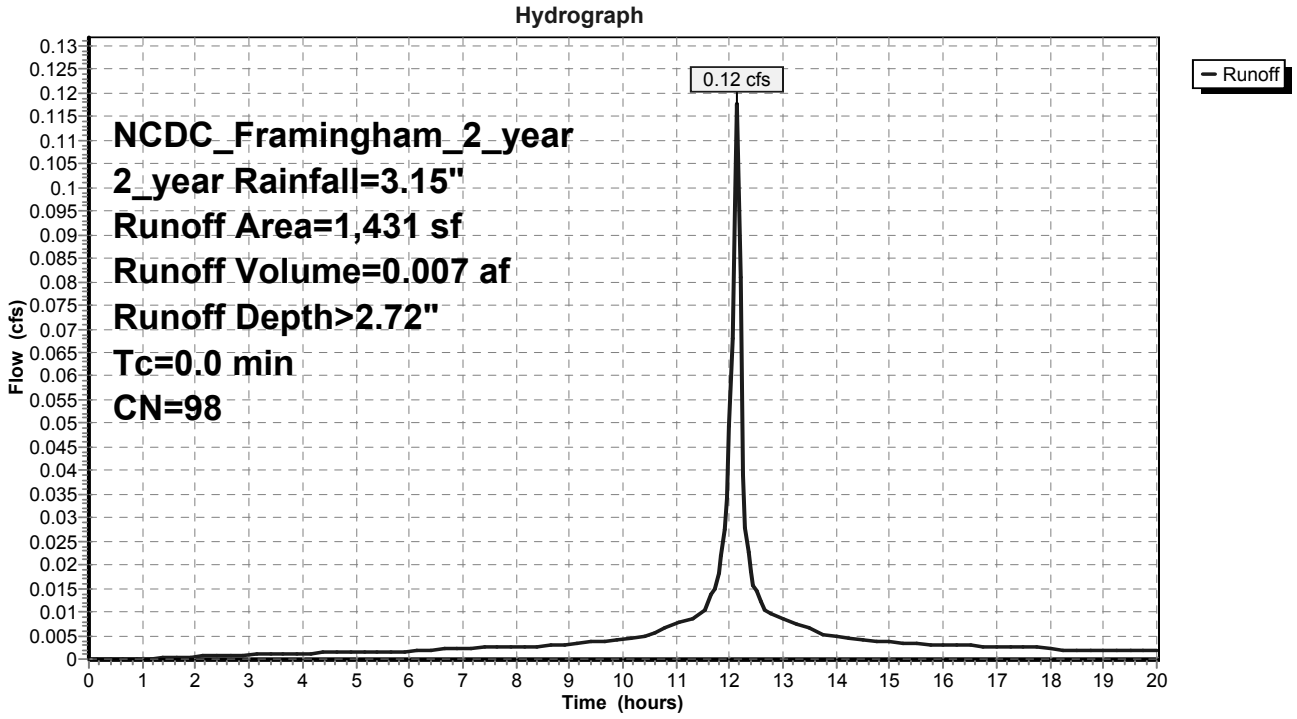
## Summary for Subcatchment ROOF-PL11: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,431 | 98 | ROOF, 100% imperv, HSG B |
| | 1,431 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL11: (blank)



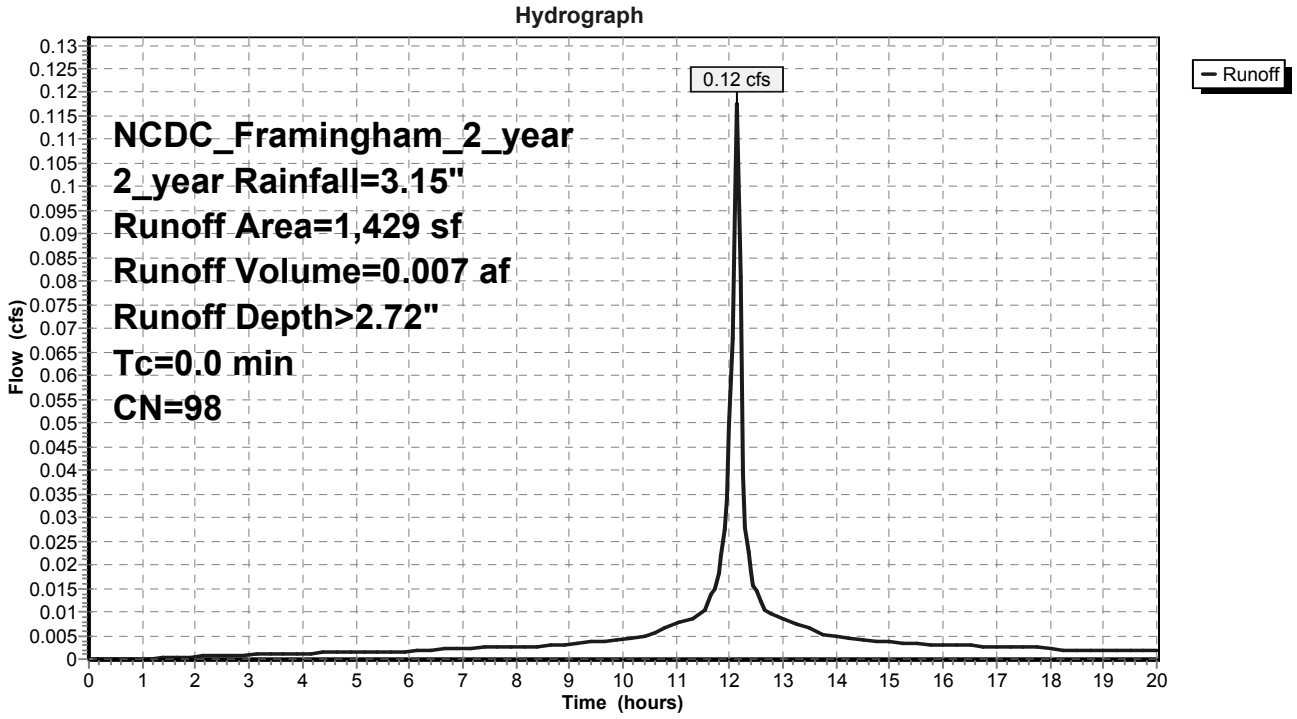
## Summary for Subcatchment ROOF-PL6: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,429 | 98 | ROOF, 100% imperv, HSG B |
| | 1,429 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL6: (blank)



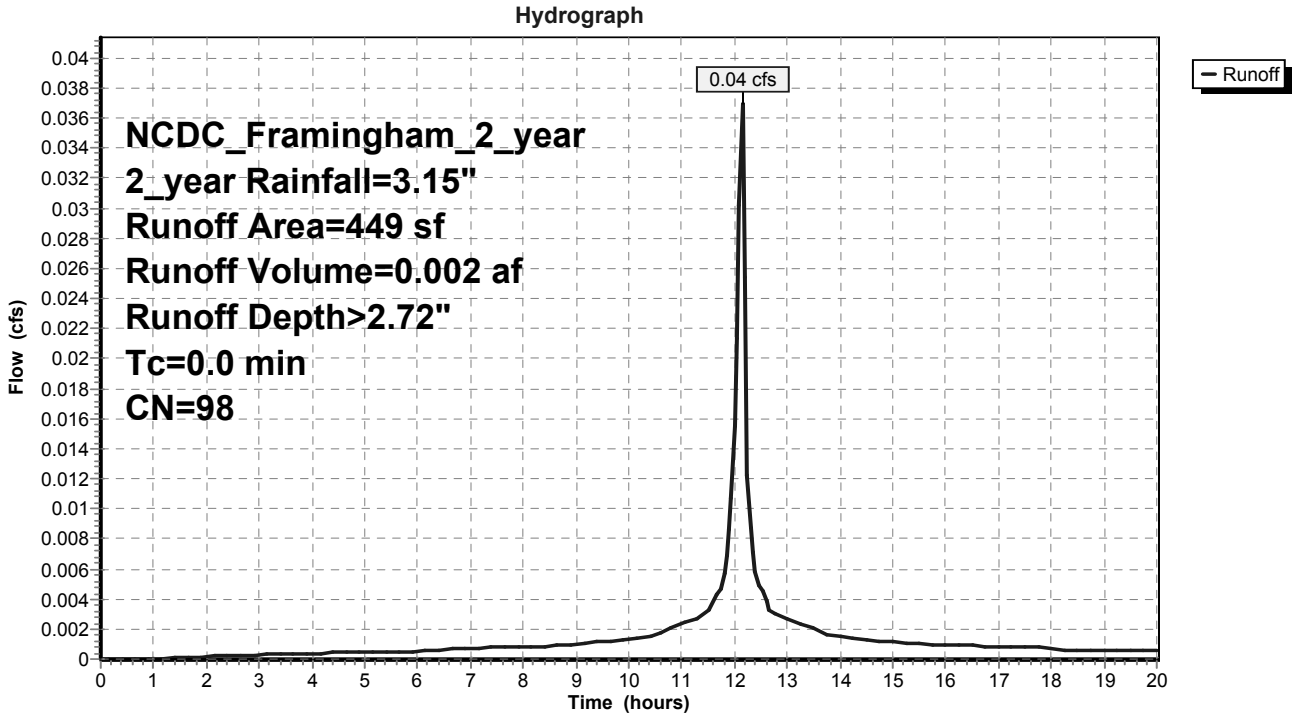
## Summary for Subcatchment ROOF-POOL: (blank)

Runoff = 0.04 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 449 | 98 | ROOF, 100% imperv, HSG B |
| | 449 | | 100.00% Pervious Area |

## Subcatchment ROOF-POOL: (blank)



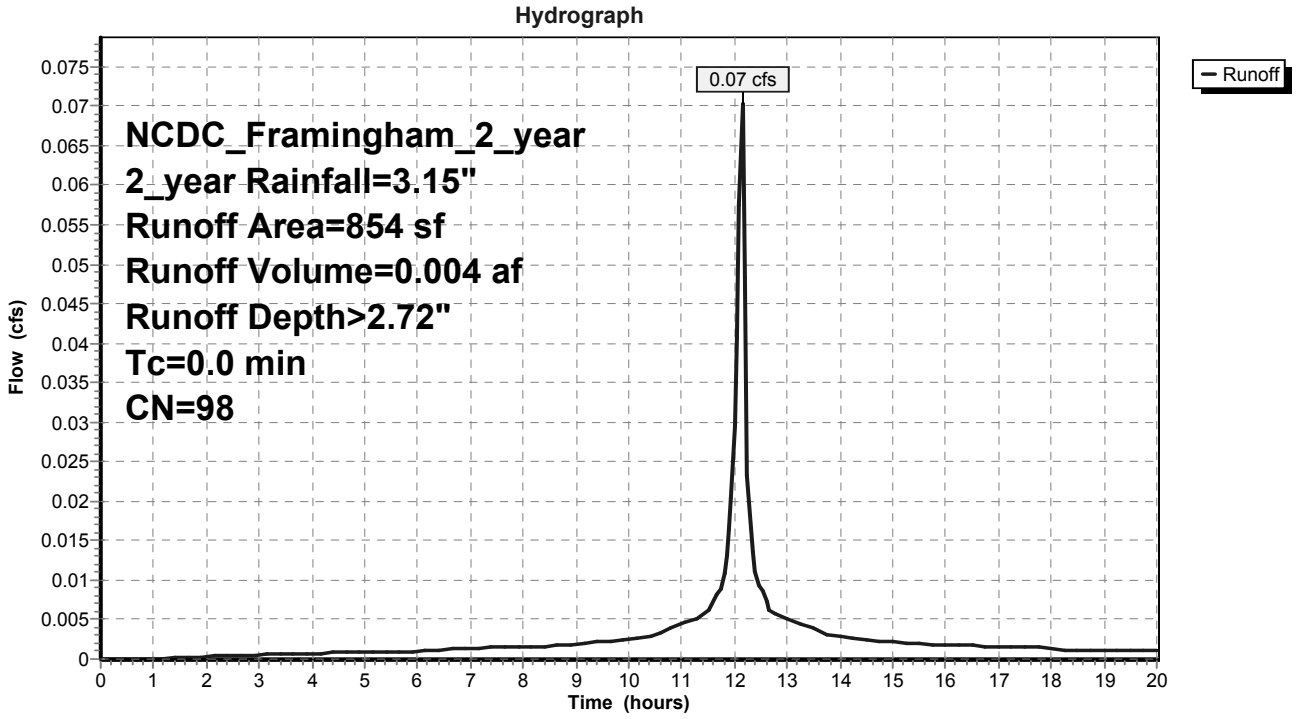
## Summary for Subcatchment ROOF-RECY: (blank)

Runoff = 0.07 cfs @ 12.14 hrs, Volume= 0.004 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 854 | 98 | ROOF, 100% imperv, HSG B |
| | 854 | | 100.00% Pervious Area |

## Subcatchment ROOF-RECY: (blank)



## Summary for Subcatchment S-CB-E-1: (blank)

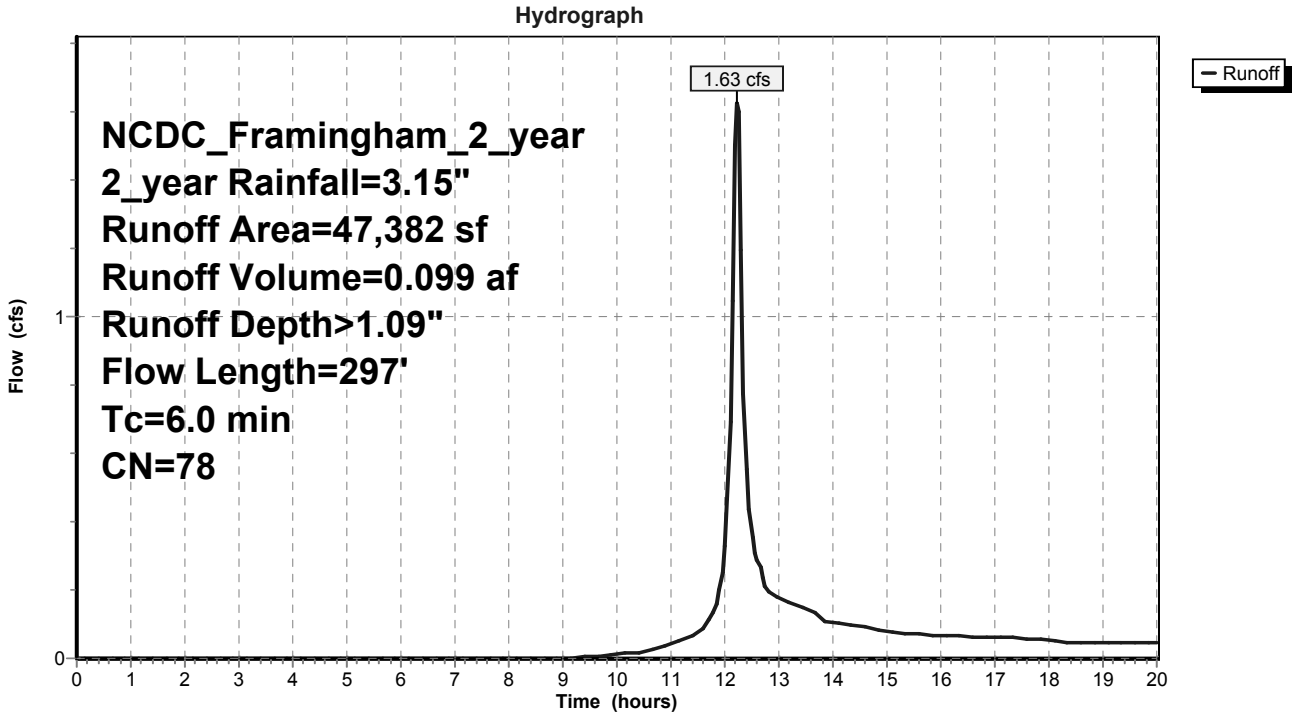
Runoff = 1.63 cfs @ 12.24 hrs, Volume= 0.099 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 25,031 | 61 | GRASS, 0% imperv, HSG B |
| * | 416 | 98 | DECK, 100% imperv, HSG B |
| * | 19,714 | 98 | IMP, 100% imperv, HSG B |
| * | 5 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,215 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 47,382 | 78 | Weighted Average |
| | 47,382 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0437 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.7 | 91 | 0.0903 | 2.10 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 68 | 0.0186 | 2.77 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0363 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0791 | 5.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 7 | 0.0208 | 1.01 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 4 | 0.0200 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 29 | 0.0291 | 3.46 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0216 | 1.03 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.0 | 297 | Total | | | |

## Subcatchment S-CB-E-1: (blank)



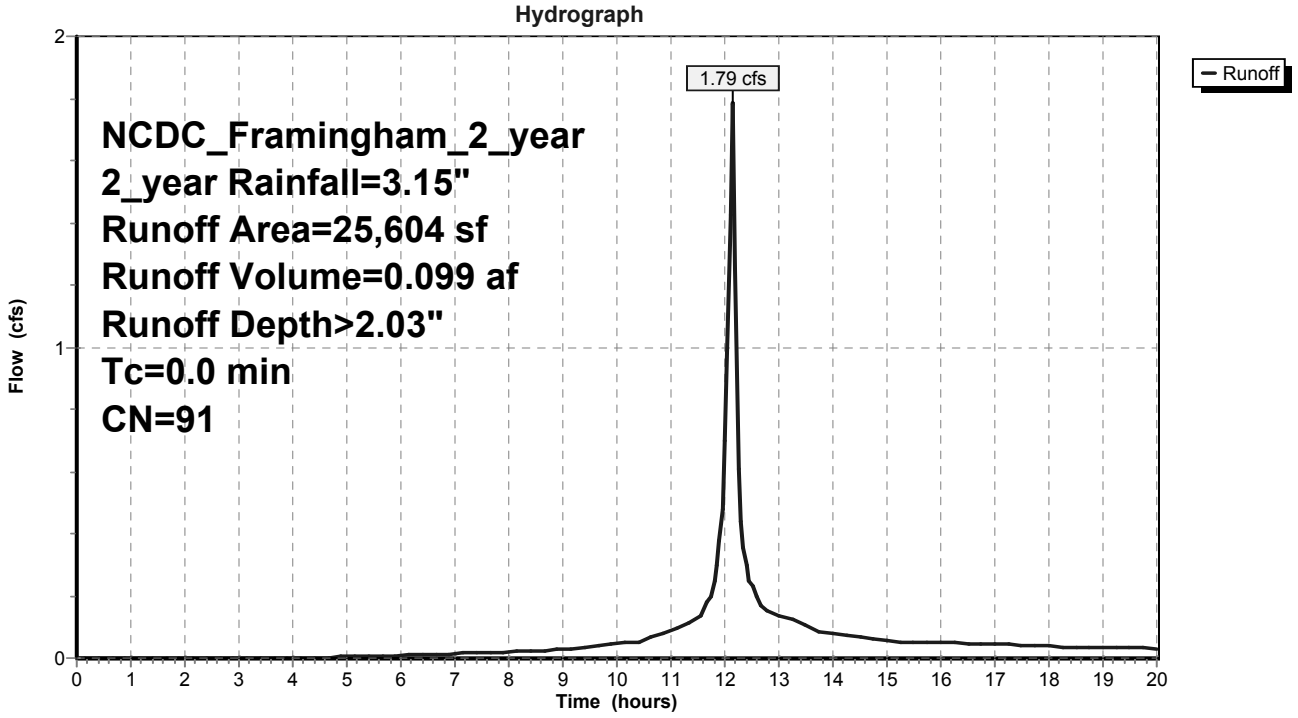
## Summary for Subcatchment S-CB-INF-E-3: (blank)

Runoff = 1.79 cfs @ 12.15 hrs, Volume= 0.099 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,743 | 61 | GRASS, 0% imperv, HSG B |
| * | 437 | 98 | DECK, 100% imperv, HSG B |
| * | 18,687 | 98 | IMP, 100% imperv, HSG B |
| * | 1,737 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,604 | 91 | Weighted Average |
| | 25,604 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-3: (blank)



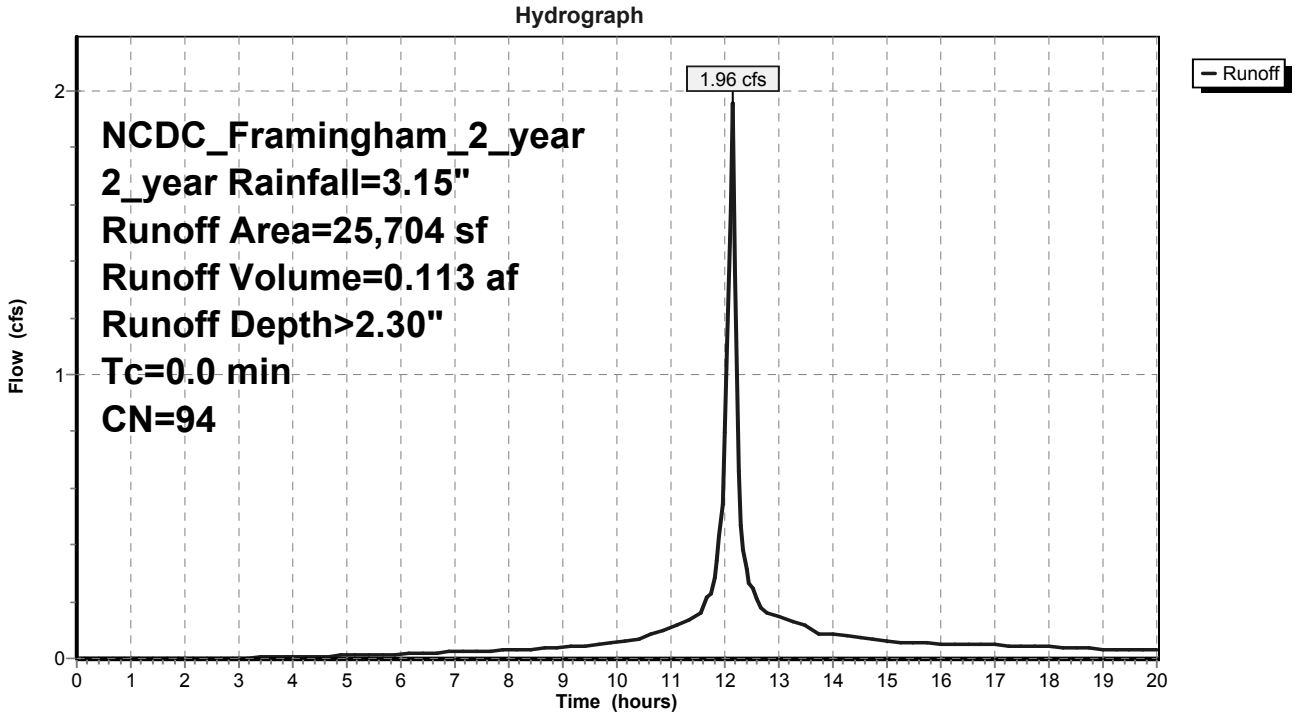
## Summary for Subcatchment S-CB-INF-E-4A: (blank)

Runoff = 1.96 cfs @ 12.14 hrs, Volume= 0.113 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,473 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,055 | 98 | IMP, 100% imperv, HSG B |
| * | 175 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,704 | 94 | Weighted Average |
| | 25,704 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-4A: (blank)



## Summary for Subcatchment S-DET-1: (blank)

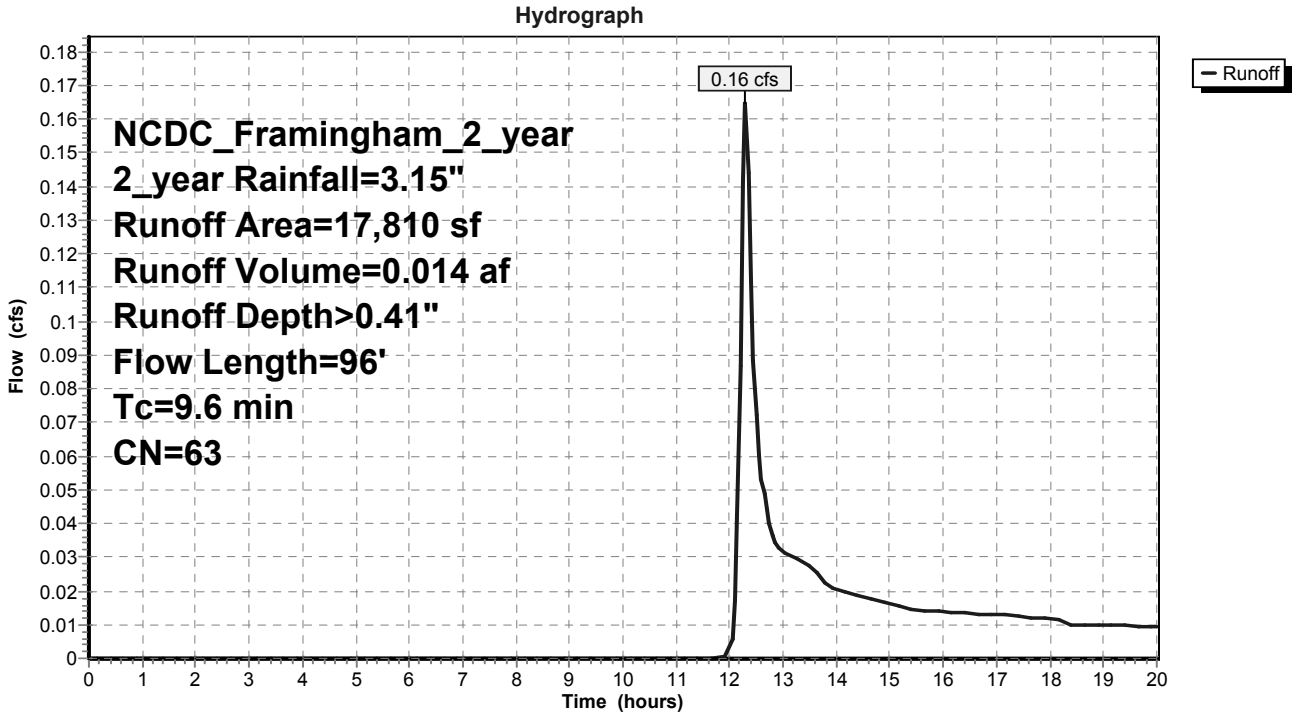
Runoff = 0.16 cfs @ 12.30 hrs, Volume= 0.014 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,881 | 61 | GRASS, 0% imperv, HSG B |
| * | 49 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 111 | 98 | DECK, 100% imperv, HSG B |
| * | 769 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,810 | 63 | Weighted Average |
| | 17,778 | | 99.82% Pervious Area |
| | 32 | | 0.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.4 | 11 | 0.0021 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 9 | 0.0010 | 0.25 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 4.1 | 29 | 0.0169 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 46 | 0.0536 | 1.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 9.6 | 96 | Total | | | |

## Subcatchment S-DET-1: (blank)



## Summary for Subcatchment S-DET-3: (blank)

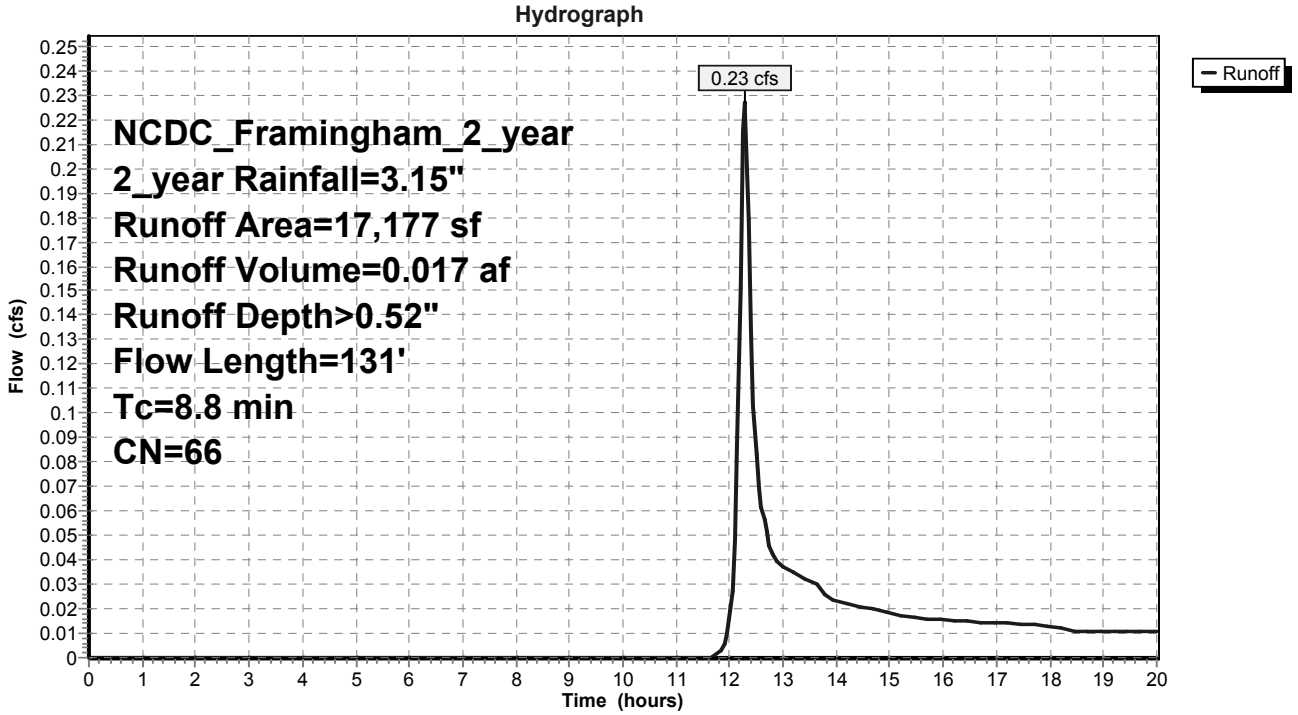
Runoff = 0.23 cfs @ 12.28 hrs, Volume= 0.017 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,639 | 61 | GRASS, 0% imperv, HSG B |
| * | 579 | 98 | DECK, 100% imperv, HSG B |
| * | 56 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,177 | 66 | Weighted Average |
| | 17,177 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.1 | 81 | 0.0332 | 1.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 8.8 | 131 | Total | | | |

## Subcatchment S-DET-3: (blank)



## Summary for Subcatchment S-INF-E-1: (blank)

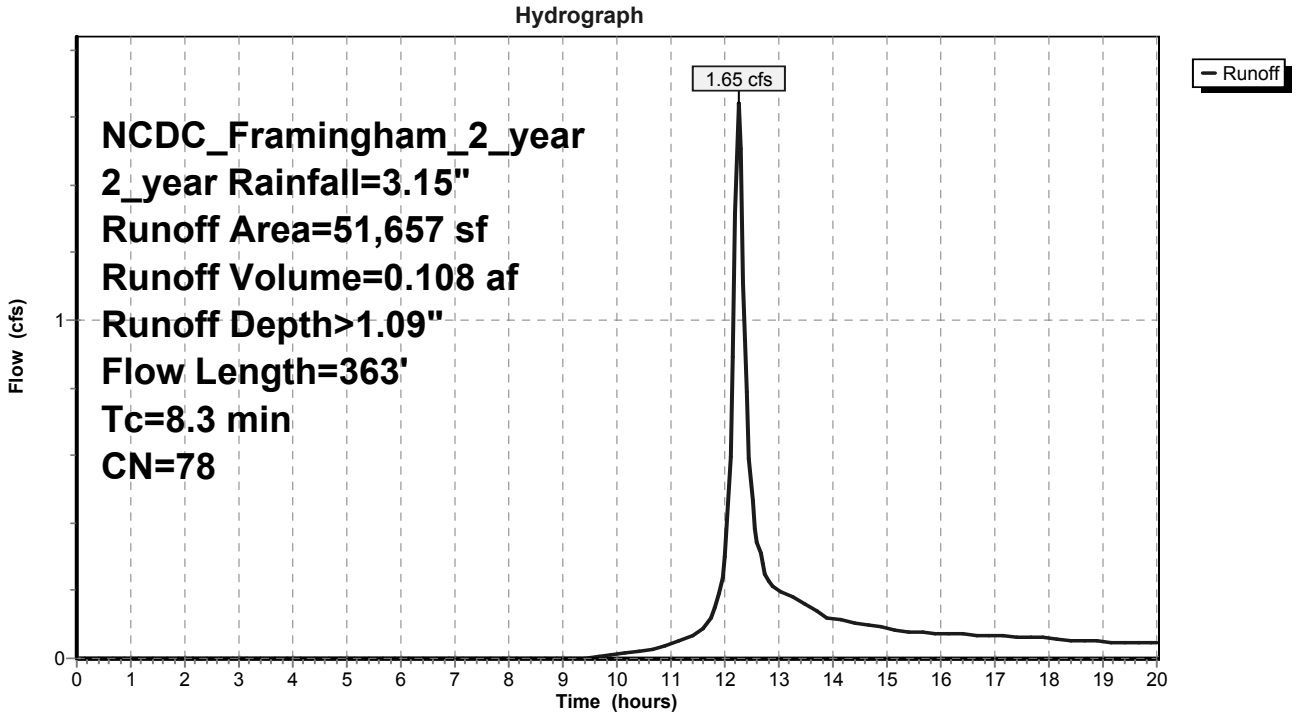
Runoff = 1.65 cfs @ 12.26 hrs, Volume= 0.108 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,205 | 61 | GRASS, 0% imperv, HSG B |
| * | 40 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,150 | 98 | DECK, 100% imperv, HSG B |
| * | 21,115 | 98 | IMP, 100% imperv, HSG B |
| * | 2,147 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 51,657 | 78 | Weighted Average |
| | 51,657 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 29 | 0.0280 | 0.15 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 21 | 0.0091 | 0.71 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 107 | 0.0148 | 2.47 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0347 | 1.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 15 | 0.0087 | 1.90 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 25 | 0.0062 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0234 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 30 | 0.0213 | 2.96 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.4 | 86 | 0.0074 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 8 | 0.0161 | 2.58 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 29 | 0.0113 | 2.16 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.3 | 363 | Total | | | |

## Subcatchment S-INF-E-1: (blank)



## Summary for Subcatchment S-INF-E-2: (blank)

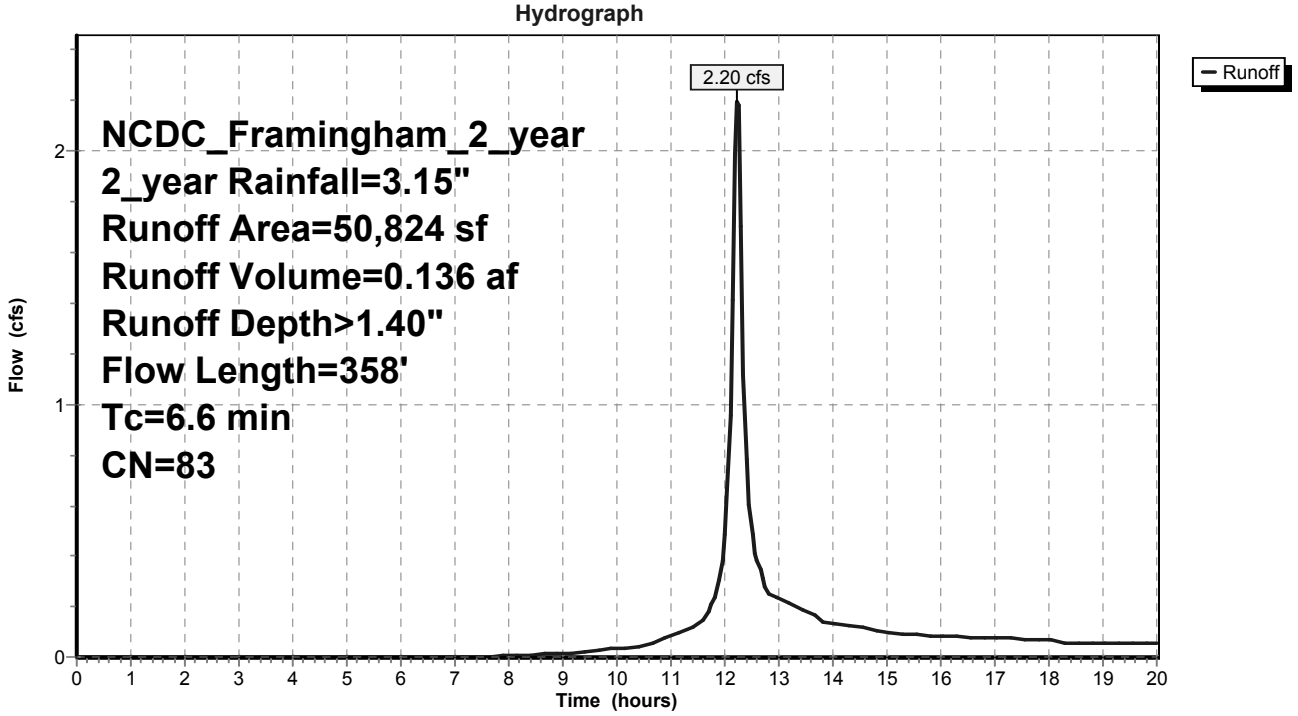
Runoff = 2.20 cfs @ 12.24 hrs, Volume= 0.136 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,826 | 61 | GRASS, 0% imperv, HSG B |
| * | 902 | 98 | DECK, 100% imperv, HSG B |
| * | 23,637 | 98 | IMP, 100% imperv, HSG B |
| * | 5,459 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 50,824 | 83 | Weighted Average |
| | 50,824 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 33 | 0.0259 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.3 | 17 | 0.0222 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 114 | 0.0156 | 0.87 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 194 | 0.0103 | 2.06 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.6 | 358 | Total | | | |

## Subcatchment S-INF-E-2: (blank)



## Summary for Subcatchment S-INF-E-3: (blank)

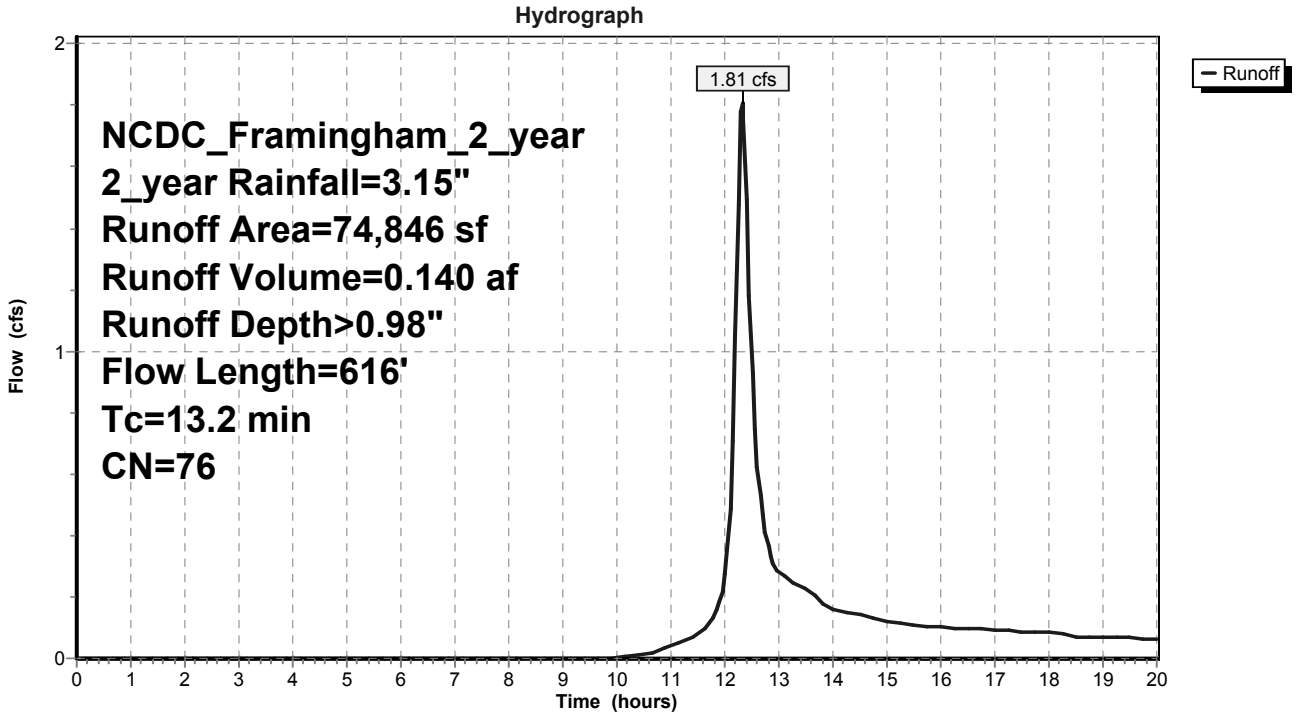
Runoff = 1.81 cfs @ 12.32 hrs, Volume= 0.140 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 43,506 | 61 | GRASS, 0% imperv, HSG B |
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 28,089 | 98 | IMP, 100% imperv, HSG B |
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,680 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,846 | 76 | Weighted Average |
| | 74,846 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 50 | 0.0660 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 91 | 0.0499 | 1.56 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0303 | 3.53 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0301 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 12 | 0.0280 | 3.40 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 57 | 0.0360 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 42 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0100 | 2.03 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 12 | 0.0013 | 0.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 48 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 32 | 0.0235 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 18 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 5 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 34 | 0.0100 | 0.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 162 | 0.0071 | 0.59 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 13.2 | 616 | Total | | | |

## Subcatchment S-INF-E-3: (blank)



## Summary for Subcatchment S-LD-1: (blank)

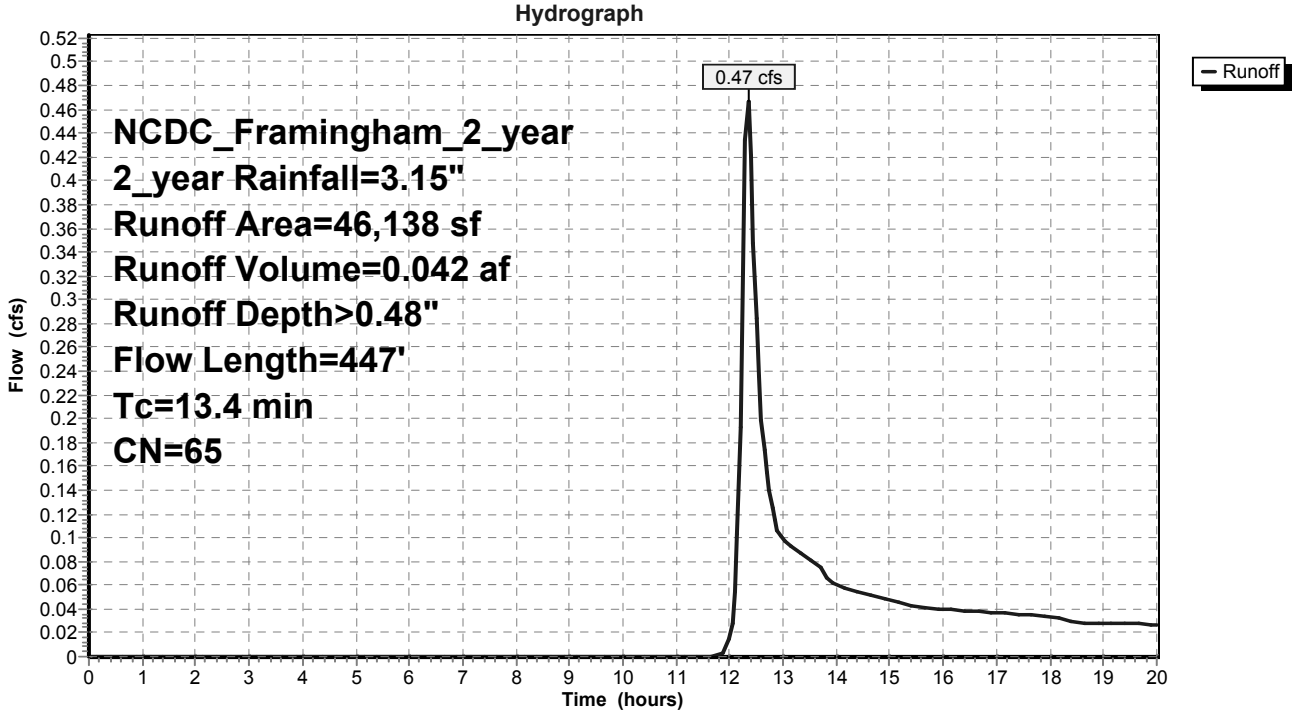
Runoff = 0.47 cfs @ 12.35 hrs, Volume= 0.042 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 38,137 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,396 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,015 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,228 | 98 | DECK, 100% imperv, HSG B |
| * | 1,712 | 98 | IMP, 100% imperv, HSG B |
| * | 650 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 46,138 | 65 | Weighted Average |
| | 44,178 | | 95.75% Pervious Area |
| | 1,960 | | 4.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 50 | 0.0135 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 6.6 | 397 | 0.0205 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 13.4 | 447 | Total | | | |

## Subcatchment S-LD-1: (blank)



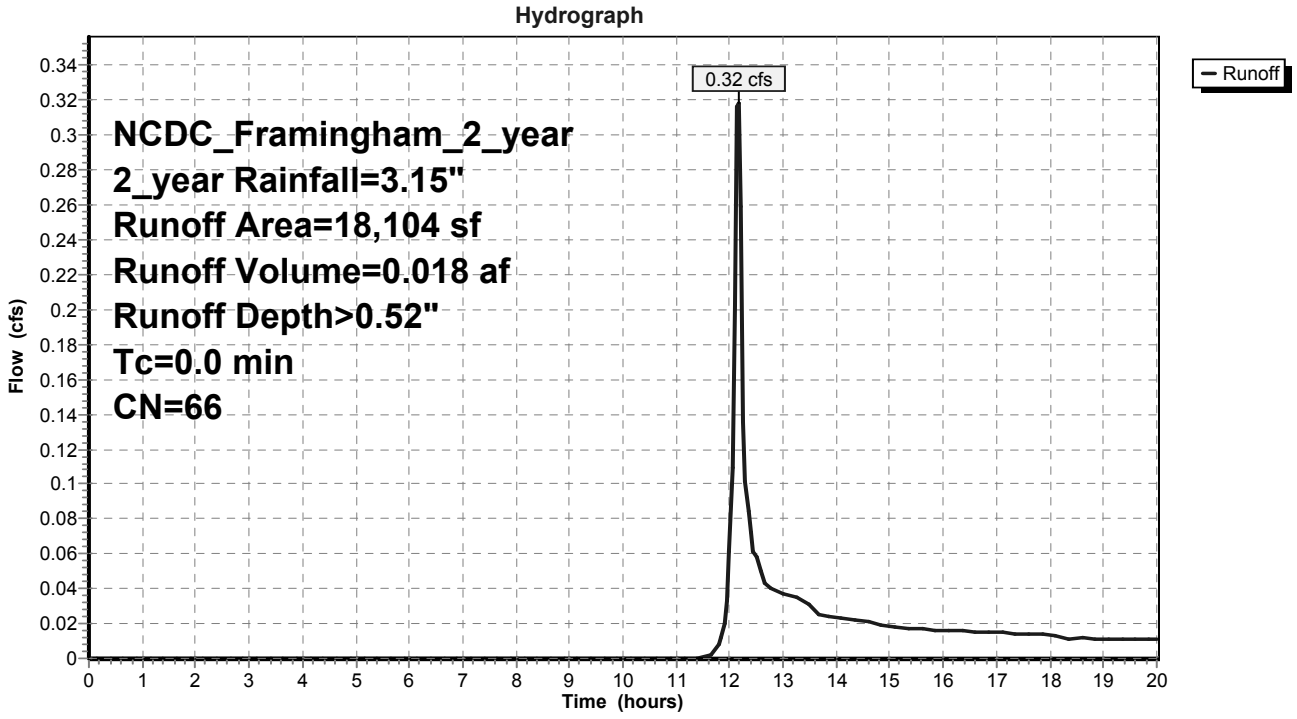
## Summary for Subcatchment S-LD-11: (blank)

Runoff = 0.32 cfs @ 12.16 hrs, Volume= 0.018 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,426 | 61 | GRASS, 0% imperv, HSG B |
| * | 439 | 98 | DECK, 100% imperv, HSG B |
| * | 2,239 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 18,104 | 66 | Weighted Average |
| | 18,104 | | 100.00% Pervious Area |

## Subcatchment S-LD-11: (blank)



## Summary for Subcatchment S-LD-2: (blank)

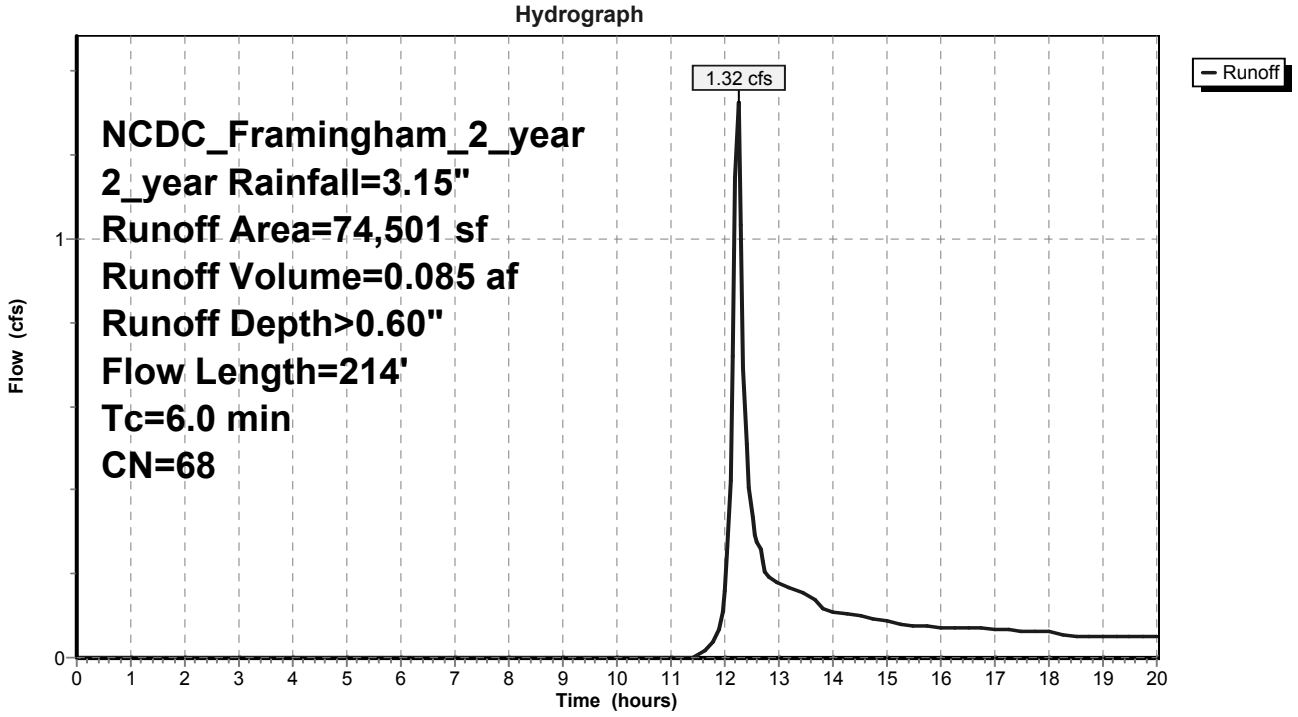
Runoff = 1.32 cfs @ 12.24 hrs, Volume= 0.085 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 57,181 | 61 | GRASS, 0% imperv, HSG B |
| * | 396 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,542 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 803 | 98 | DECK, 100% imperv, HSG B |
| * | 4,508 | 98 | IMP, 100% imperv, HSG B |
| * | 1,071 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,501 | 68 | Weighted Average |
| | 67,649 | | 90.80% Pervious Area |
| | 6,852 | | 9.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2134 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 164 | 0.0313 | 1.24 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.5 | 214 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment S-LD-2: (blank)



## Summary for Subcatchment S-LD-4: (blank)

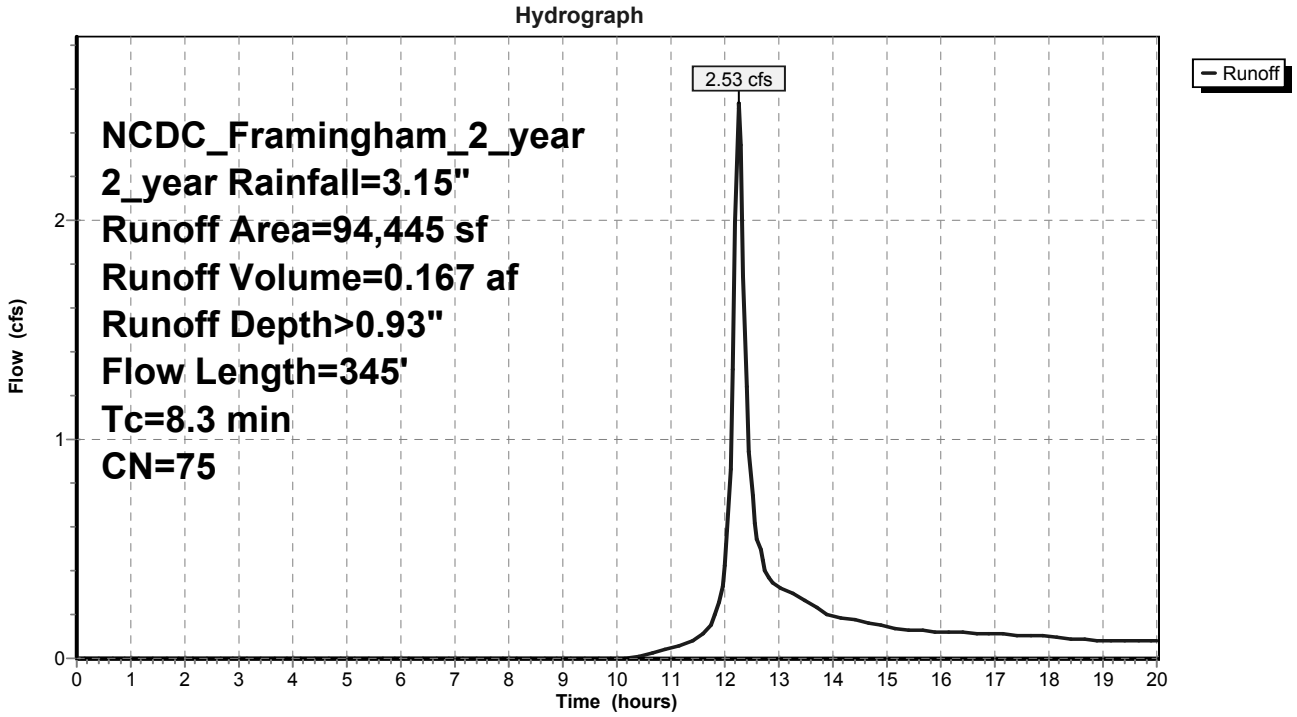
Runoff = 2.53 cfs @ 12.26 hrs, Volume= 0.167 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 53,813 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,316 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 486 | 98 | DECK, 100% imperv, HSG B |
| * | 25,119 | 98 | IMP, 100% imperv, HSG B |
| * | 710 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 94,445 | 75 | Weighted Average |
| | 85,139 | | 90.15% Pervious Area |
| | 9,306 | | 9.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.9 | 50 | 0.0309 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.4 | 288 | 0.0398 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0194 | 2.83 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0182 | 0.94 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 345 | Total | | | |

## Subcatchment S-LD-4: (blank)



## Summary for Subcatchment W 10.0: (blank)

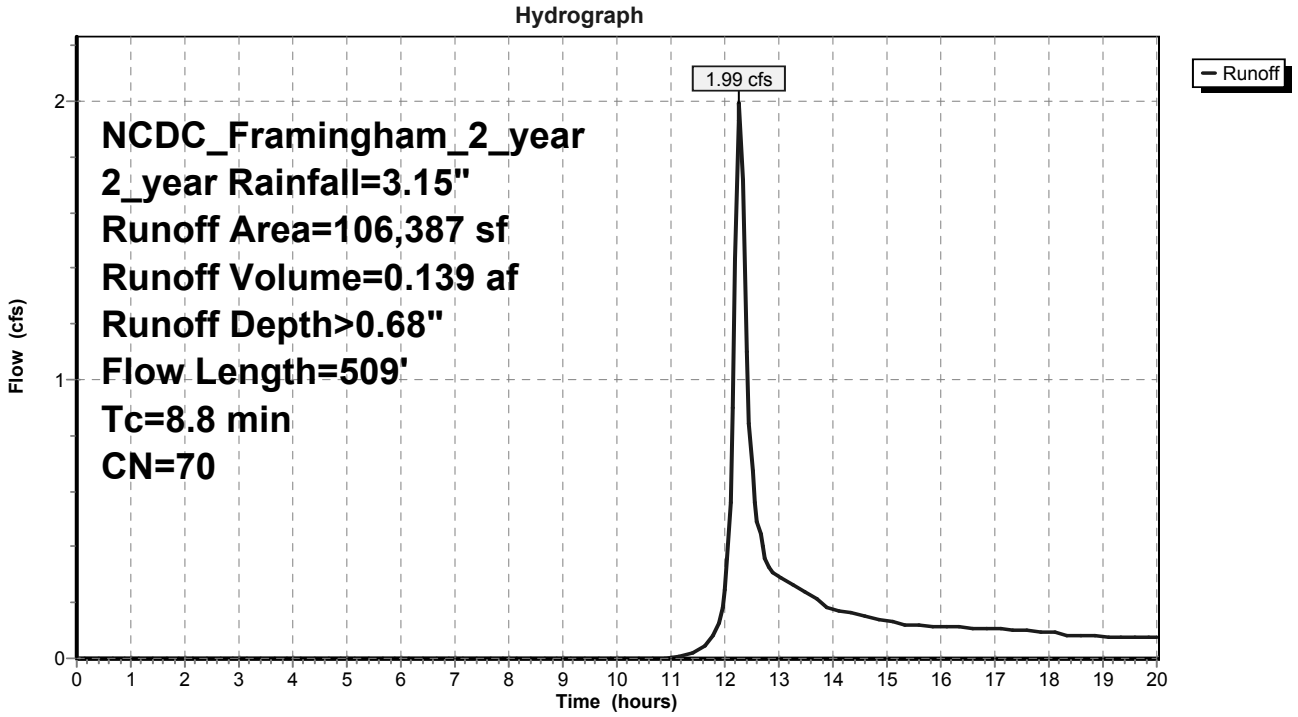
Runoff = 1.99 cfs @ 12.27 hrs, Volume= 0.139 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 100% imperv, HSG C |
| * | 6,541 | 98 | Water, 100% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.8 | 41 | 0.0223 | 0.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 11 | 0.2240 | 1.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.8 | 509 | Total | | | |

## Subcatchment W 10.0: (blank)



## Summary for Subcatchment W 2.0: (blank)

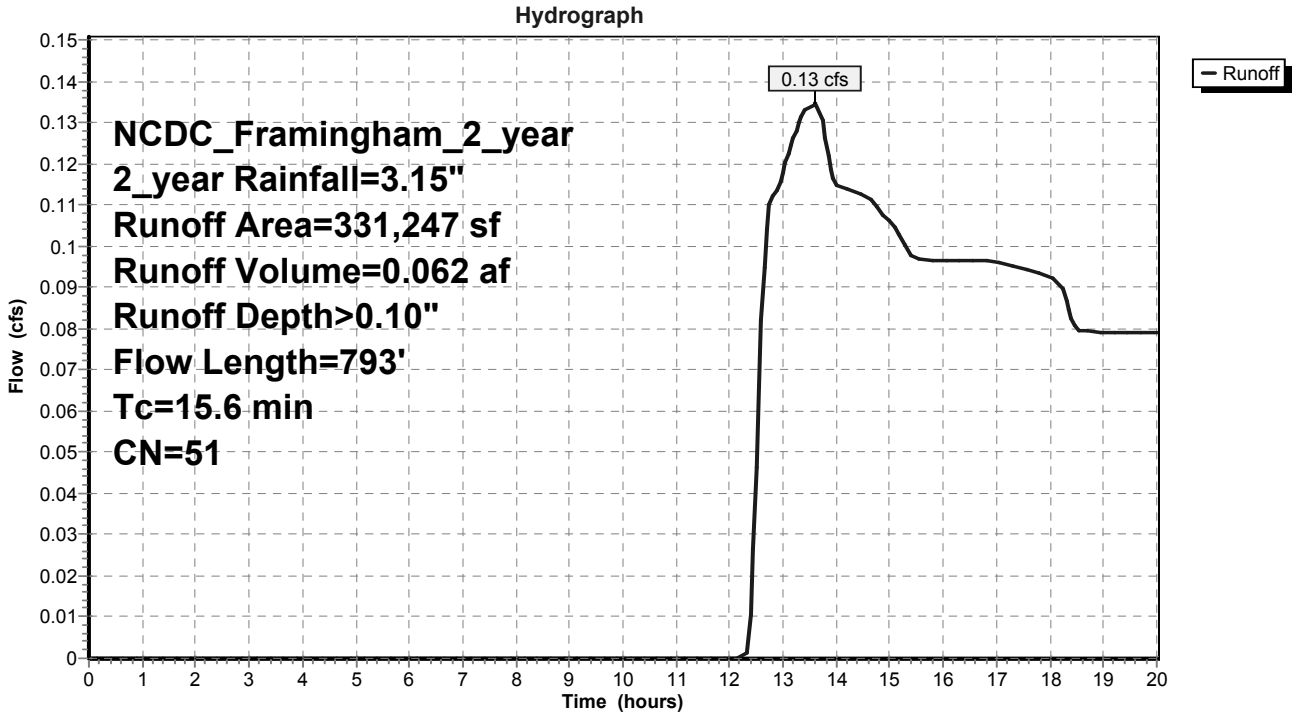
Runoff = 0.13 cfs @ 13.61 hrs, Volume= 0.062 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 40,834 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,020 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 158,571 | 30 | WOODS, 0% imperv, HSG A |
| * | 15 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 17,208 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 2,472 | 98 | DECK, 100% imperv, HSG A |
| * | 54 | 98 | DECK, 100% imperv, HSG B |
| * | 19,292 | 98 | Water, 100% imperv, HSG D |
| * | 1,268 | 98 | Water, 100% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 331,247 | 51 | Weighted Average |
| | 320,062 | | 96.62% Pervious Area |
| | 11,185 | | 3.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: (blank)



## Summary for Subcatchment W 3.1: (blank)

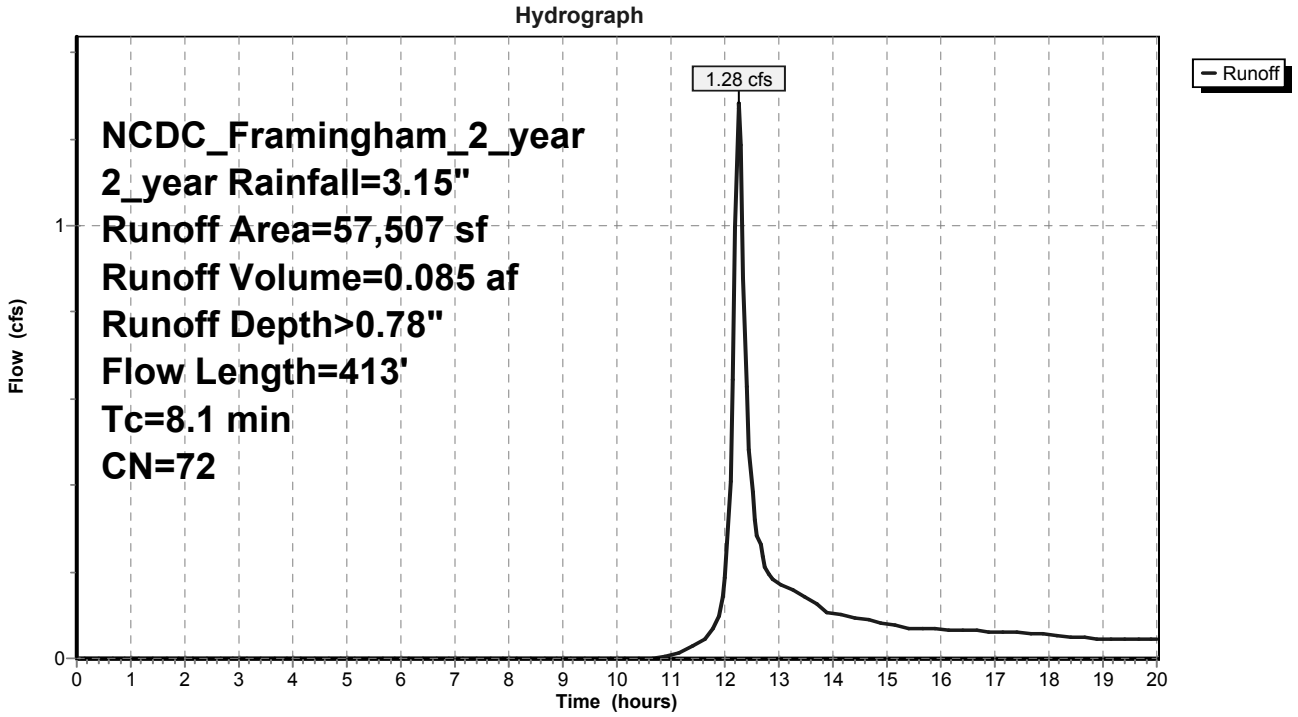
Runoff = 1.28 cfs @ 12.26 hrs, Volume= 0.085 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,850 | 39 | GRASS, 0% imperv, HSG A |
| * | 26,567 | 61 | GRASS, 0% imperv, HSG B |
| * | 112 | 30 | WOODS, 0% imperv, HSG A |
| * | 408 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,113 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 15,113 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12 | 98 | DECK, 100% imperv, HSG A |
| * | 1,574 | 98 | DECK, 100% imperv, HSG B |
| * | 3,090 | 98 | IMP, 100% imperv, HSG A |
| * | 4,669 | 98 | IMP, 100% imperv, HSG B |
| | 57,507 | 72 | Weighted Average |
| | 46,310 | | 80.53% Pervious Area |
| | 11,197 | | 19.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2132 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.8 | 363 | 0.0223 | 1.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.1 | 413 | Total | | | |

## Subcatchment W 3.1: (blank)



## Summary for Subcatchment W 3.2: (blank)

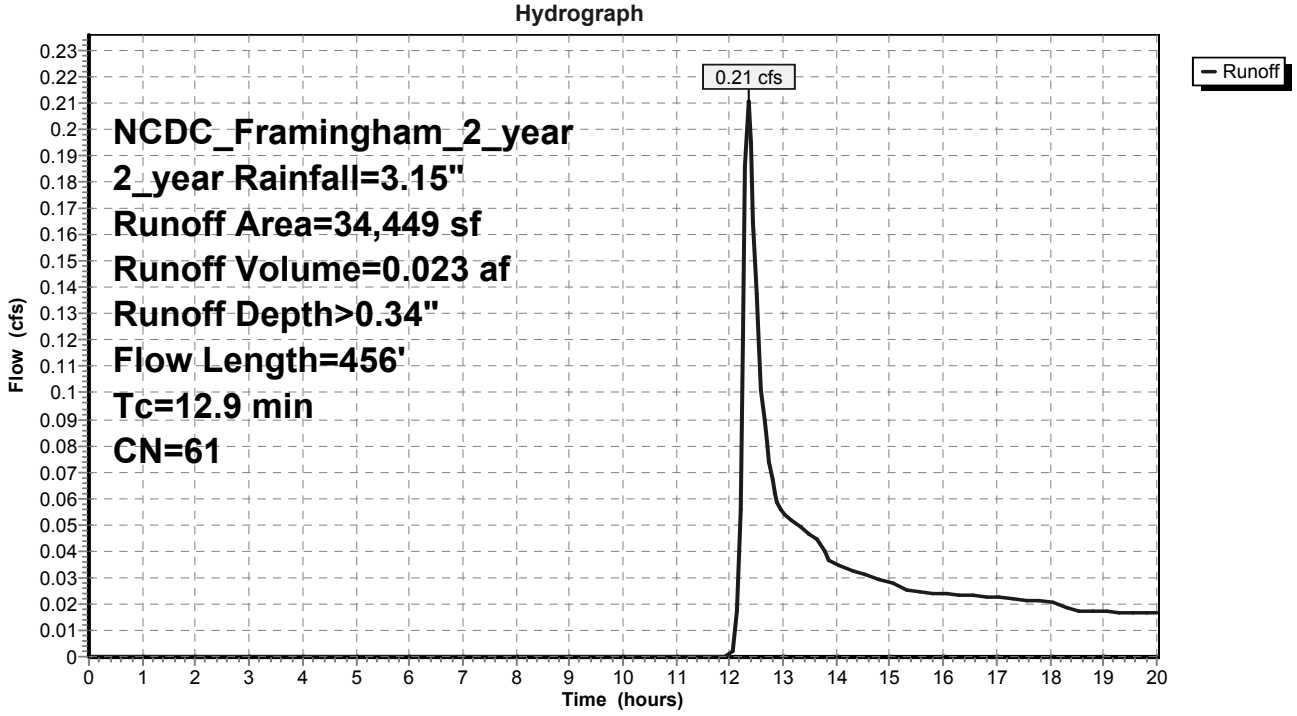
Runoff = 0.21 cfs @ 12.36 hrs, Volume= 0.023 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,379 | 39 | GRASS, 0% imperv, HSG A |
| * | 30,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 8 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 459 | 98 | DECK, 100% imperv, HSG B |
| * | 15 | 98 | IMP, 100% imperv, HSG A |
| * | 621 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 34,449 | 61 | Weighted Average |
| | 34,444 | | 99.99% Pervious Area |
| | 5 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 406 | 0.0128 | 0.79 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 12.9 | 456 | Total | | | |

## Subcatchment W 3.2: (blank)



## Summary for Subcatchment W 3.3: (blank)

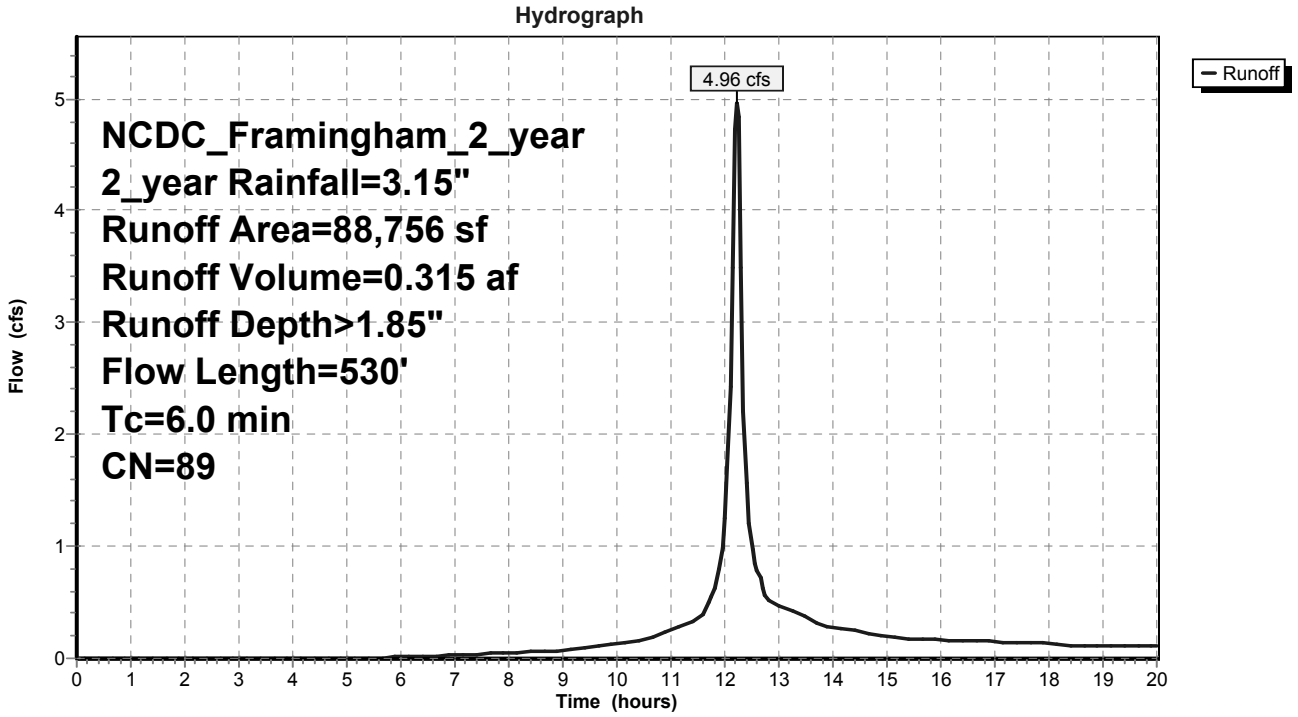
Runoff = 4.96 cfs @ 12.23 hrs, Volume= 0.315 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 285 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,658 | 30 | WOODS, 0% imperv, HSG A |
| * | 3,726 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,454 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,698 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,852 | 98 | IMP, 100% imperv, HSG A |
| * | 45,884 | 98 | IMP, 100% imperv, HSG B |
| | 88,756 | 89 | Weighted Average |
| | 79,557 | | 89.64% Pervious Area |
| | 9,199 | | 10.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 530 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.3: (blank)



## Summary for Subcatchment W 3.4: (blank)

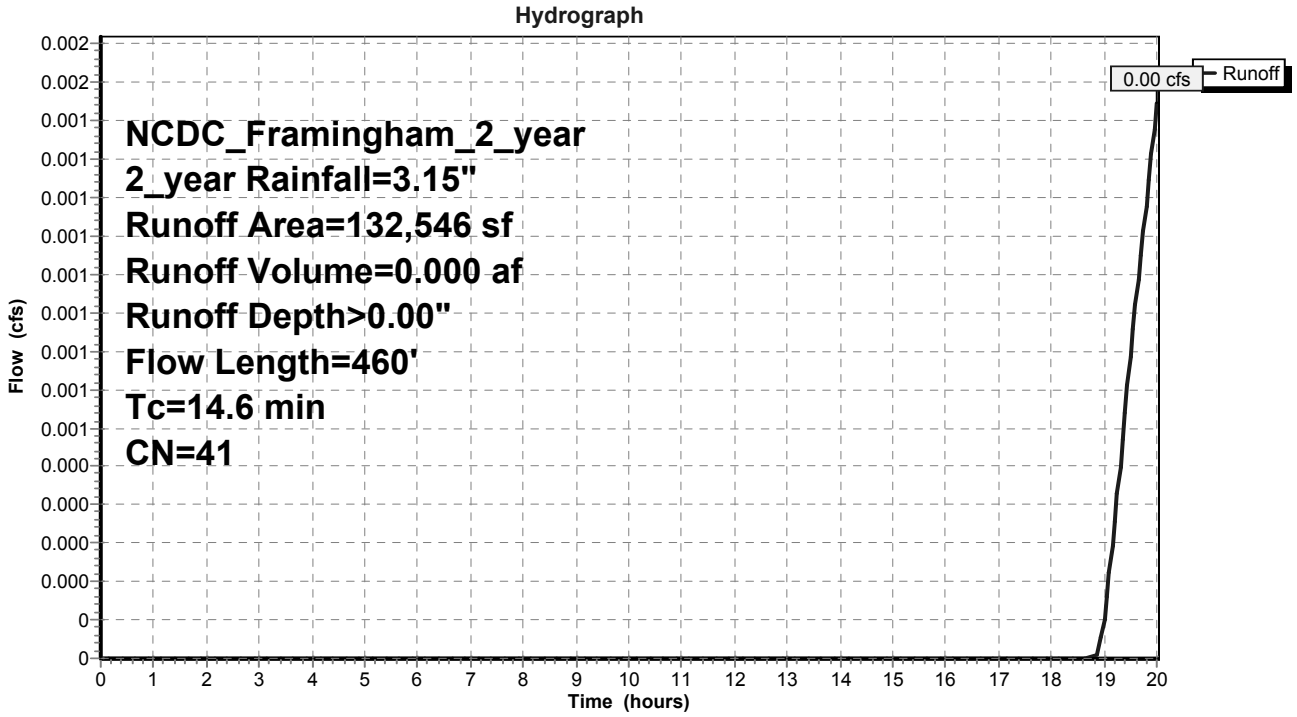
Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 34,402 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,152 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,242 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 132,546 | 41 | Weighted Average |
| | 125,888 | | 94.98% Pervious Area |
| | 6,658 | | 5.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: (blank)



## Summary for Subcatchment W 9.1A: (blank)

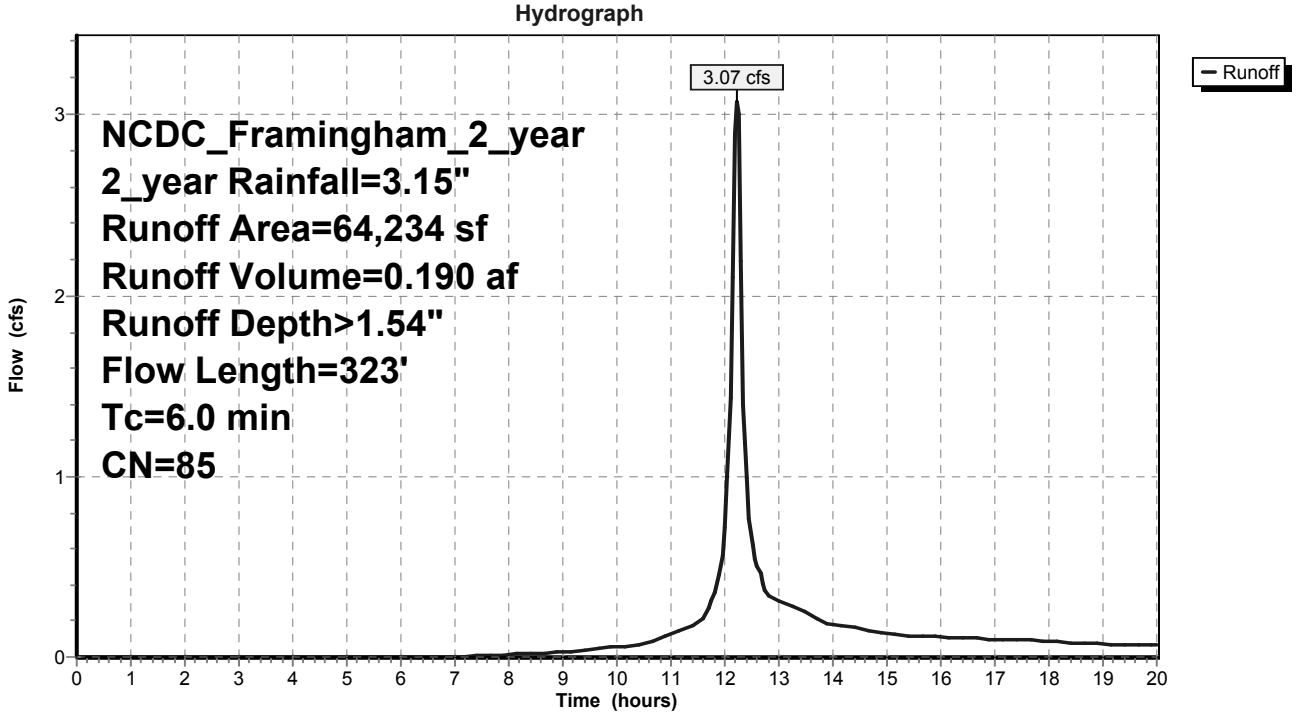
Runoff = 3.07 cfs @ 12.23 hrs, Volume= 0.190 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,121 | 55 | WOODS, 0% imperv, HSG B |
| * | 60,291 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 2,821 | 98 | IMP, 100% imperv, HSG B |
| | 64,234 | 85 | Weighted Average |
| | 25,044 | | 38.99% Pervious Area |
| | 39,189 | | 61.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.5 | 323 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1A: (blank)



## Summary for Subcatchment W 9.1B: (blank)

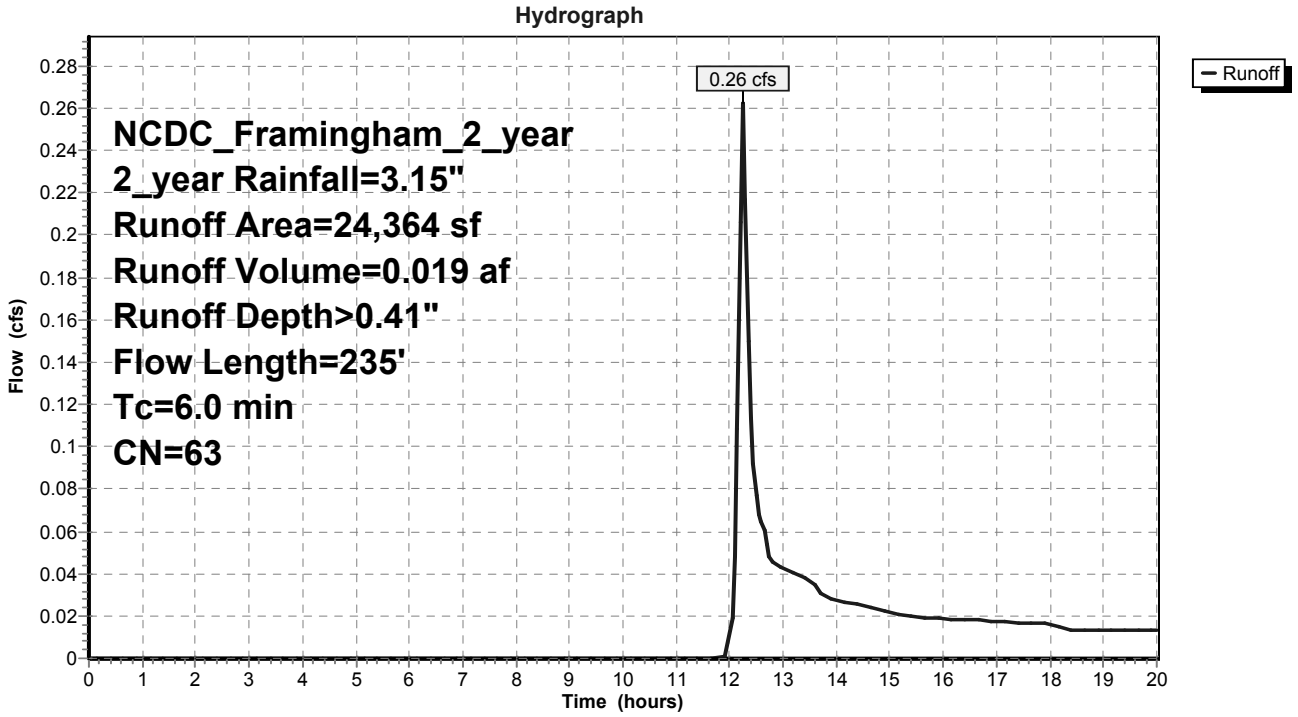
Runoff = 0.26 cfs @ 12.25 hrs, Volume= 0.019 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 12 | 61 | GRASS, 0% imperv, HSG B |
| * | 116 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 676 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,461 | | 83.98% Pervious Area |
| | 3,902 | | 16.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: (blank)



## Summary for Subcatchment W-CULV-N: (blank)

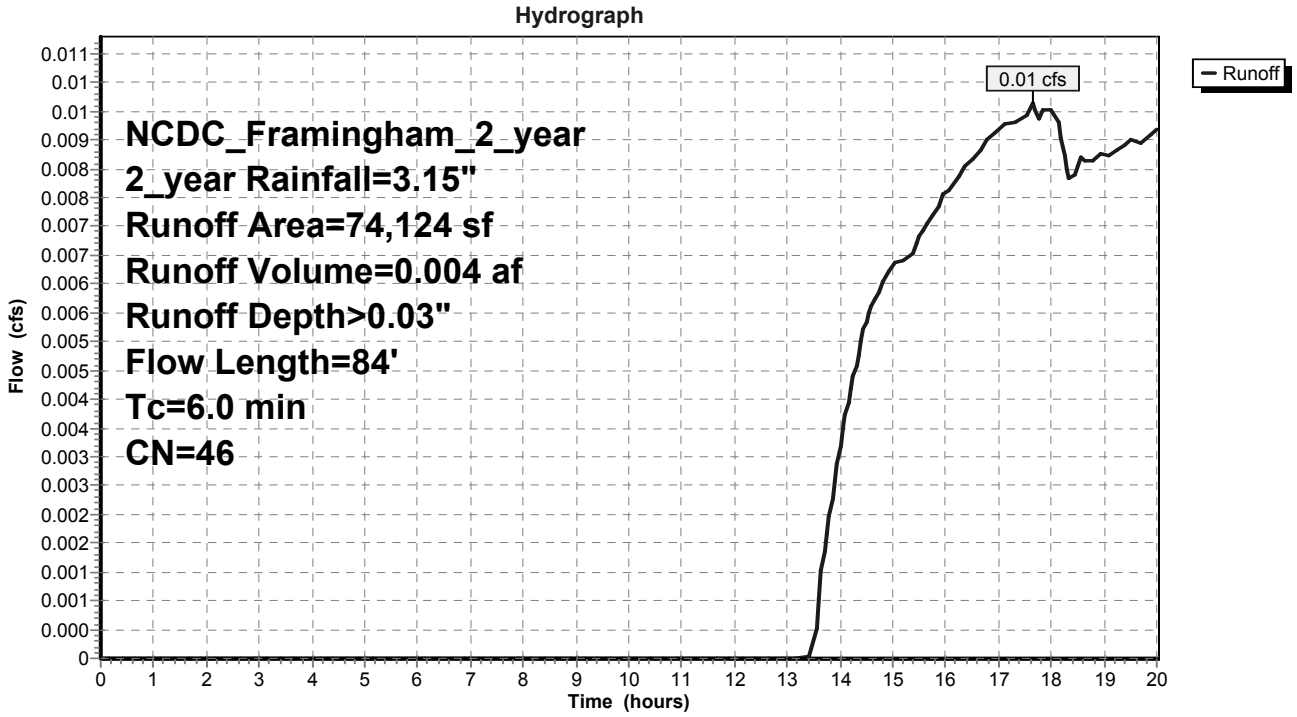
Runoff = 0.01 cfs @ 17.65 hrs, Volume= 0.004 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 49,219 | 39 | GRASS, 0% imperv, HSG A |
| * | 878 | 61 | GRASS, 0% imperv, HSG B |
| * | 11,450 | 30 | WOODS, 0% imperv, HSG A |
| * | 6,537 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 3 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 458 | 98 | DECK, 100% imperv, HSG A |
| * | 70 | 98 | DECK, 100% imperv, HSG B |
| * | 4,994 | 98 | IMP, 100% imperv, HSG A |
| * | 515 | 98 | IMP, 100% imperv, HSG B |
| | 74,124 | 46 | Weighted Average |
| | 69,873 | | 94.27% Pervious Area |
| | 4,251 | | 5.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2138 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 34 | 0.2186 | 3.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 84 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-CULV-N: (blank)



## Summary for Subcatchment W-D-1: (blank)

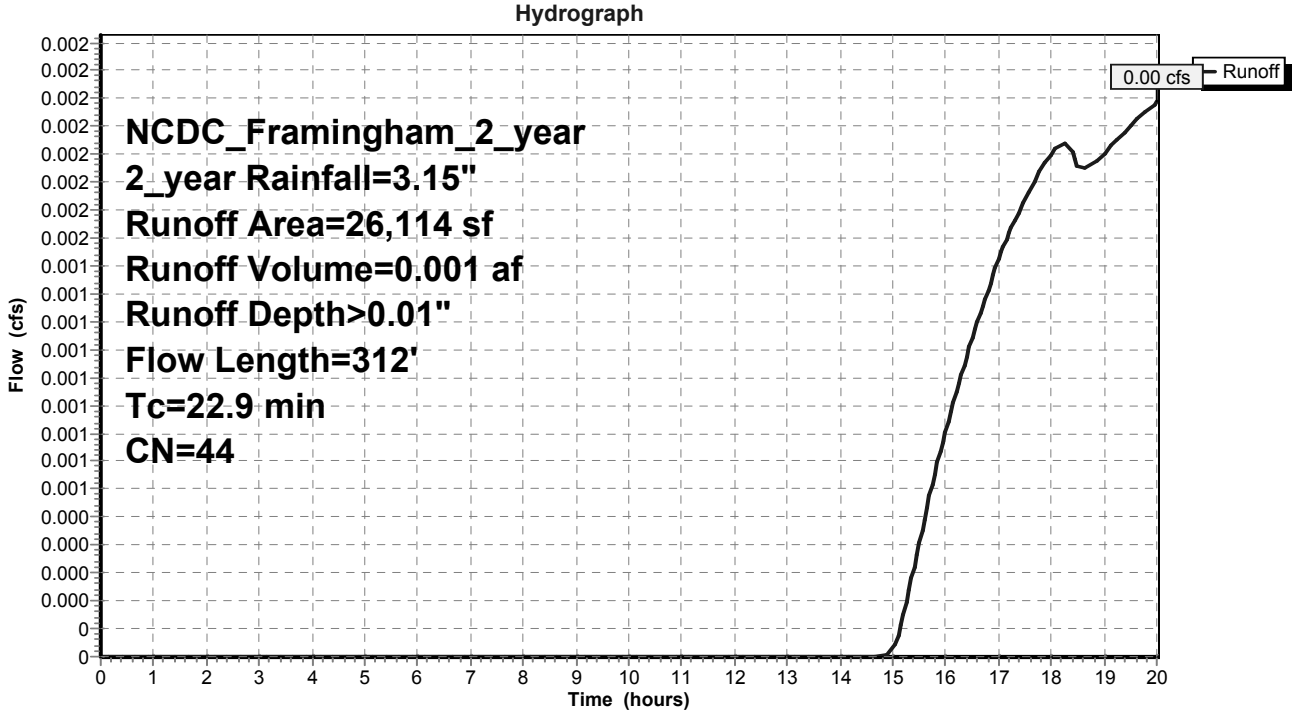
Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.001 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,996 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,258 | 61 | GRASS, 0% imperv, HSG B |
| * | 535 | 98 | DECK, 100% imperv, HSG A |
| * | 1 | 98 | IMP, 100% imperv, HSG A |
| * | 47 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,136 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 141 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 26,114 | 44 | Weighted Average |
| | 26,114 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 50 | 0.0010 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.6 | 262 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 22.9 | 312 | Total | | | |

## Subcatchment W-D-1: (blank)



## Summary for Subcatchment W-D-3: (blank)

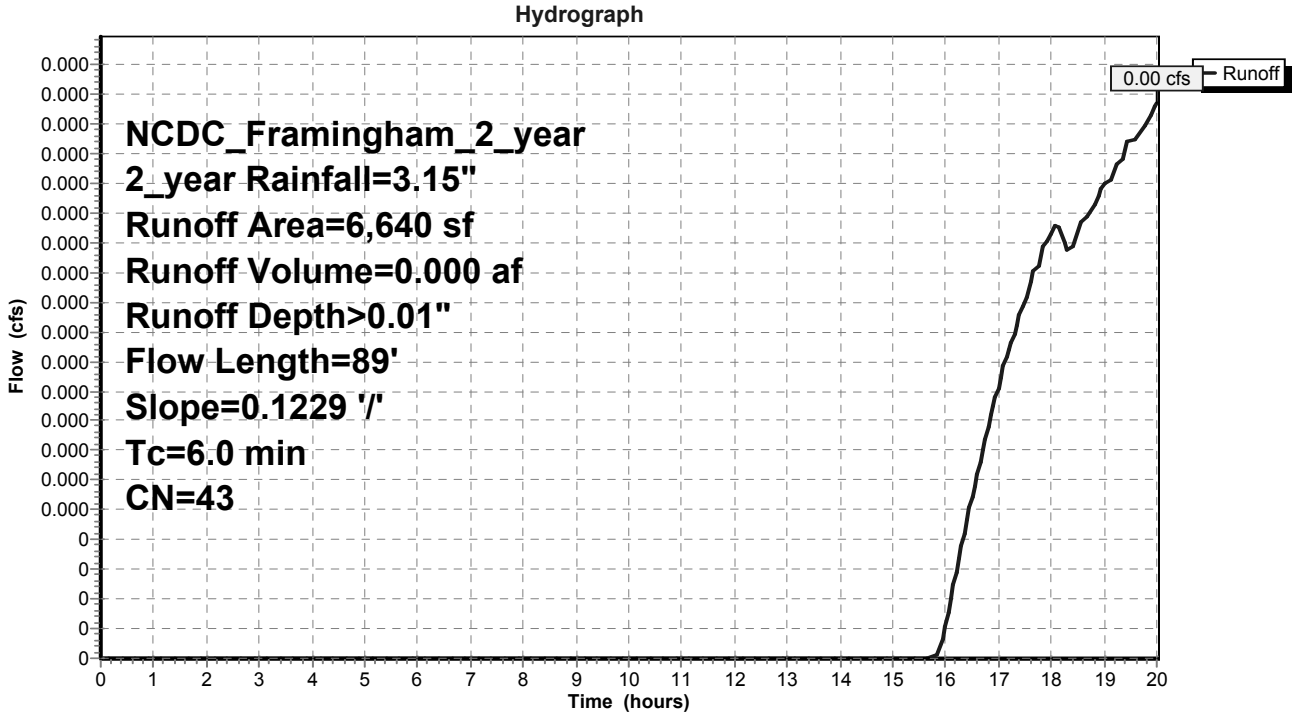
Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_2_year 2_year Rainfall=3.15"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,198 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,421 | 30 | WOODS, 0% imperv, HSG A |
| * | 1,021 | 77 | GRAVEL, 65% imperv, HSG A |
| | 6,640 | 43 | Weighted Average |
| | 5,977 | | 90.01% Pervious Area |
| | 664 | | 9.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 89 | 0.1229 | 0.33 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 4.5 | 89 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-D-3: (blank)



## Summary for Reach R-SWALE1: (new Reach)

Inflow Area = 0.663 ac, 2.32% Impervious, Inflow Depth > 0.38" for 2_year event
Inflow = 0.25 cfs @ 12.28 hrs, Volume= 0.021 af
Outflow = 0.11 cfs @ 12.46 hrs, Volume= 0.020 af, Atten= 54%, Lag= 10.7 min

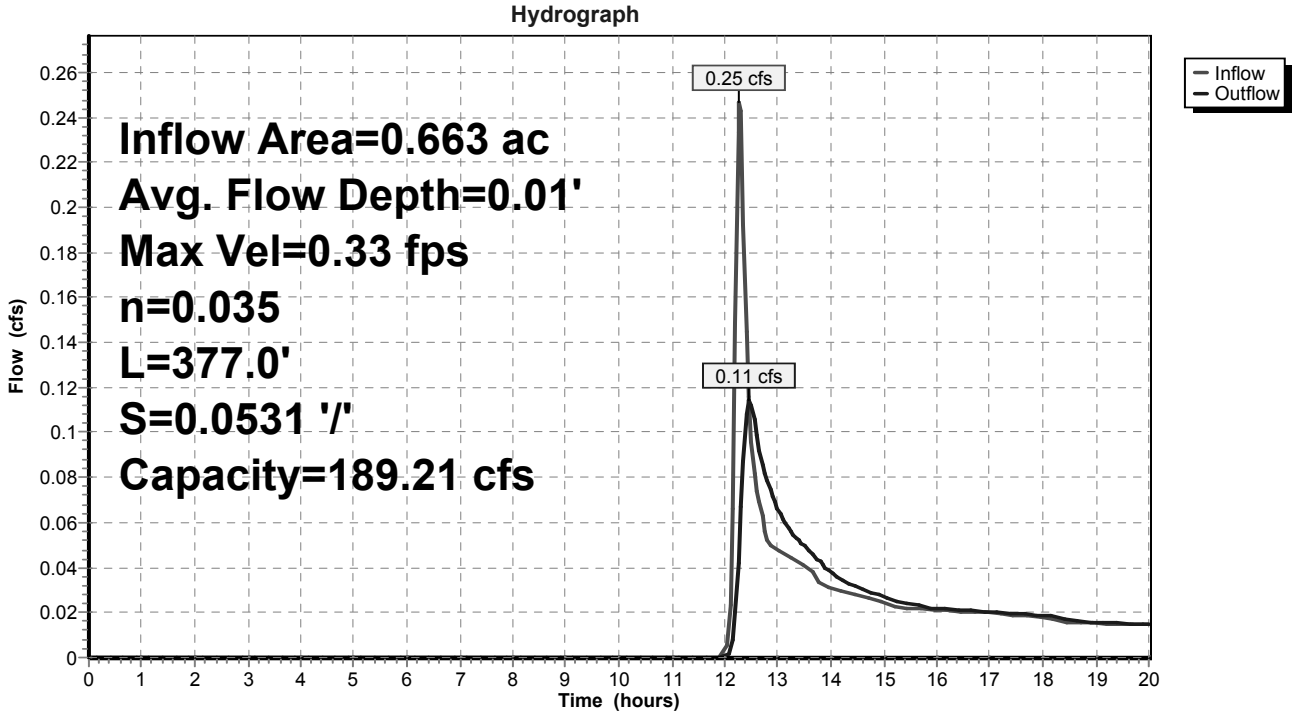
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.33 fps, Min. Travel Time= 19.1 min
Avg. Velocity = 0.29 fps, Avg. Travel Time= 21.9 min

Peak Storage= 130 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 189.21 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 377.0' Slope= 0.0531 '/'
Inlet Invert= 165.00', Outlet Invert= 145.00'

‡

## Reach R-SWALE1: (new Reach)



## Summary for Reach R-SWALE2: (new Reach)

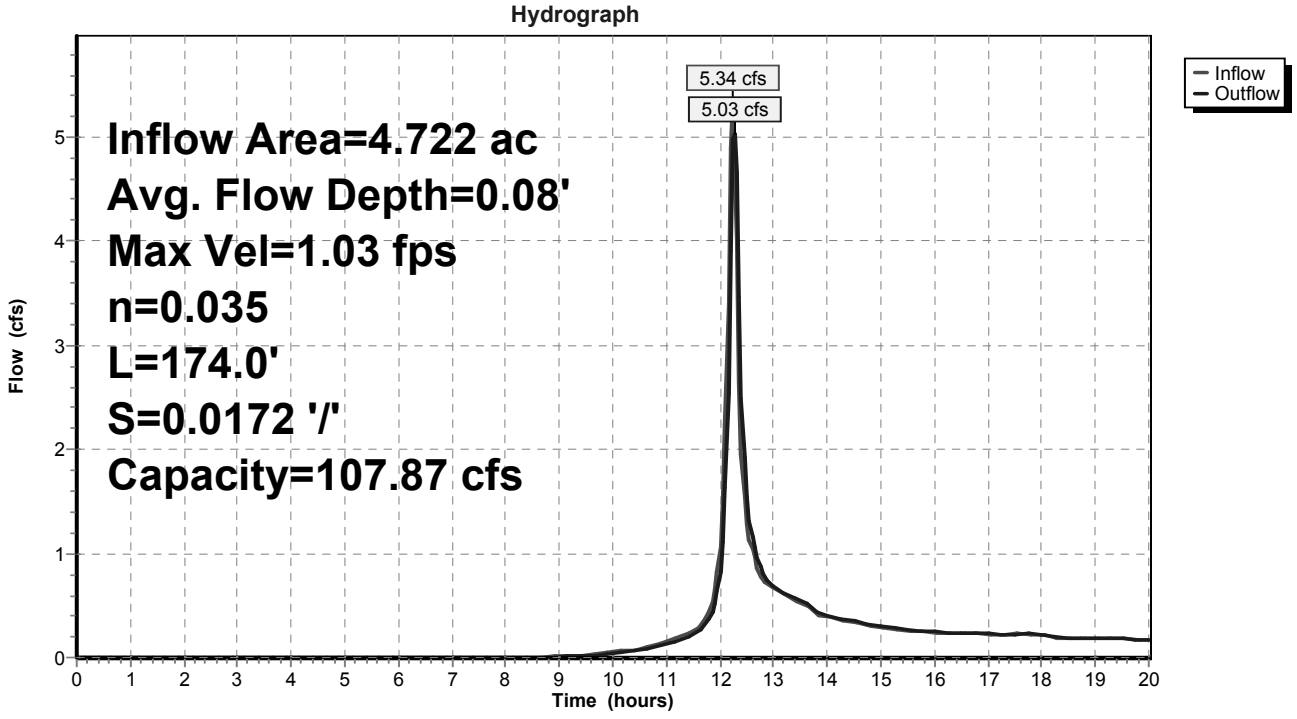
Inflow Area = 4.722 ac, 23.76% Impervious, Inflow Depth > 0.90" for 2_year event
Inflow = 5.34 cfs @ 12.24 hrs, Volume= 0.354 af
Outflow = 5.03 cfs @ 12.26 hrs, Volume= 0.351 af, Atten= 6%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 1.03 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 9.3 min

Peak Storage= 849 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 107.87 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 174.0' Slope= 0.0172 '/'
Inlet Invert= 145.00', Outlet Invert= 142.00'

## Reach R-SWALE2: (new Reach)



## Summary for Reach R-SWALE3: (new Reach)

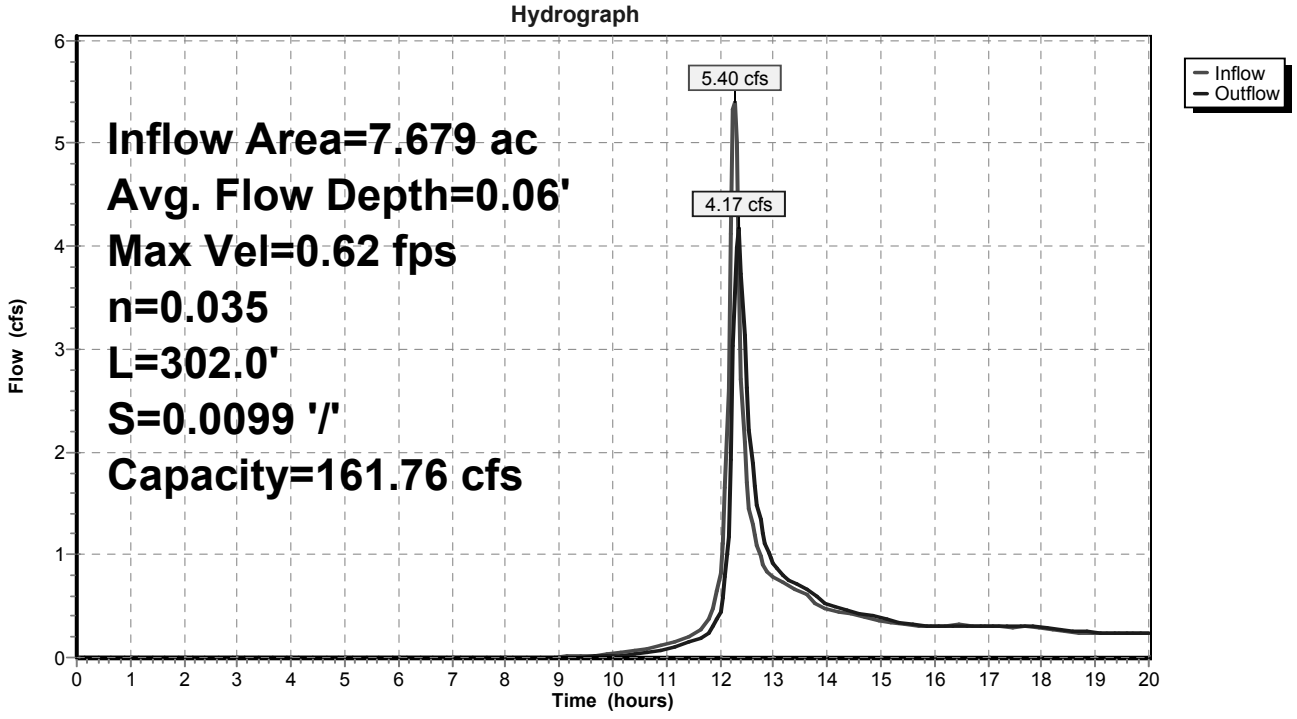
Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 0.63" for 2_year event
Inflow = 5.40 cfs @ 12.26 hrs, Volume= 0.403 af
Outflow = 4.17 cfs @ 12.34 hrs, Volume= 0.395 af, Atten= 23%, Lag= 4.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.62 fps, Min. Travel Time= 8.2 min
Avg. Velocity = 0.22 fps, Avg. Travel Time= 23.2 min

Peak Storage= 2,037 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50' Flow Area= 62.0 sf, Capacity= 161.76 cfs

120.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 128.00'
Length= 302.0' Slope= 0.0099 '/'
Inlet Invert= 142.00', Outlet Invert= 139.00'

## Reach R-SWALE3: (new Reach)



## Summary for Pond DET-1: 387

Inflow Area = 0.908 ac, 0.08% Impervious, Inflow Depth > 1.68" for 2_year event
Inflow = 1.83 cfs @ 12.15 hrs, Volume= 0.127 af
Outflow = 0.03 cfs @ 20.00 hrs, Volume= 0.001 af, Atten= 98%, Lag= 471.3 min
Primary = 0.03 cfs @ 20.00 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.31' @ 20.00 hrs Surf.Area= 4,736 sf Storage= 5,484 cf
Flood Elev= 170.00' Surf.Area= 5,344 sf Storage= 8,945 cf

Plug-Flow detention time= 1,048.5 min calculated for 0.001 af (1% of inflow)
Center-of-Mass det. time= 447.5 min ( 1,183.9 - 736.3 )

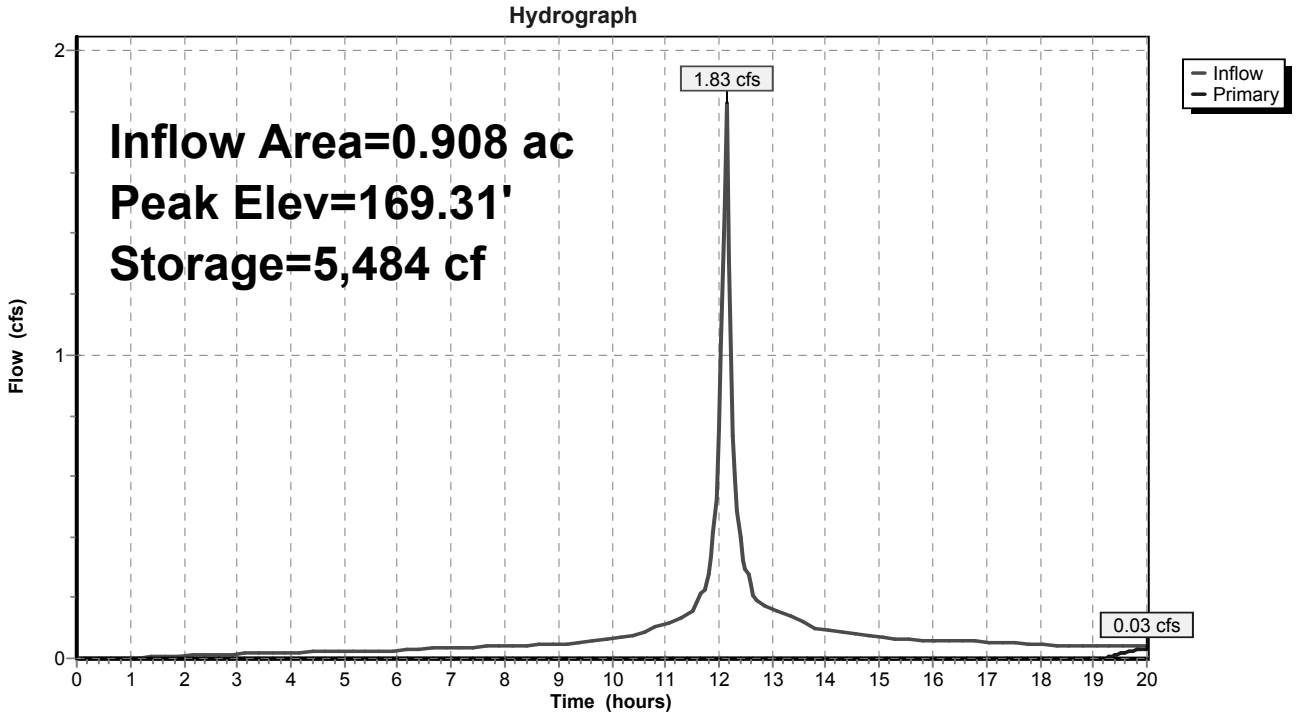
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 8,945 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 3,630 | 0 | 0 |
| 169.00 | 4,458 | 4,044 | 4,044 |
| 170.00 | 5,344 | 4,901 | 8,945 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 15.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.80' S= 0.0133 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.30' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.03 cfs @ 20.00 hrs HW=169.31' TW=149.67' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 0.03 cfs of 22.72 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 0.03 cfs @ 0.38 fps)

## Pond DET-1: 387



## Summary for Pond DET-2: 391

Inflow Area = 0.988 ac, 0.00% Impervious, Inflow Depth > 1.80" for 2_year event
Inflow = 2.36 cfs @ 12.15 hrs, Volume= 0.148 af
Outflow = 1.20 cfs @ 12.23 hrs, Volume= 0.109 af, Atten= 49%, Lag= 5.1 min
Primary = 1.20 cfs @ 12.23 hrs, Volume= 0.109 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.71' @ 12.23 hrs Surf.Area= 1,919 sf Storage= 2,537 cf
Flood Elev= 166.00' Surf.Area= 2,656 sf Storage= 5,490 cf

Plug-Flow detention time= 166.3 min calculated for 0.109 af (74% of inflow)
Center-of-Mass det. time= 87.1 min ( 823.2 - 736.1 )

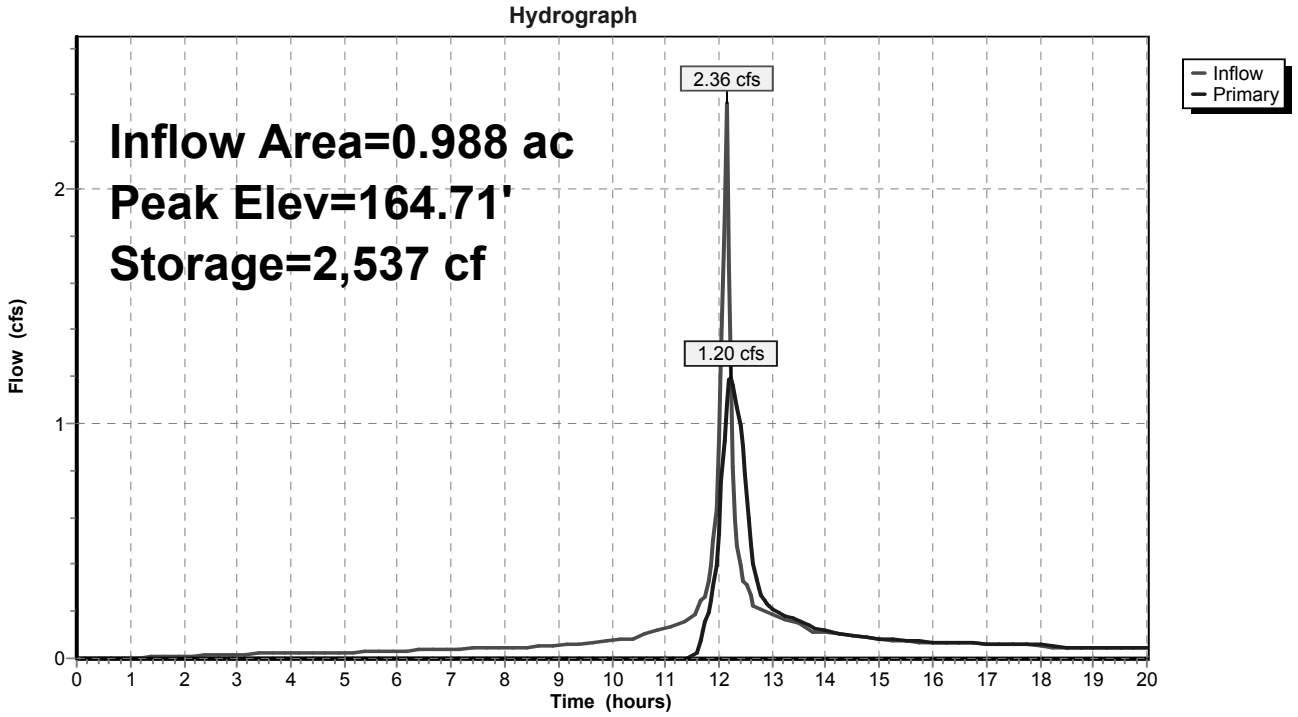
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 5,490 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 1,079 | 0 | 0 |
| 164.00 | 1,548 | 1,314 | 1,314 |
| 165.00 | 2,074 | 1,811 | 3,125 |
| 166.00 | 2,656 | 2,365 | 5,490 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 25.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.80' S= 0.0080 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 164.20' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.19 cfs @ 12.23 hrs HW=164.70' TW=158.50' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.19 cfs of 13.03 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.19 cfs @ 3.40 fps)

## Pond DET-2: 391



## Summary for Pond DET-3: 395

Inflow Area = 0.995 ac, 0.00% Impervious, Inflow Depth > 1.85" for 2_year event
Inflow = 2.23 cfs @ 12.15 hrs, Volume= 0.153 af
Outflow = 1.06 cfs @ 12.25 hrs, Volume= 0.099 af, Atten= 53%, Lag= 6.3 min
Primary = 1.06 cfs @ 12.25 hrs, Volume= 0.099 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.70' @ 12.25 hrs Surf.Area= 2,299 sf Storage= 3,167 cf
Flood Elev= 176.00' Surf.Area= 3,044 sf Storage= 6,640 cf

Plug-Flow detention time= 199.7 min calculated for 0.099 af (65% of inflow)
Center-of-Mass det. time= 103.9 min ( 839.2 - 735.2 )

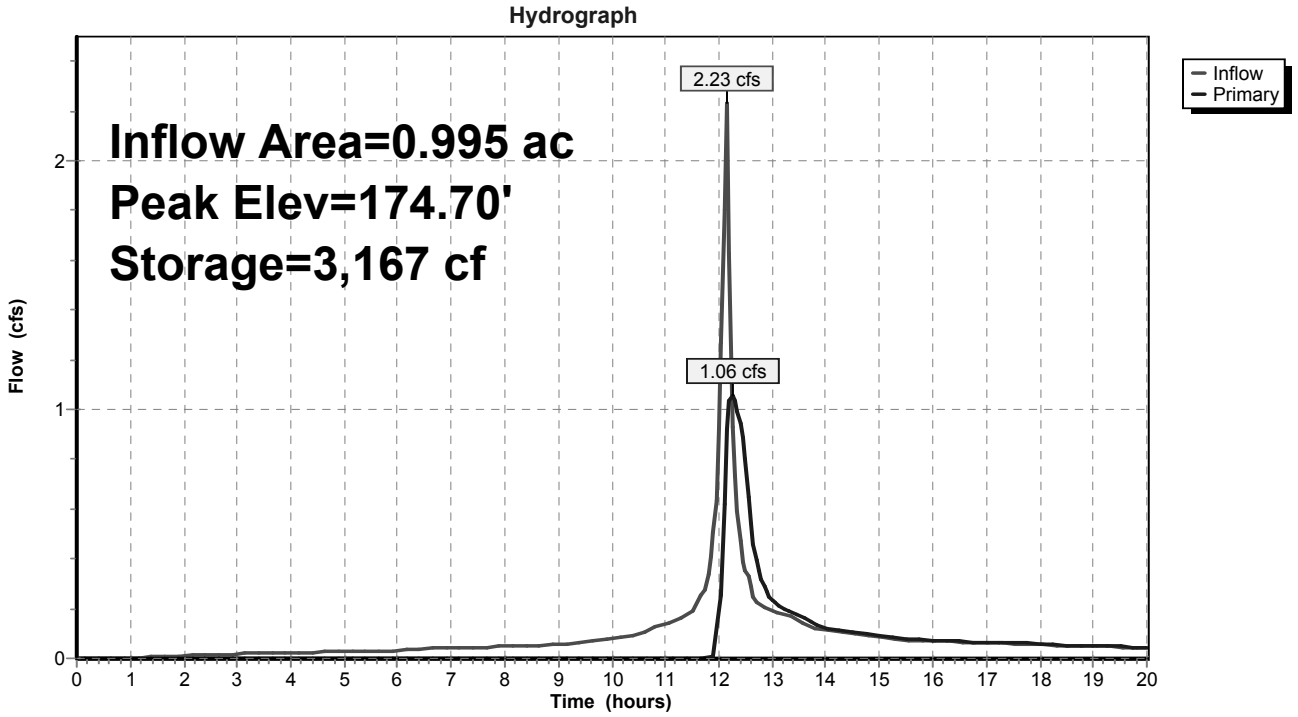
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 6,640 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 1,458 | 0 | 0 |
| 174.00 | 1,930 | 1,694 | 1,694 |
| 175.00 | 2,459 | 2,195 | 3,889 |
| 176.00 | 3,044 | 2,752 | 6,640 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 169.00' | **18.0" Round RCP_Round 18"**<br>L= 48.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.00' / 168.40' S= 0.0125 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 174.30' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.06 cfs @ 12.25 hrs HW=174.70' TW=162.40' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.06 cfs of 21.55 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.06 cfs @ 3.03 fps)

## Pond DET-3: 395



## Summary for Pond INF-ROOF-100: 368

Inflow Area = 0.166 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.60 cfs @ 12.14 hrs, Volume= 0.038 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.93' @ 20.00 hrs Surf.Area= 471 sf Storage= 1,639 cf

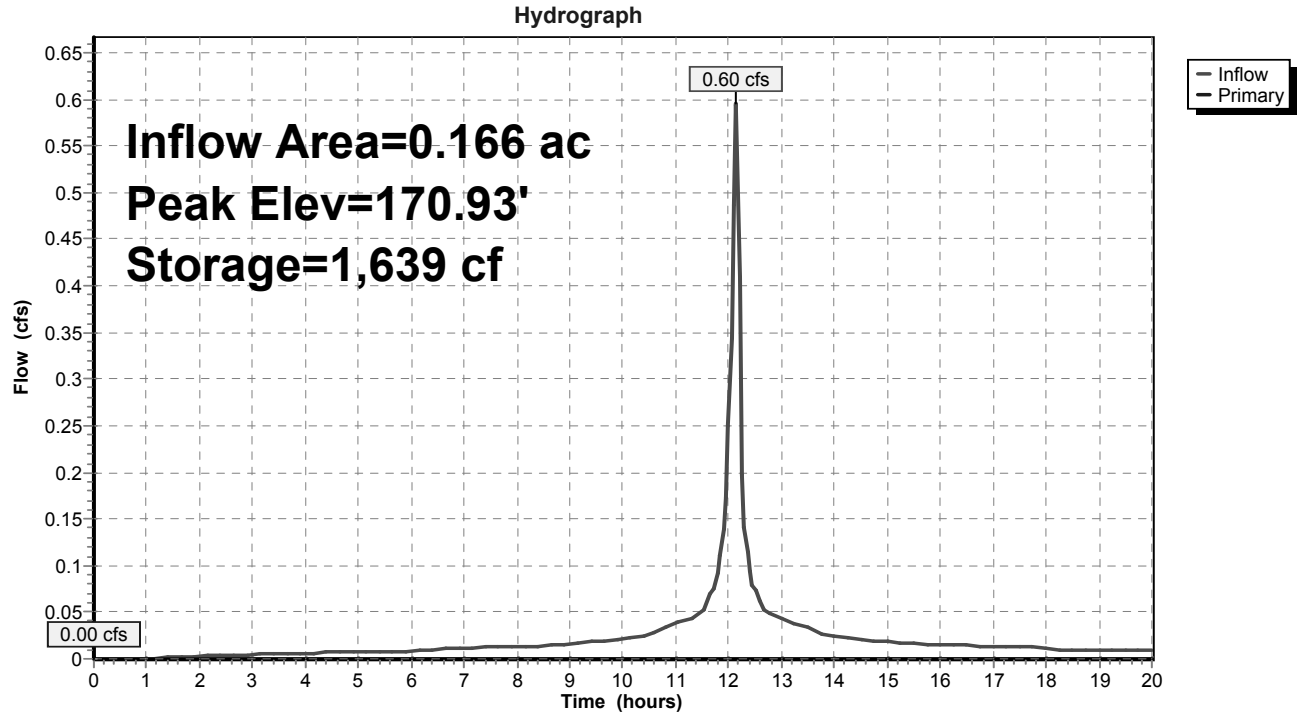
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=166.00' TW=162.50' (Dynamic Tailwater)
└**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-100: 368



## Summary for Pond INF-ROOF-110: 299

Inflow Area = 0.159 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.57 cfs @ 12.14 hrs, Volume= 0.036 af
Outflow = 0.55 cfs @ 12.15 hrs, Volume= 0.034 af, Atten= 3%, Lag= 0.5 min
Primary = 0.55 cfs @ 12.15 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.69' @ 12.15 hrs Surf.Area= 393 sf Storage= 109 cf
Flood Elev= 176.00' Surf.Area= 393 sf Storage= 2,620 cf

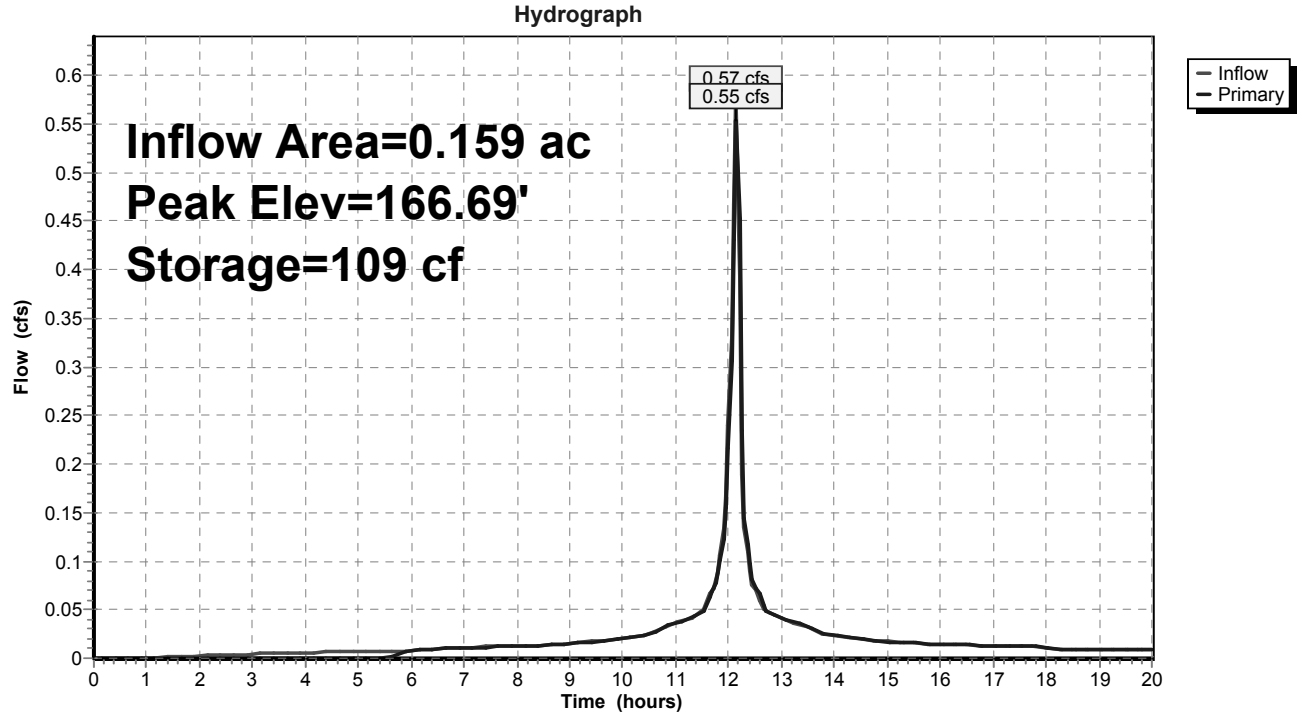
Plug-Flow detention time= 48.8 min calculated for 0.034 af (95% of inflow)
Center-of-Mass det. time= 27.0 min ( 746.5 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.55 cfs @ 12.15 hrs HW=166.69' TW=140.68' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.55 cfs @ 1.41 fps)

## Pond INF-ROOF-110: 299



## Summary for Pond INF-ROOF-114: 297

Inflow Area = 0.250 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.89 cfs @ 12.14 hrs, Volume= 0.057 af
Outflow = 0.02 cfs @ 17.63 hrs, Volume= 0.003 af, Atten= 98%, Lag= 329.0 min
Primary = 0.02 cfs @ 17.63 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.02' @ 17.63 hrs Surf.Area= 393 sf Storage= 2,319 cf
Flood Elev= 164.00' Surf.Area= 393 sf Storage= 2,312 cf

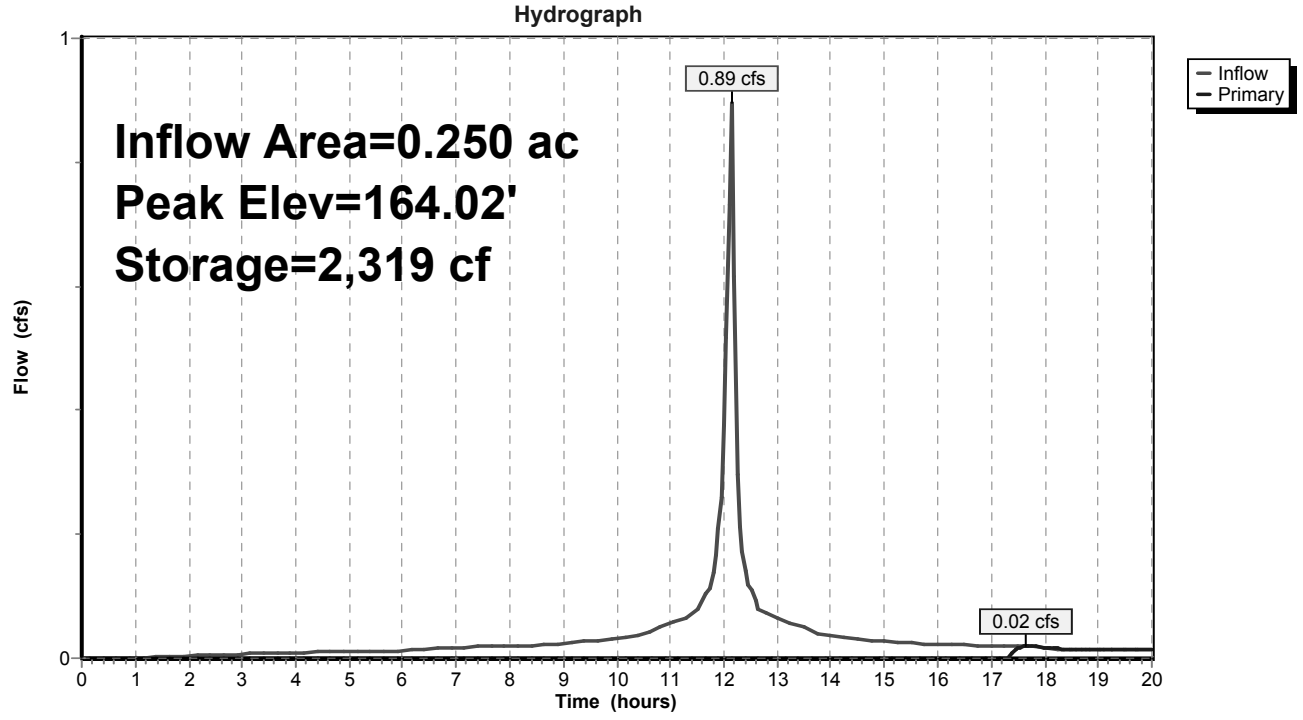
Plug-Flow detention time= 862.9 min calculated for 0.003 af (6% of inflow)
Center-of-Mass det. time= 399.5 min ( 1,118.9 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.02 cfs @ 17.63 hrs HW=164.02' TW=145.01' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.46 fps)

## Pond INF-ROOF-114: 297



## Summary for Pond INF-ROOF-117: 295

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.40 cfs @ 12.14 hrs, Volume= 0.026 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.53' @ 20.00 hrs Surf.Area= 236 sf Storage= 1,115 cf
Flood Elev= 168.00' Surf.Area= 236 sf Storage= 1,572 cf

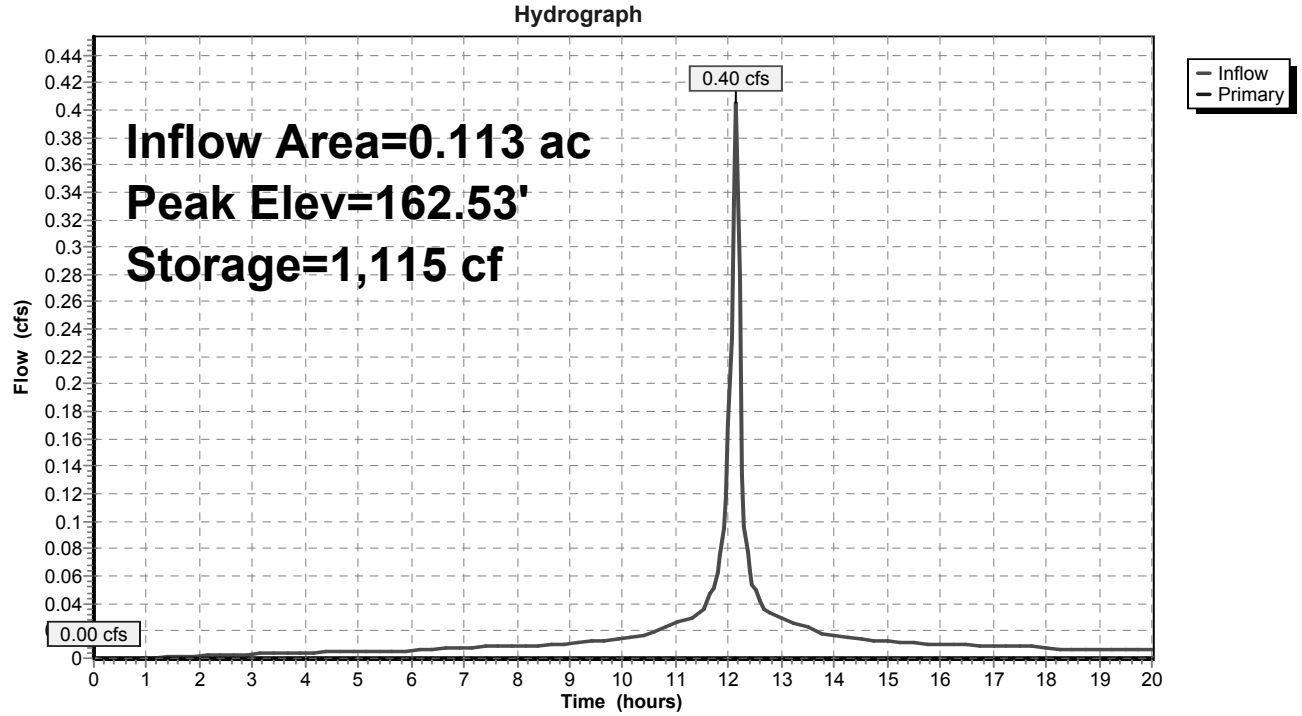
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=142.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-117: 295



## Summary for Pond INF-ROOF-123: 119

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 1.12 cfs @ 12.14 hrs, Volume= 0.071 af
Outflow = 0.03 cfs @ 16.43 hrs, Volume= 0.007 af, Atten= 98%, Lag= 257.1 min
Primary = 0.03 cfs @ 16.43 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 148.53' @ 16.43 hrs Surf.Area= 471 sf Storage= 2,784 cf
Flood Elev= 150.00' Surf.Area= 471 sf Storage= 3,144 cf

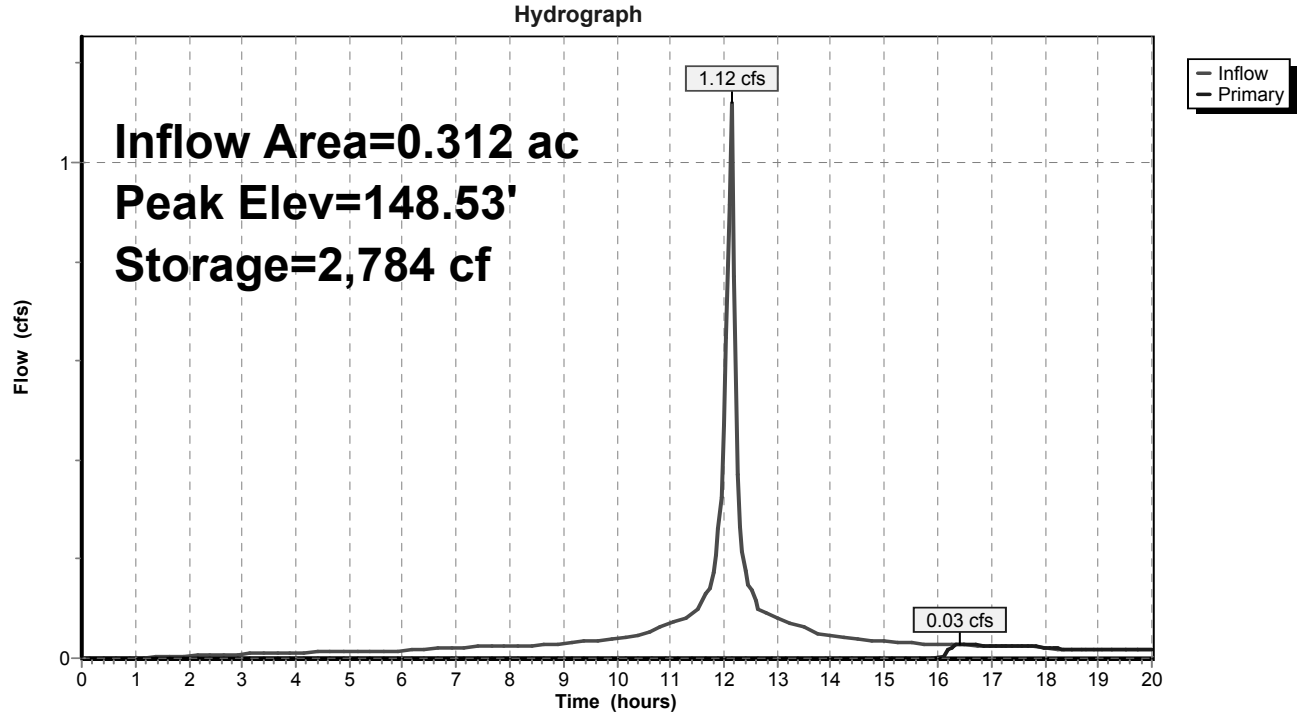
Plug-Flow detention time= 757.2 min calculated for 0.007 af (10% of inflow)
Center-of-Mass det. time= 356.7 min ( 1,076.1 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.50' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 141.50' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.03 cfs @ 16.43 hrs HW=148.53' TW=142.01' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.52 fps)

## Pond INF-ROOF-123: 119



## Summary for Pond INF-ROOF-13: 384

Inflow Area = 0.083 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.30 cfs @ 12.14 hrs, Volume= 0.019 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 179.81' @ 20.00 hrs Surf.Area= 314 sf Storage= 819 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

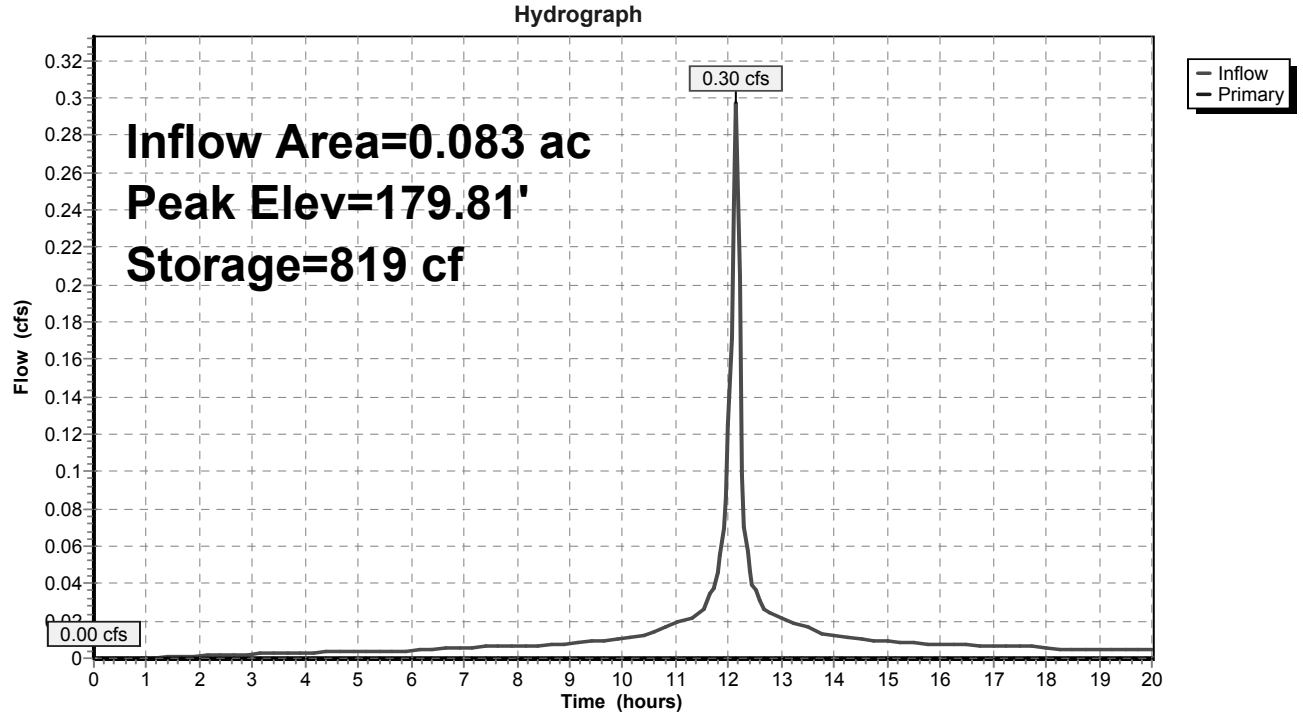
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=176.00' TW=171.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-13: 384



## Summary for Pond INF-ROOF-16: 375

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.40 cfs @ 12.14 hrs, Volume= 0.026 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 181.02' @ 20.00 hrs Surf.Area= 314 sf Storage= 1,115 cf
Flood Elev= 188.00' Surf.Area= 314 sf Storage= 2,096 cf

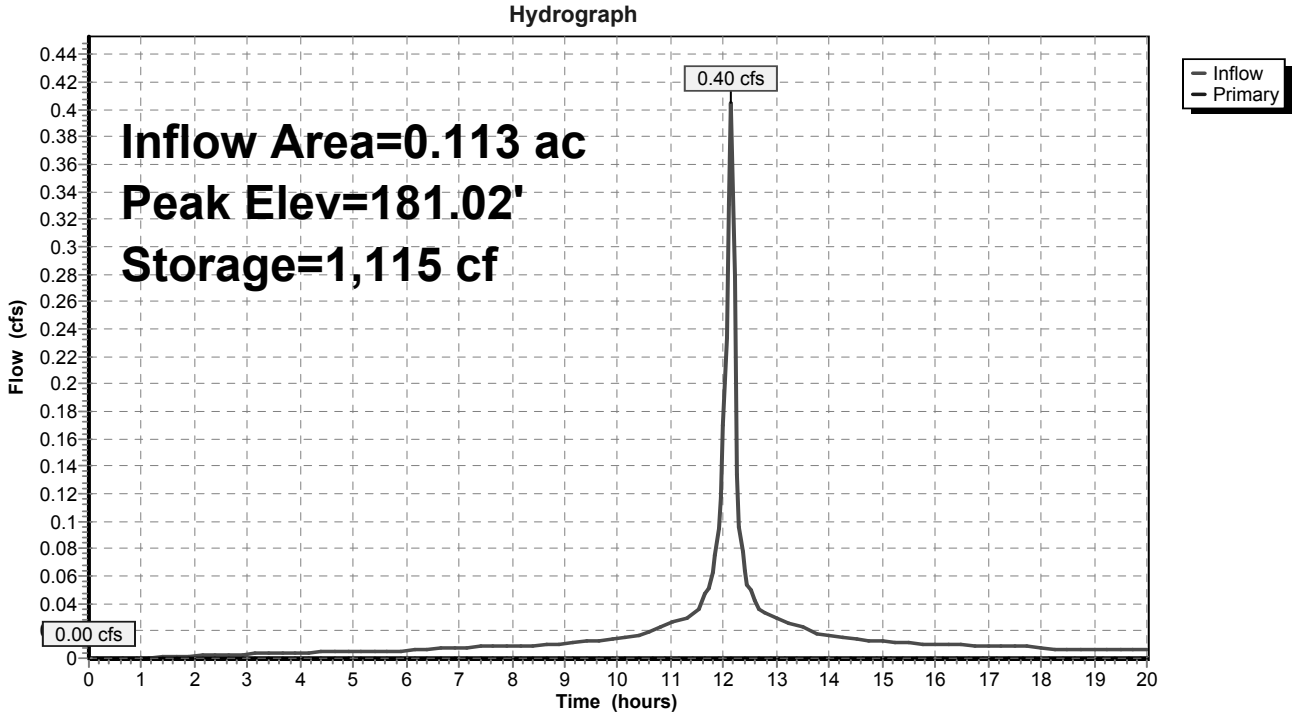
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=176.00' TW=167.25' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-16: 375



## Summary for Pond INF-ROOF-19: 377

Inflow Area = 0.138 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.50 cfs @ 12.14 hrs, Volume= 0.031 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 177.87' @ 20.00 hrs Surf.Area= 236 sf Storage= 1,364 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

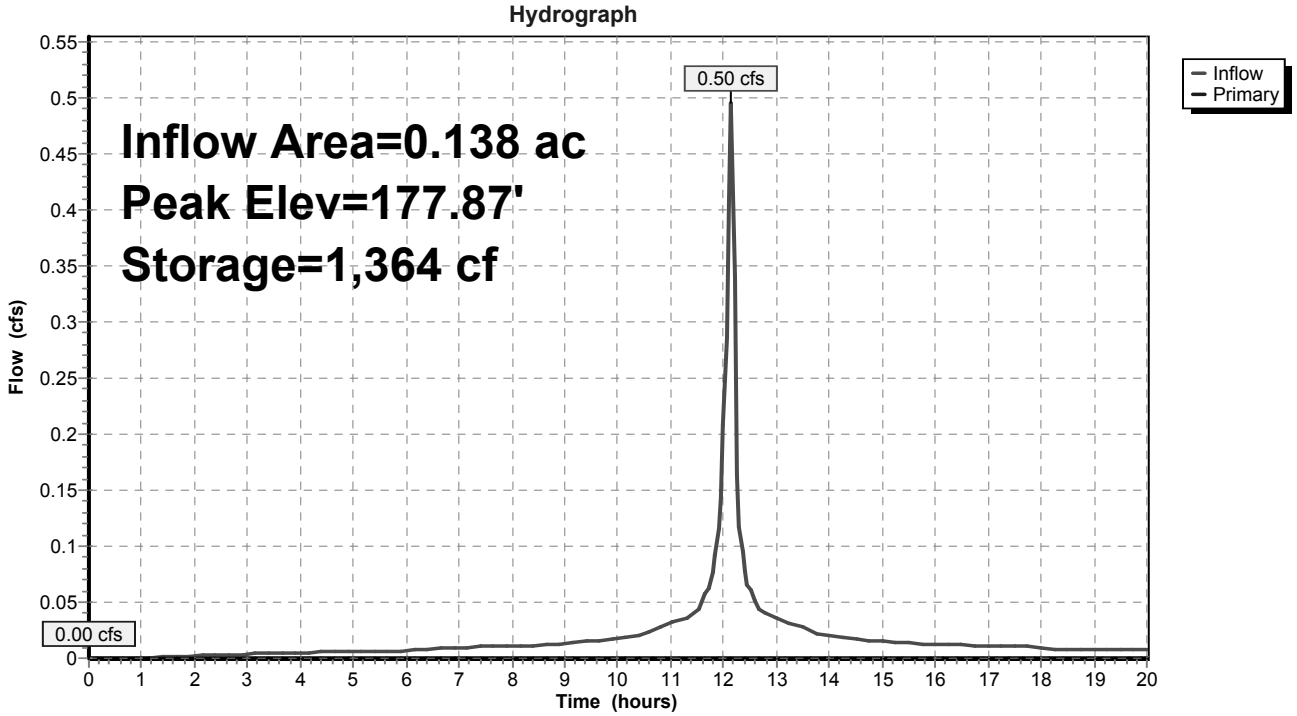
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 171.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 178.50' | **36.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=170.00' TW=167.25' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

### Pond INF-ROOF-19: 377



## Summary for Pond INF-ROOF-23: 372

Inflow Area = 0.134 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.48 cfs @ 12.14 hrs, Volume= 0.030 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 181.84' @ 20.00 hrs Surf.Area= 314 sf Storage= 1,319 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

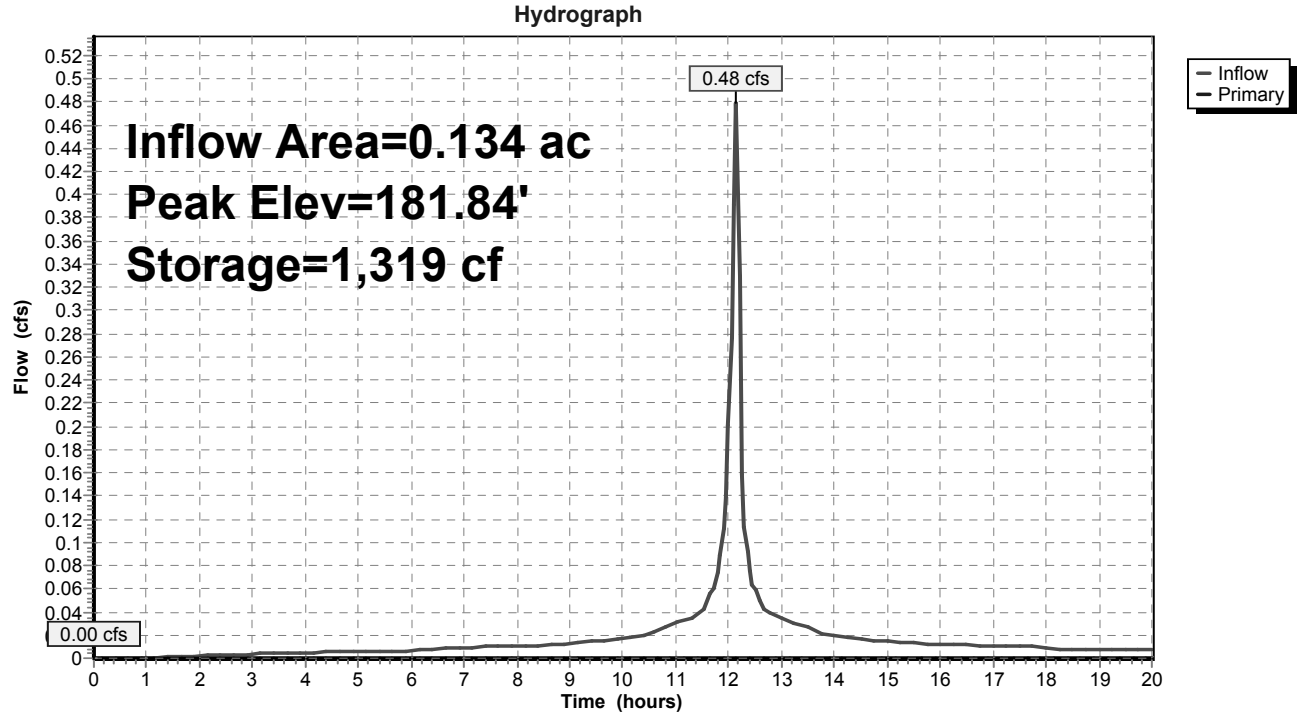
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=176.00' TW=167.25' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-23: 372



## Summary for Pond INF-ROOF-25: 382

Inflow Area = 0.107 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.21' @ 20.00 hrs Surf.Area= 236 sf Storage= 1,056 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

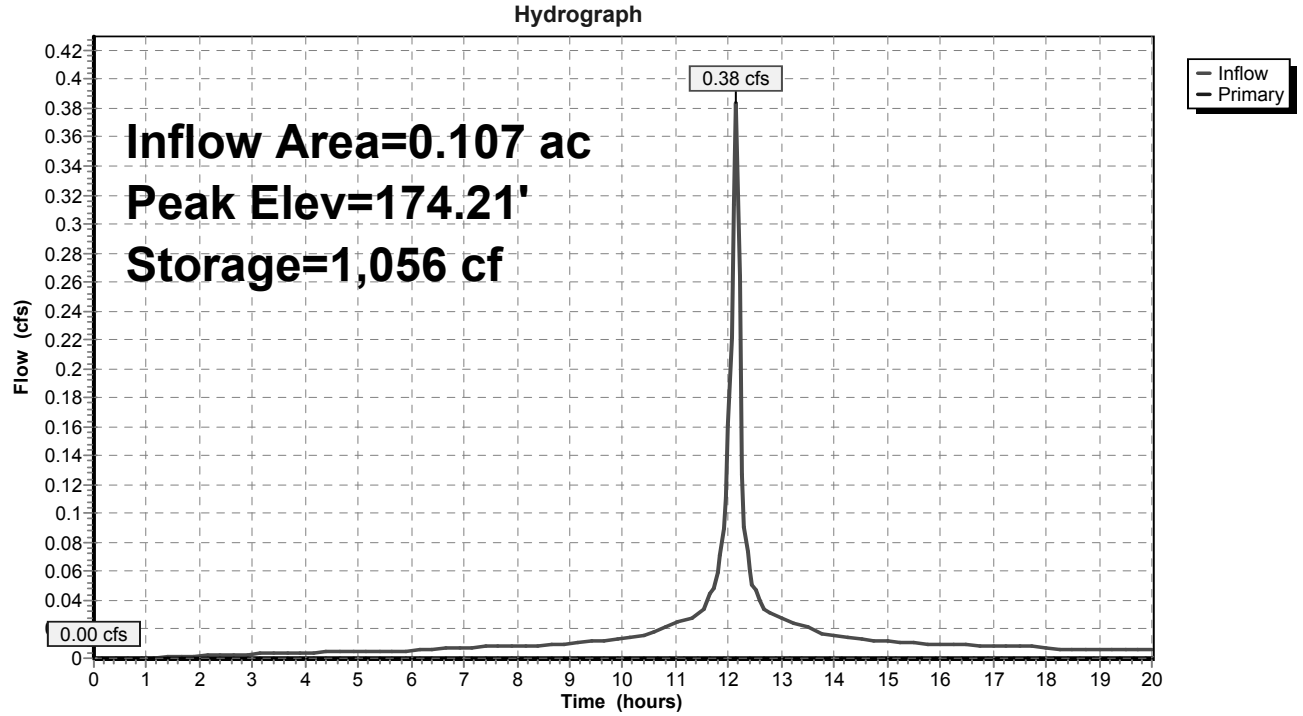
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 176.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=168.00' TW=167.25' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-25: 382



## Summary for Pond INF-ROOF-28:

Inflow Area = 0.274 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.98 cfs @ 12.14 hrs, Volume= 0.062 af
Outflow = 0.93 cfs @ 12.15 hrs, Volume= 0.037 af, Atten= 6%, Lag= 0.3 min
Primary = 0.93 cfs @ 12.15 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.77' @ 12.15 hrs Surf.Area= 236 sf Storage= 1,161 cf
Flood Elev= 177.00' Surf.Area= 236 sf Storage= 1,572 cf

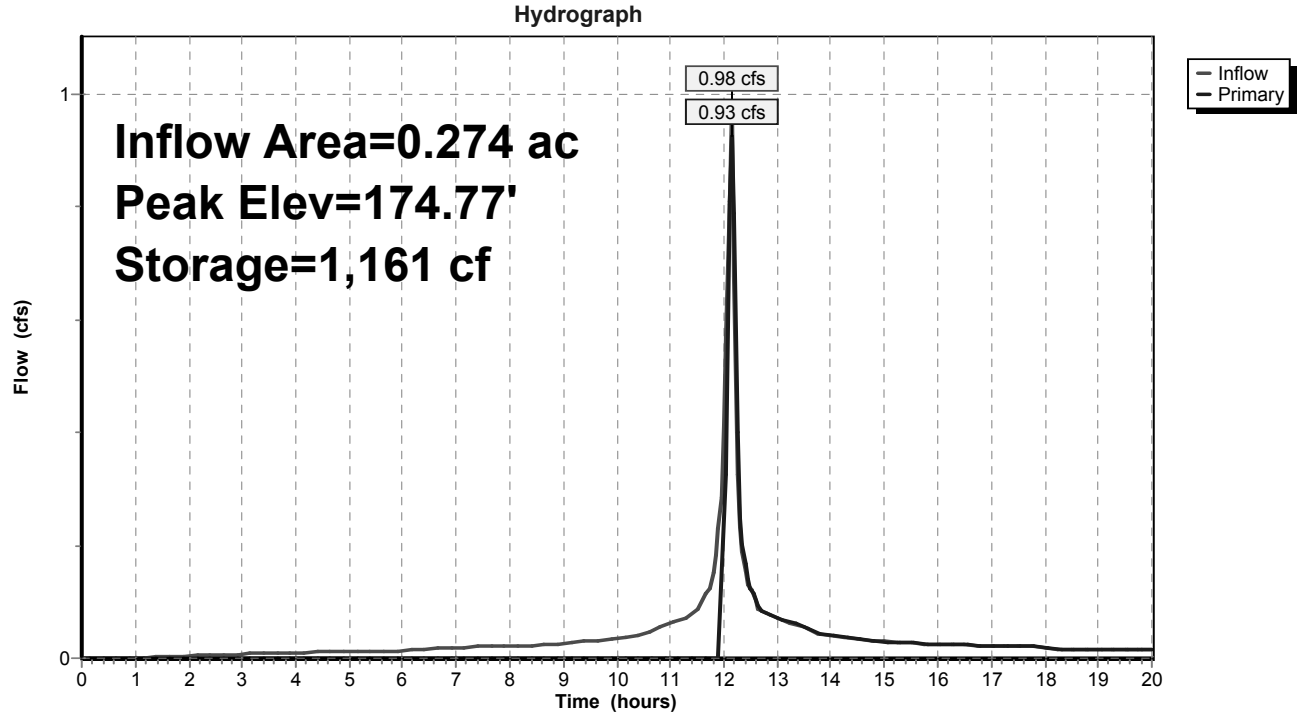
Plug-Flow detention time= 210.3 min calculated for 0.037 af (59% of inflow)
Center-of-Mass det. time= 107.2 min ( 826.7 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.92 cfs @ 12.15 hrs HW=174.77' TW=155.65' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.92 cfs @ 1.68 fps)

## Pond INF-ROOF-28:



## Summary for Pond INF-ROOF-3: 370

Inflow Area = 0.361 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 1.29 cfs @ 12.14 hrs, Volume= 0.082 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 162.92' @ 20.00 hrs Surf.Area= 707 sf Storage= 3,566 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

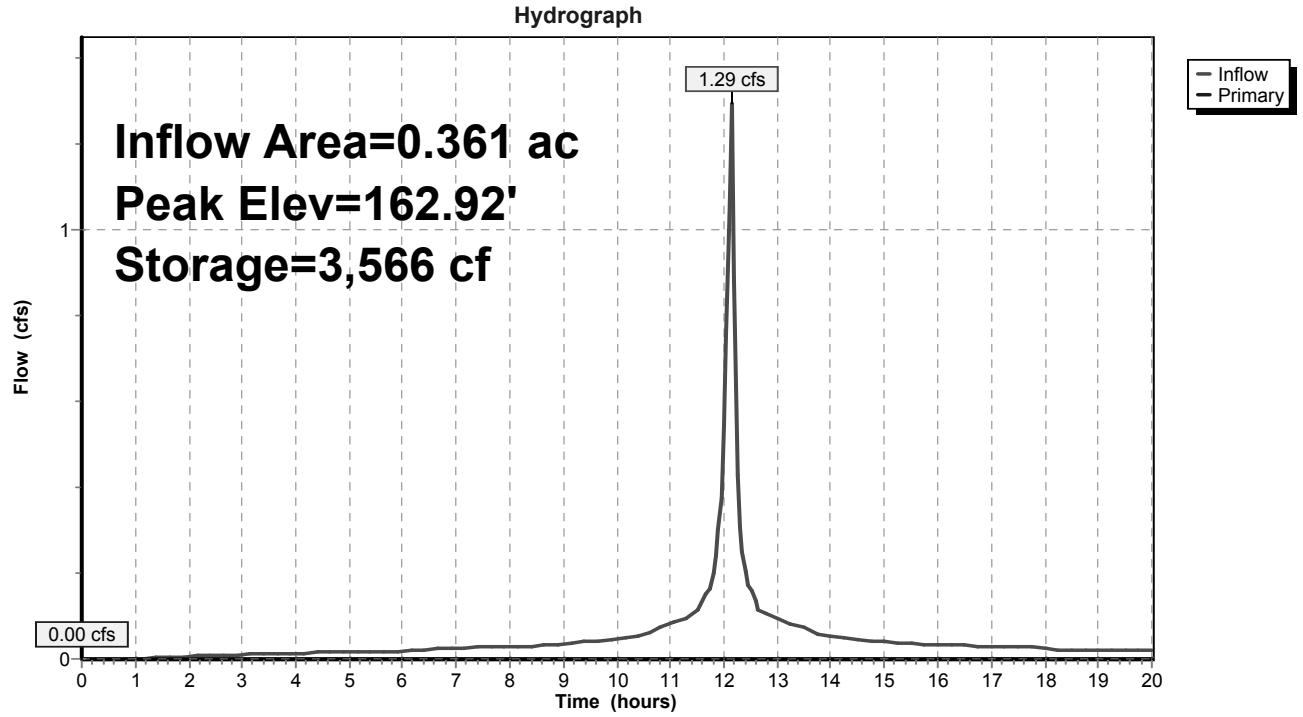
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=167.00' (Dynamic Tailwater)
└**1=Orifice/Grate** ( Controls 0.00 cfs)

### Pond INF-ROOF-3: 370



## Summary for Pond INF-ROOF-36: 366

Inflow Area = 0.213 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.76 cfs @ 12.14 hrs, Volume= 0.048 af
Outflow = 0.02 cfs @ 20.00 hrs, Volume= 0.000 af, Atten= 97%, Lag= 471.4 min
Primary = 0.02 cfs @ 20.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 314 sf Storage= 0 cf
Peak Elev= 190.02' @ 20.00 hrs Surf.Area= 314 sf Storage= 2,096 cf
Flood Elev= 157.00' Surf.Area= 314 sf Storage= 126 cf

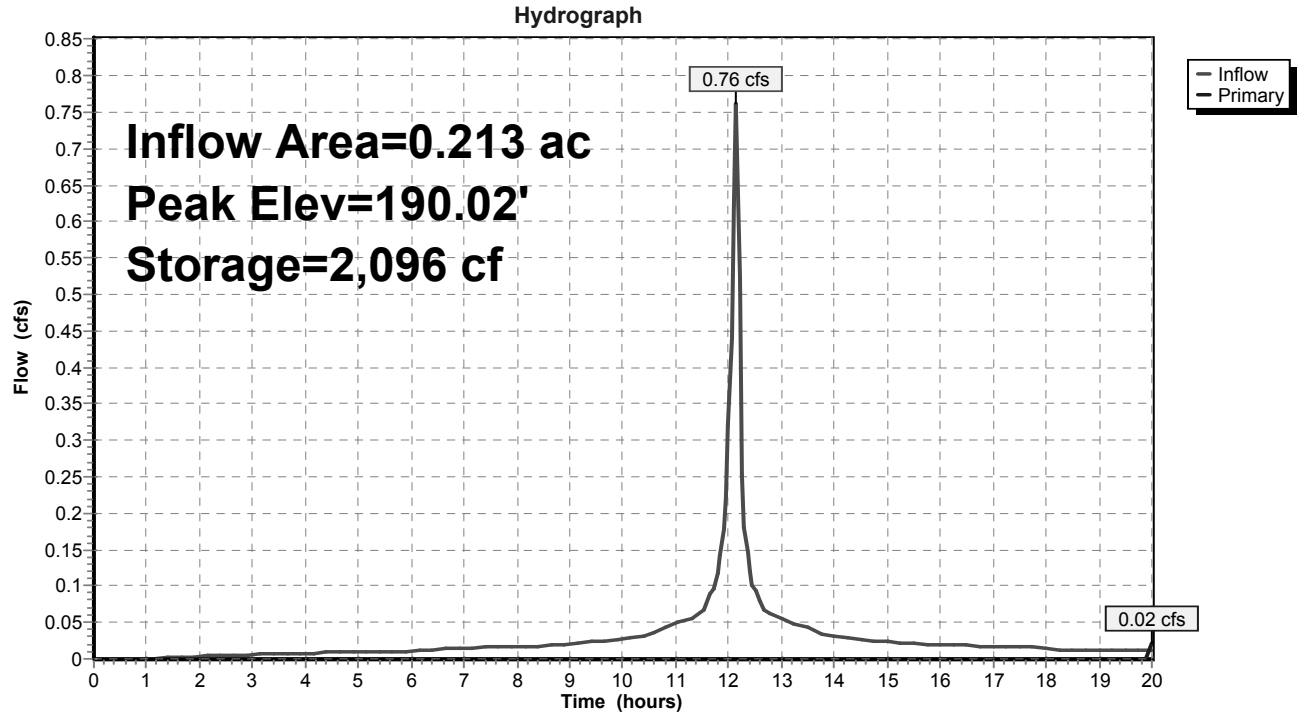
Plug-Flow detention time= 1,109.6 min calculated for 0.000 af (0% of inflow)
Center-of-Mass det. time= 480.2 min ( 1,199.7 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.02 cfs @ 20.00 hrs HW=190.02' TW=168.84' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.48 fps)

## Pond INF-ROOF-36: 366



## Summary for Pond INF-ROOF-43: 364

Inflow Area = 0.106 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.38 cfs @ 12.14 hrs, Volume= 0.024 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 162.15' @ 20.00 hrs Surf.Area= 236 sf Storage= 1,045 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

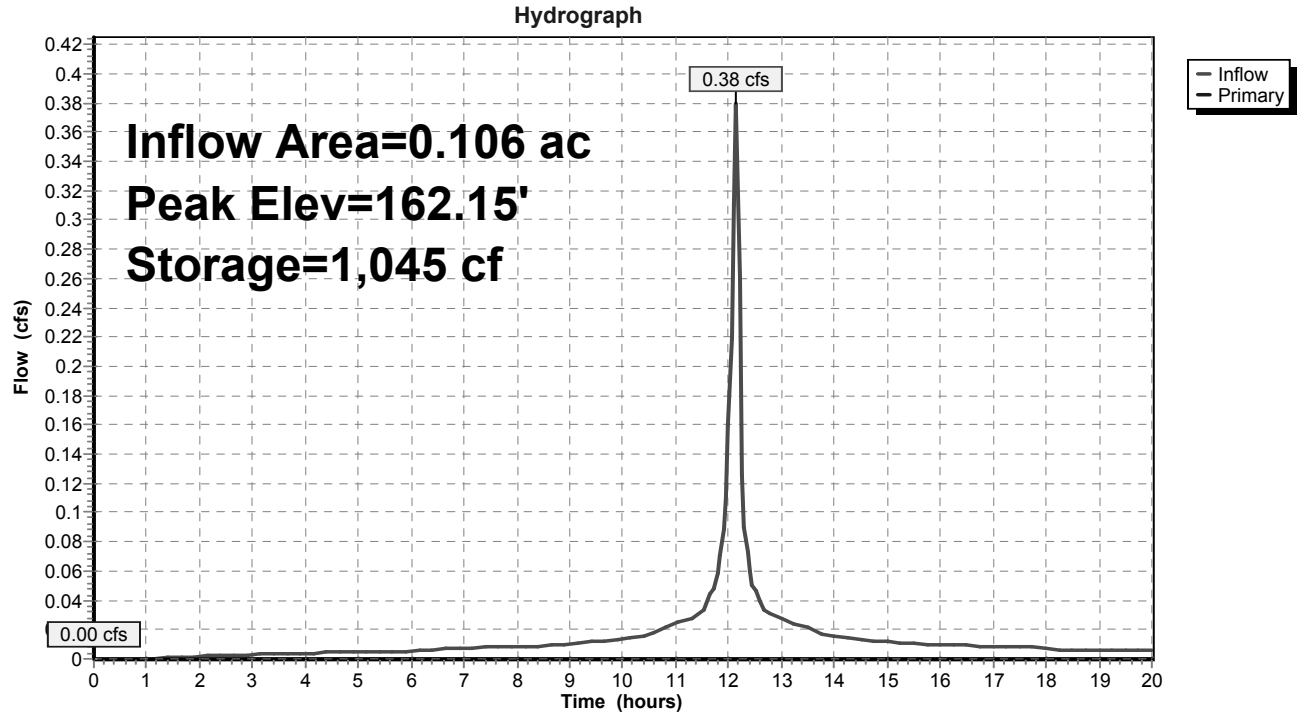
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=167.00' (Dynamic Tailwater)
└**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-43: 364



## Summary for Pond INF-ROOF-53: 362

Inflow Area = 0.174 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.62 cfs @ 12.14 hrs, Volume= 0.039 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 162.06' @ 20.00 hrs Surf.Area= 393 sf Storage= 1,716 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

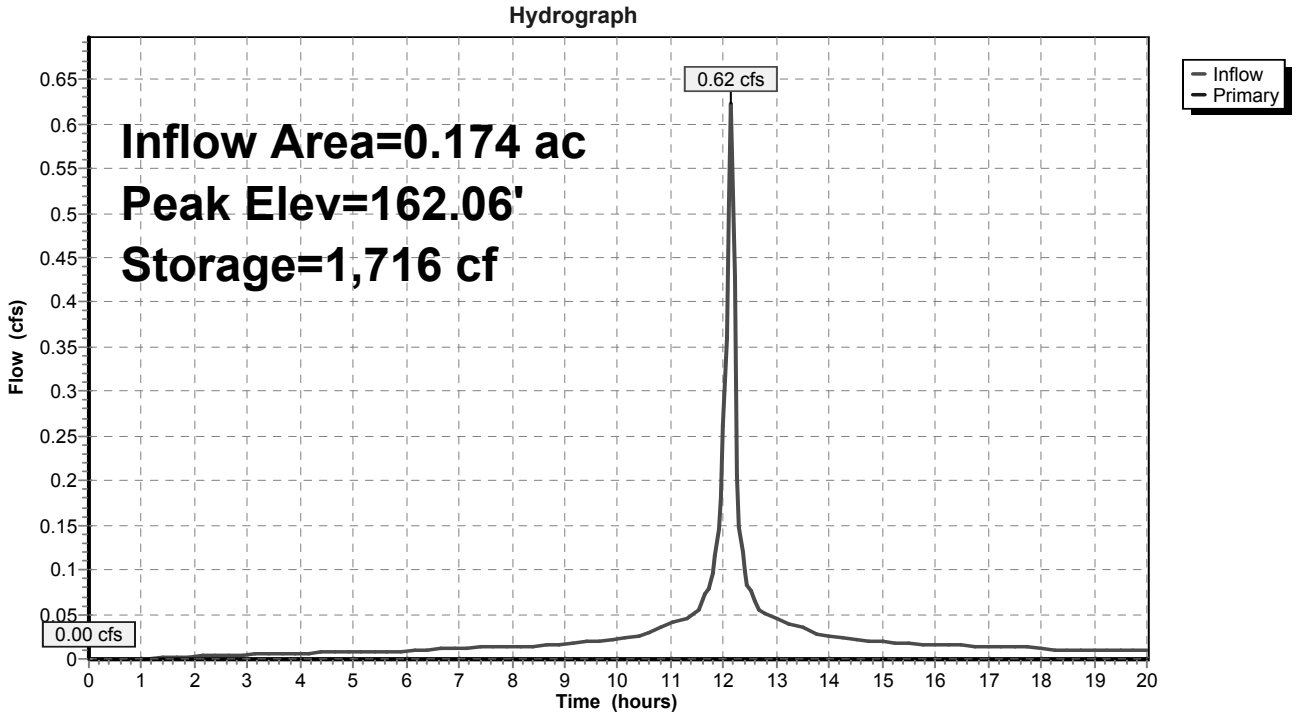
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=167.00' (Dynamic Tailwater)
↳**1=Orifice/Grate** ( Controls 0.00 cfs)

### Pond INF-ROOF-53: 362



## Summary for Pond INF-ROOF-55: 314

Inflow Area = 0.248 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.89 cfs @ 12.14 hrs, Volume= 0.056 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 163.11' @ 20.00 hrs Surf.Area= 471 sf Storage= 2,446 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

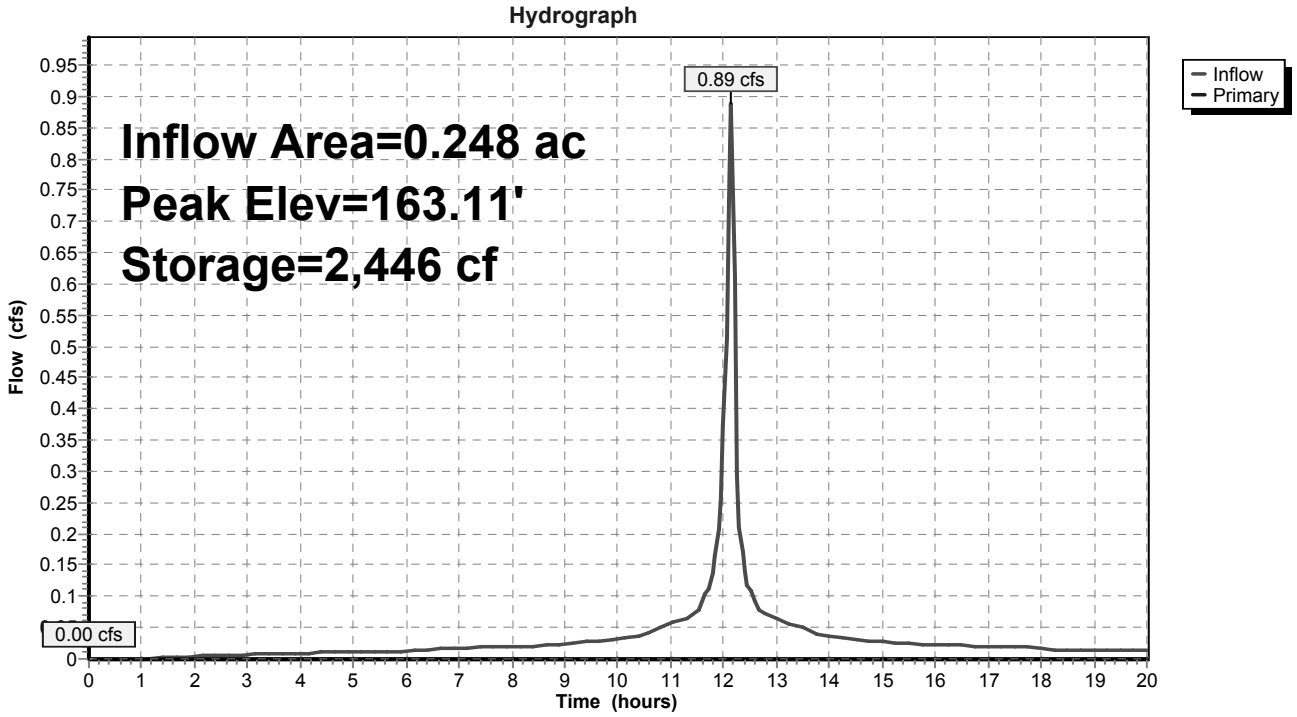
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=170.00' (Dynamic Tailwater)
└**1=Orifice/Grate** ( Controls 0.00 cfs)

### Pond INF-ROOF-55: 314



## Summary for Pond INF-ROOF-62: 310

Inflow Area = 0.135 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.48 cfs @ 12.14 hrs, Volume= 0.031 af
Outflow = 0.04 cfs @ 13.56 hrs, Volume= 0.007 af, Atten= 93%, Lag= 84.8 min
Primary = 0.04 cfs @ 13.56 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.03' @ 13.55 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

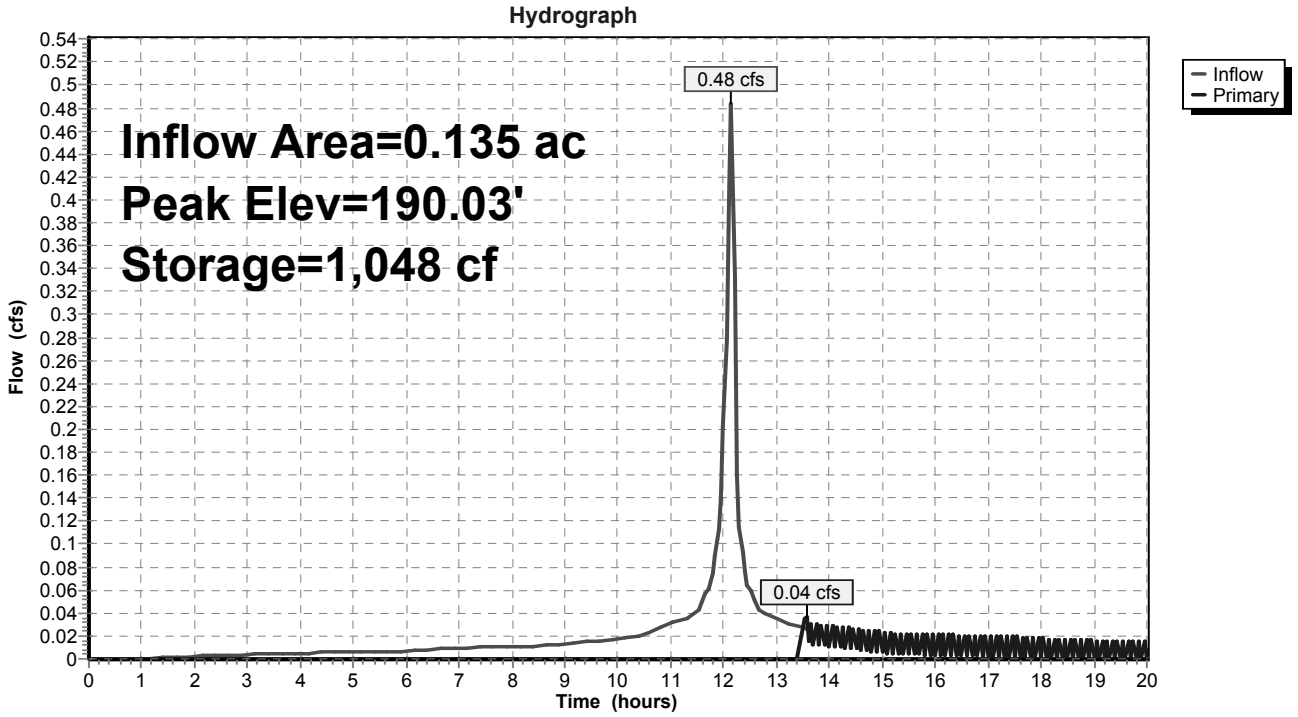
Plug-Flow detention time= 518.1 min calculated for 0.007 af (21% of inflow)
Center-of-Mass det. time= 249.8 min ( 969.2 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.03 cfs @ 13.56 hrs HW=190.03' TW=171.19' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.55 fps)

## Pond INF-ROOF-62: 310



## Summary for Pond INF-ROOF-63: 308

Inflow Area = 0.511 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 1.83 cfs @ 12.14 hrs, Volume= 0.116 af
Outflow = 1.00 cfs @ 12.30 hrs, Volume= 0.044 af, Atten= 45%, Lag= 9.4 min
Primary = 1.00 cfs @ 12.30 hrs, Volume= 0.044 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.29' @ 12.30 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

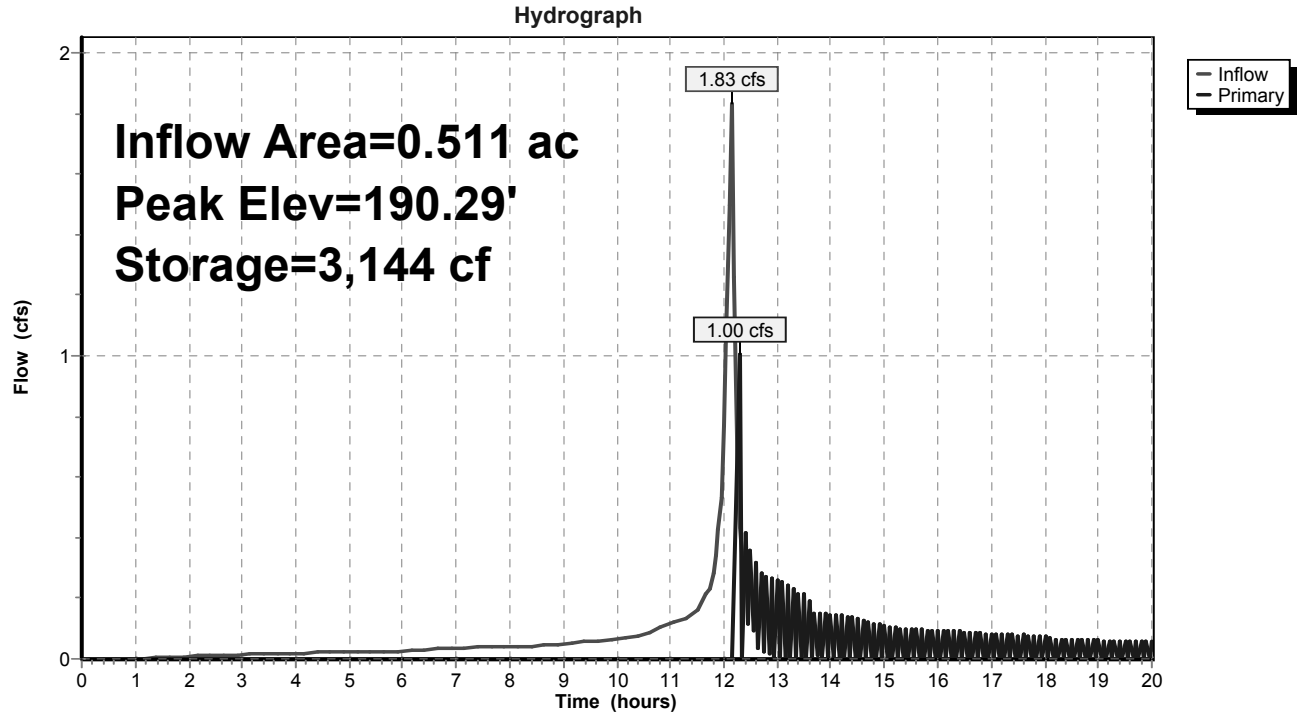
Plug-Flow detention time= 326.8 min calculated for 0.044 af (38% of inflow)
Center-of-Mass det. time= 161.7 min ( 881.1 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.00 cfs @ 12.30 hrs HW=190.29' TW=0.00' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.00 cfs @ 1.73 fps)

### Pond INF-ROOF-63: 308



## Summary for Pond INF-ROOF-67: 316

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.74 cfs @ 12.14 hrs, Volume= 0.047 af
Outflow = 0.79 cfs @ 12.19 hrs, Volume= 0.023 af, Atten= 0%, Lag= 2.7 min
Primary = 0.79 cfs @ 12.19 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.24' @ 12.20 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

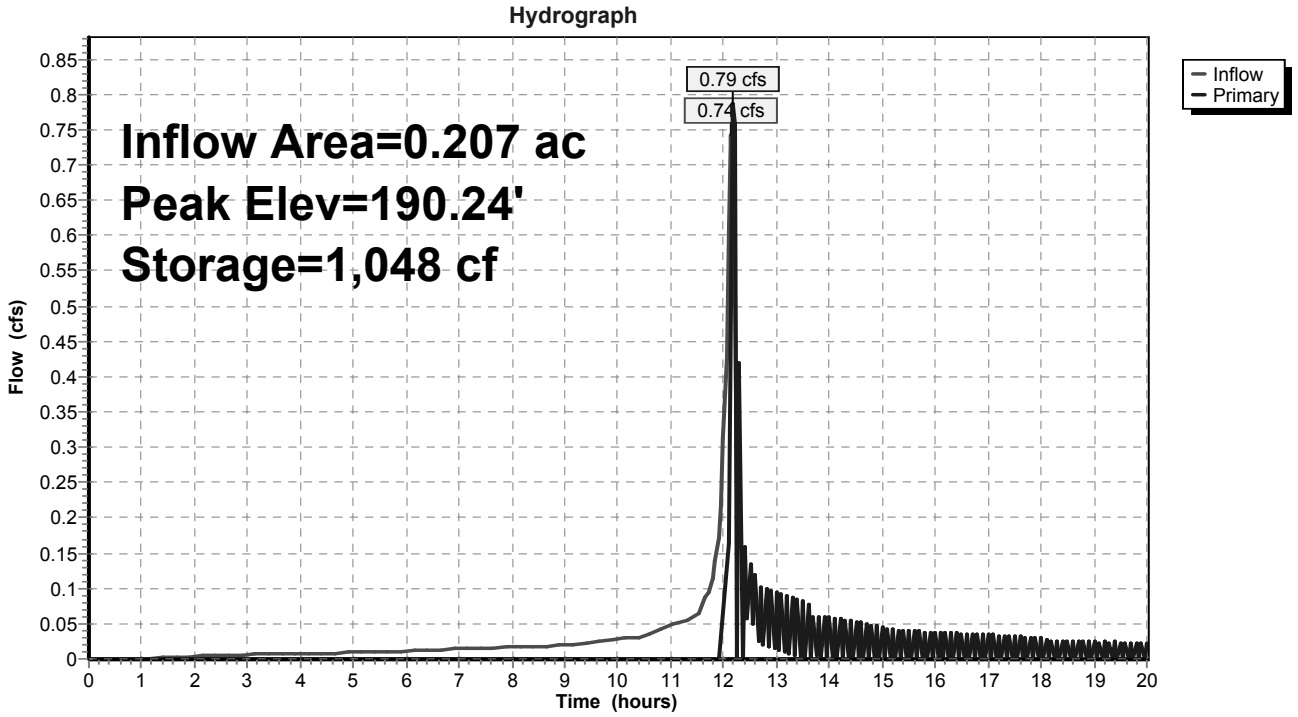
Plug-Flow detention time= 253.9 min calculated for 0.023 af (49% of inflow)
Center-of-Mass det. time= 127.7 min ( 847.1 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.69 cfs @ 12.19 hrs HW=190.23' TW=170.39' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.69 cfs @ 1.53 fps)

## Pond INF-ROOF-67: 316



## Summary for Pond INF-ROOF-71: 312

Inflow Area = 0.364 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 1.30 cfs @ 12.14 hrs, Volume= 0.083 af
Outflow = 0.17 cfs @ 12.90 hrs, Volume= 0.022 af, Atten= 87%, Lag= 45.4 min
Primary = 0.17 cfs @ 12.90 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.09' @ 12.90 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

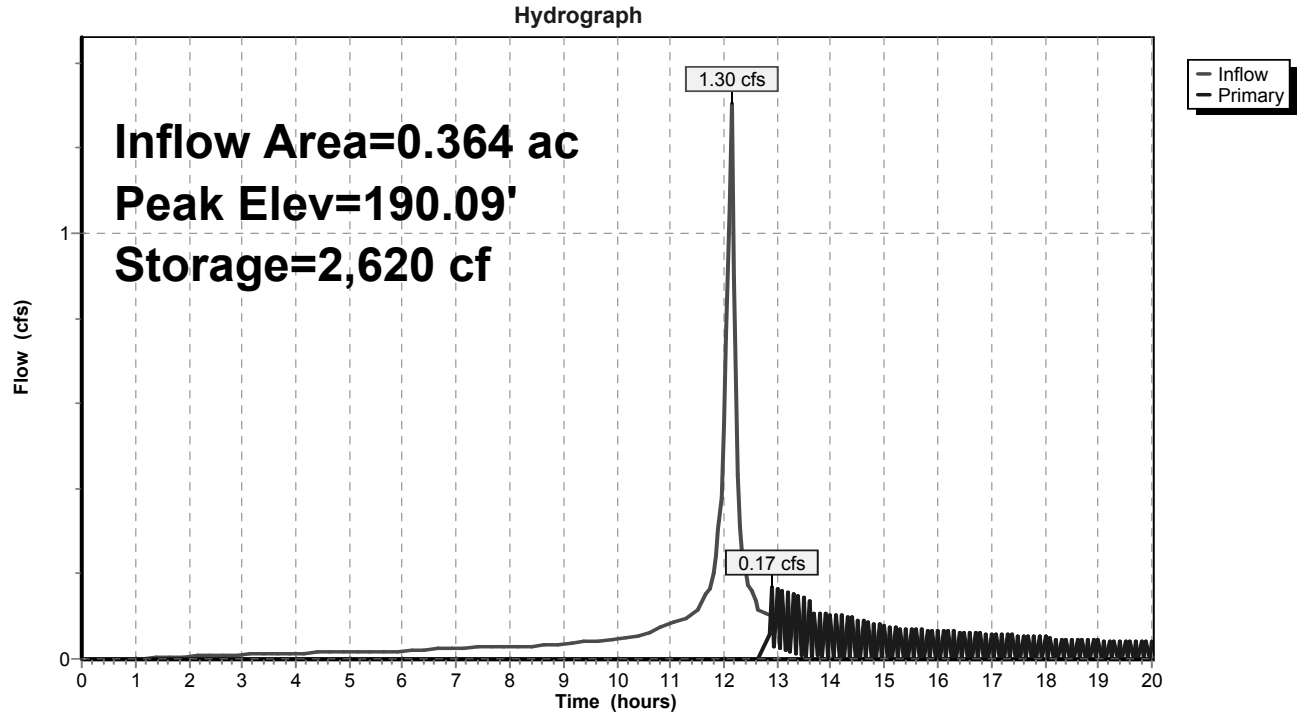
Plug-Flow detention time= 435.8 min calculated for 0.022 af (27% of inflow)
Center-of-Mass det. time= 212.9 min ( 932.3 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.17 cfs @ 12.90 hrs HW=190.09' TW=154.40' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.17 cfs @ 0.95 fps)

### Pond INF-ROOF-71: 312



## Summary for Pond INF-ROOF-76: 318

Inflow Area = 0.204 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.73 cfs @ 12.14 hrs, Volume= 0.046 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 163.02' @ 20.00 hrs Surf.Area= 393 sf Storage= 2,010 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

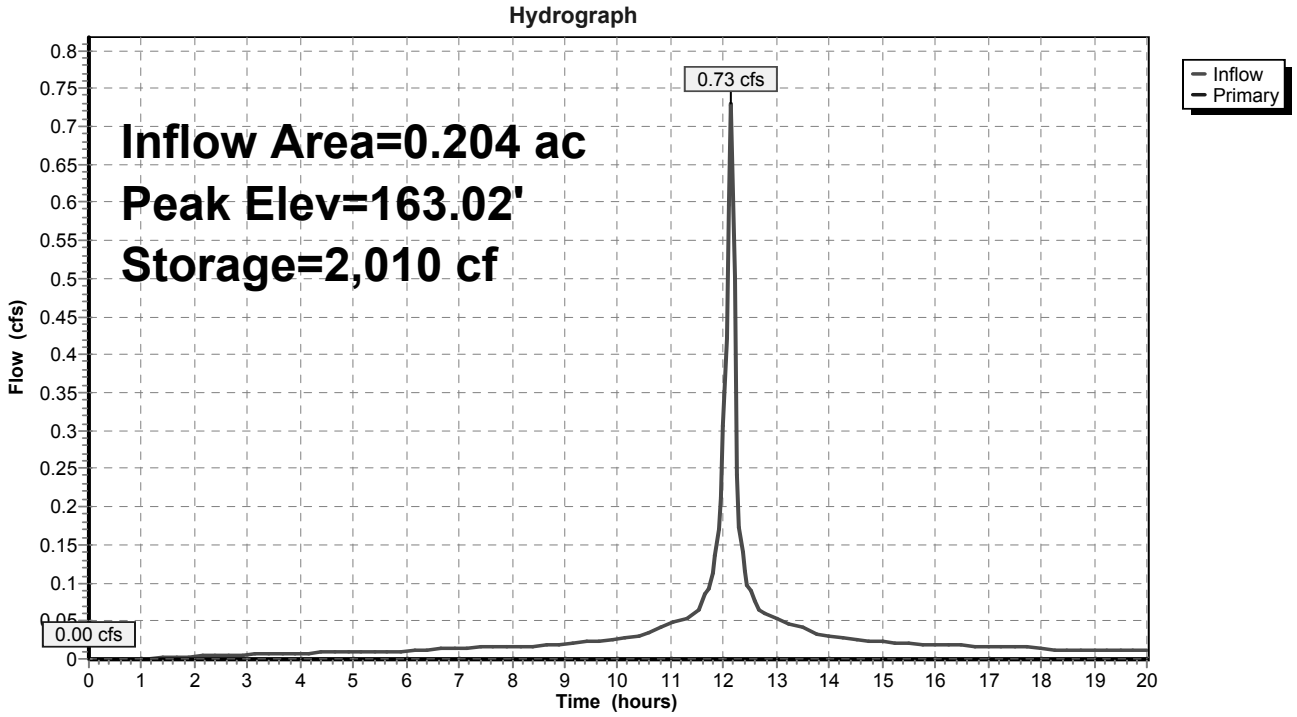
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=170.00' (Dynamic Tailwater)
↳**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-76: 318



## Summary for Pond INF-ROOF-89: 338

Inflow Area = 0.317 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 1.13 cfs @ 12.14 hrs, Volume= 0.072 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 162.13' @ 20.00 hrs Surf.Area= 707 sf Storage= 3,126 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

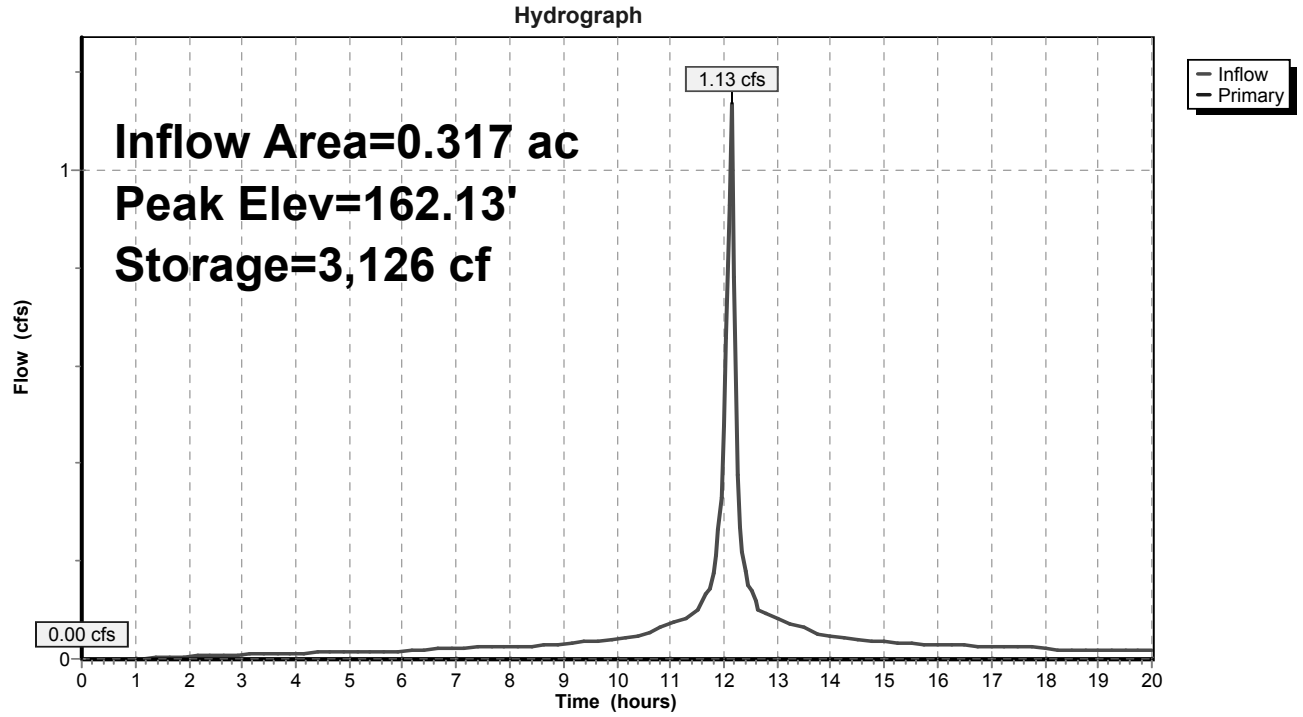
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=153.00' (Dynamic Tailwater)
└**1=Orifice/Grate** ( Controls 0.00 cfs)

### Pond INF-ROOF-89: 338



## Summary for Pond INF-ROOF-90: 336

Inflow Area = 0.245 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.88 cfs @ 12.14 hrs, Volume= 0.056 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 163.03' @ 20.00 hrs Surf.Area= 471 sf Storage= 2,418 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

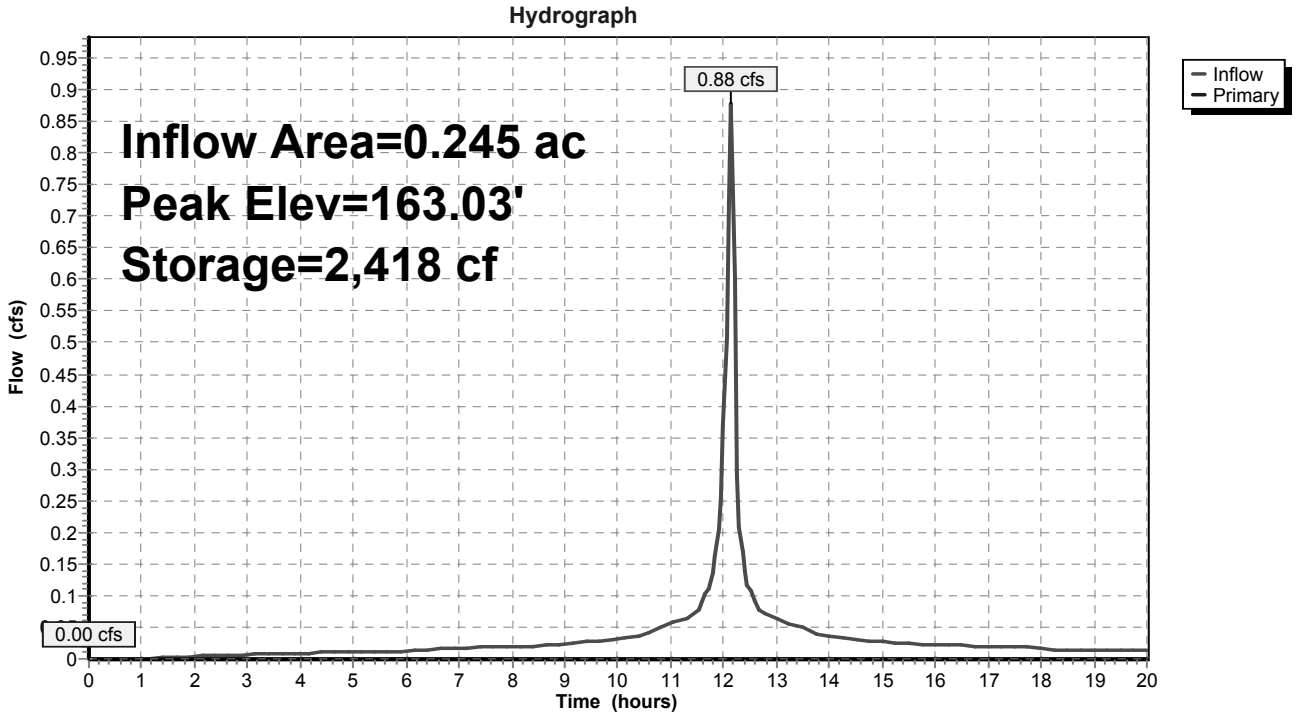
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=167.00' (Dynamic Tailwater)
↳**1=Orifice/Grate** ( Controls 0.00 cfs)

### Pond INF-ROOF-90: 336



## Summary for Pond INF-ROOF-94: 342

Inflow Area = 0.136 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.49 cfs @ 12.14 hrs, Volume= 0.031 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 163.77' @ 20.00 hrs Surf.Area= 236 sf Storage= 1,344 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

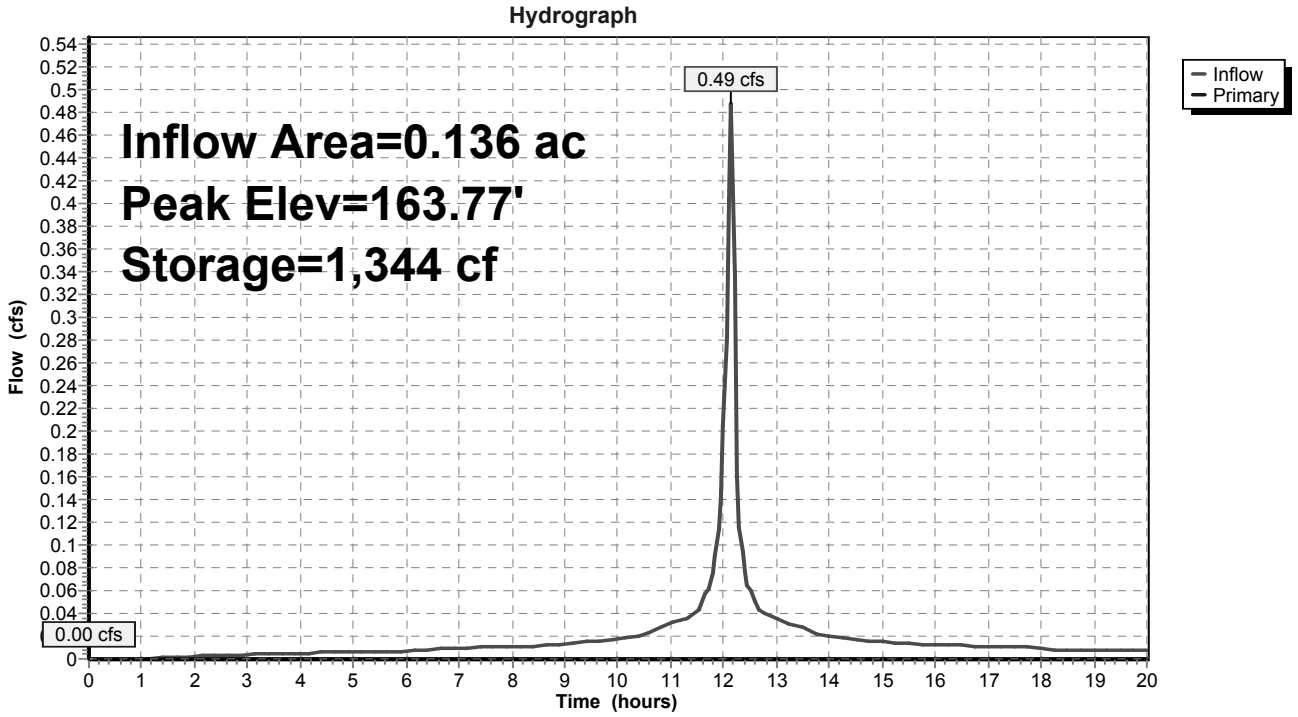
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=163.00' (Dynamic Tailwater)
↳**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-94: 342



## Summary for Pond INF-ROOF-95: 340

Inflow Area = 0.154 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.55 cfs @ 12.14 hrs, Volume= 0.035 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 164.71' @ 20.00 hrs Surf.Area= 236 sf Storage= 1,519 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

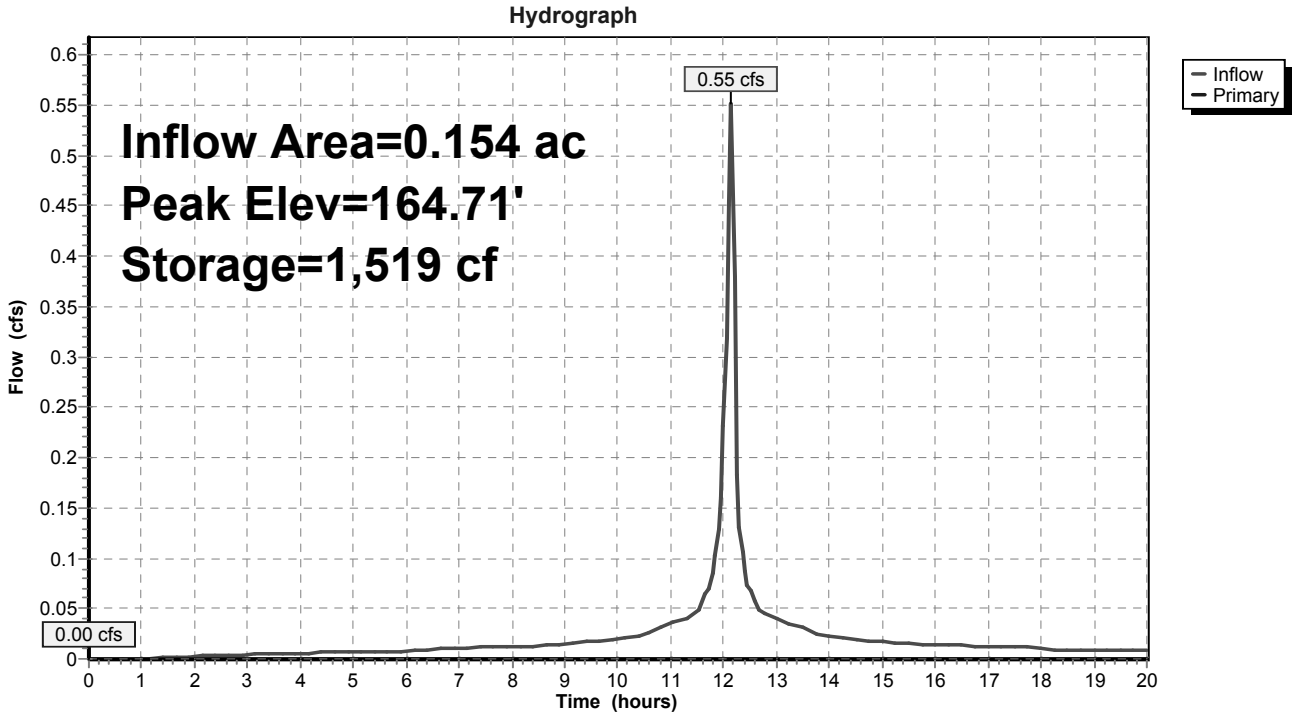
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=156.00' TW=153.00' (Dynamic Tailwater)
└**1=Orifice/Grate** ( Controls 0.00 cfs)

### Pond INF-ROOF-95: 340



## Summary for Pond INF-ROOF-96: 344

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 2.72" for 2_year event
Inflow = 0.74 cfs @ 12.14 hrs, Volume= 0.047 af
Outflow = 0.79 cfs @ 12.19 hrs, Volume= 0.023 af, Atten= 0%, Lag= 2.7 min
Primary = 0.79 cfs @ 12.19 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.24' @ 12.20 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

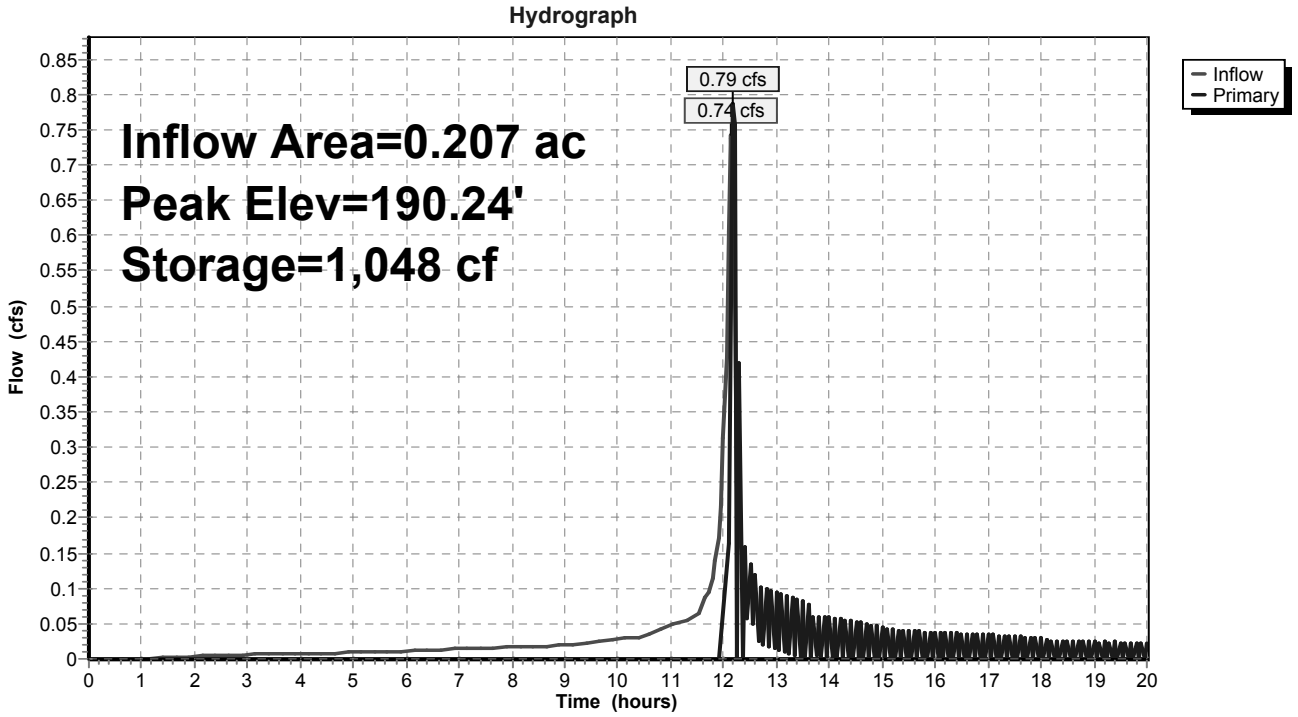
Plug-Flow detention time= 253.9 min calculated for 0.023 af (49% of inflow)
Center-of-Mass det. time= 127.7 min ( 847.1 - 719.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.69 cfs @ 12.19 hrs HW=190.23' TW=163.60' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.69 cfs @ 1.53 fps)

## Pond INF-ROOF-96: 344



## Summary for Pond P E 1.1A: 284

Inflow Area = 21.860 ac, 1.84% Impervious, Inflow Depth > 0.17" for 2_year event
Inflow = 4.93 cfs @ 12.23 hrs, Volume= 0.301 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 133.32' @ 20.00 hrs Surf.Area= 41,779 sf Storage= 13,116 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

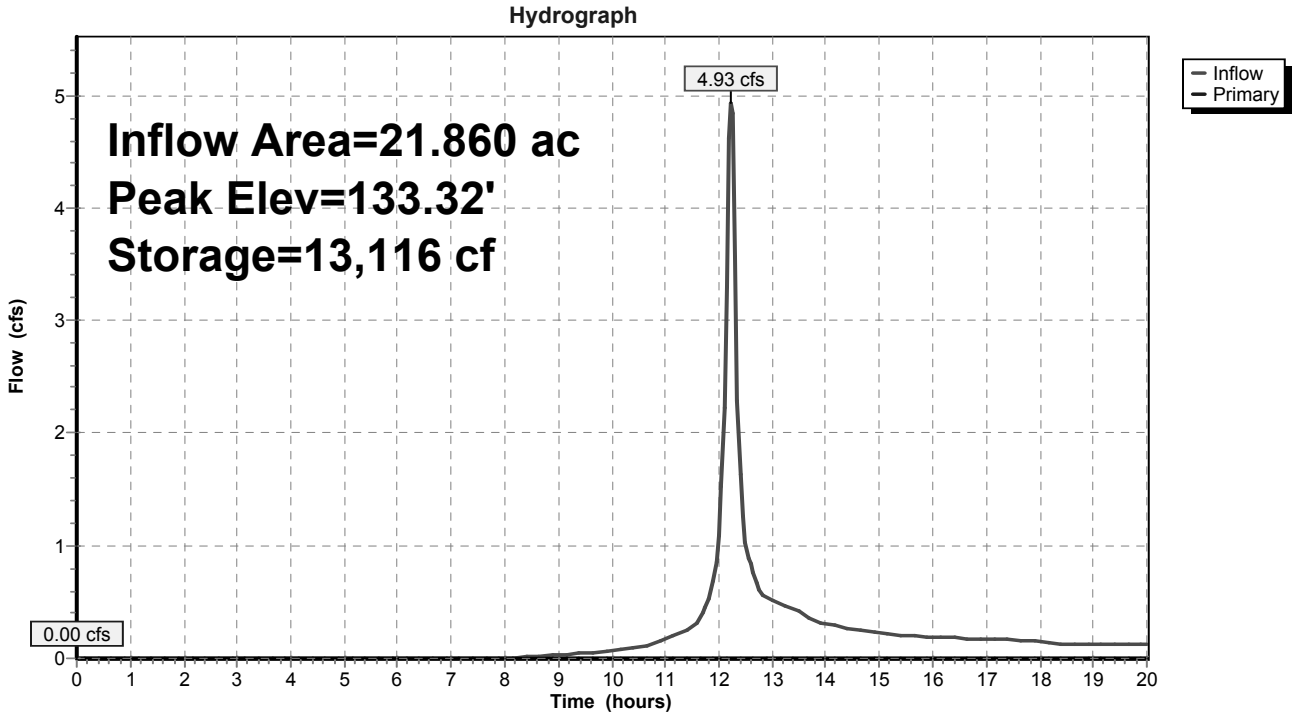
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 19.156 ac, 1.06% Impervious, Inflow Depth > 0.27" for 2_year event
Inflow = 2.47 cfs @ 12.35 hrs, Volume= 0.434 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 144.32' @ 20.00 hrs Surf.Area= 17,622 sf Storage= 18,878 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

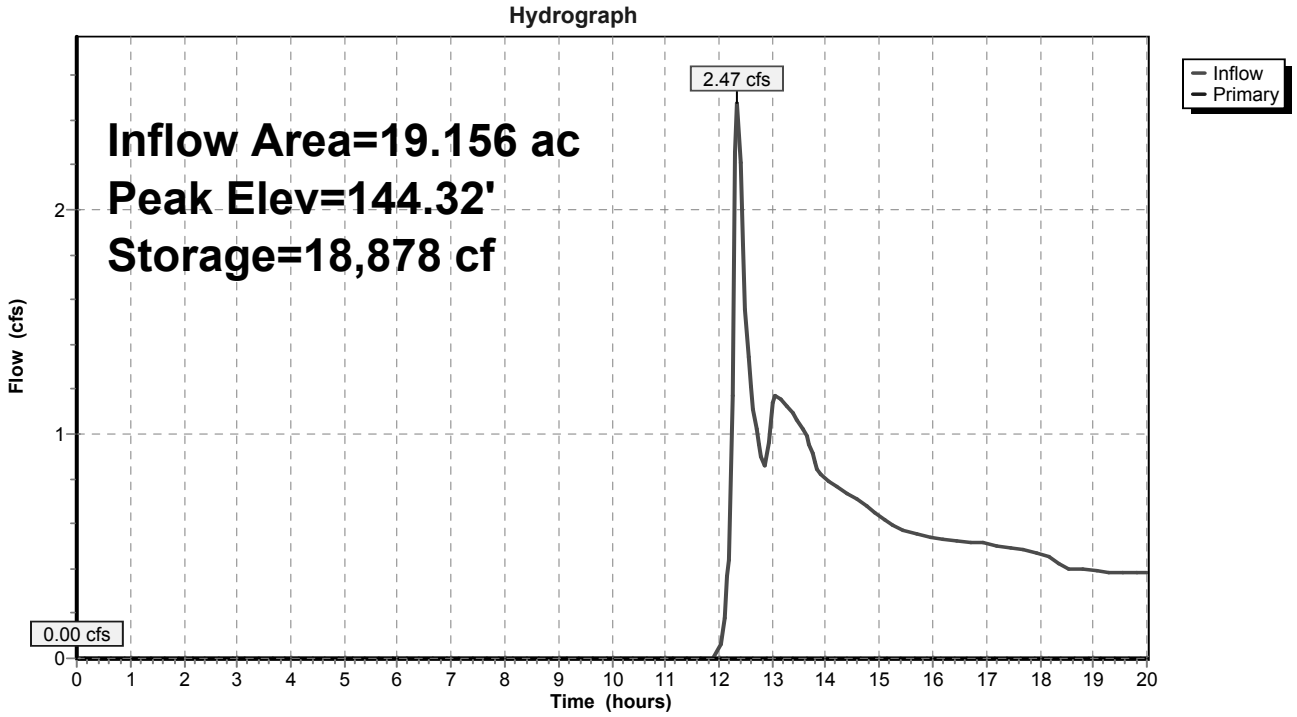
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=142.00' TW=133.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.2A: 282

Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 0.62" for 2_year event
Inflow = 4.17 cfs @ 12.34 hrs, Volume= 0.395 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 134.22' @ 20.00 hrs Surf.Area= 26,746 sf Storage= 17,163 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

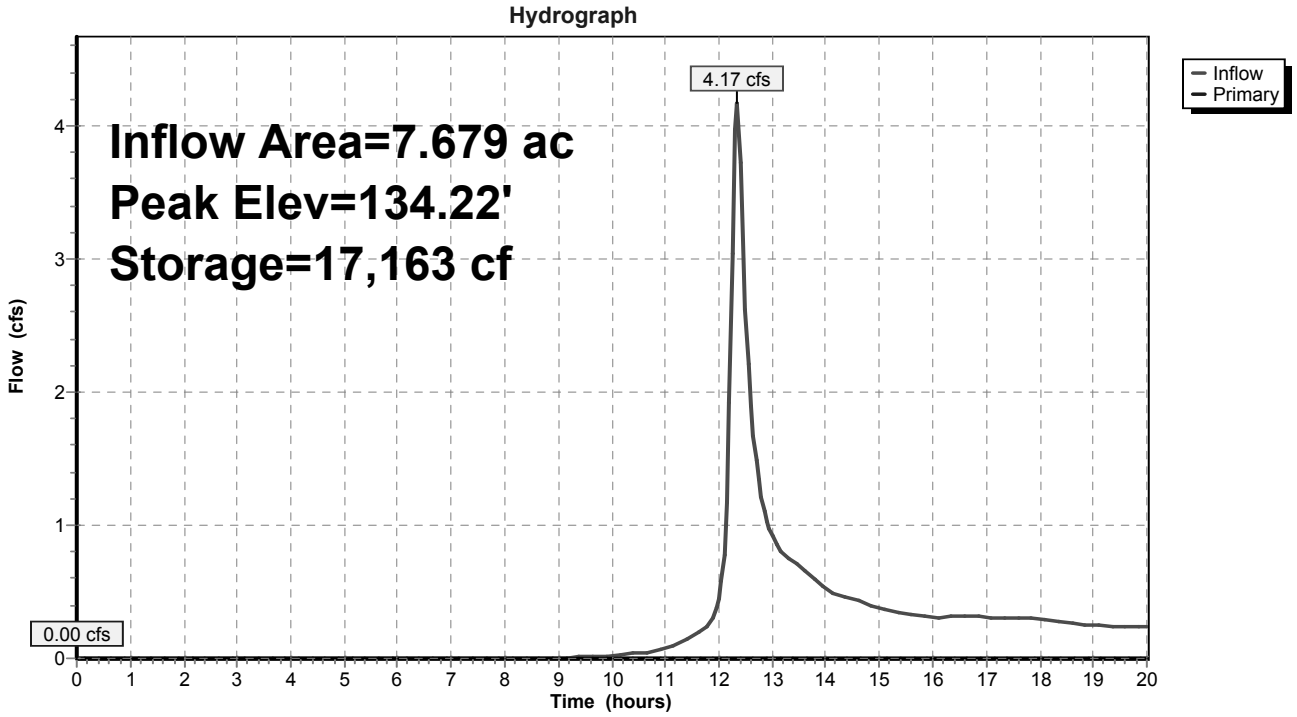
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2A: 282



## Summary for Pond P E-CULV-S: 231

Inflow Area = 4.510 ac, 0.93% Impervious, Inflow Depth > 0.44" for 2_year event
Inflow = 2.06 cfs @ 12.30 hrs, Volume= 0.167 af
Outflow = 1.81 cfs @ 12.36 hrs, Volume= 0.158 af, Atten= 12%, Lag= 3.5 min
Primary = 1.81 cfs @ 12.36 hrs, Volume= 0.158 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 168.45' @ 12.36 hrs Surf.Area= 2,033 sf Storage= 734 cf
Flood Elev= 171.00' Surf.Area= 9,105 sf Storage= 14,267 cf

Plug-Flow detention time= 29.1 min calculated for 0.158 af (94% of inflow)
Center-of-Mass det. time= 10.8 min ( 880.2 - 869.5 )

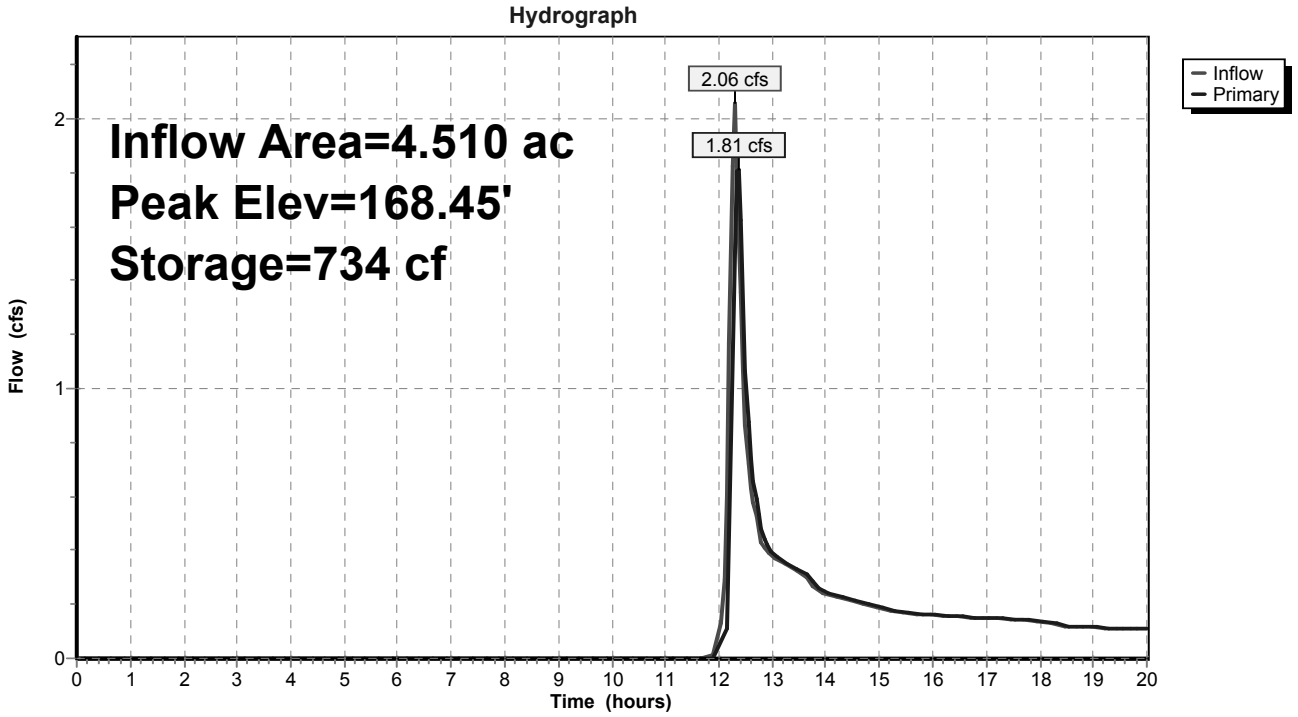
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 14,267 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 1,243 | 0 | 0 |
| 169.00 | 3,008 | 2,125 | 2,125 |
| 170.00 | 6,086 | 4,547 | 6,672 |
| 171.00 | 9,105 | 7,595 | 14,267 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 236.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 158.00' S= 0.0254 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 168.25' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=1.78 cfs @ 12.36 hrs HW=168.45' TW=142.33' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.78 cfs of 18.06 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 1.78 cfs @ 1.45 fps)

## Pond P E-CULV-S: 231



## Summary for Pond P INF-E-1:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.385 ac, 0.00% Impervious, Inflow Depth > 1.00" for 2_year event
Inflow = 1.68 cfs @ 12.26 hrs, Volume= 0.115 af
Outflow = 0.02 cfs @ 12.20 hrs, Volume= 0.019 af, Atten= 99%, Lag= 0.0 min
Discarded = 0.02 cfs @ 12.20 hrs, Volume= 0.019 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.30' @ 20.00 hrs Surf.Area= 3,441 sf Storage= 4,169 cf
Flood Elev= 168.50' Surf.Area= 3,441 sf Storage= 7,308 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 45.1 min ( 863.3 - 818.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 162.50' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 163.00' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | x 2.00 = 7,308 cf Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 364.90' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #2 | Device 3 | 165.00' | **9.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Primary | 160.50' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 160.50' / 159.50' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #4 | Discarded | 162.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 12.20 hrs HW=163.08' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.50' TW=150.00' (Dynamic Tailwater)
└**3=RCP_Round 18"** (Passes 0.00 cfs of 7.88 cfs potential flow)
  ├**1=Bleeder at WQT Vol** ( Controls 0.00 cfs)
  └**2=Orifice/Grate Overflow** ( Controls 0.00 cfs)

## Pond P INF-E-1: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

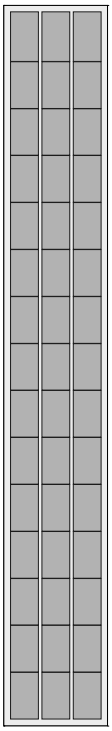
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

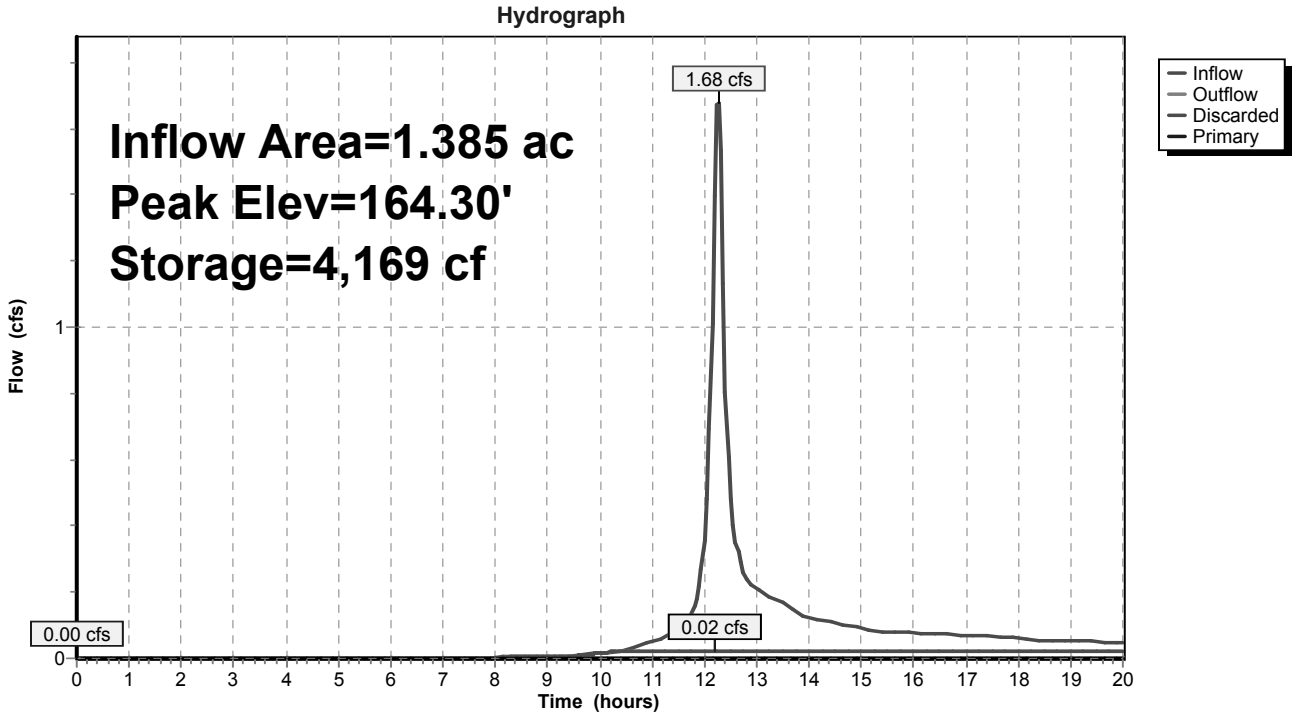
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-1:


Hydrograph
Inflow Area=1.385 ac
Peak Elev=164.30'
Storage=4,169 cf
1.68 cfs
0.02 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P INF-E-2: 142

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 1.41" for 2_year event
Inflow = 2.20 cfs @ 12.24 hrs, Volume= 0.137 af
Outflow = 0.29 cfs @ 12.73 hrs, Volume= 0.070 af, Atten= 87%, Lag= 29.3 min
Discarded = 0.01 cfs @ 11.45 hrs, Volume= 0.011 af
Primary = 0.28 cfs @ 12.73 hrs, Volume= 0.059 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.65' @ 12.73 hrs Surf.Area= 1,721 sf Storage= 3,036 cf
Flood Elev= 169.60' Surf.Area= 1,721 sf Storage= 3,654 cf

Plug-Flow detention time= 183.7 min calculated for 0.070 af (51% of inflow)
Center-of-Mass det. time= 88.9 min ( 897.0 - 808.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 164.00' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 164.50' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 166.50' | **18.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 4 | 167.00' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary overflow** C= 0.600 |
| #3 | Device 4 | 366.40' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #4 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #5 | Discarded | 164.00' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 11.45 hrs HW=164.50' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.28 cfs @ 12.73 hrs HW=166.65' TW=155.49' (Dynamic Tailwater)
└**4=RCP_Round 18"** (Passes 0.28 cfs of 13.11 cfs potential flow)
  ├**1=Orifice/Grate Overflow** (Orifice Controls 0.28 cfs @ 1.25 fps)
  ├**2=Orifice/Grate Overflow - auxiliary overflow**( Controls 0.00 cfs)
  └**3=Bleeder at WQT Vol** ( Controls 0.00 cfs)

## Pond P INF-E-2: 142 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

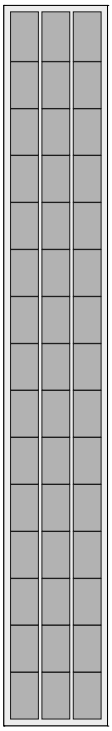
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

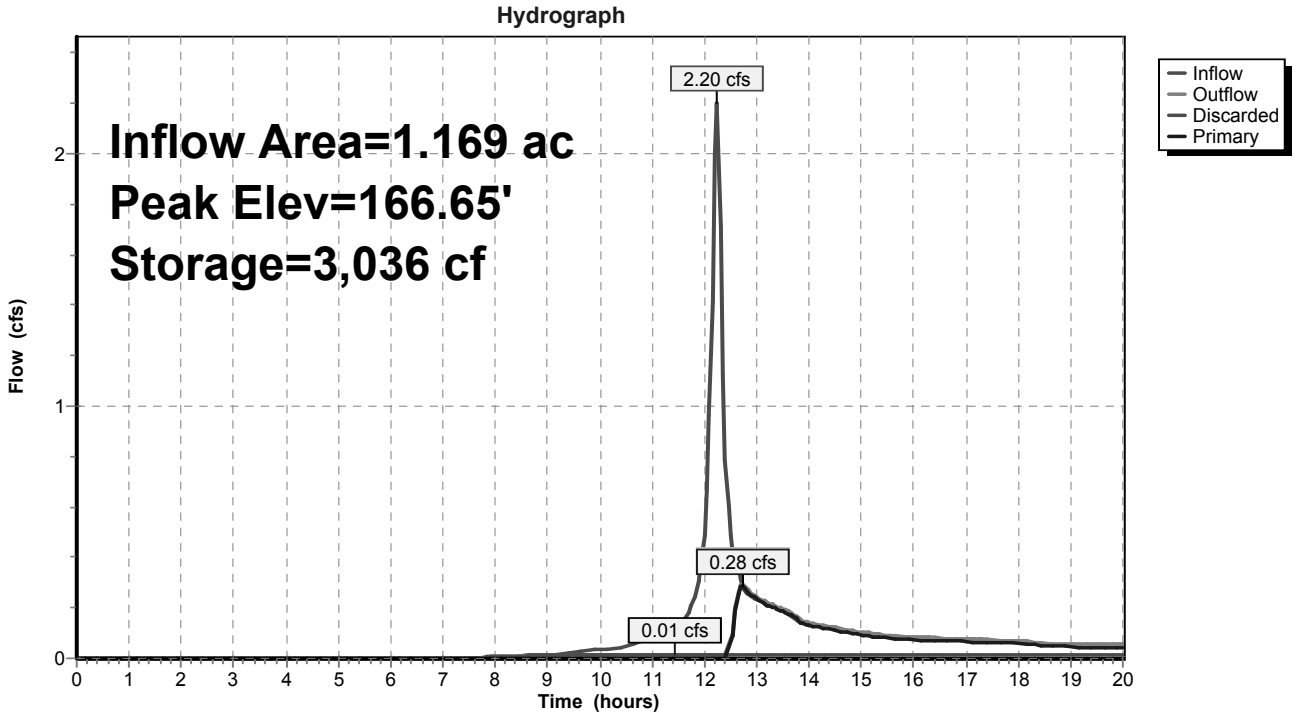
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-2: 142



## Summary for Pond P INF-E-3:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 6.824 ac, 5.44% Impervious, Inflow Depth > 0.92" for 2_year event
Inflow = 6.10 cfs @ 12.25 hrs, Volume= 0.525 af
Outflow = 0.29 cfs @ 18.11 hrs, Volume= 0.178 af, Atten= 95%, Lag= 351.9 min
Discarded = 0.02 cfs @ 10.20 hrs, Volume= 0.031 af
Primary = 0.26 cfs @ 18.11 hrs, Volume= 0.147 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.70' @ 18.11 hrs Surf.Area= 6,283 sf Storage= 15,380 cf
Flood Elev= 174.75' Surf.Area= 6,283 sf Storage= 21,456 cf

Plug-Flow detention time= 251.6 min calculated for 0.178 af (34% of inflow)
Center-of-Mass det. time= 131.2 min ( 949.2 - 818.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.25' | 8,735 cf | **44.25'W x 142.00'L x 5.50'H Field A**<br>34,558 cf Overall - 12,722 cf Embedded = 21,837 cf x 40.0% Voids |
| #2A | 168.00' | 12,722 cf | **ADS_StormTech MC-3500 c +Cap**x 114 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf |
| | | 21,456 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.75' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.75' / 161.75' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 171.25' | **14.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Device 1 | 171.75' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary X 4.00**<br>C= 0.600 |
| #4 | Device 1 | 169.35' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #5 | Discarded | 167.25' | **0.170 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 10.20 hrs HW=167.33' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.26 cfs @ 18.11 hrs HW=170.70' TW=158.21' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.26 cfs of 34.60 cfs potential flow)
  ├**2=Orifice/Grate Overflow** ( Controls 0.00 cfs)
  ├**3=Orifice/Grate Overflow - auxiliary**( Controls 0.00 cfs)
  └**4=Bleeder at WQT Vol** (Orifice Controls 0.26 cfs @ 5.34 fps)

## Pond P INF-E-3: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

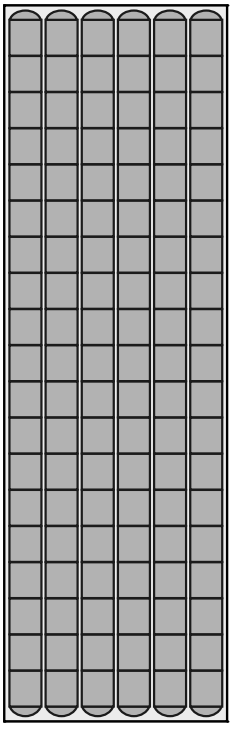
19 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 140.00' Row Length +12.0" End Stone x 2 = 142.00' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

114 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 6 Rows = 12,721.7 cf Chamber Storage

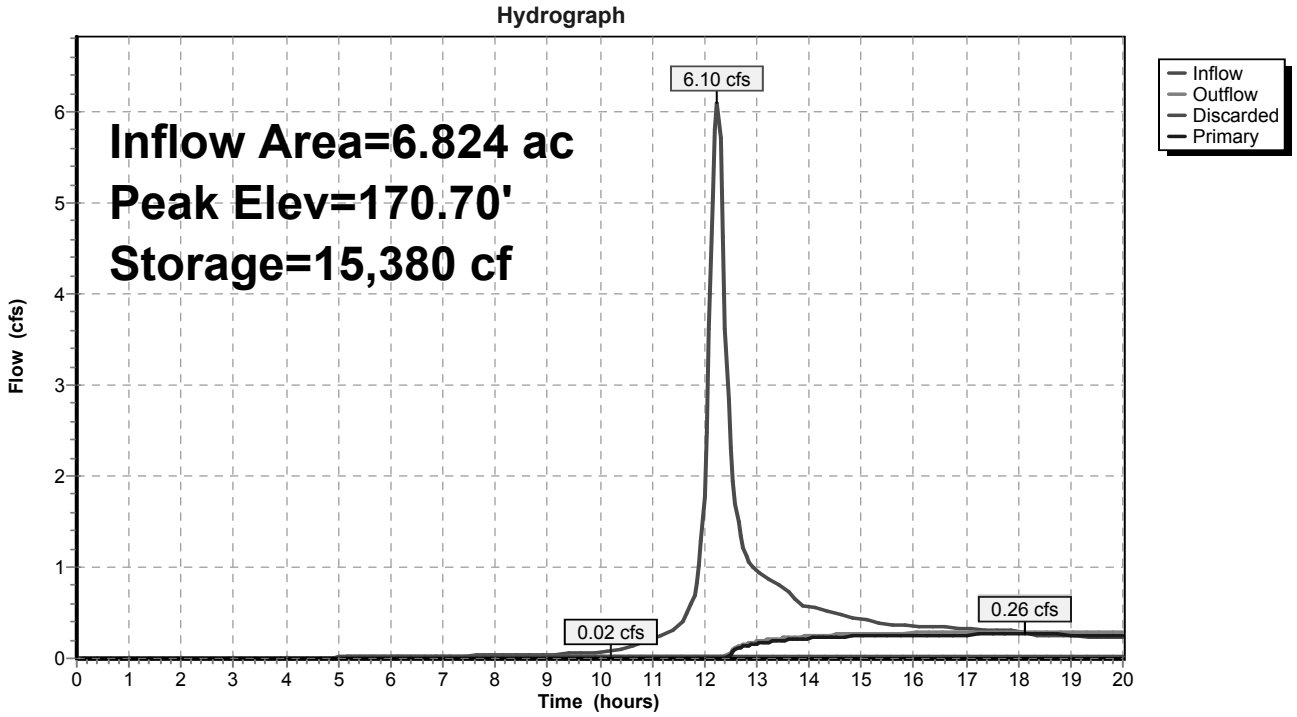
34,558.4 cf Field - 12,721.7 cf Chambers = 21,836.7 cf Stone x 40.0% Voids = 8,734.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,456.4 cf = 0.493 af
Overall Storage Efficiency = 62.1%

114 Chambers
1,279.9 cy Field
808.8 cy Stone



## Pond P INF-E-3:


Hydrograph
Inflow Area=6.824 ac
Peak Elev=170.70'
Storage=15,380 cf
6.10 cfs
0.26 cfs
0.02 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
0 1 2 3 4 5 6

## Summary for Pond P INF-E-4A: 145

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.603 ac, 0.00% Impervious, Inflow Depth > 0.74" for 2_year event
Inflow = 1.86 cfs @ 12.30 hrs, Volume= 0.099 af
Outflow = 0.05 cfs @ 19.81 hrs, Volume= 0.015 af, Atten= 97%, Lag= 450.7 min
Discarded = 0.01 cfs @ 12.25 hrs, Volume= 0.008 af
Primary = 0.04 cfs @ 19.81 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.04' @ 19.81 hrs Surf.Area= 2,089 sf Storage= 3,656 cf
Flood Elev= 175.00' Surf.Area= 2,089 sf Storage= 7,026 cf

Plug-Flow detention time= 302.8 min calculated for 0.015 af (15% of inflow)
Center-of-Mass det. time= 189.2 min ( 1,039.0 - 849.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 2,974 cf | **22.75'W x 91.81'L x 5.50'H Field A**<br>11,487 cf Overall - 4,052 cf Embedded = 7,435 cf x 40.0% Voids |
| #2A | 168.25' | 4,052 cf | **ADS_StormTech MC-3500 c +Cap**x 36 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 7,026 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 171.50' | **3.0" Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 3 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #3 | Primary | 168.00' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #4 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 12.25 hrs HW=167.73' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.04 cfs @ 19.81 hrs HW=170.04' TW=162.12' (Dynamic Tailwater)
└**3=Culvert** (Passes 0.04 cfs of 14.38 cfs potential flow)
  ├**1=Orifice/Grate Overflow** ( Controls 0.00 cfs)
  └**2=Bleeder** (Orifice Controls 0.04 cfs @ 1.28 fps)

## Pond P INF-E-4A: 145 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

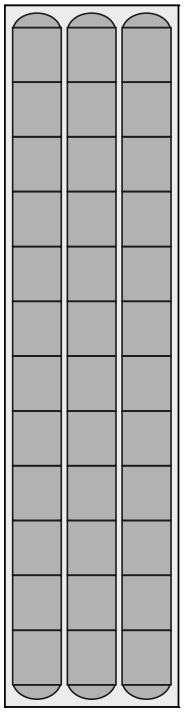
12 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 89.81' Row Length +12.0" End Stone x 2 = 91.81' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

36 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 4,051.9 cf Chamber Storage

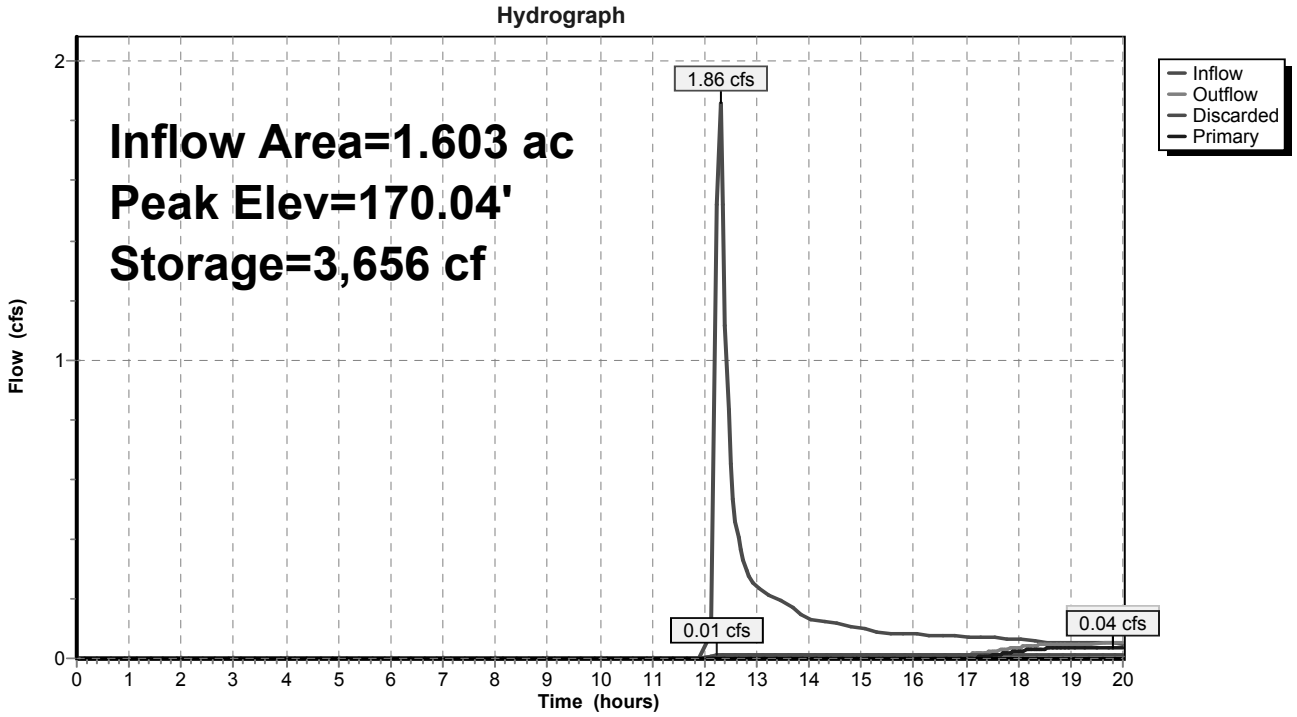
11,487.3 cf Field - 4,051.9 cf Chambers = 7,435.4 cf Stone x 40.0% Voids = 2,974.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,026.0 cf = 0.161 af
Overall Storage Efficiency = 61.2%

36 Chambers
425.5 cy Field
275.4 cy Stone



## Pond P INF-E-4A: 145



## Summary for Pond P INF-E-4B: 140

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth > 2.30" for 2_year event
Inflow = 1.96 cfs @ 12.14 hrs, Volume= 0.113 af
Outflow = 0.19 cfs @ 12.63 hrs, Volume= 0.063 af, Atten= 90%, Lag= 29.2 min
Discarded = 0.01 cfs @ 6.60 hrs, Volume= 0.011 af
Primary = 0.18 cfs @ 12.63 hrs, Volume= 0.052 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.63' @ 12.63 hrs Surf.Area= 1,273 sf Storage= 2,746 cf
Flood Elev= 175.00' Surf.Area= 1,273 sf Storage= 4,242 cf

Plug-Flow detention time= 192.0 min calculated for 0.063 af (56% of inflow)
Center-of-Mass det. time= 96.3 min ( 850.9 - 754.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 1,840 cf | **22.75'W x 55.96'L x 5.50'H Field A**<br>7,002 cf Overall - 2,403 cf Embedded = 4,599 cf x 40.0% Voids |
| #2A | 168.25' | 2,403 cf | **ADS_StormTech MC-3500 c +Cap**x 21 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 4,242 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.90' | **18.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.90' / 166.80' S= 0.0005 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.50' | **3.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 172.00' | **36.0" W x 3.0" H Vert. Orifice/Grate-auxiliary** C= 0.600 |
| #4 | Device 1 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #5 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 6.60 hrs HW=167.58' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.18 cfs @ 12.63 hrs HW=170.63' TW=162.30' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.18 cfs of 9.82 cfs potential flow)
  ├**2=Orifice/Grate** ( Controls 0.00 cfs)
  ├**3=Orifice/Grate-auxiliary** ( Controls 0.00 cfs)
  └**4=Bleeder** (Orifice Controls 0.18 cfs @ 3.74 fps)

## Pond P INF-E-4B: 140 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

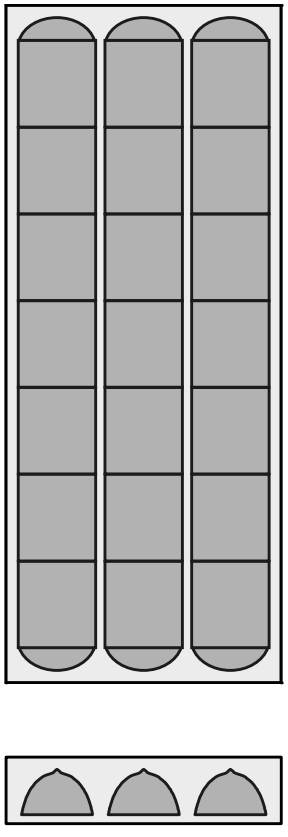
7 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 53.96' Row Length +12.0" End Stone x 2 = 55.96' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

21 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 2,402.6 cf Chamber Storage

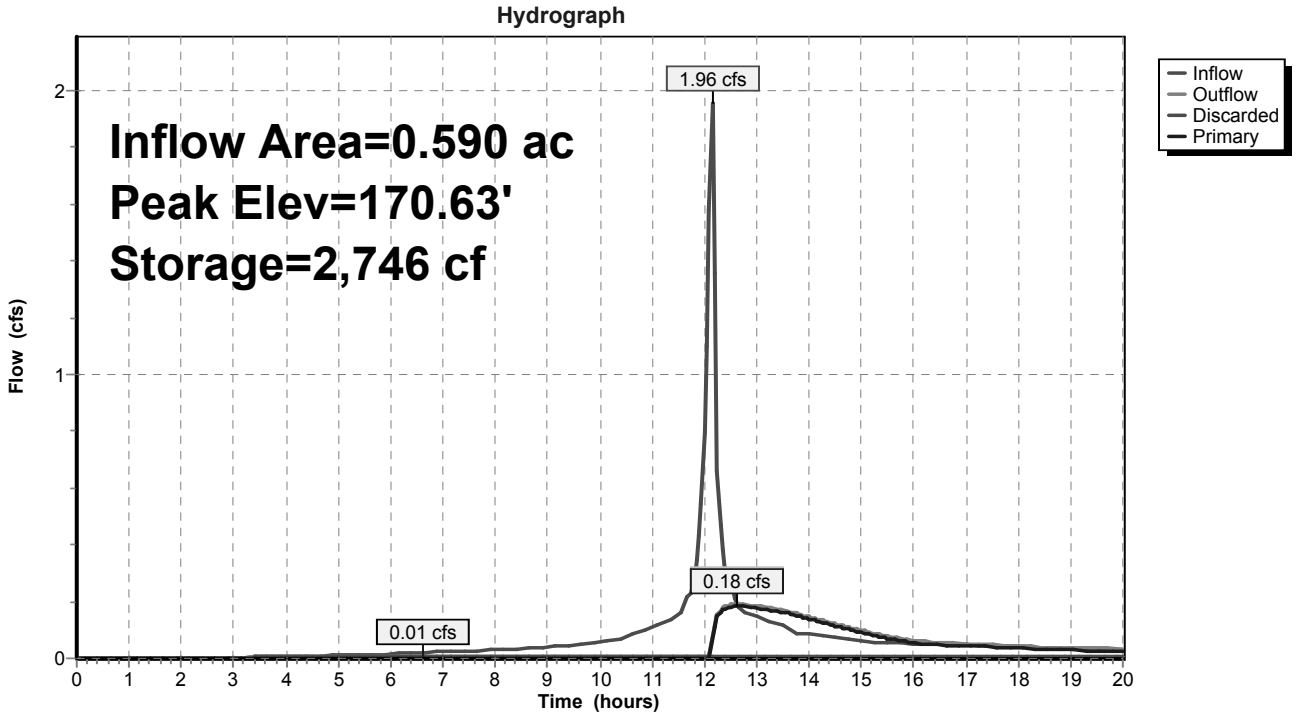
7,001.6 cf Field - 2,402.6 cf Chambers = 4,599.0 cf Stone x 40.0% Voids = 1,839.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,242.2 cf = 0.097 af
Overall Storage Efficiency = 60.6%

21 Chambers
259.3 cy Field
170.3 cy Stone



## Pond P INF-E-4B: 140



## Summary for Pond P MH-CULV-NA: 114

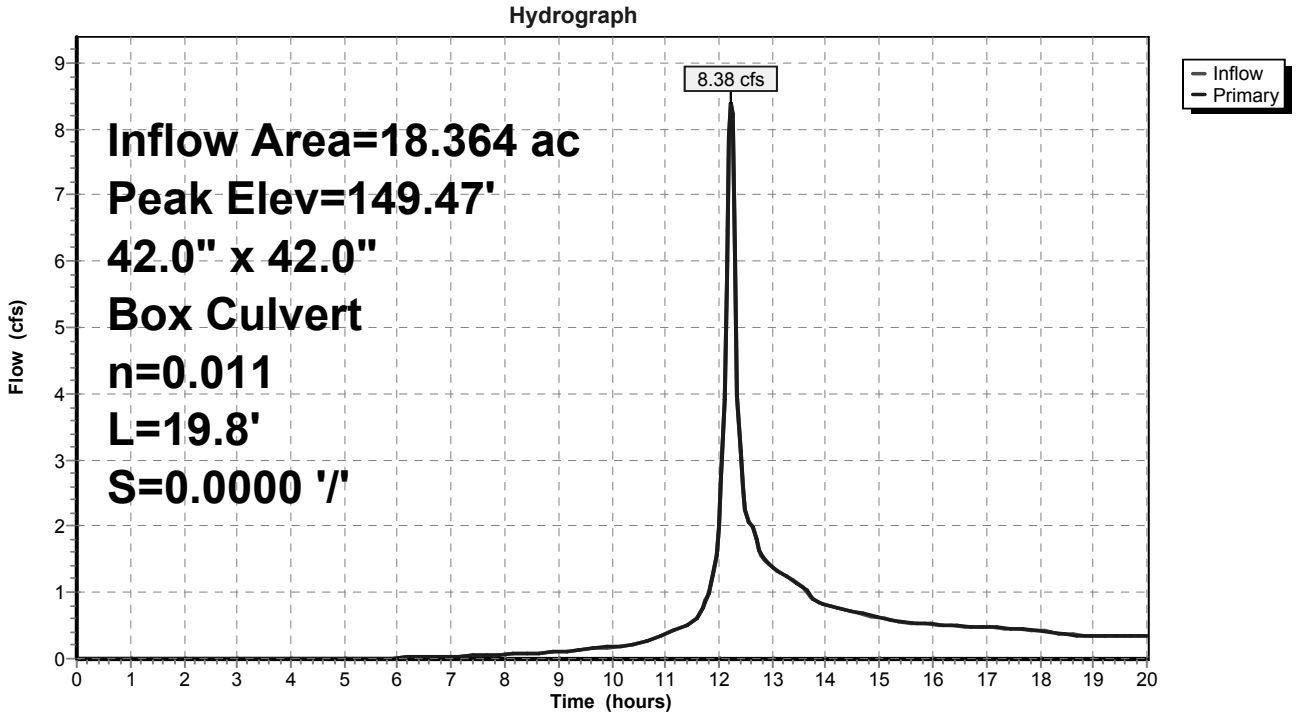
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 8.39 cfs @ 12.23 hrs, Volume= 0.699 af
Outflow = 8.38 cfs @ 12.23 hrs, Volume= 0.699 af, Atten= 0%, Lag= 0.0 min
Primary = 8.38 cfs @ 12.23 hrs, Volume= 0.699 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 149.47' @ 12.23 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=8.10 cfs @ 12.23 hrs HW=149.45' TW=149.38' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 8.10 cfs @ 1.24 fps)

## Pond P MH-CULV-NA: 114



## Summary for Pond P MH-CULV-NB: 115

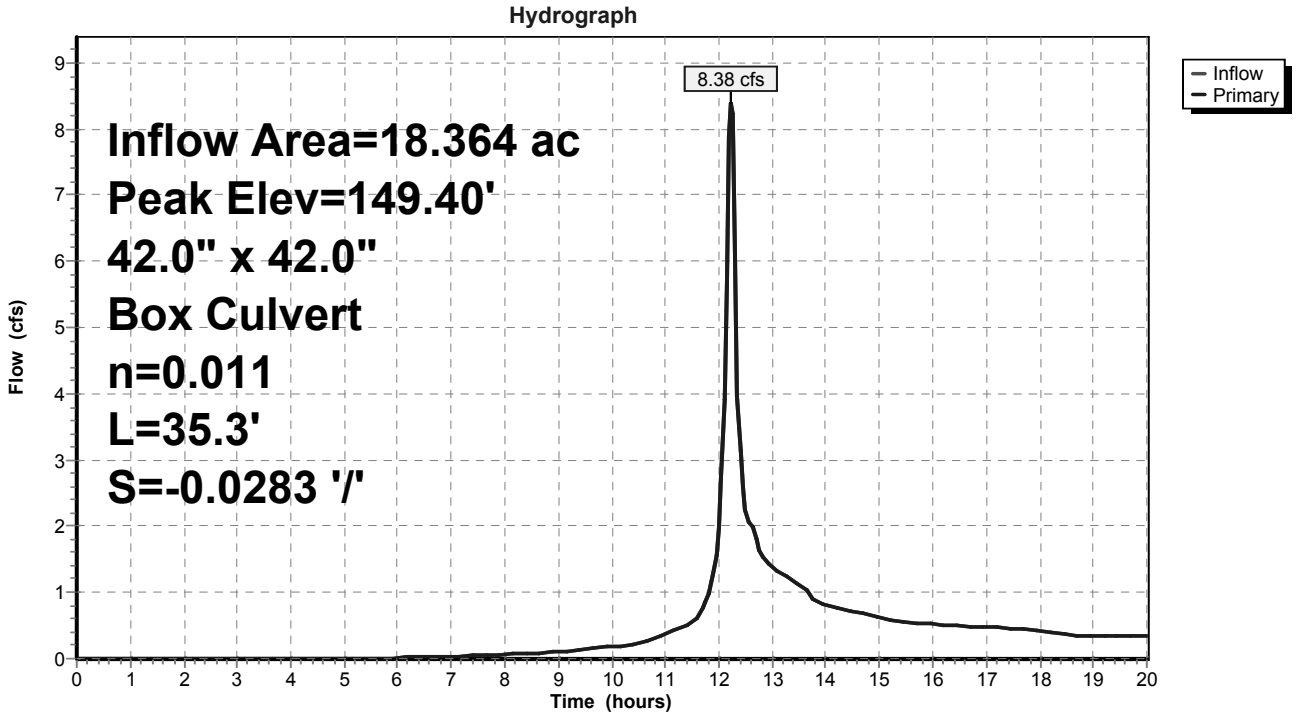
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 8.38 cfs @ 12.23 hrs, Volume= 0.699 af
Outflow = 8.38 cfs @ 12.23 hrs, Volume= 0.699 af, Atten= 0%, Lag= 0.0 min
Primary = 8.38 cfs @ 12.23 hrs, Volume= 0.699 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 149.40' @ 12.23 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=8.10 cfs @ 12.23 hrs HW=149.38' TW=0.00' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 8.10 cfs @ 2.88 fps)

### Pond P MH-CULV-NB: 115



## Summary for Pond P RG-E-7:

Inflow Area = 0.951 ac, 0.00% Impervious, Inflow Depth > 1.94" for 2_year event
Inflow = 2.40 cfs @ 12.23 hrs, Volume= 0.153 af
Outflow = 1.86 cfs @ 12.30 hrs, Volume= 0.099 af, Atten= 23%, Lag= 4.3 min
Primary = 1.86 cfs @ 12.30 hrs, Volume= 0.099 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 173.93' @ 12.30 hrs Surf.Area= 3,585 sf Storage= 2,778 cf
Flood Elev= 175.00' Surf.Area= 7,929 sf Storage= 8,847 cf

Plug-Flow detention time= 149.9 min calculated for 0.099 af (64% of inflow)
Center-of-Mass det. time= 68.7 min ( 849.8 - 781.1 )

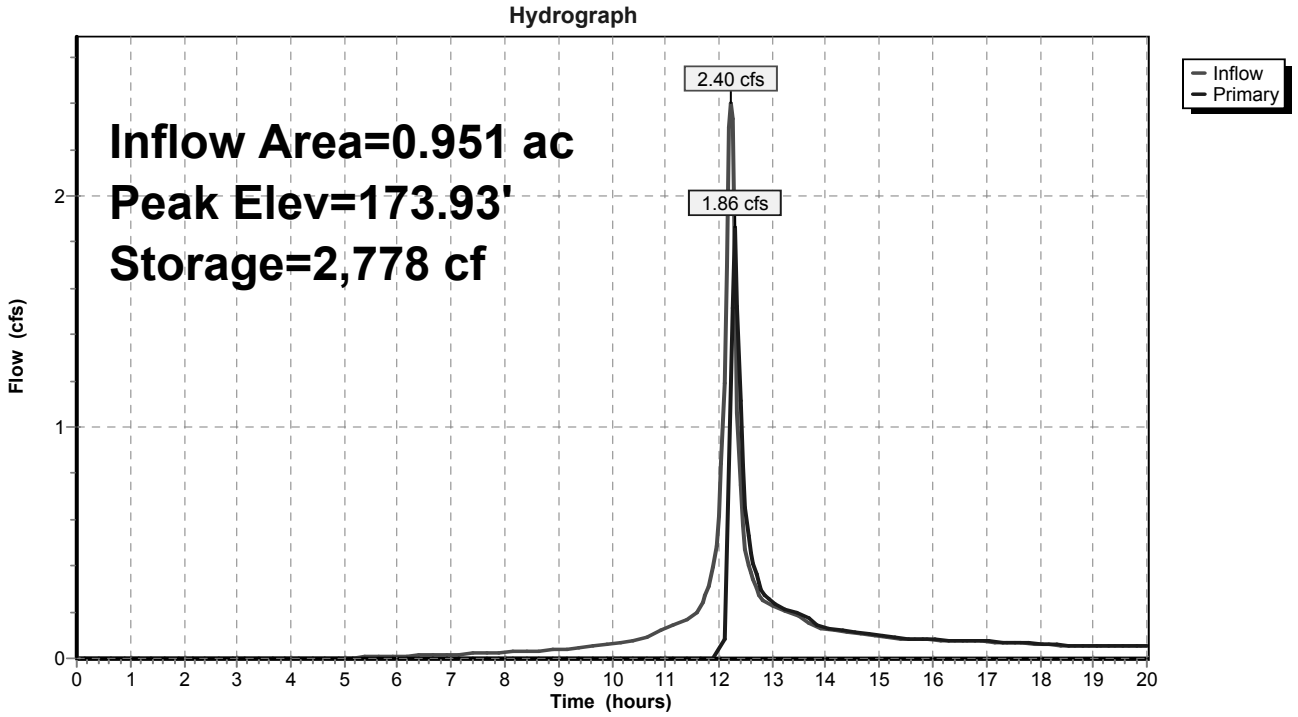
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 8,847 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 2,408 | 0 | 0 |
| 174.00 | 3,678 | 3,043 | 3,043 |
| 175.00 | 7,929 | 5,804 | 8,847 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 173.80' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.40' | **18.0" Round Culvert**<br>L= 35.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.40' / 169.20' S= 0.0057 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=1.86 cfs @ 12.30 hrs HW=173.93' TW=168.09' (Dynamic Tailwater)
↑**2=Culvert** (Passes 1.86 cfs of 18.78 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 1.86 cfs @ 1.17 fps)

## Pond P RG-E-7:


Hydrograph
Inflow Area=0.951 ac
Peak Elev=173.93'
Storage=2,778 cf
2.40 cfs
1.86 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P RG-E-9A:

Inflow Area = 2.302 ac, 0.00% Impervious, Inflow Depth > 1.05" for 2_year event
Inflow = 2.95 cfs @ 12.24 hrs, Volume= 0.201 af
Outflow = 2.89 cfs @ 12.26 hrs, Volume= 0.196 af, Atten= 2%, Lag= 0.9 min
Primary = 2.89 cfs @ 12.26 hrs, Volume= 0.196 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 165.83' @ 12.26 hrs Surf.Area= 789 sf Storage= 436 cf
Flood Elev= 167.00' Surf.Area= 1,657 sf Storage= 1,860 cf

Plug-Flow detention time= 20.1 min calculated for 0.196 af (97% of inflow)
Center-of-Mass det. time= 10.9 min ( 828.3 - 817.4 )

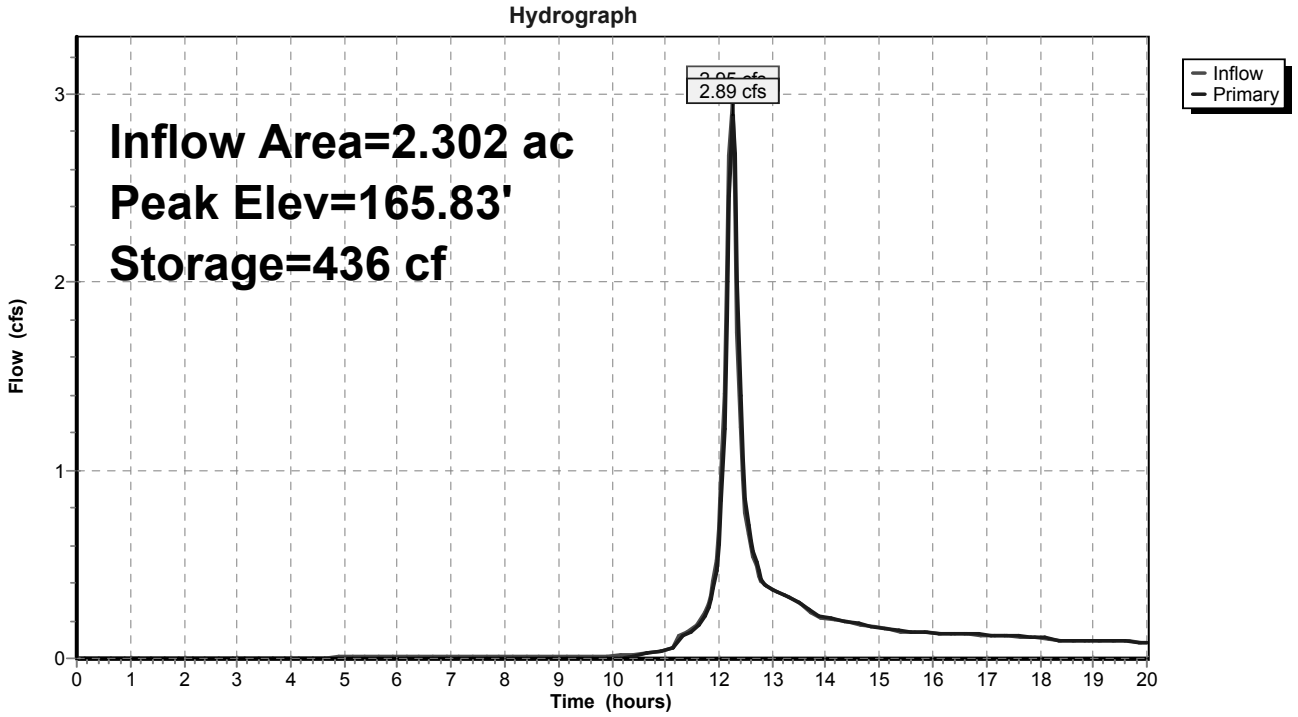
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 1,860 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 266 | 0 | 0 |
| 166.00 | 898 | 582 | 582 |
| 167.00 | 1,657 | 1,278 | 1,860 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 165.50' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 151.00' | **18.0" Round Culvert**<br>L= 46.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 151.00' / 150.20' S= 0.0174 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=2.84 cfs @ 12.26 hrs HW=165.82' TW=149.80' (Dynamic Tailwater)
↑**2=Culvert** (Passes 2.84 cfs of 37.30 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 2.84 cfs @ 1.86 fps)

## Pond P RG-E-9A:


Hydrograph
Inflow Area=2.302 ac
Peak Elev=165.83'
Storage=436 cf
2.89 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P RG-E-9B: 244

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

Inflow Area = 2.836 ac, 0.00% Impervious, Inflow Depth > 0.90" for 2_year event
Inflow = 3.06 cfs @ 12.26 hrs, Volume= 0.212 af
Outflow = 0.38 cfs @ 13.12 hrs, Volume= 0.101 af, Atten= 87%, Lag= 51.4 min
Primary = 0.38 cfs @ 13.12 hrs, Volume= 0.101 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.53' @ 13.12 hrs Surf.Area= 3,793 sf Storage= 4,903 cf
Flood Elev= 151.00' Surf.Area= 4,178 sf Storage= 6,784 cf

Plug-Flow detention time= 210.1 min calculated for 0.100 af (47% of inflow)
Center-of-Mass det. time= 109.9 min ( 940.6 - 830.8 )

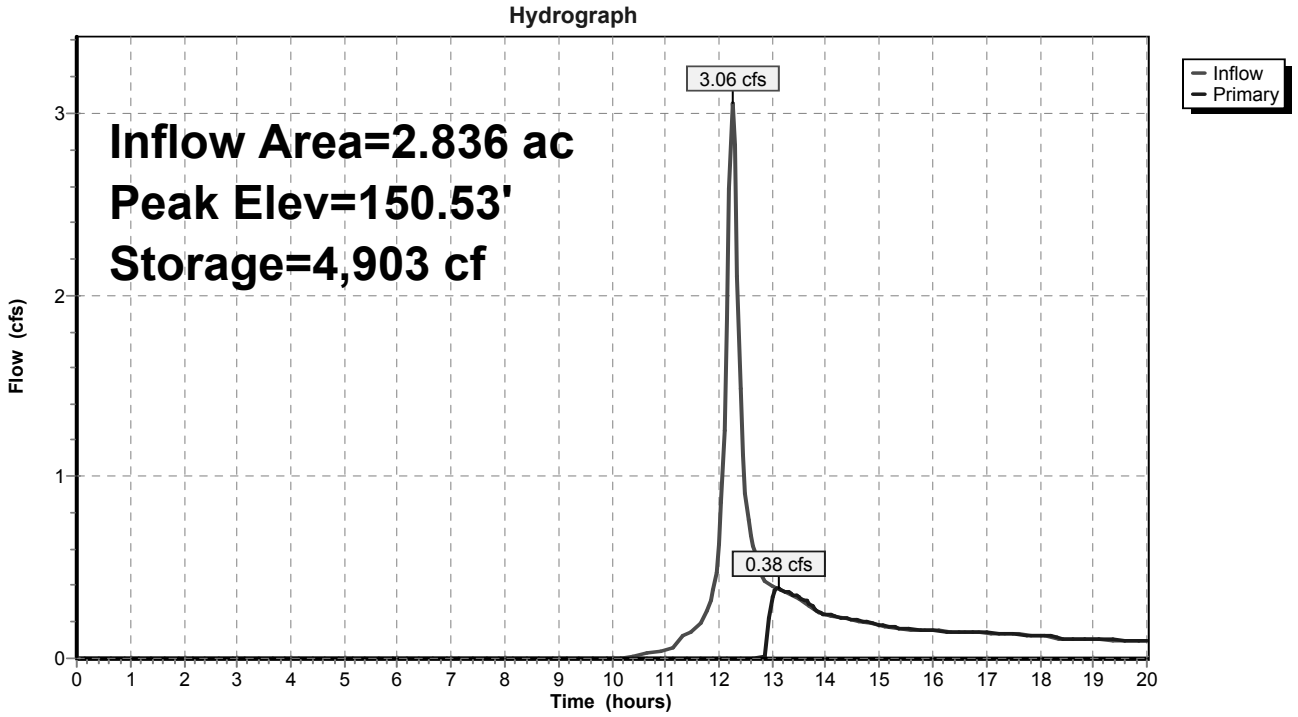
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 149.00' | 6,784 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 149.00 | 2,666 | 0 | 0 |
| 150.00 | 3,362 | 3,014 | 3,014 |
| 151.00 | 4,178 | 3,770 | 6,784 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 28.00 31.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.38 cfs @ 13.12 hrs HW=150.53' TW=143.13' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 0.38 cfs @ 0.54 fps)

## Pond P RG-E-9B: 244



## Summary for Pond P RG-W-5A: 250

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 0.65" for 2_year event
Inflow = 1.41 cfs @ 12.20 hrs, Volume= 0.072 af
Outflow = 1.47 cfs @ 12.20 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.2 min
Primary = 1.47 cfs @ 12.20 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 163.60' @ 12.20 hrs Surf.Area= 190 sf Storage= 86 cf
Flood Elev= 164.00' Surf.Area= 252 sf Storage= 173 cf

Plug-Flow detention time= 10.7 min calculated for 0.070 af (98% of inflow)
Center-of-Mass det. time= 3.1 min ( 854.3 - 851.2 )

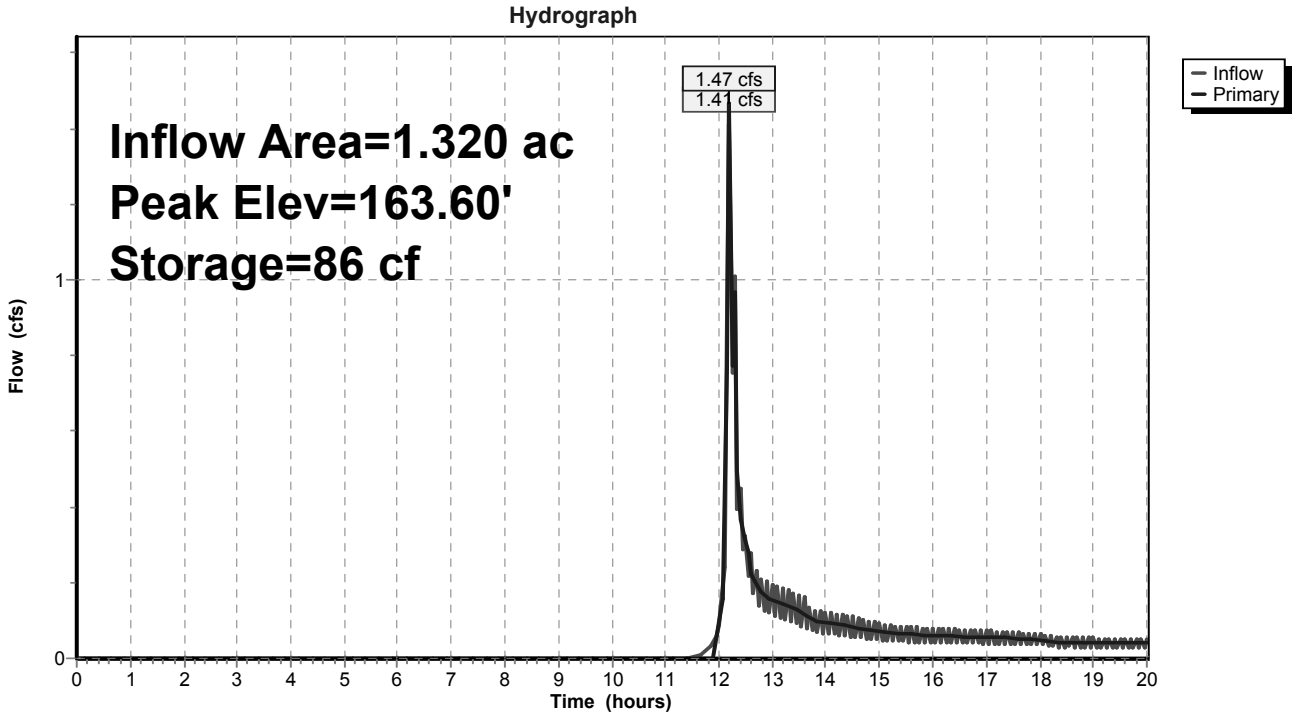
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 173 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 95 | 0 | 0 |
| 164.00 | 252 | 173 | 173 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 163.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=1.47 cfs @ 12.20 hrs HW=163.60' TW=162.60' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 1.47 cfs @ 1.03 fps)

## Pond P RG-W-5A: 250



## Summary for Pond P RG-W-5B: 252

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 0.64" for 2_year event
Inflow = 1.47 cfs @ 12.20 hrs, Volume= 0.070 af
Outflow = 1.44 cfs @ 12.20 hrs, Volume= 0.069 af, Atten= 2%, Lag= 0.1 min
Primary = 1.44 cfs @ 12.20 hrs, Volume= 0.069 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.60' @ 12.20 hrs Surf.Area= 154 sf Storage= 66 cf
Flood Elev= 163.00' Surf.Area= 212 sf Storage= 138 cf

Plug-Flow detention time= 8.2 min calculated for 0.069 af (98% of inflow)
Center-of-Mass det. time= 2.4 min ( 856.7 - 854.3 )

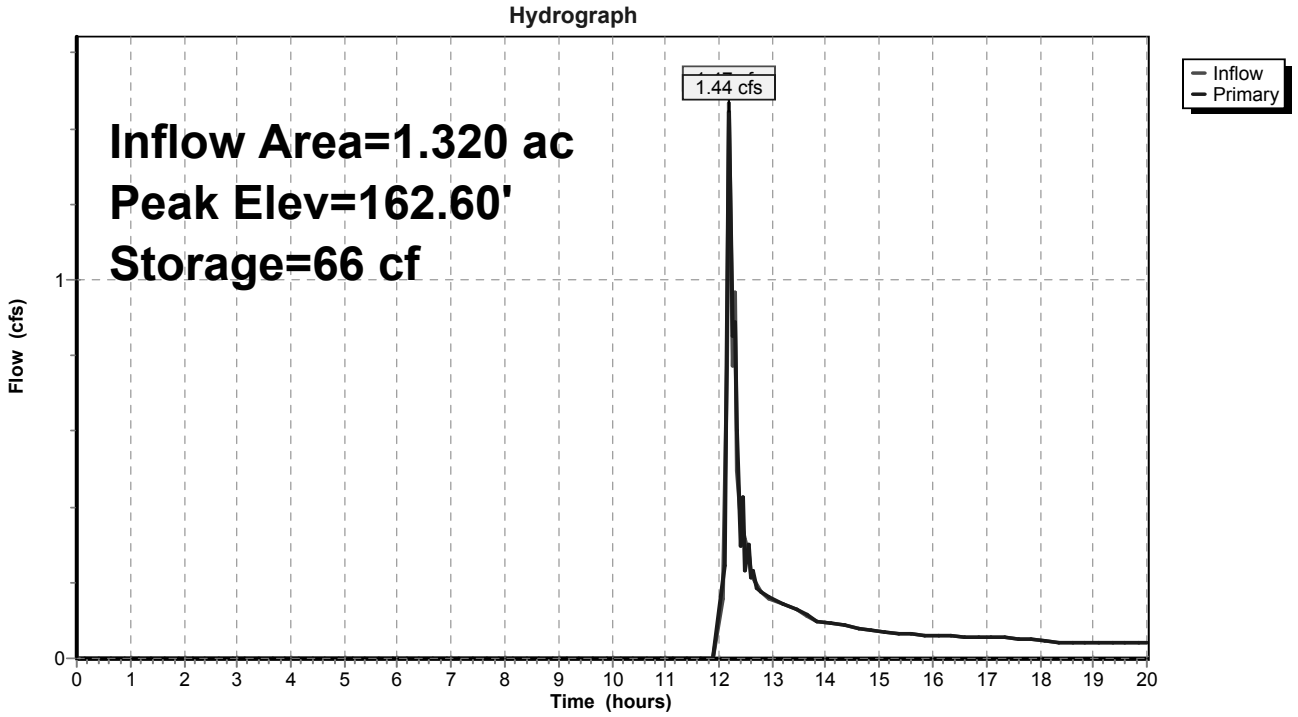
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 138 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 65 | 0 | 0 |
| 163.00 | 212 | 138 | 138 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=1.41 cfs @ 12.20 hrs HW=162.60' TW=160.89' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 1.41 cfs @ 1.02 fps)

## Pond P RG-W-5B: 252



## Summary for Pond P RG-W-5C: 254

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.1 in/hr to drawdown in 72 hours.

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 0.63" for 2_year event
Inflow = 1.44 cfs @ 12.20 hrs, Volume= 0.069 af
Outflow = 0.37 cfs @ 12.46 hrs, Volume= 0.051 af, Atten= 74%, Lag= 15.4 min
Primary = 0.37 cfs @ 12.46 hrs, Volume= 0.051 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 161.54' @ 12.46 hrs Surf.Area= 954 sf Storage= 822 cf
Flood Elev= 162.00' Surf.Area= 1,046 sf Storage= 1,280 cf

Plug-Flow detention time= 116.3 min calculated for 0.051 af (73% of inflow)
Center-of-Mass det. time= 44.8 min ( 901.6 - 856.7 )

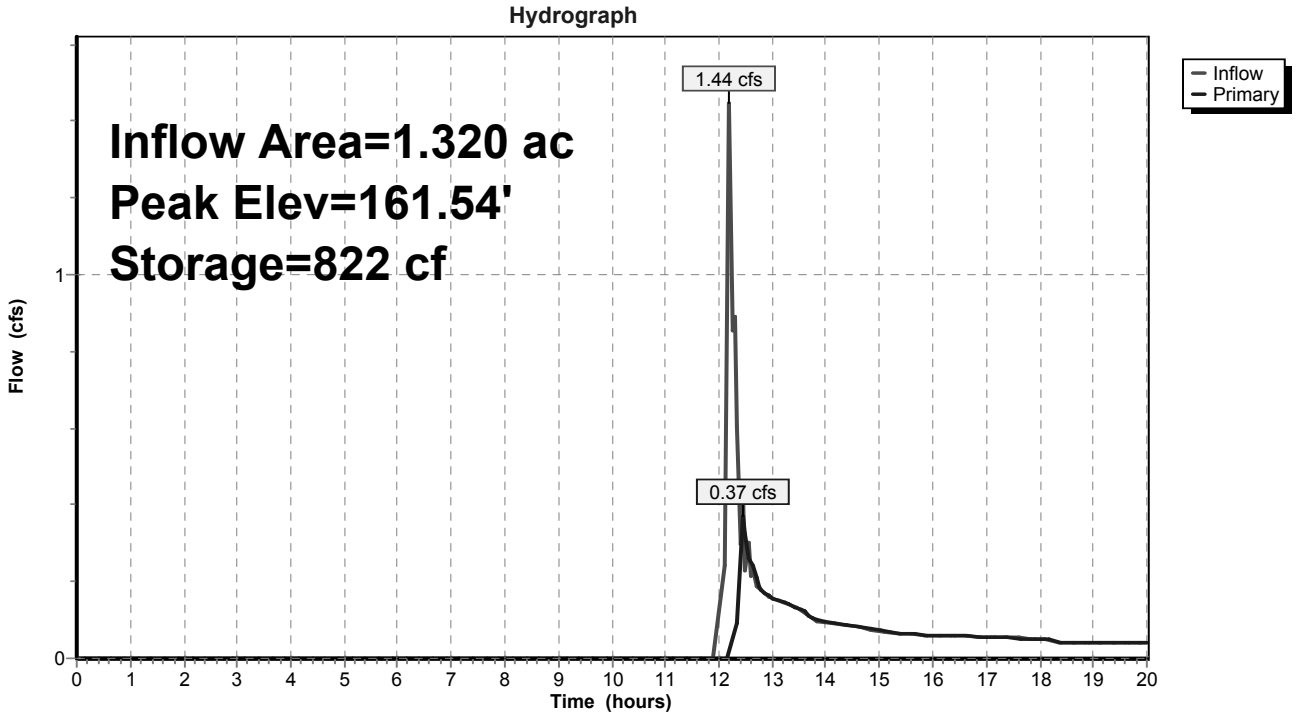
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 160.50' | 1,280 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 160.50 | 624 | 0 | 0 |
| 161.00 | 778 | 351 | 351 |
| 161.50 | 946 | 431 | 782 |
| 162.00 | 1,046 | 498 | 1,280 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 161.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.36 cfs @ 12.46 hrs HW=161.54' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 0.36 cfs @ 0.66 fps)

## Pond P RG-W-5C: 254



## Summary for Pond P S-CB-E-1: 263

Inflow Area = 1.190 ac, 0.00% Impervious, Inflow Depth > 1.04" for 2_year event
Inflow = 1.66 cfs @ 12.23 hrs, Volume= 0.103 af
Outflow = 1.65 cfs @ 12.24 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.5 min
Primary = 1.65 cfs @ 12.24 hrs, Volume= 0.099 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 155 sf Storage= 0 cf
Peak Elev= 171.62' @ 12.24 hrs Surf.Area= 623 sf Storage= 240 cf
Flood Elev= 172.00' Surf.Area= 913 sf Storage= 534 cf

Plug-Flow detention time= 23.6 min calculated for 0.099 af (96% of inflow)
Center-of-Mass det. time= 9.8 min ( 828.7 - 818.9 )

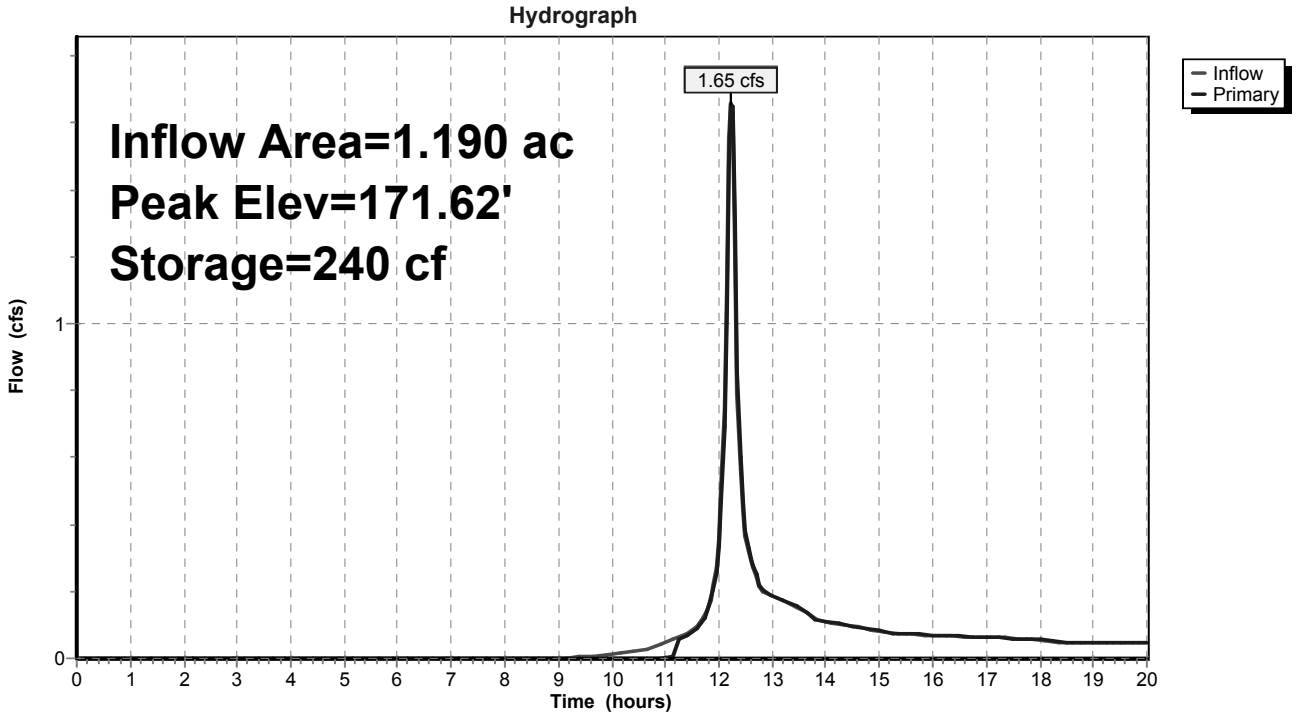
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 534 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 155 | 0 | 0 |
| 172.00 | 913 | 534 | 534 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.50' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.20' | **18.0" Round Culvert**<br>L= 16.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.80' / 169.20' S= -0.0875 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=1.62 cfs @ 12.24 hrs HW=171.62' TW=165.82' (Dynamic Tailwater)
↑**2=Culvert** (Passes 1.62 cfs of 13.73 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 1.62 cfs @ 1.11 fps)

## Pond P S-CB-E-1: 263



## Summary for Pond P W 3.1: 5

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 0.45" for 2_year event
Inflow = 1.28 cfs @ 12.26 hrs, Volume= 0.243 af
Outflow = 0.30 cfs @ 16.86 hrs, Volume= 0.074 af, Atten= 76%, Lag= 275.7 min
Discarded = 0.01 cfs @ 11.40 hrs, Volume= 0.008 af
Primary = 0.29 cfs @ 16.86 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.01' @ 16.86 hrs Surf.Area= 4,616 sf Storage= 7,383 cf
Flood Elev= 157.00' Surf.Area= 6,397 sf Storage= 12,836 cf

Plug-Flow detention time= 312.4 min calculated for 0.073 af (30% of inflow)
Center-of-Mass det. time= 162.7 min ( 1,077.9 - 915.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 12,836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

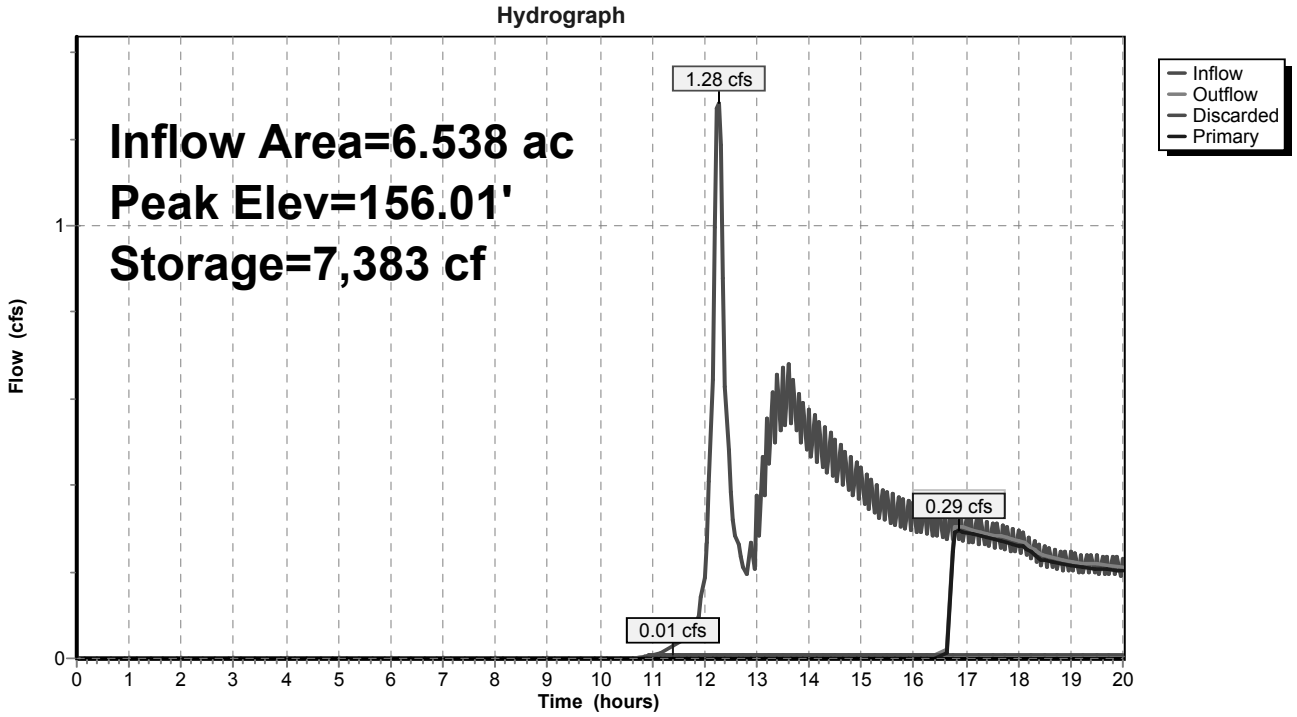
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,598 | 3,930 | 7,338 |
| 157.00 | 6,397 | 5,498 | 12,836 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Discarded | 153.00' | **0.01 cfs Exfiltration at all elevations** |

**Discarded OutFlow** Max=0.01 cfs @ 11.40 hrs HW=153.04' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.29 cfs @ 16.86 hrs HW=156.01' TW=0.00' (Dynamic Tailwater)
↑**1=Asymmetrical Weir** (Weir Controls 0.29 cfs @ 0.32 fps)

## Pond P W 3.1: 5


Hydrograph
Inflow Area=6.538 ac
Peak Elev=156.01'
Storage=7,383 cf
1.28 cfs
0.29 cfs
0.01 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P W 3.4: 13

Inflow Area = 3.043 ac, 5.02% Impervious, Inflow Depth > 0.00" for 2_year event
Inflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 180.00' @ 20.00 hrs Surf.Area= 577 sf Storage= 3 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

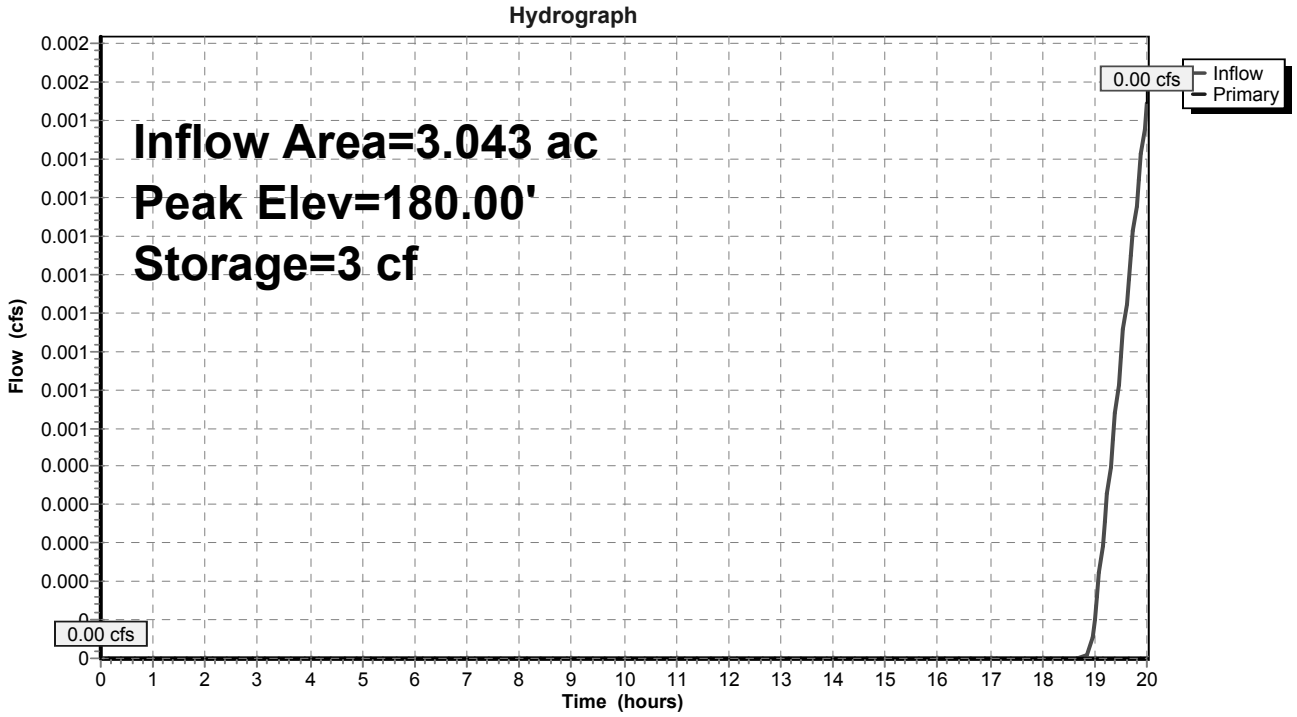
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=180.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 3.4: 13


Hydrograph
Inflow Area=3.043 ac
Peak Elev=180.00'
Storage=3 cf
0.00 cfs
Inflow
Primary
0.00 cfs
Flow (cfs)
Time (hours)
0.002
0.002
0.001
0.001
0.001
0.001
0.001
0.001
0.001
0.001
0.000
0.000
0.000
0.000
0
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P W 9.1B: 14

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 732 sf Storage= 0 cf
Flood Elev= 159.00' Surf.Area= 4,550 sf Storage= 5,474 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

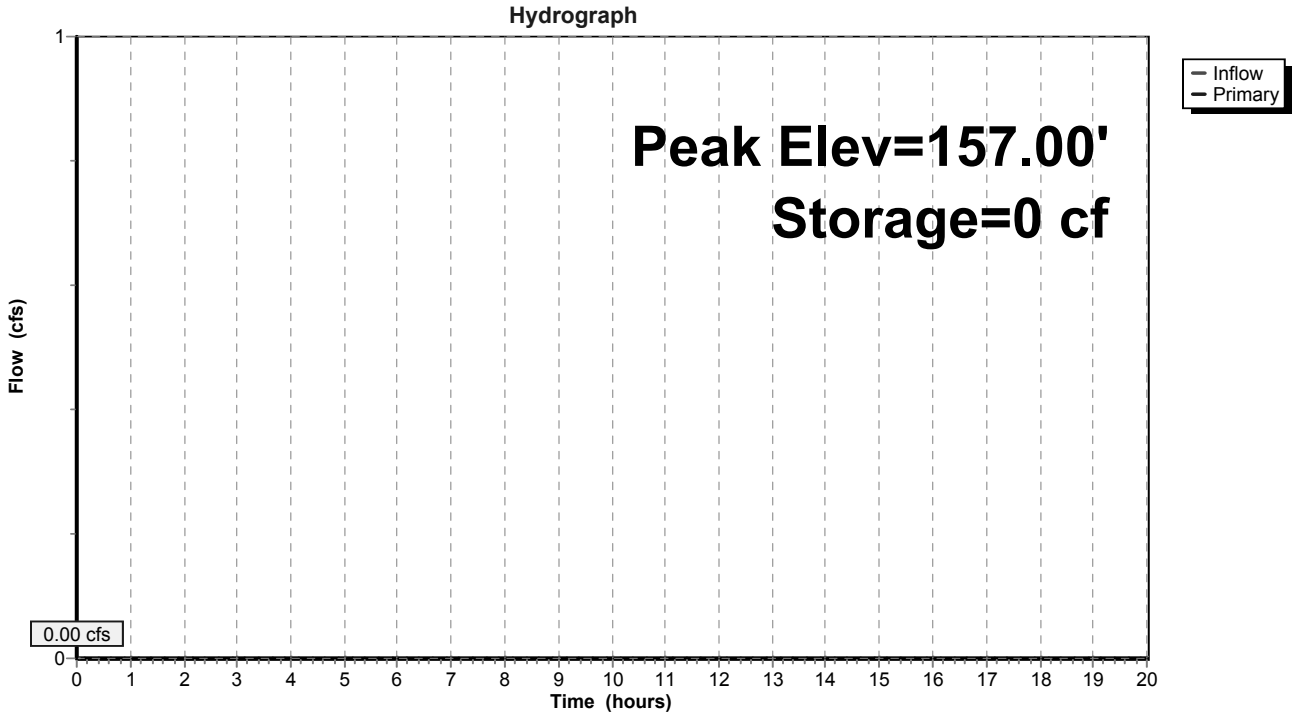
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=157.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 9.1B: 14



## Summary for Pond P W-CULV-N: 227

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 8.39 cfs @ 12.23 hrs, Volume= 0.699 af
Outflow = 8.39 cfs @ 12.23 hrs, Volume= 0.699 af, Atten= 0%, Lag= 0.0 min
Primary = 8.39 cfs @ 12.23 hrs, Volume= 0.699 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 4,411 sf Storage= 0 cf
Peak Elev= 153.00' @ 12.25 hrs Surf.Area= 4,411 sf Storage= 0 cf
Flood Elev= 159.00' Surf.Area= 21,416 sf Storage= 72,181 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 823.5 - 823.5 )

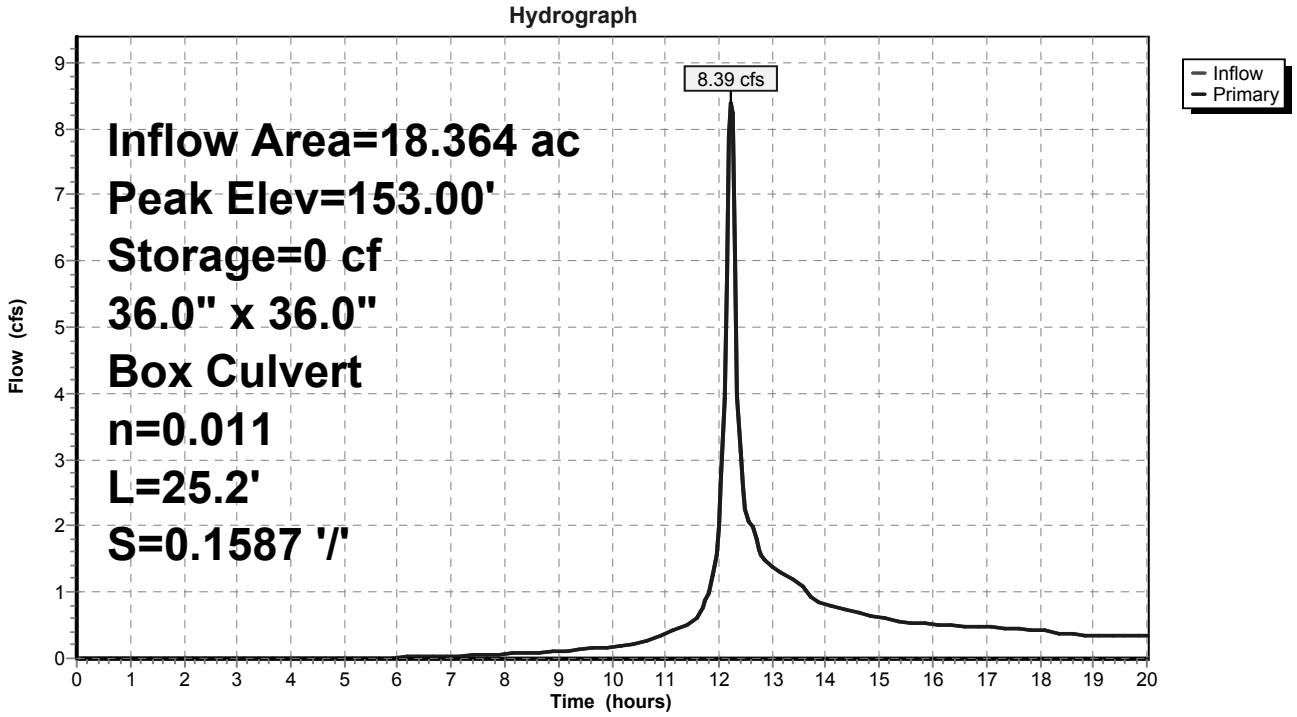
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 72,181 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 4,411 | 0 | 0 |
| 154.00 | 6,861 | 5,636 | 5,636 |
| 155.00 | 8,907 | 7,884 | 13,520 |
| 156.00 | 11,660 | 10,284 | 23,804 |
| 157.00 | 14,425 | 13,042 | 36,846 |
| 158.00 | 17,414 | 15,919 | 52,765 |
| 159.00 | 21,416 | 19,415 | 72,181 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **36.0" W x 36.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 9.00 sf |

**Primary OutFlow** Max=16.30 cfs @ 12.23 hrs HW=153.00' TW=149.45' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 16.30 cfs @ 3.83 fps)

## Pond P W-CULV-N: 227



## Summary for Pond P W-D-3: 111

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 158.00' Surf.Area= 435 sf Storage= 0 cf
Peak Elev= 158.00' @ 0.00 hrs Surf.Area= 435 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,217 sf Storage= 2,517 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

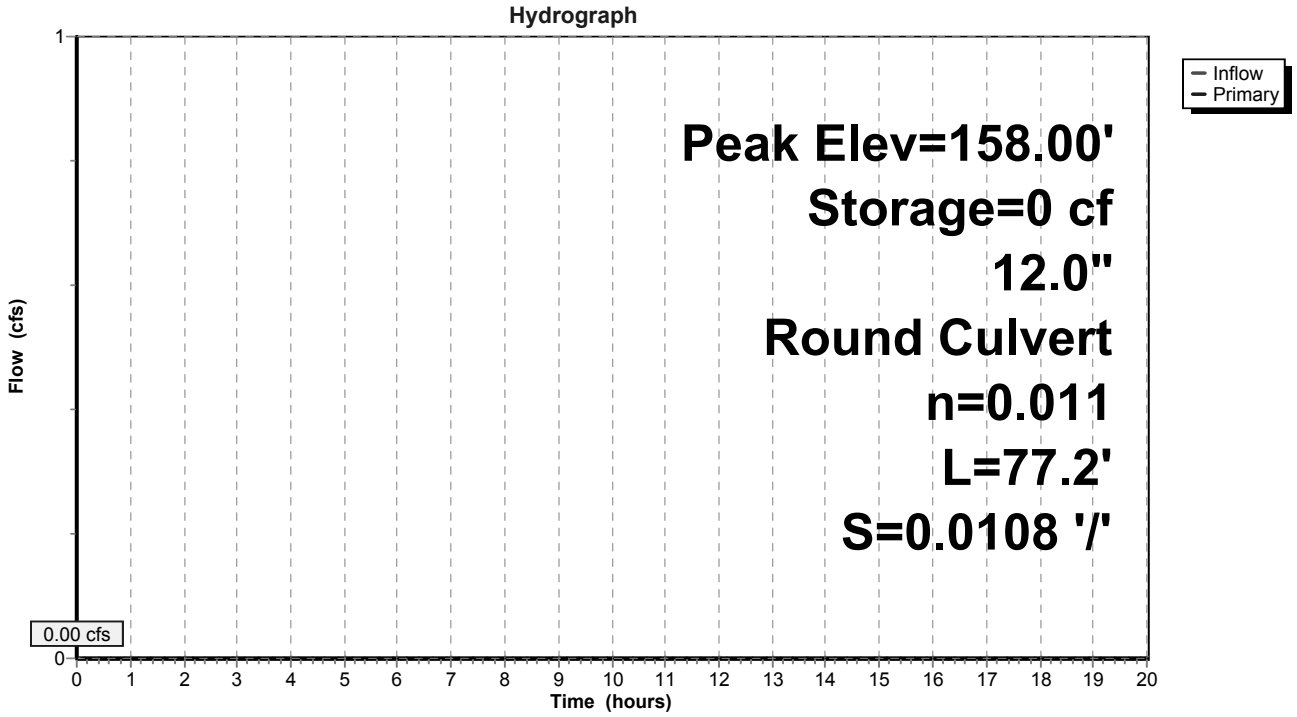
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 158.00' | 2,517 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 158.00 | 435 | 0 | 0 |
| 159.00 | 722 | 578 | 578 |
| 161.00 | 1,217 | 1,939 | 2,517 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Existing Culvert to Remain in Place**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=158.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Existing Culvert to Remain in Place**(Passes 0.00 cfs of 3.51 cfs potential flow)

## Pond P W-D-3: 111



## Summary for Pond P-RG-E-1:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

---

Inflow Area = 2.568 ac, 0.00% Impervious, Inflow Depth > 0.84" for 2_year event
Inflow = 2.45 cfs @ 12.25 hrs, Volume= 0.181 af
Outflow = 0.59 cfs @ 12.57 hrs, Volume= 0.114 af, Atten= 76%, Lag= 19.5 min
Primary = 0.59 cfs @ 12.57 hrs, Volume= 0.114 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 141.41' @ 12.57 hrs Surf.Area= 2,940 sf Storage= 3,233 cf
Flood Elev= 143.00' Surf.Area= 4,489 sf Storage= 9,132 cf

Plug-Flow detention time= 167.4 min calculated for 0.114 af (63% of inflow)
Center-of-Mass det. time= 76.1 min ( 902.3 - 826.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.00' | 9,132 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

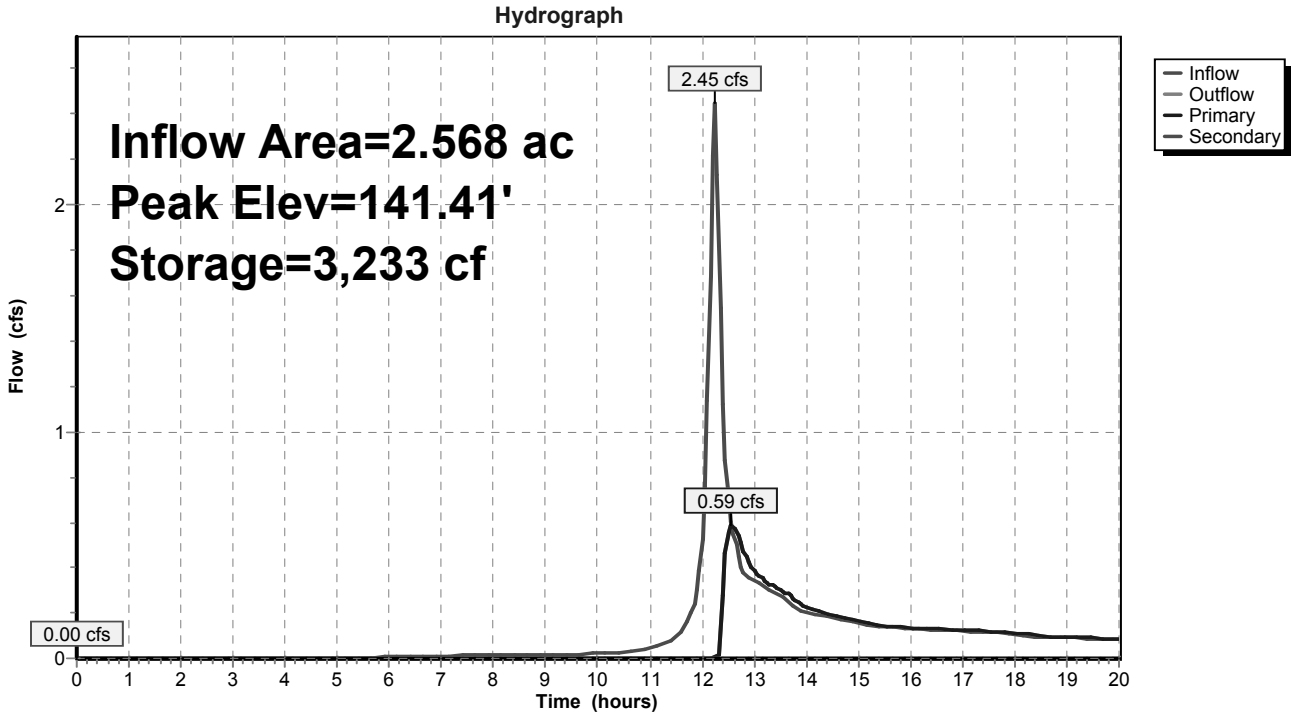
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 140.00 | 1,669 | 0 | 0 |
| 141.00 | 2,558 | 2,114 | 2,114 |
| 142.00 | 3,495 | 3,027 | 5,140 |
| 143.00 | 4,489 | 3,992 | 9,132 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 142.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 6.00 9.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Device 3 | 141.25' | **11.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 140.00' | **18.0" Round Culvert**<br>L= 50.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 140.00' / 139.50' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.58 cfs @ 12.57 hrs HW=141.41' TW=137.21' (Dynamic Tailwater)
↑—**3=Culvert** (Passes 0.58 cfs of 7.08 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 0.58 cfs @ 1.29 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=140.00' TW=142.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P-RG-E-1:


Hydrograph
Inflow Area=2.568 ac
Peak Elev=141.41'
Storage=3,233 cf
2.45 cfs
0.59 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-2:

No Infiltration rate assumed in the model. However, an infiltration rate of 0.17 in/hr will be required to meet the 72 hour drawdown requirement.

---

Inflow Area = 0.477 ac, 0.08% Impervious, Inflow Depth > 1.09" for 2_year event
Inflow = 0.71 cfs @ 12.24 hrs, Volume= 0.043 af
Outflow = 0.34 cfs @ 12.37 hrs, Volume= 0.029 af, Atten= 52%, Lag= 8.0 min
Primary = 0.34 cfs @ 12.37 hrs, Volume= 0.029 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.57' @ 12.37 hrs Surf.Area= 1,507 sf Storage= 697 cf
Flood Elev= 163.00' Surf.Area= 1,929 sf Storage= 1,444 cf

Plug-Flow detention time= 136.1 min calculated for 0.029 af (67% of inflow)
Center-of-Mass det. time= 55.5 min ( 878.9 - 823.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 1,444 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

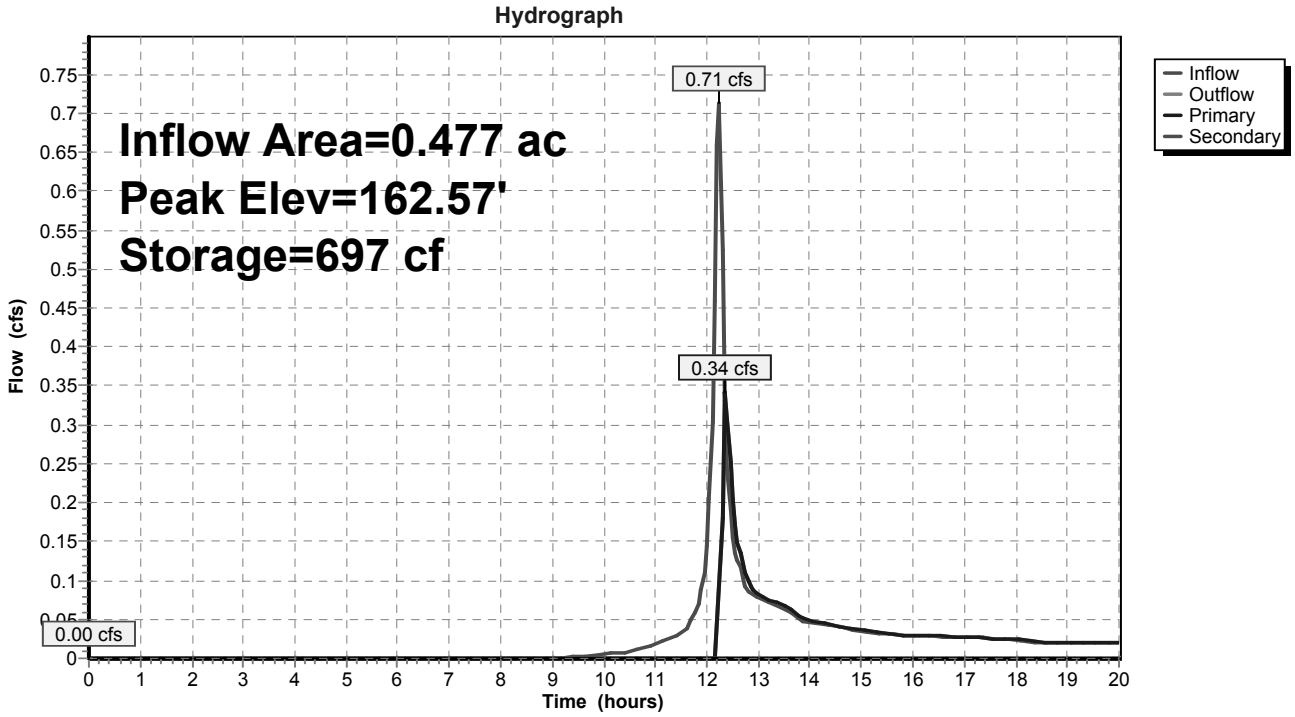
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 959 | 0 | 0 |
| 163.00 | 1,929 | 1,444 | 1,444 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.90' | **18.0" Round RCP_Round 18"**<br>L= 18.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.90' / 155.70' S= 0.0111 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 162.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 162.80' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 1.00 5.00 6.00<br>Height (feet) 0.33 0.00 0.00 0.33 |

**Primary OutFlow** Max=0.32 cfs @ 12.37 hrs HW=162.56' TW=148.63' (Dynamic Tailwater)
↑—**1=RCP_Round 18"** (Passes 0.32 cfs of 25.86 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 0.32 cfs @ 0.82 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
↑—**3=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P-RG-E-2:


Hydrograph
Inflow Area=0.477 ac
Peak Elev=162.57'
Storage=697 cf
0.71 cfs
0.34 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4A:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth > 0.83" for 2_year event
Inflow = 0.54 cfs @ 12.24 hrs, Volume= 0.033 af
Outflow = 0.24 cfs @ 12.37 hrs, Volume= 0.025 af, Atten= 55%, Lag= 8.1 min
Primary = 0.24 cfs @ 12.37 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.73' @ 12.37 hrs Surf.Area= 861 sf Storage= 450 cf
Flood Elev= 173.00' Surf.Area= 2,506 sf Storage= 2,480 cf

Plug-Flow detention time= 112.3 min calculated for 0.025 af (75% of inflow)
Center-of-Mass det. time= 43.2 min ( 881.0 - 837.9 )

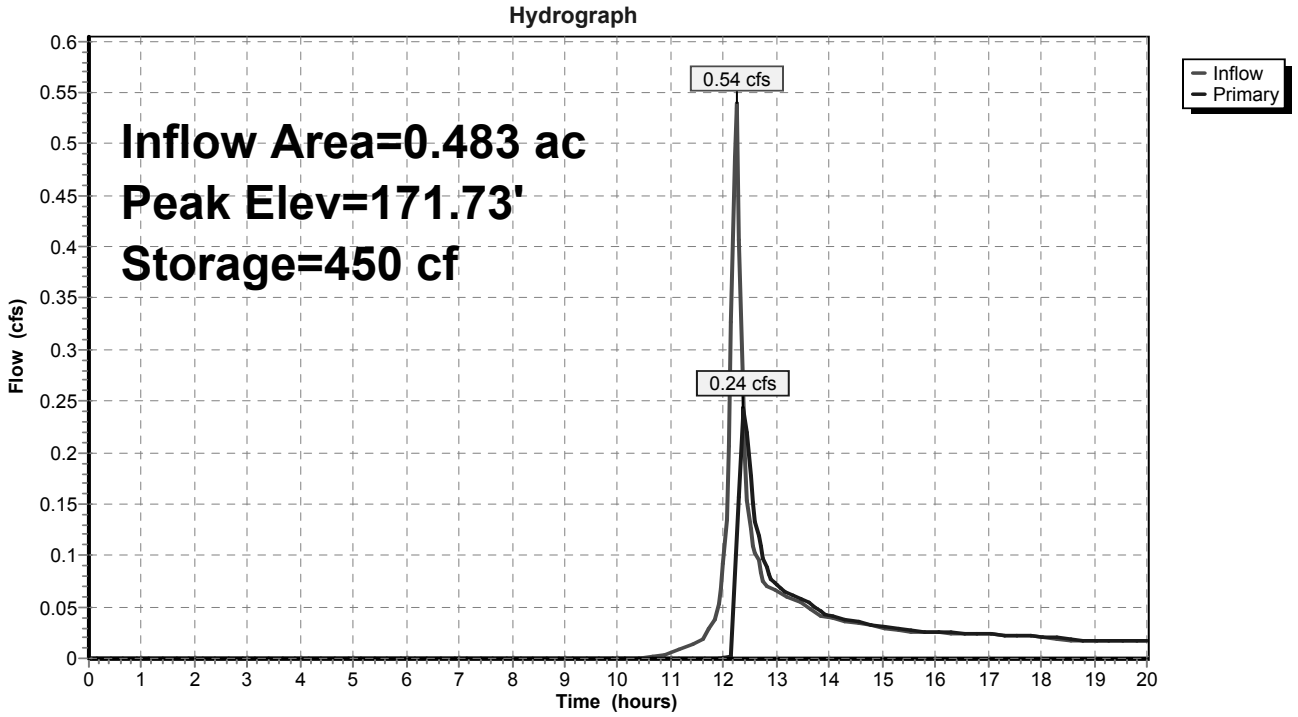
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 2,480 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 371 | 0 | 0 |
| 172.00 | 1,041 | 706 | 706 |
| 173.00 | 2,506 | 1,774 | 2,480 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 168.00' | **18.0" Round Culvert**<br>L= 65.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.30' S= 0.0108 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.60' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.23 cfs @ 12.37 hrs HW=171.73' TW=155.69' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.23 cfs of 15.70 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 0.23 cfs @ 1.17 fps)

## Pond P-RG-E-4A:


Hydrograph
Inflow Area=0.483 ac
Peak Elev=171.73'
Storage=450 cf
0.54 cfs
0.24 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4B:

Inflow Area = 0.527 ac, 0.00% Impervious, Inflow Depth > 1.41" for 2_year event
Inflow = 1.01 cfs @ 12.23 hrs, Volume= 0.062 af
Outflow = 0.33 cfs @ 12.41 hrs, Volume= 0.039 af, Atten= 67%, Lag= 10.7 min
Primary = 0.33 cfs @ 12.41 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.82' @ 12.41 hrs Surf.Area= 1,785 sf Storage= 1,186 cf
Flood Elev= 171.00' Surf.Area= 2,920 sf Storage= 3,942 cf

Plug-Flow detention time= 154.8 min calculated for 0.039 af (63% of inflow)
Center-of-Mass det. time= 70.3 min ( 877.5 - 807.2 )

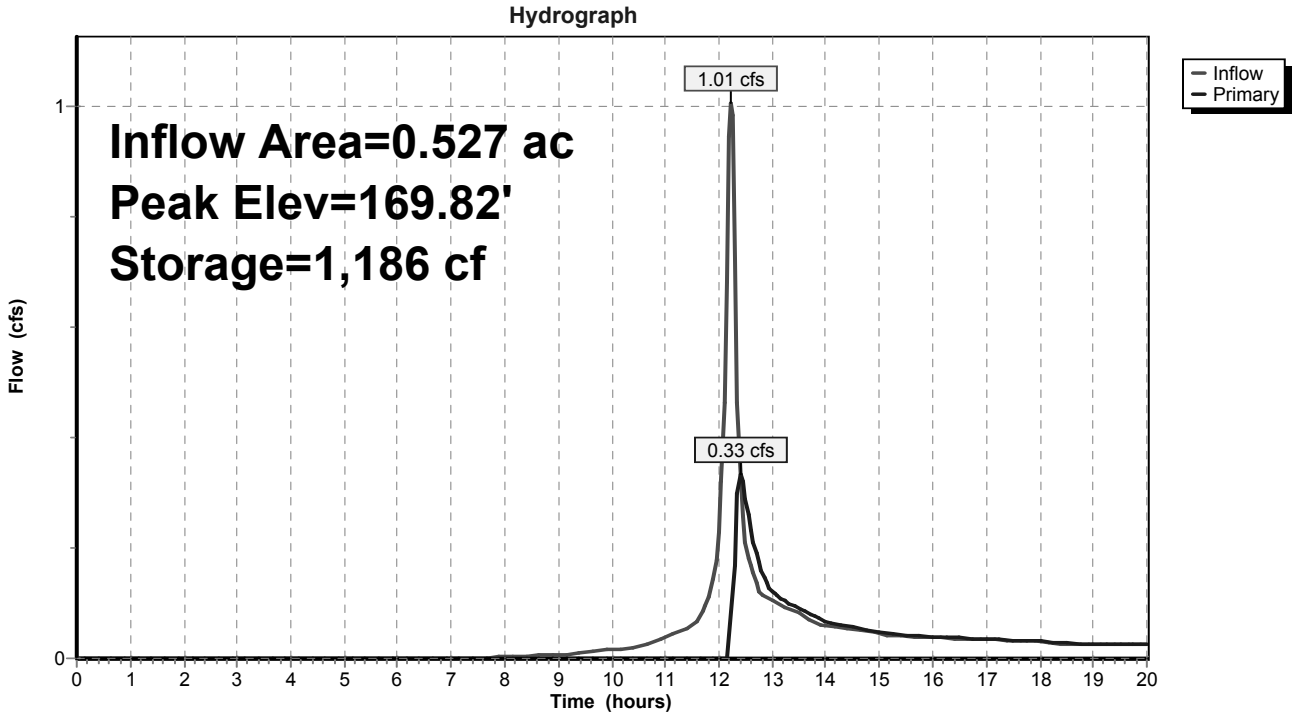
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 3,942 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 1,097 | 0 | 0 |
| 170.00 | 1,933 | 1,515 | 1,515 |
| 171.00 | 2,920 | 2,427 | 3,942 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.90' | **18.0" Round Culvert**<br>L= 72.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.90' / 161.90' S= 0.0139 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.70' | **9.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.33 cfs @ 12.41 hrs HW=169.82' TW=155.67' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.33 cfs of 22.65 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 0.33 cfs @ 1.14 fps)

## Pond P-RG-E-4B:


Hydrograph
Inflow Area=0.527 ac
Peak Elev=169.82'
Storage=1,186 cf
1.01 cfs
0.33 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-8:

Inflow Area = 0.652 ac, 0.01% Impervious, Inflow Depth > 0.87" for 2_year event
Inflow = 0.78 cfs @ 12.24 hrs, Volume= 0.048 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.63' @ 20.00 hrs Surf.Area= 3,605 sf Storage= 2,068 cf
Flood Elev= 176.00' Surf.Area= 5,077 sf Storage= 8,003 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

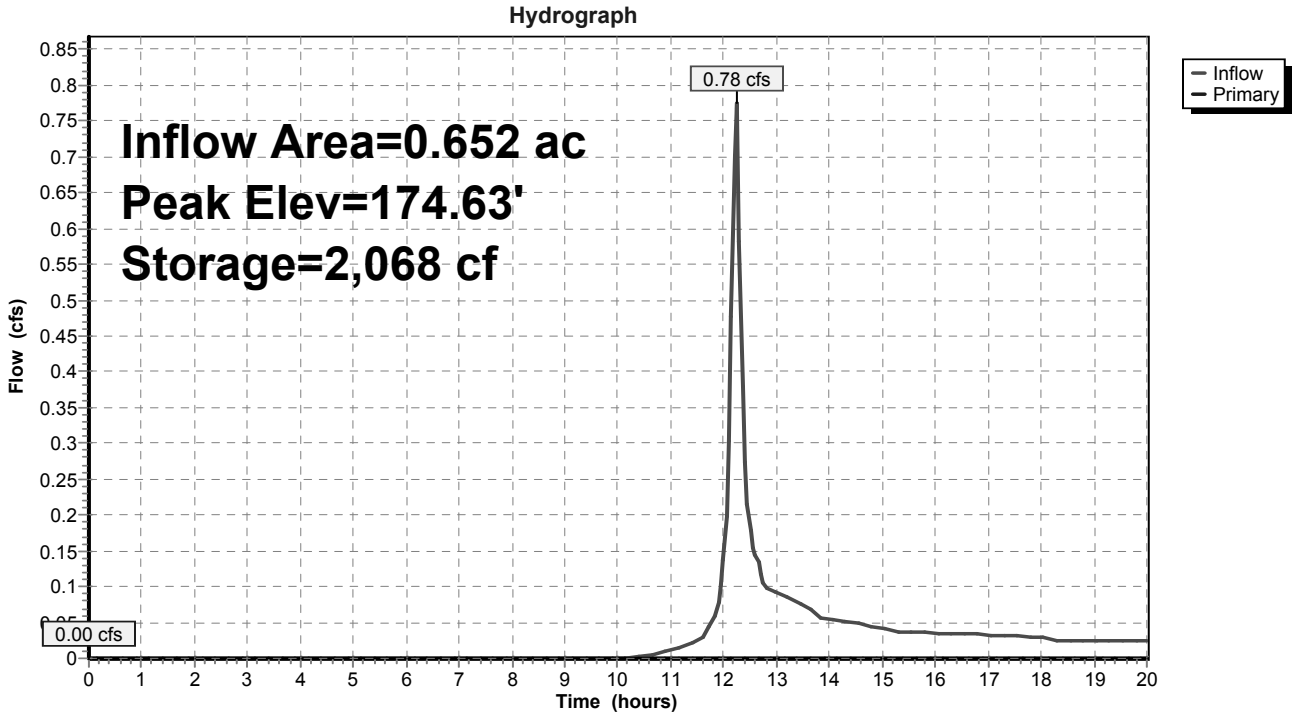
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 174.00' | 8,003 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 174.00 | 2,972 | 0 | 0 |
| 175.00 | 3,978 | 3,475 | 3,475 |
| 176.00 | 5,077 | 4,528 | 8,003 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 174.90' | **4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 170.40' | **18.0" Round RCP_Round 18"**<br>L= 91.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 170.40' / 169.20' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=174.00' TW=167.50' (Dynamic Tailwater)
↑└**2=RCP_Round 18"** (Passes 0.00 cfs of 15.22 cfs potential flow)
↑└**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond P-RG-E-8:


Hydrograph
Inflow Area=0.652 ac
Peak Elev=174.63'
Storage=2,068 cf
0.78 cfs
0.00 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
0.65
0.7
0.75
0.8
0.85
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-W-2: 306

Inflow Area = 4.854 ac, 0.00% Impervious, Inflow Depth > 0.65" for 2_year event
Inflow = 4.12 cfs @ 12.22 hrs, Volume= 0.265 af
Outflow = 0.41 cfs @ 13.66 hrs, Volume= 0.135 af, Atten= 90%, Lag= 86.6 min
Primary = 0.41 cfs @ 13.66 hrs, Volume= 0.135 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.19' @ 13.66 hrs Surf.Area= 6,245 sf Storage= 5,914 cf
Flood Elev= 174.00' Surf.Area= 14,642 sf Storage= 34,022 cf

Plug-Flow detention time= 216.9 min calculated for 0.135 af (51% of inflow)
Center-of-Mass det. time= 110.8 min ( 958.4 - 847.6 )

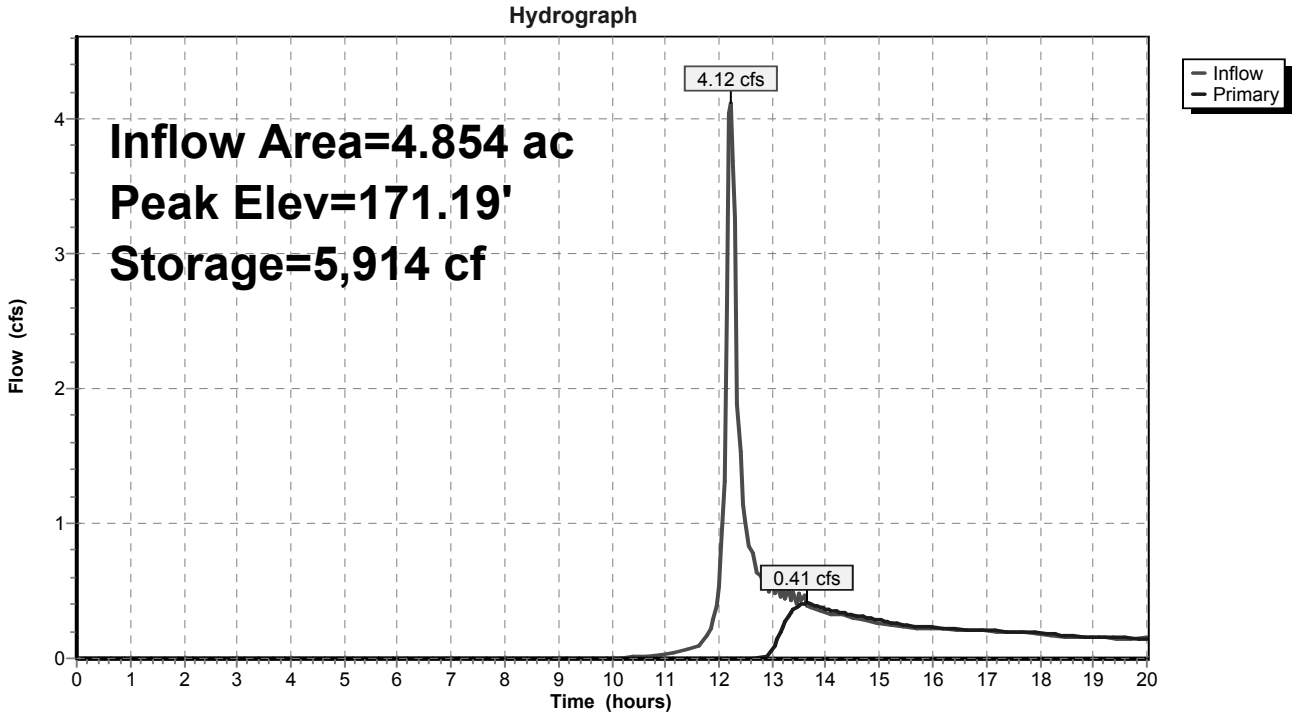
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 34,022 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 3,744 | 0 | 0 |
| 171.00 | 5,804 | 4,774 | 4,774 |
| 172.00 | 8,133 | 6,969 | 11,743 |
| 173.00 | 10,892 | 9,513 | 21,255 |
| 174.00 | 14,642 | 12,767 | 34,022 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.10' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 162.10' | **18.0" Round RCP_Round 18"**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.10' / 160.80' S= 0.0096 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.41 cfs @ 13.66 hrs HW=171.19' TW=154.89' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 0.41 cfs of 22.07 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 0.41 cfs @ 0.98 fps)

## Pond P-RG-W-2: 306



## Summary for Pond P-RG-W-3:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.85 in/hr to drawdown in 72 hours.

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Inflow Area = 4.660 ac, 0.00% Impervious, Inflow Depth > 0.50" for 2_year event
Inflow = 2.97 cfs @ 12.24 hrs, Volume= 0.195 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 168.84' @ 20.00 hrs Surf.Area= 7,734 sf Storage= 8,502 cf
Flood Elev= 173.00' Surf.Area= 24,206 sf Storage= 71,944 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

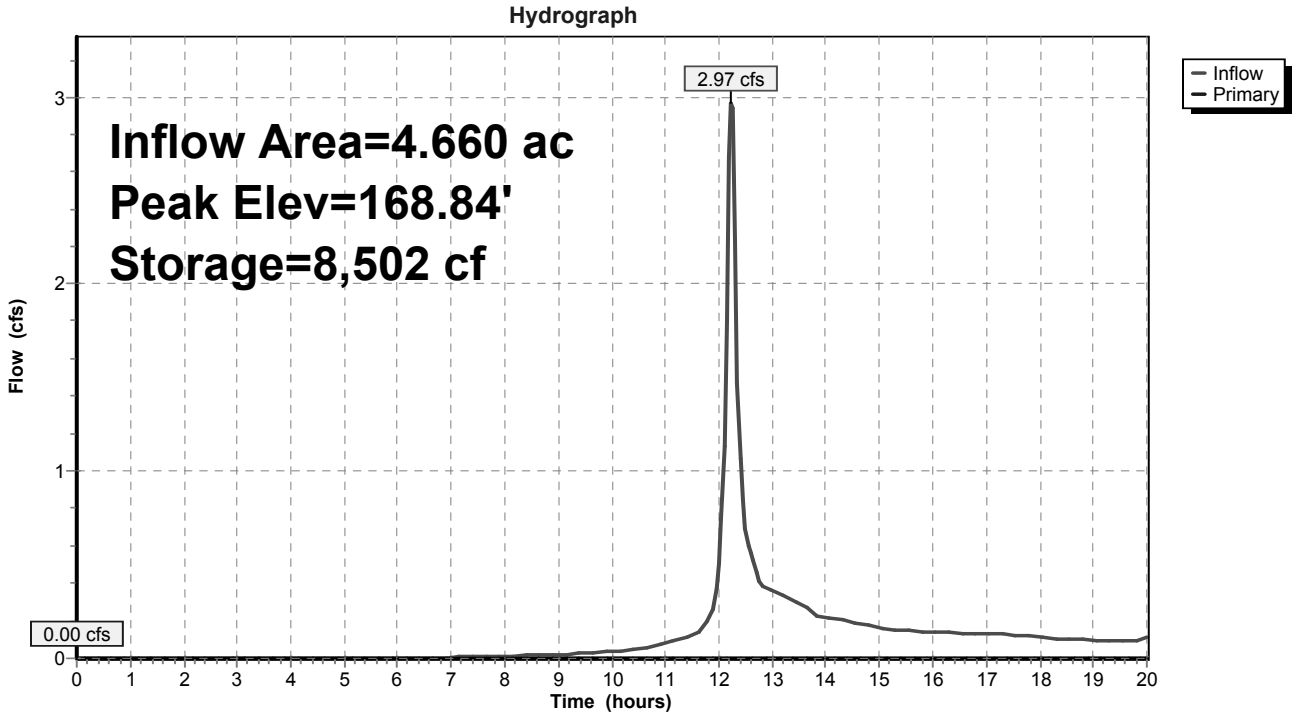
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 71,944 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 1,954 | 0 | 0 |
| 168.00 | 4,656 | 3,305 | 3,305 |
| 169.00 | 8,325 | 6,491 | 9,796 |
| 170.00 | 11,764 | 10,045 | 19,840 |
| 171.00 | 14,923 | 13,344 | 33,184 |
| 172.00 | 19,196 | 17,060 | 50,243 |
| 173.00 | 24,206 | 21,701 | 71,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 170.00' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 133.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.00' S= 0.0075 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=167.00' TW=153.00' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 0.00 cfs of 11.77 cfs potential flow)
↑**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond P-RG-W-3:


Hydrograph
Inflow Area=4.660 ac
Peak Elev=168.84'
Storage=8,502 cf
2.97 cfs
0.00 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-W-4:

Inflow Area = 2.305 ac, 0.00% Impervious, Inflow Depth > 0.88" for 2_year event
Inflow = 2.74 cfs @ 12.24 hrs, Volume= 0.168 af
Outflow = 0.41 cfs @ 12.72 hrs, Volume= 0.098 af, Atten= 85%, Lag= 28.9 min
Primary = 0.41 cfs @ 12.72 hrs, Volume= 0.098 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.27' @ 12.72 hrs Surf.Area= 3,552 sf Storage= 3,250 cf
Flood Elev= 172.00' Surf.Area= 5,024 sf Storage= 6,366 cf

Plug-Flow detention time= 175.4 min calculated for 0.097 af (58% of inflow)
Center-of-Mass det. time= 81.9 min ( 916.6 - 834.8 )

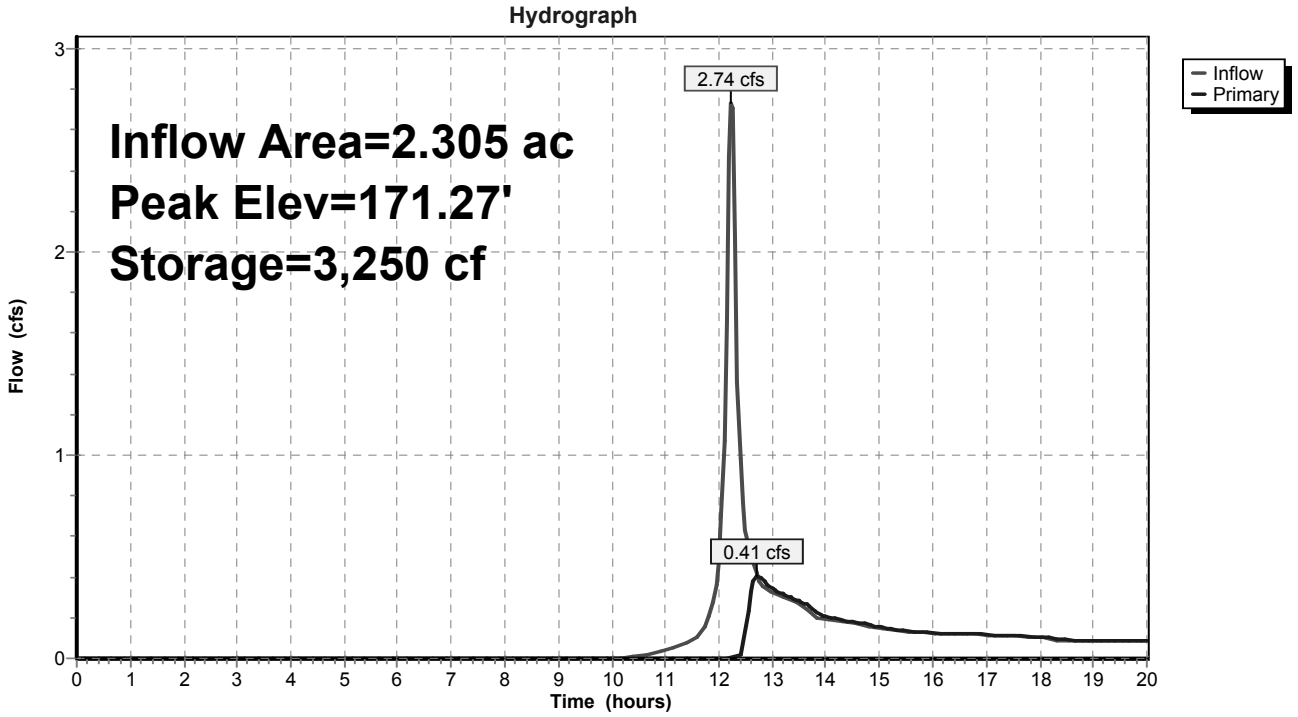
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 15,687 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 1,710 | 0 | 0 |
| 171.00 | 2,999 | 2,355 | 2,355 |
| 172.00 | 5,024 | 4,012 | 6,366 |
| 173.00 | 13,618 | 9,321 | 15,687 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 166.40' | **18.0" Round RCP_Round 18"**<br>L= 42.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.40' / 166.00' S= 0.0095 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.40 cfs @ 12.72 hrs HW=171.27' TW=153.00' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 0.40 cfs of 19.63 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 0.40 cfs @ 0.88 fps)

## Pond P-RG-W-4:


Hydrograph
Inflow Area=2.305 ac
Peak Elev=171.27'
Storage=3,250 cf
2.74 cfs
0.41 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond R-CULV-1: PIPE 1

Inflow Area = 3.188 ac, 0.00% Impervious, Inflow Depth > 0.59" for 2_year event
Inflow = 1.21 cfs @ 12.27 hrs, Volume= 0.158 af
Outflow = 1.21 cfs @ 12.27 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min
Primary = 1.21 cfs @ 12.27 hrs, Volume= 0.158 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

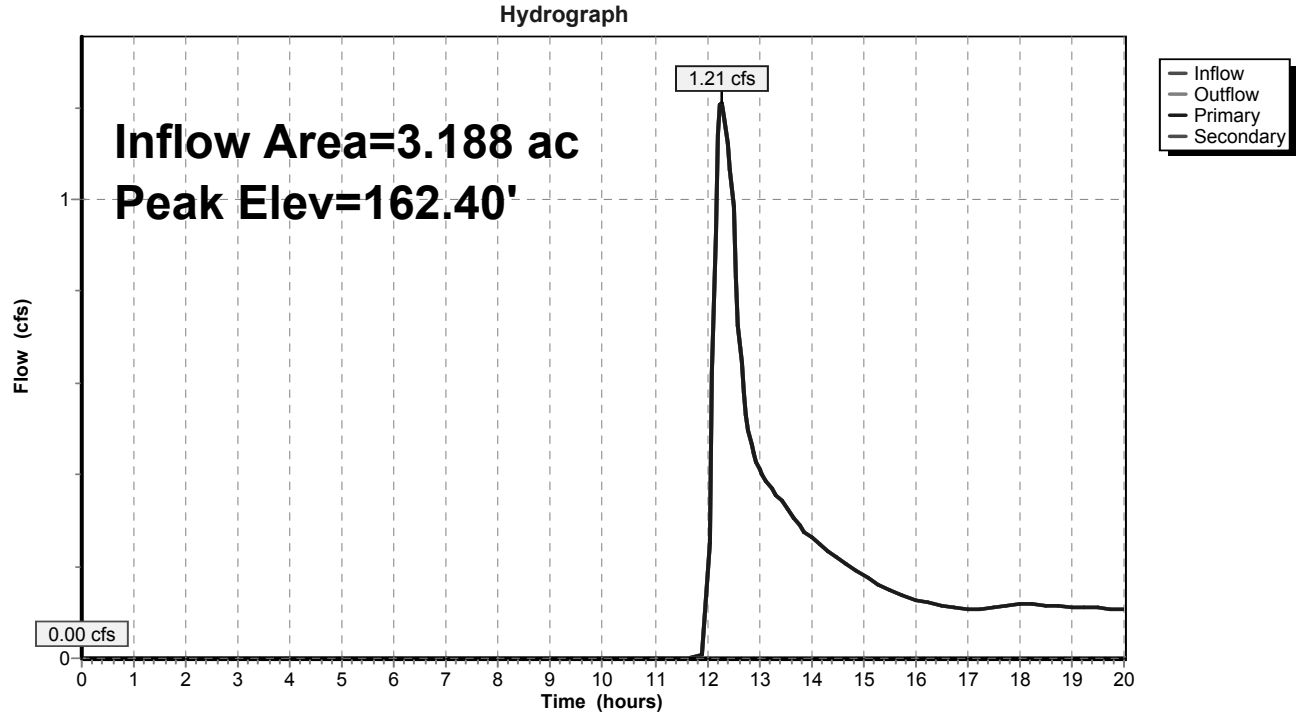
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.40' @ 12.27 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **24.0" Round RCP_Round 24"**<br>L= 195.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 158.10' S= 0.0200 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 173.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=1.20 cfs @ 12.27 hrs HW=162.40' TW=158.50' (Dynamic Tailwater)
↑—**1=RCP_Round 24"** (Inlet Controls 1.20 cfs @ 2.69 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-1: PIPE 1



## Summary for Pond R-CULV-10: PIPE 10

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 3.85 cfs @ 12.39 hrs, Volume= 0.760 af
Outflow = 3.85 cfs @ 12.39 hrs, Volume= 0.760 af, Atten= 0%, Lag= 0.0 min
Primary = 3.85 cfs @ 12.39 hrs, Volume= 0.760 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

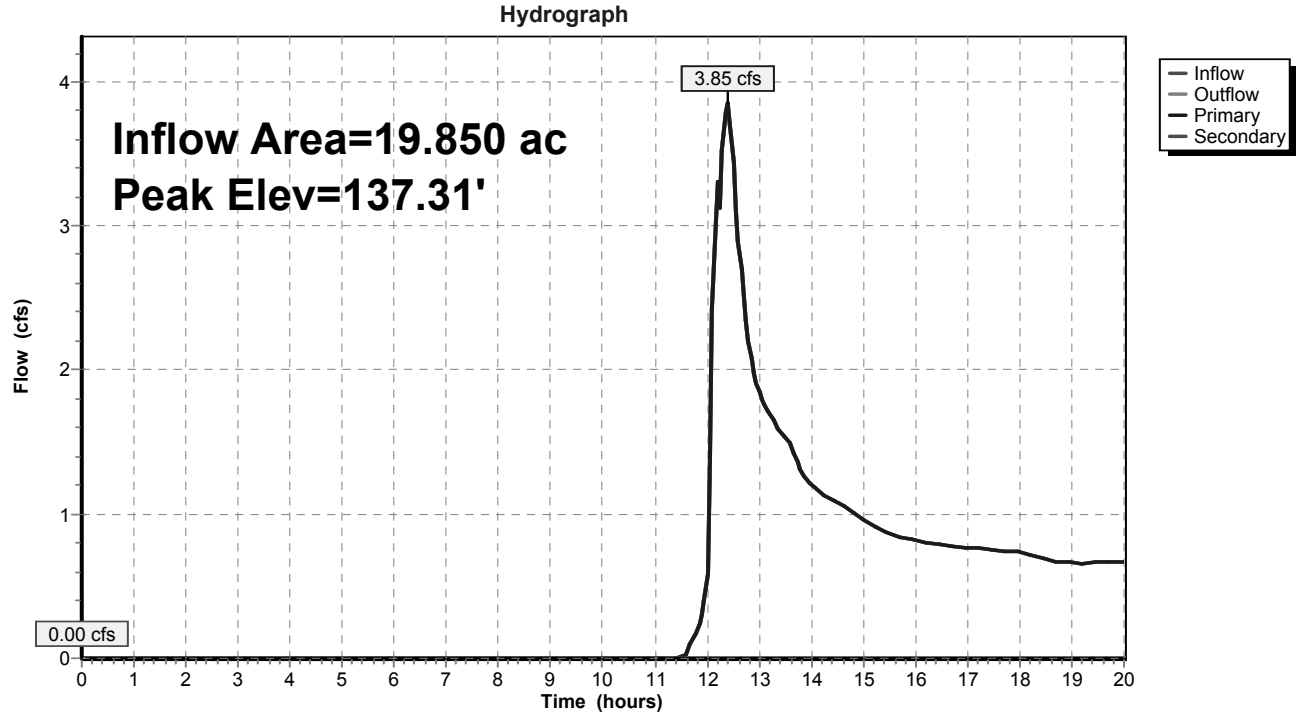
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 137.31' @ 12.39 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 136.50' | **36.0" Round Culvert**<br>L= 339.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 136.50' / 135.00' S= 0.0044 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 144.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.83 cfs @ 12.39 hrs HW=137.30' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 3.83 cfs @ 3.78 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=136.50' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-10: PIPE 10



## Summary for Pond R-CULV-2: PIPE 2

Inflow Area = 10.999 ac, 3.37% Impervious, Inflow Depth > 0.45" for 2_year event
Inflow = 2.40 cfs @ 12.25 hrs, Volume= 0.414 af
Outflow = 2.40 cfs @ 12.25 hrs, Volume= 0.414 af, Atten= 0%, Lag= 0.0 min
Primary = 2.40 cfs @ 12.25 hrs, Volume= 0.414 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

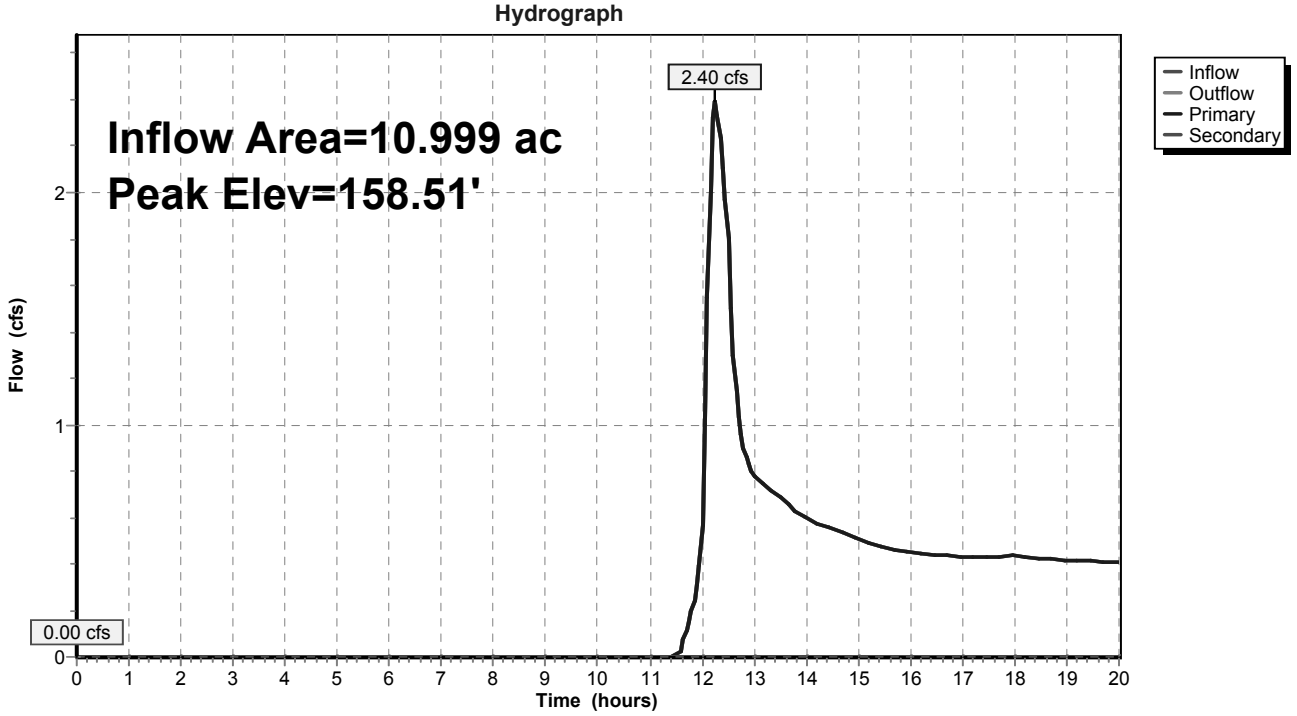
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 158.51' @ 12.25 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **36.0" Round Culvert**<br>L= 191.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 158.00' / 155.10' S= 0.0152 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 166.80' | **36.0" Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.39 cfs @ 12.25 hrs HW=158.51' TW=155.66' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 2.39 cfs @ 3.03 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=158.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-2: PIPE 2



## Summary for Pond R-CULV-3: PIPE 3

Inflow Area = 14.512 ac, 2.87% Impervious, Inflow Depth > 0.51" for 2_year event
Inflow = 3.44 cfs @ 12.34 hrs, Volume= 0.616 af
Outflow = 3.44 cfs @ 12.34 hrs, Volume= 0.616 af, Atten= 0%, Lag= 0.0 min
Primary = 3.44 cfs @ 12.34 hrs, Volume= 0.616 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

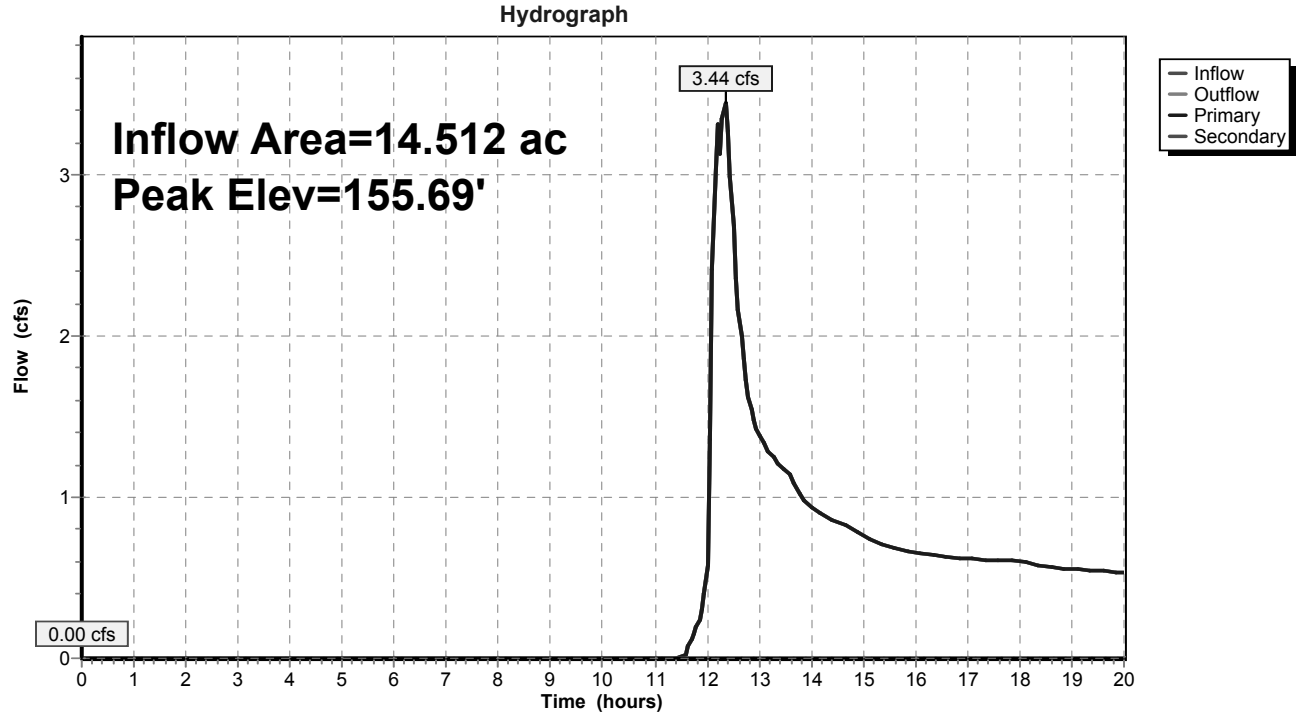
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 155.69' @ 12.34 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.00' | **24.0" Round Culvert**<br>L= 230.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.00' / 150.10' S= 0.0213 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.42 cfs @ 12.34 hrs HW=155.69' TW=150.76' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.42 cfs @ 3.54 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=155.00' TW=142.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-3: PIPE 3



## Summary for Pond R-CULV-4: PIPE 4

Inflow Area = 15.897 ac, 2.62% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 3.44 cfs @ 12.34 hrs, Volume= 0.616 af
Outflow = 3.44 cfs @ 12.34 hrs, Volume= 0.616 af, Atten= 0%, Lag= 0.0 min
Primary = 3.44 cfs @ 12.34 hrs, Volume= 0.616 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

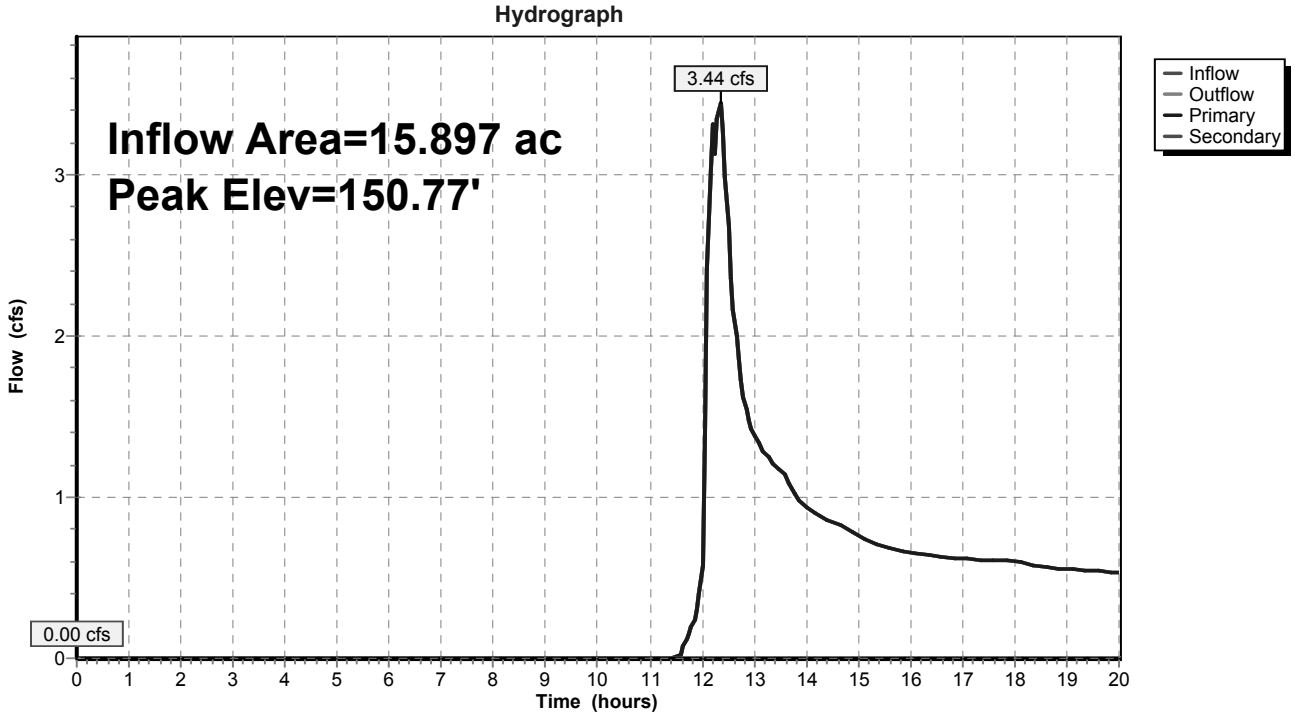
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.77' @ 12.34 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.00' | **24.0" Round Culvert**<br>L= 38.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 150.00' / 149.50' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.42 cfs @ 12.34 hrs HW=150.76' TW=150.09' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.42 cfs @ 4.61 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=150.00' TW=142.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-4: PIPE 4



## Summary for Pond R-CULV-5: PIPE 5

Inflow Area = 16.805 ac, 2.48% Impervious, Inflow Depth > 0.44" for 2_year event
Inflow = 3.44 cfs @ 12.34 hrs, Volume= 0.617 af
Outflow = 3.44 cfs @ 12.34 hrs, Volume= 0.617 af, Atten= 0%, Lag= 0.0 min
Primary = 3.44 cfs @ 12.34 hrs, Volume= 0.617 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

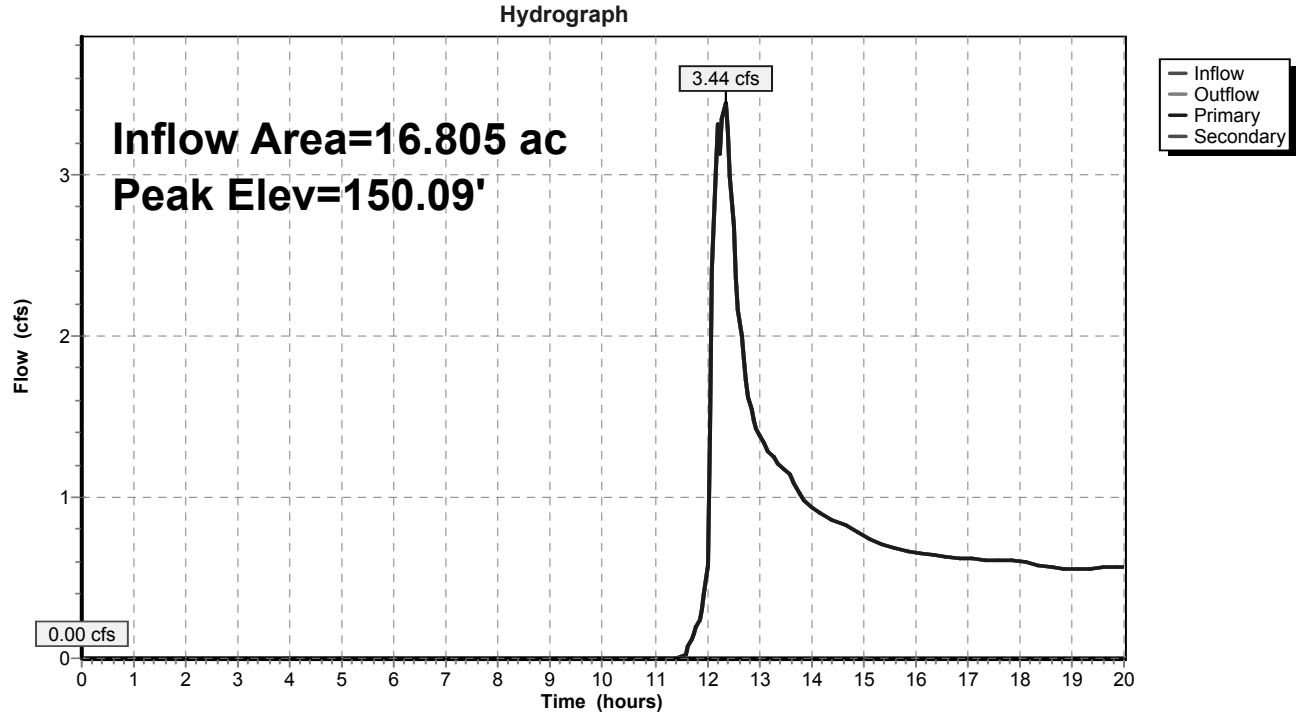
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.09' @ 12.34 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 149.40' | **24.0" Round Culvert**<br>L= 78.3' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 149.40' / 148.10' S= 0.0166 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 170.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.42 cfs @ 12.34 hrs HW=150.09' TW=148.64' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.42 cfs @ 3.54 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=149.40' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-5: PIPE 5



## Summary for Pond R-CULV-6: PIPE 6

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 0.45" for 2_year event
Inflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Outflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af, Atten= 0%, Lag= 0.0 min
Primary = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

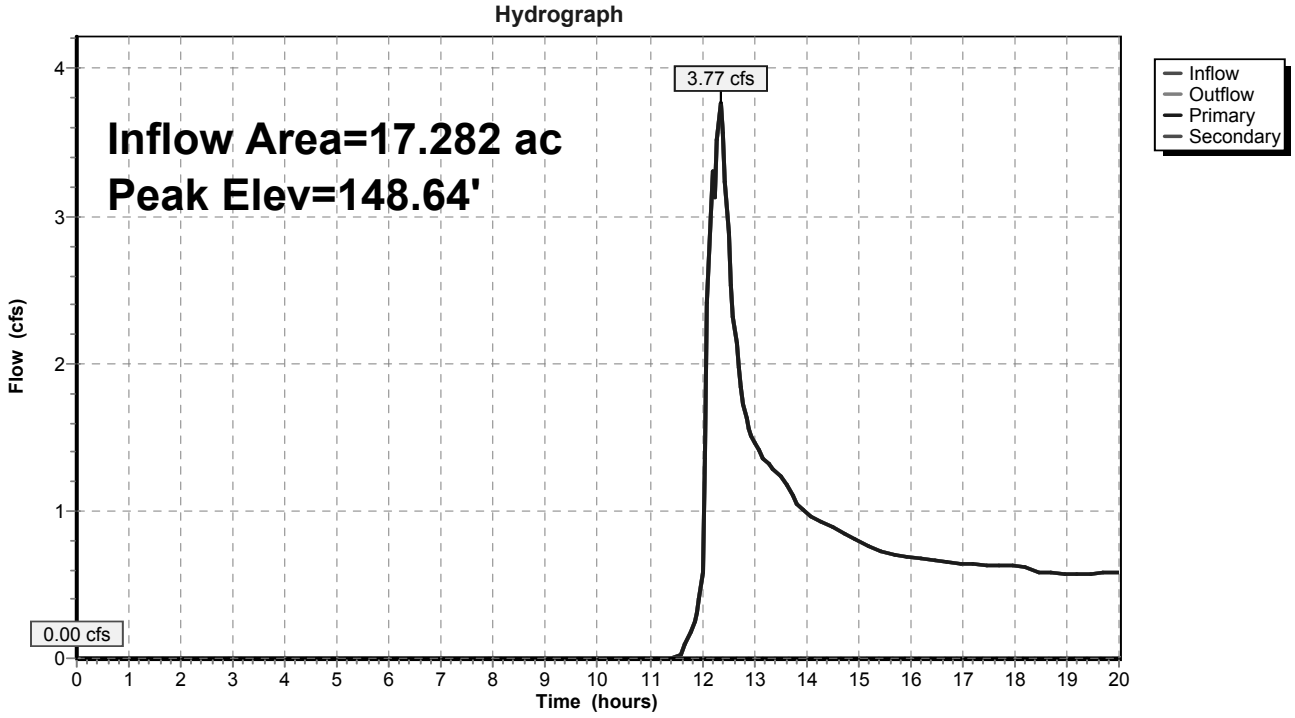
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 148.64' @ 12.35 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.00' | **36.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 148.00' / 145.10' S= 0.0215 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 161.10' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.76 cfs @ 12.35 hrs HW=148.64' TW=145.64' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.76 cfs @ 3.40 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=148.00' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-6: PIPE 6



## Summary for Pond R-CULV-7: PIPE 7

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 0.45" for 2_year event
Inflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Outflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af, Atten= 0%, Lag= 0.0 min
Primary = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

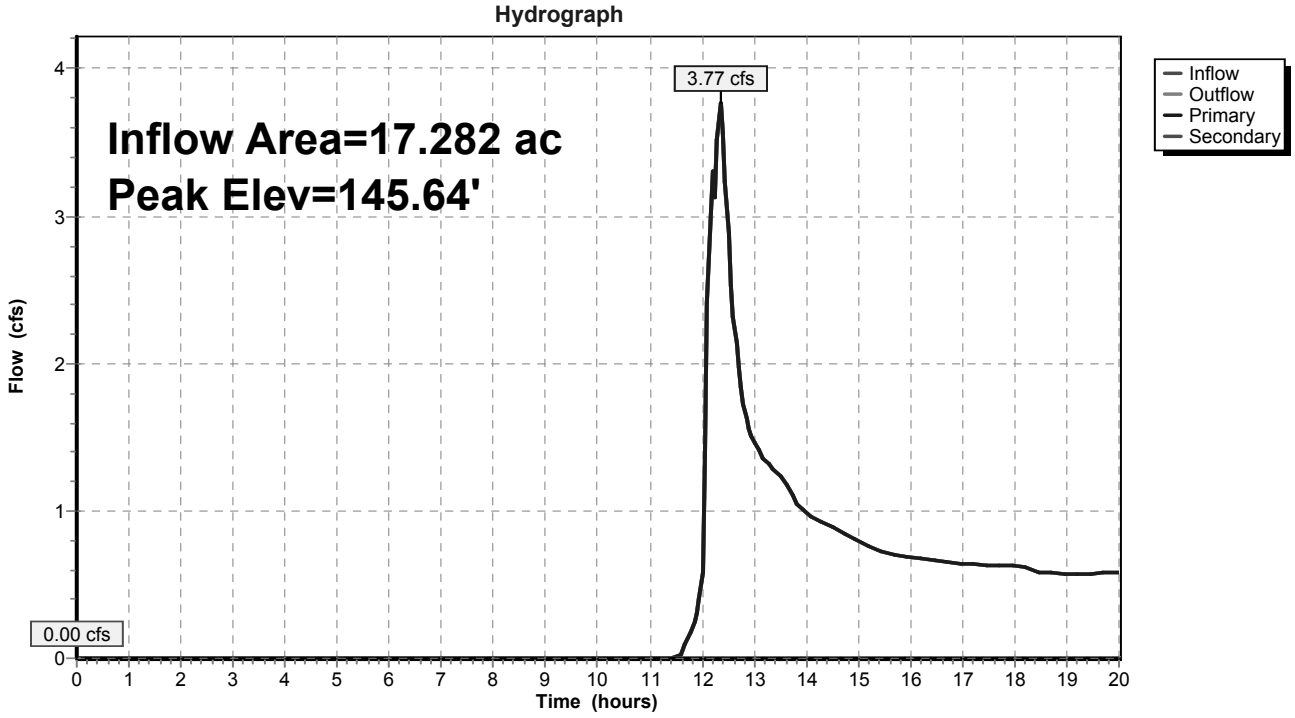
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 145.64' @ 12.35 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 145.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 145.00' / 141.10' S= 0.0198 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.76 cfs @ 12.35 hrs HW=145.64' TW=141.66' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.76 cfs @ 3.40 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=145.00' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-7: PIPE 7



## Summary for Pond R-CULV-8: PIPE 8

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 0.45" for 2_year event
Inflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Outflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af, Atten= 0%, Lag= 0.0 min
Primary = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

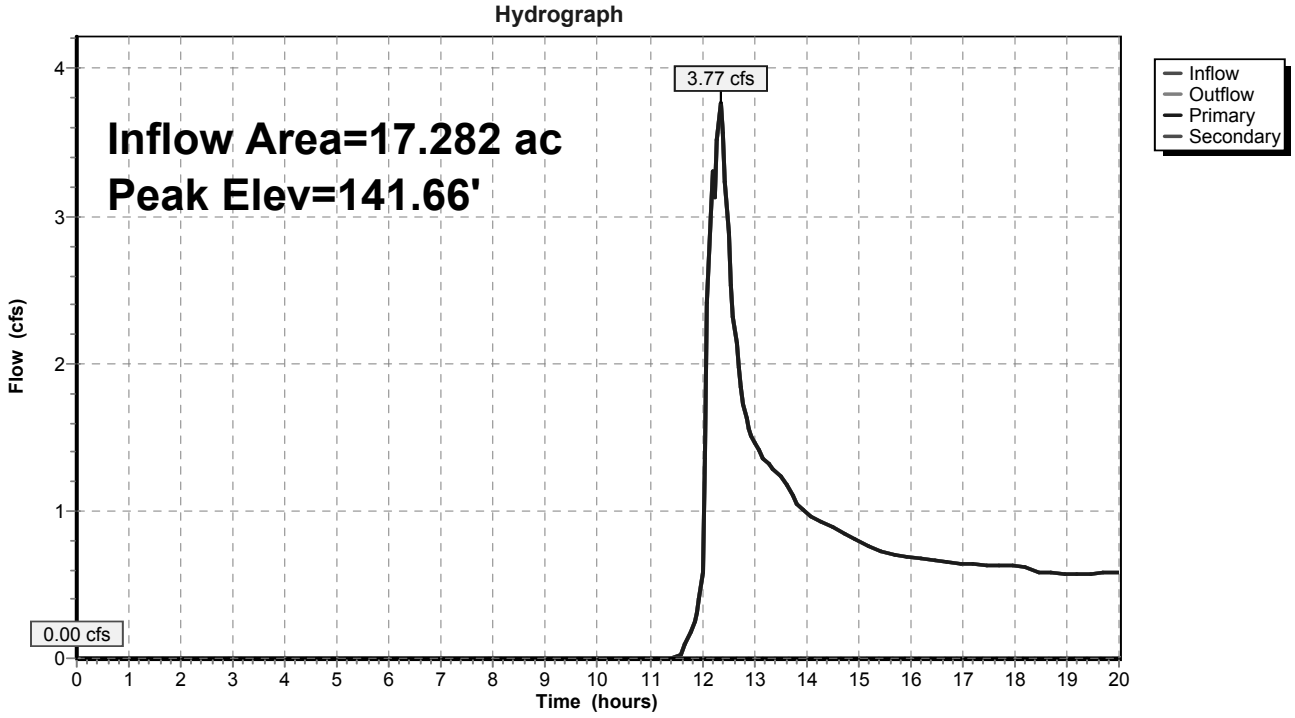
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 141.66' @ 12.35 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 141.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 141.00' / 138.70' S= 0.0117 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.75 cfs @ 12.35 hrs HW=141.66' TW=139.38' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.75 cfs @ 4.95 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=141.00' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-8: PIPE 8



## Summary for Pond R-CULV-9: PIPE 9

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 0.45" for 2_year event
Inflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Outflow = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af, Atten= 0%, Lag= 0.0 min
Primary = 3.77 cfs @ 12.35 hrs, Volume= 0.646 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

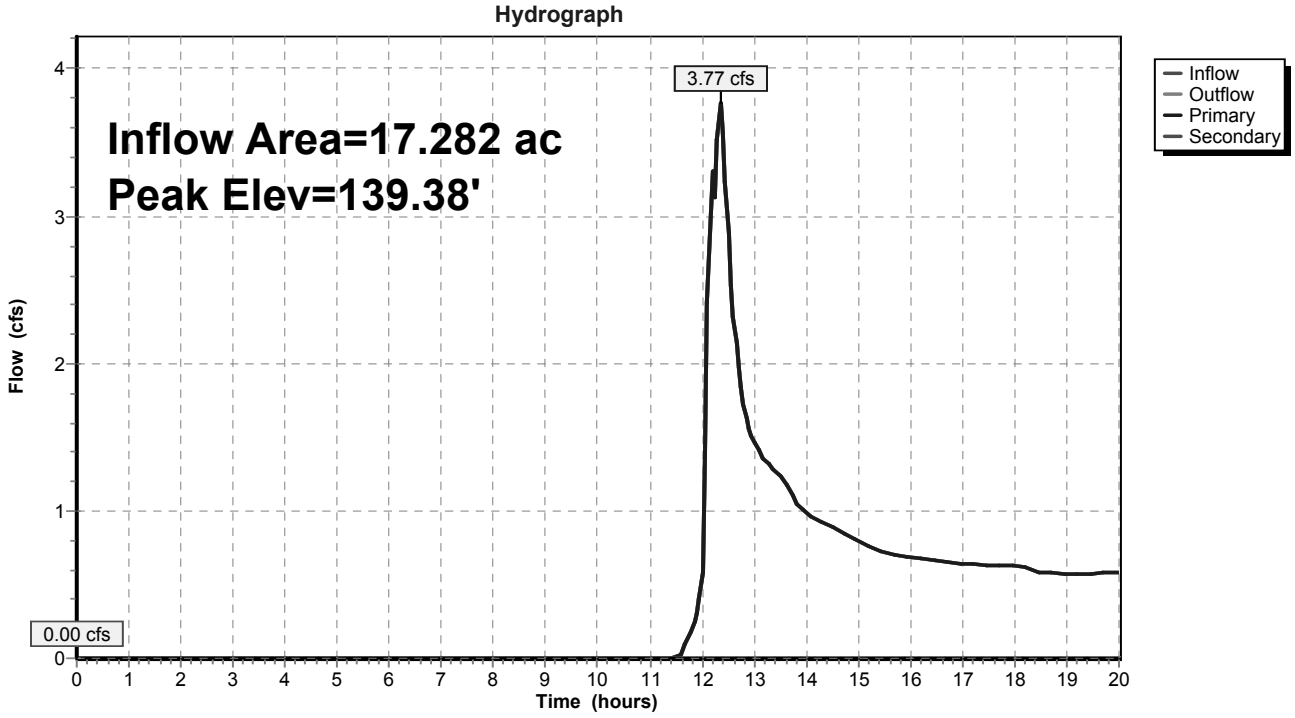
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 139.38' @ 12.35 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 138.71' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 138.71' / 136.60' S= 0.0107 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 143.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.76 cfs @ 12.35 hrs HW=139.38' TW=137.30' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 3.76 cfs @ 4.79 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=138.71' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-9: PIPE 9

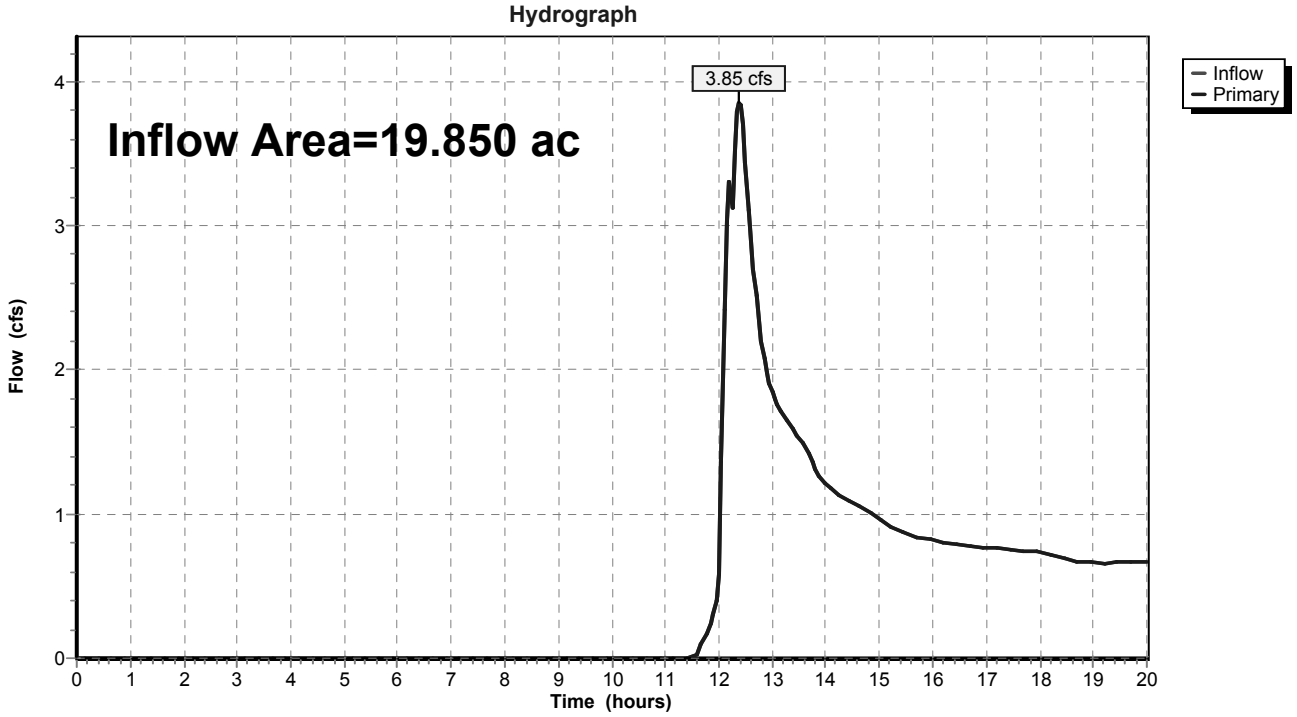


## Summary for Link DP CULV: outflow from culvert

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 3.85 cfs @ 12.39 hrs, Volume= 0.760 af
Primary = 3.85 cfs @ 12.39 hrs, Volume= 0.760 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP CULV: outflow from culvert

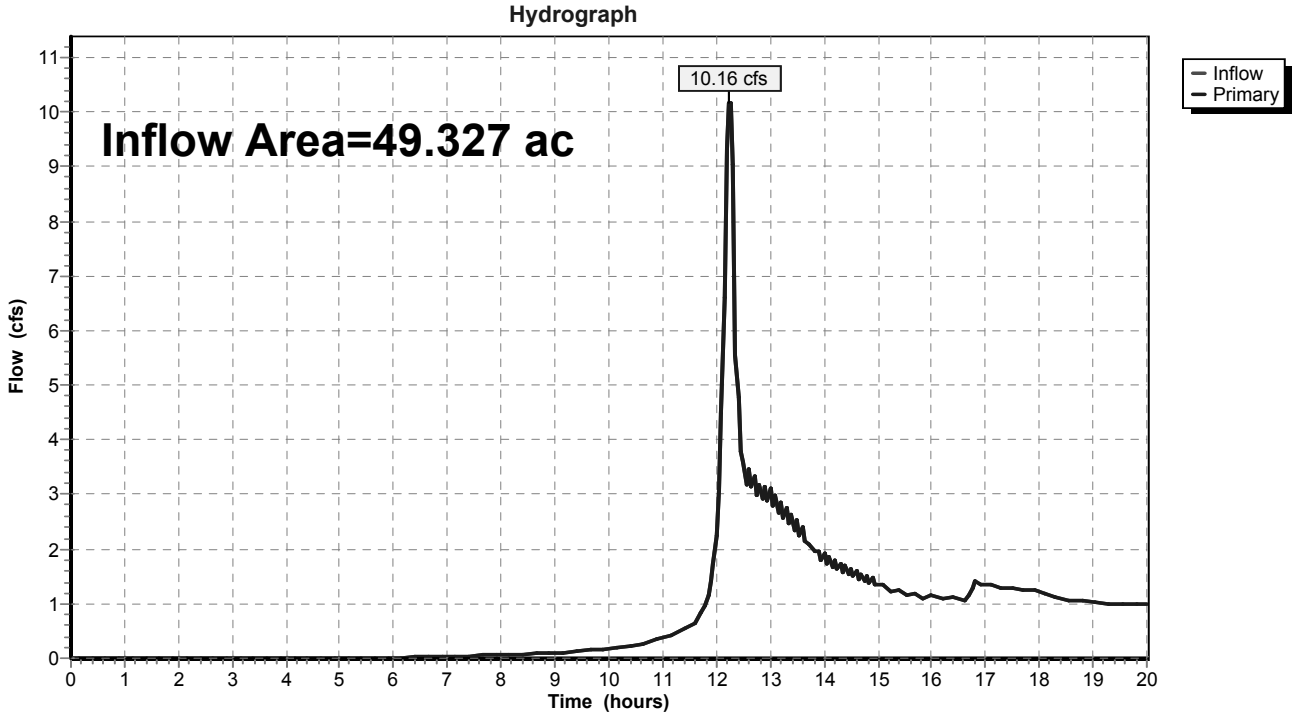


## Summary for Link DP North: DP North

Inflow Area = 49.327 ac, 7.79% Impervious, Inflow Depth > 0.31" for 2_year event
Inflow = 10.16 cfs @ 12.25 hrs, Volume= 1.293 af
Primary = 10.16 cfs @ 12.25 hrs, Volume= 1.293 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

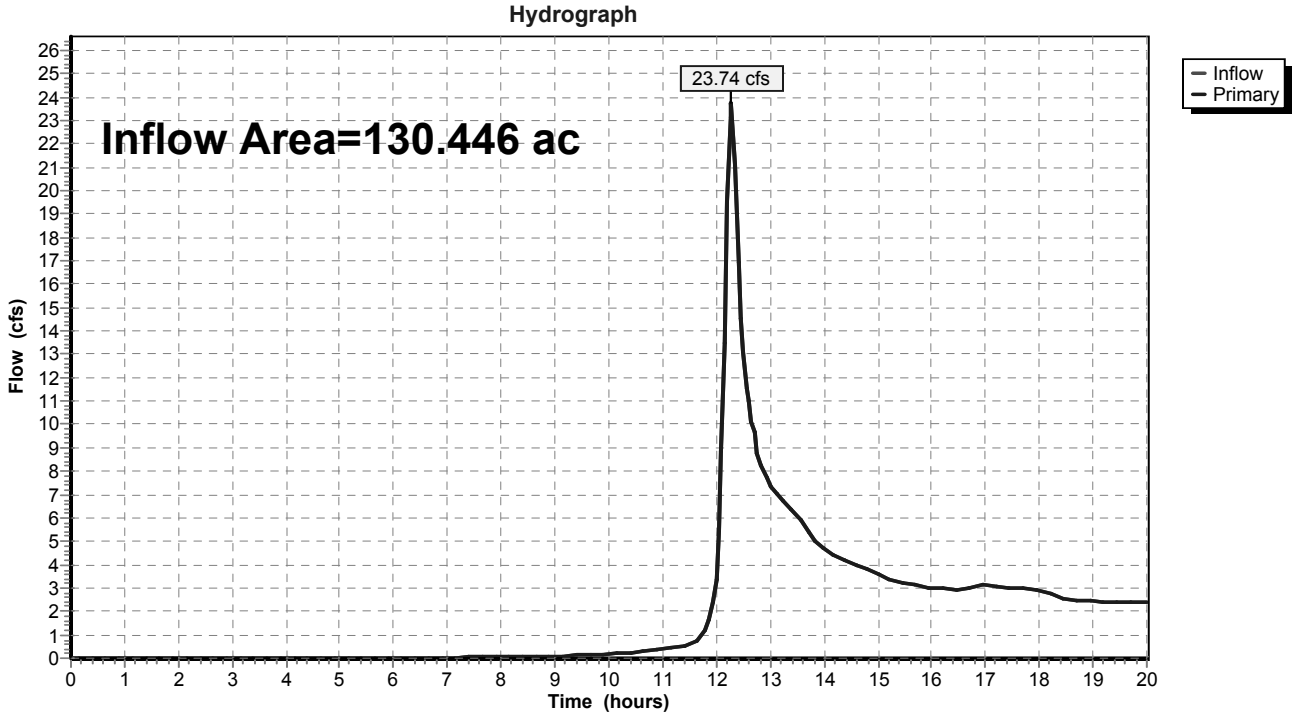


## Summary for Link DP Sudbury: DP Sudbury

Inflow Area = 130.446 ac, 6.65% Impervious, Inflow Depth > 0.29" for 2_year event
Inflow = 23.74 cfs @ 12.28 hrs, Volume= 3.151 af
Primary = 23.74 cfs @ 12.28 hrs, Volume= 3.151 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: DP Sudbury

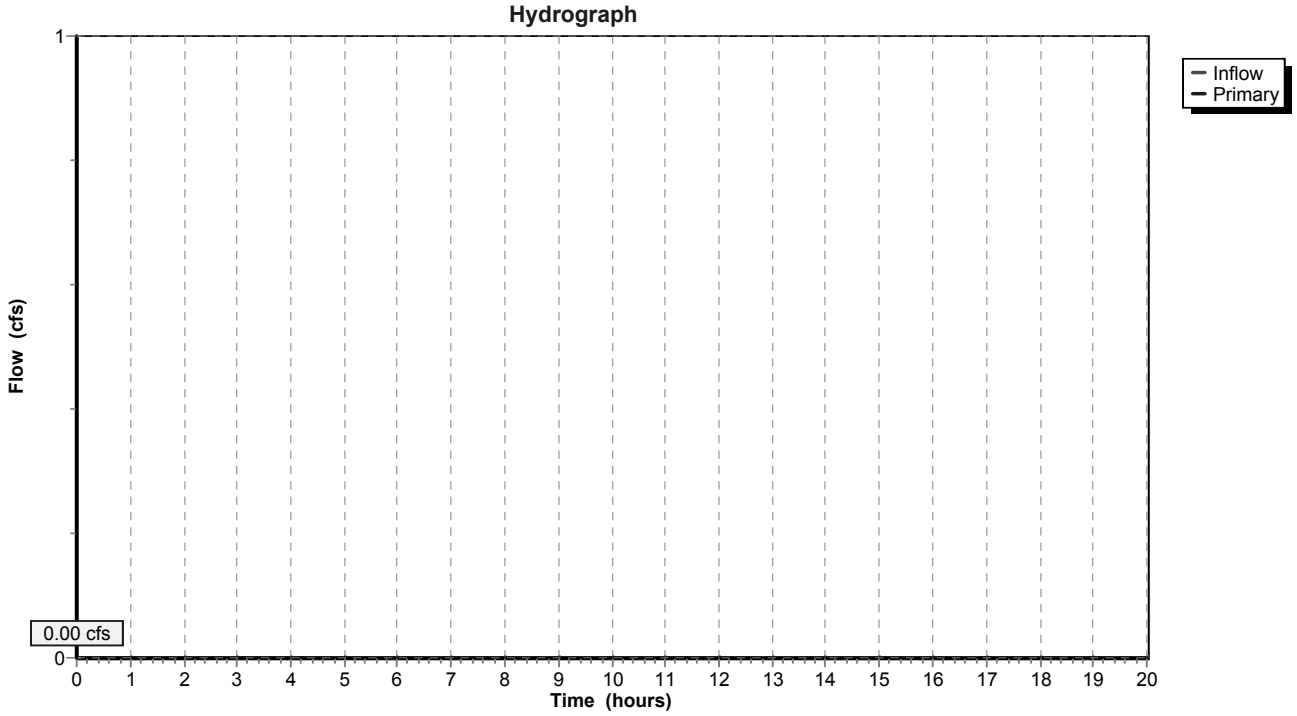


## Summary for Link DP Wellhead: DP Wellhead

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

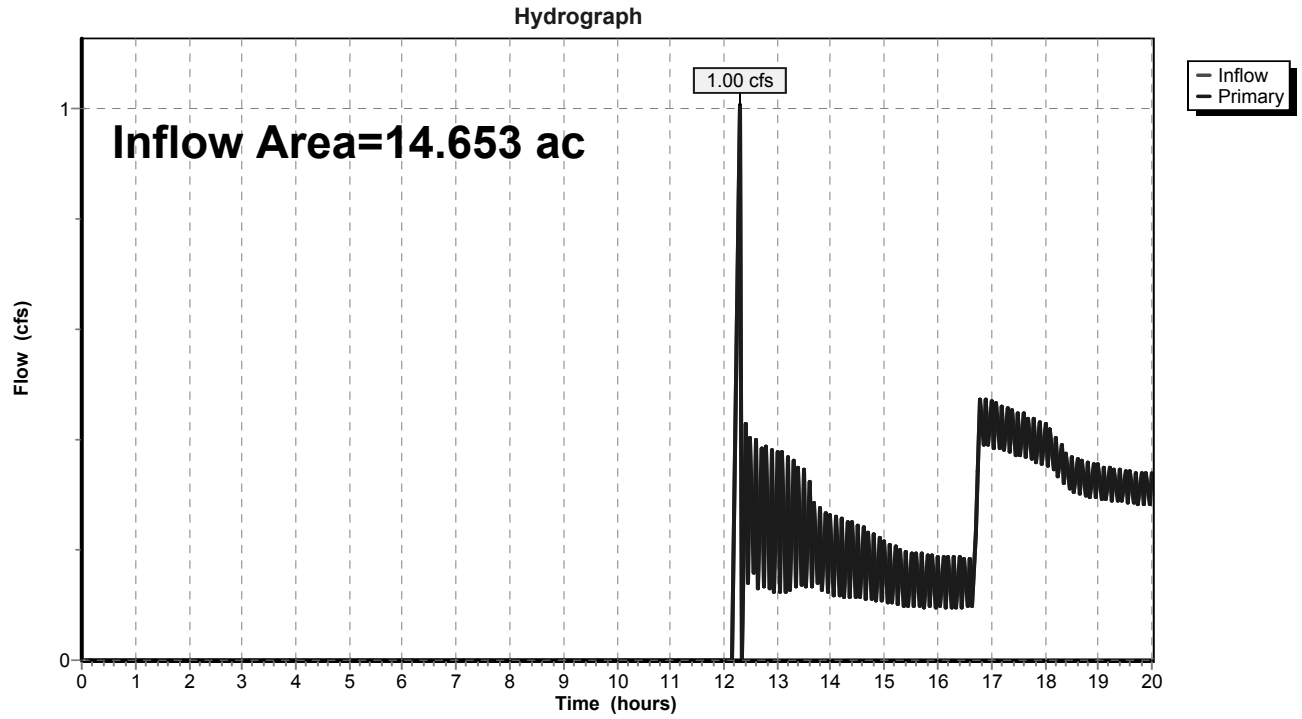


## Summary for Link DP West: DP West

Inflow Area = 14.653 ac, 3.51% Impervious, Inflow Depth > 0.14" for 2_year event
Inflow = 1.00 cfs @ 12.30 hrs, Volume= 0.171 af
Primary = 1.00 cfs @ 12.30 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

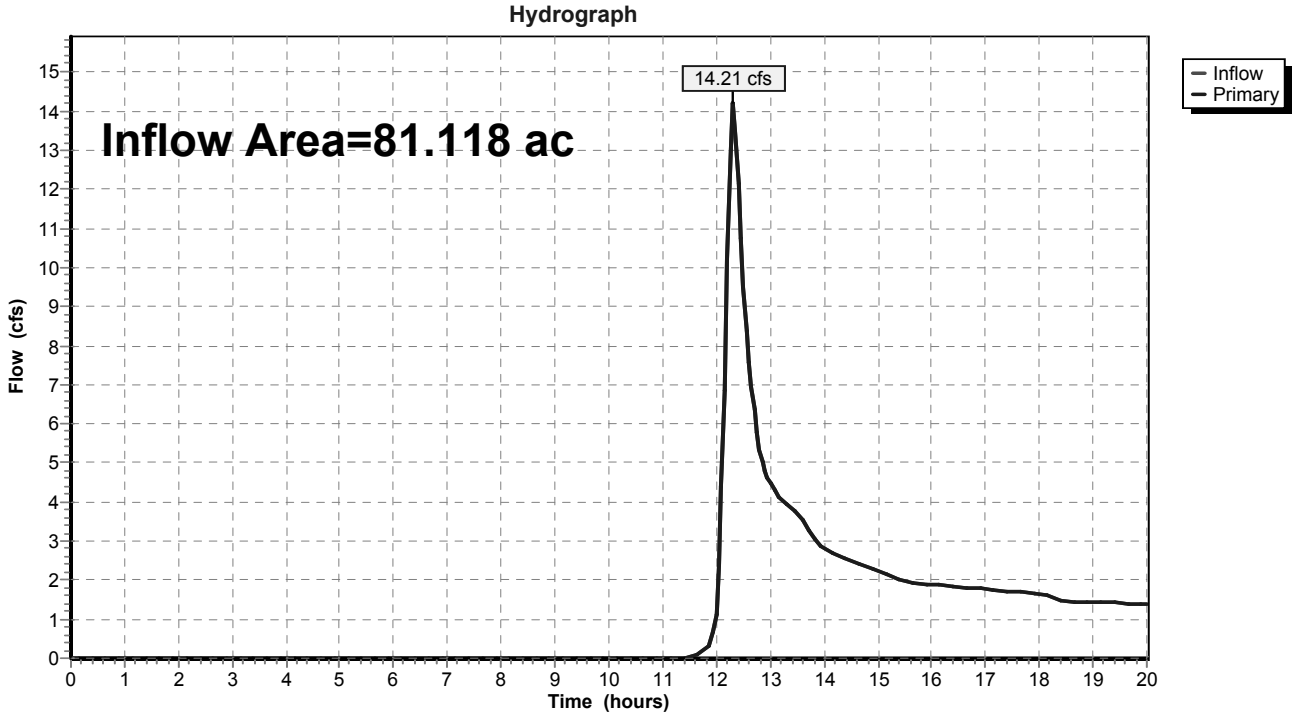


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 81.118 ac, 5.95% Impervious, Inflow Depth > 0.27" for 2_year event
Inflow = 14.21 cfs @ 12.31 hrs, Volume= 1.859 af
Primary = 14.21 cfs @ 12.31 hrs, Volume= 1.859 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

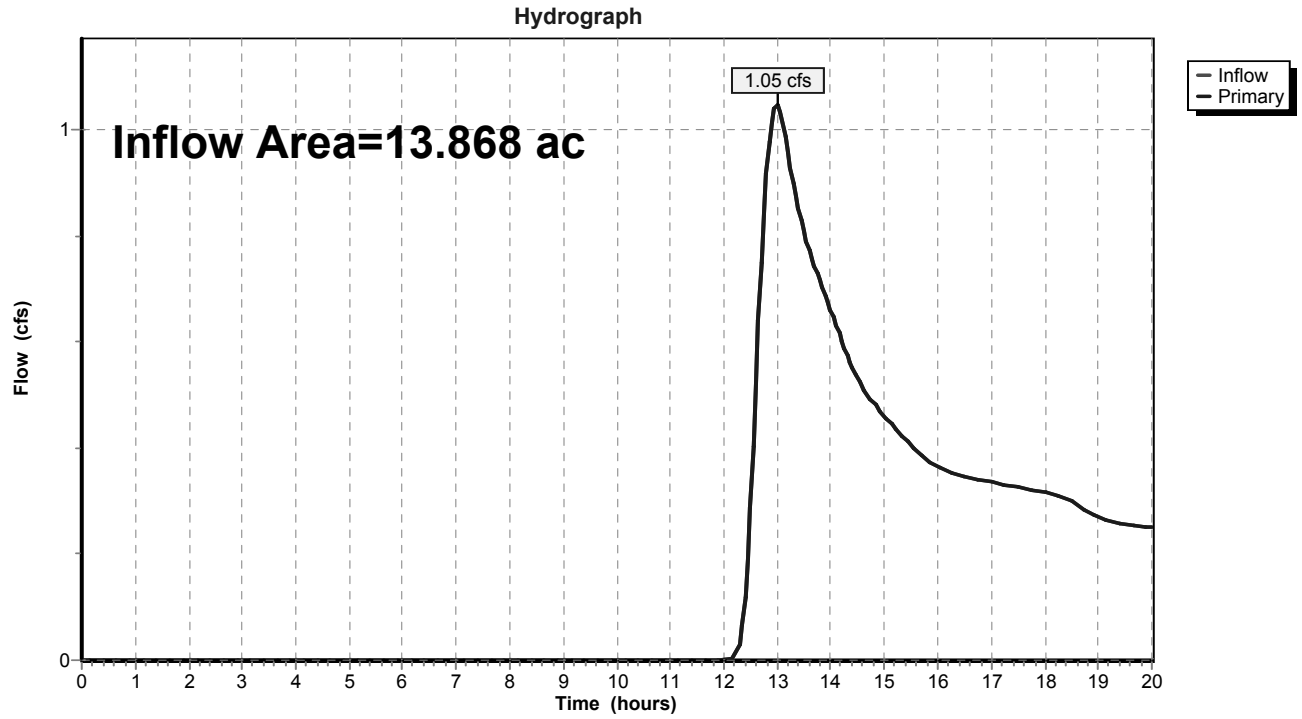


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.868 ac, 9.70% Impervious, Inflow Depth > 0.24" for 2_year event
Inflow = 1.05 cfs @ 13.00 hrs, Volume= 0.283 af
Primary = 1.05 cfs @ 13.00 hrs, Volume= 0.283 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

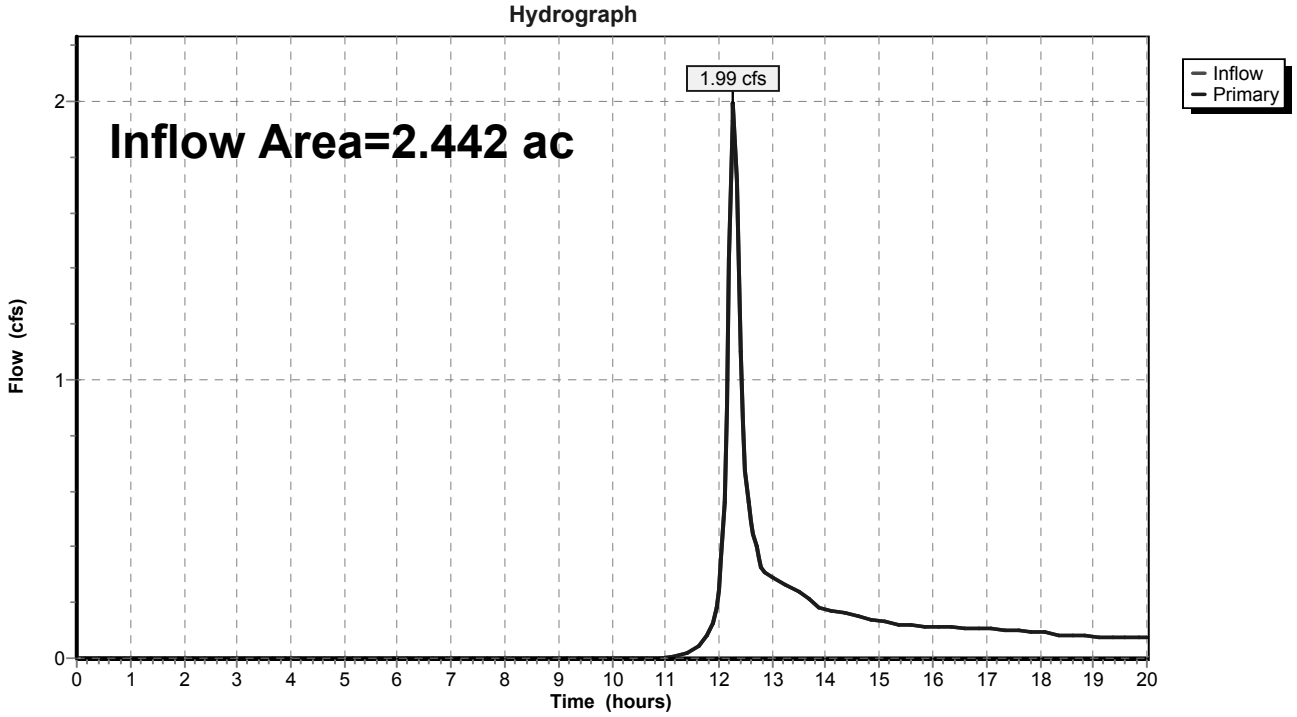


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 0.68" for 2_year event
Inflow = 1.99 cfs @ 12.27 hrs, Volume= 0.139 af
Primary = 1.99 cfs @ 12.27 hrs, Volume= 0.139 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 10.0: L W 10.0

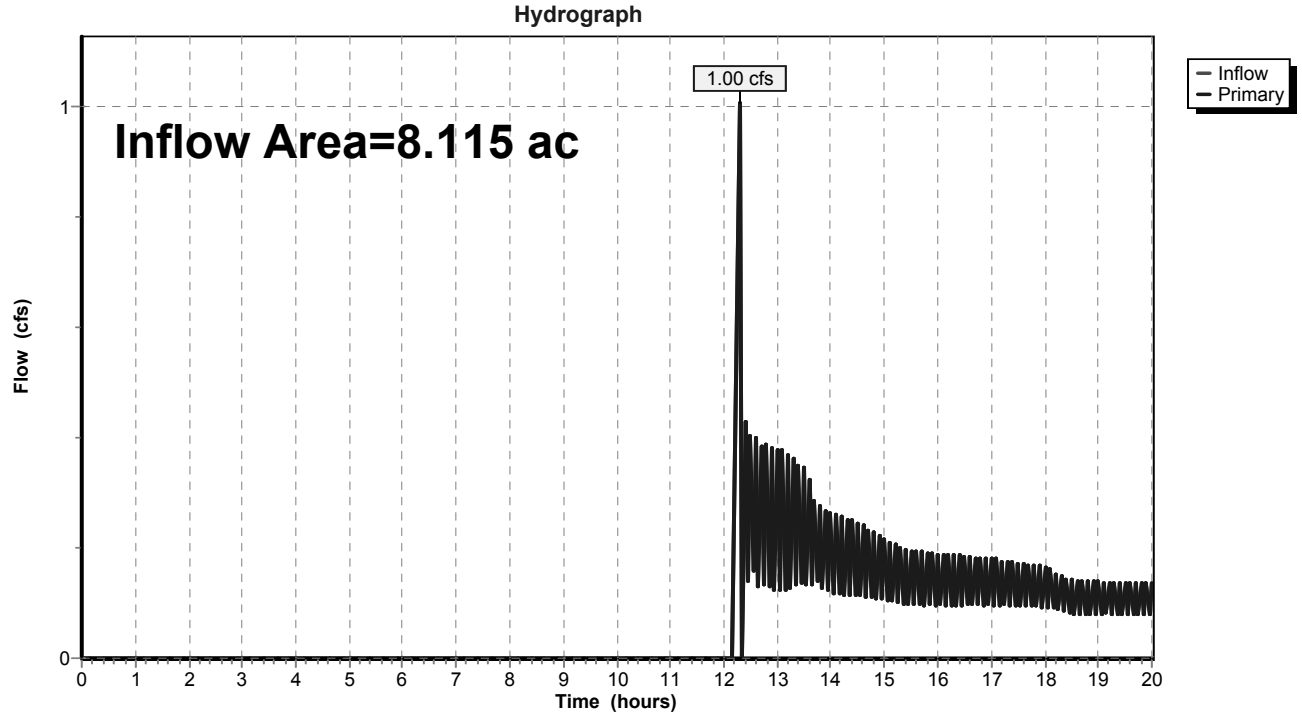


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 8.115 ac, 3.16% Impervious, Inflow Depth > 0.16" for 2_year event
Inflow = 1.00 cfs @ 12.30 hrs, Volume= 0.105 af
Primary = 1.00 cfs @ 12.30 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 2.0: L W 2.0

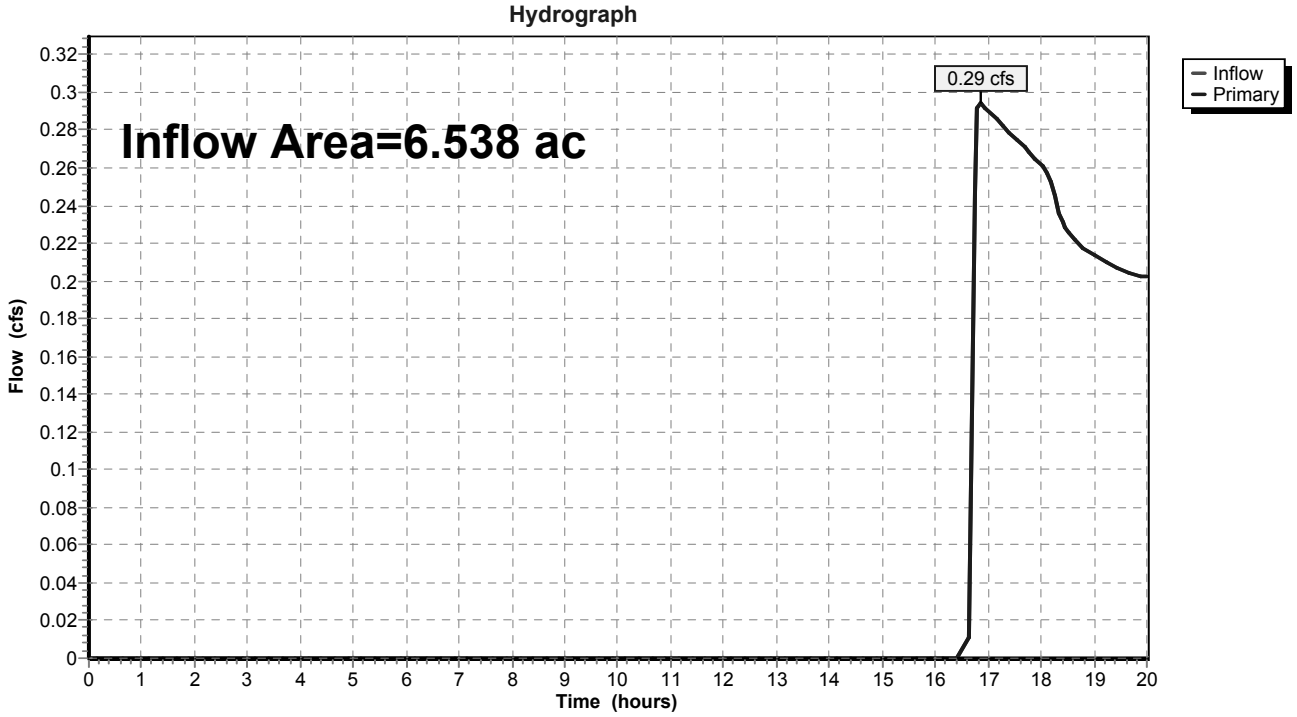


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 0.12" for 2_year event
Inflow = 0.29 cfs @ 16.86 hrs, Volume= 0.066 af
Primary = 0.29 cfs @ 16.86 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 3.0: L W 3.0

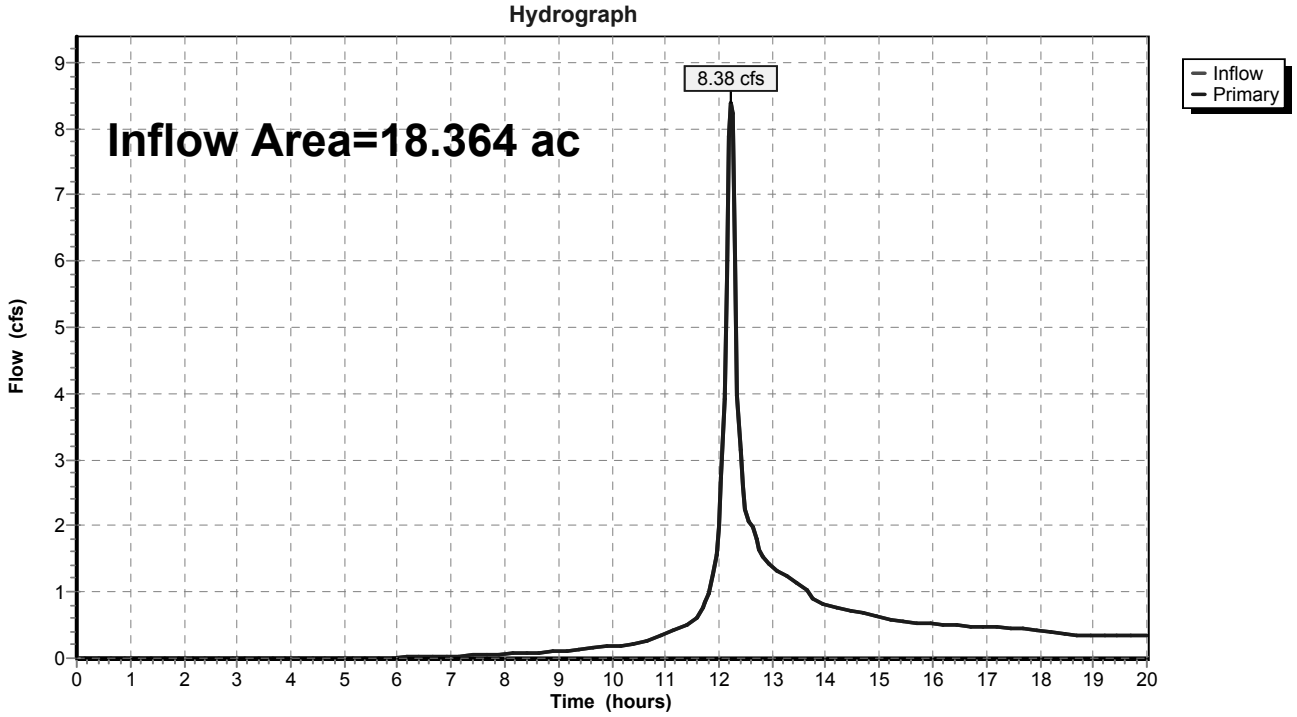


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 0.46" for 2_year event
Inflow = 8.38 cfs @ 12.23 hrs, Volume= 0.699 af
Primary = 8.38 cfs @ 12.23 hrs, Volume= 0.699 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

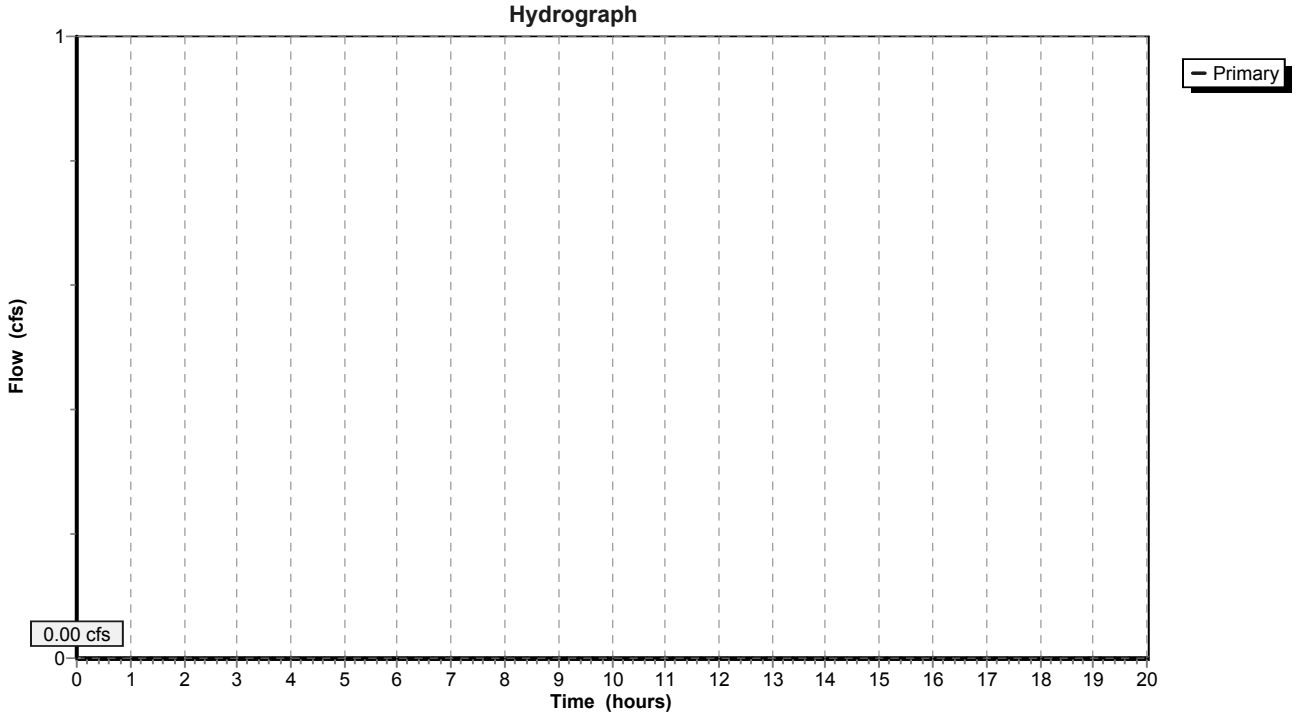


## Summary for Link L Well 1.1B: L Well 1.1B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.1B: L Well 1.1B

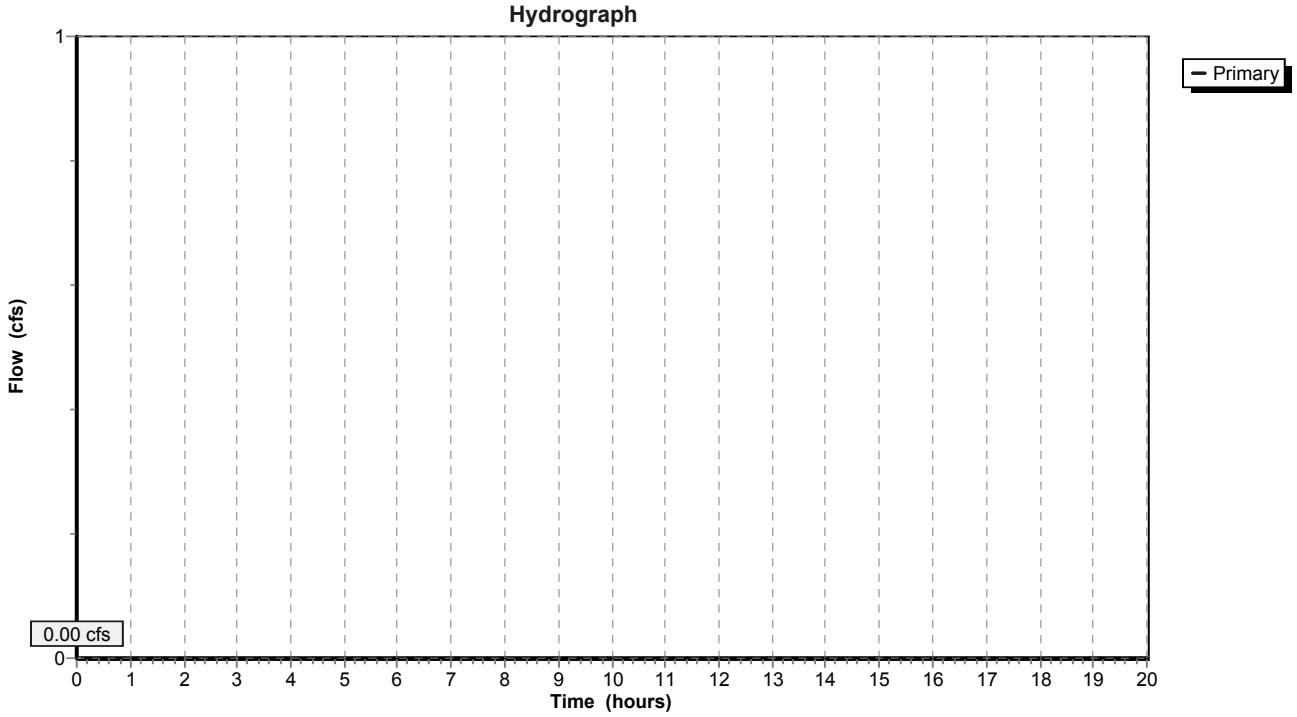


## Summary for Link L Well 1.2A: L Well 1.2A

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2A: L Well 1.2A

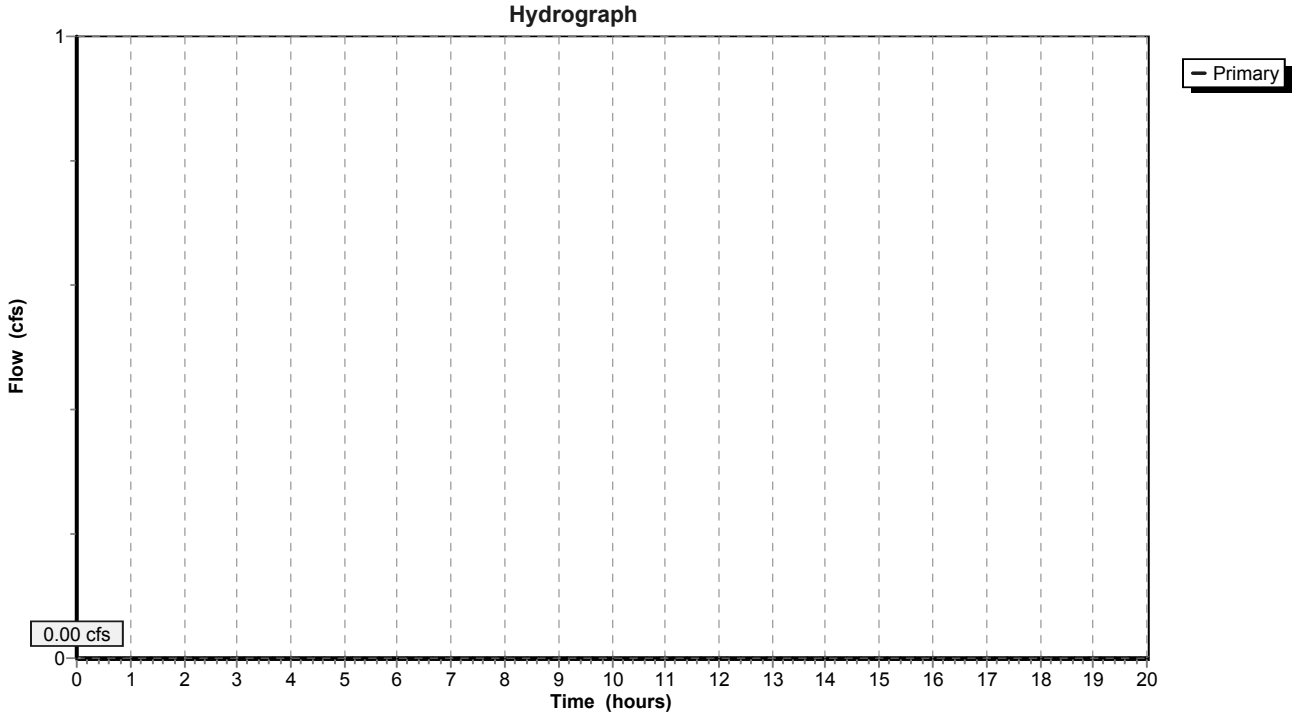


## Summary for Link L Well 1.2B: L Well 1.2B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2B: L Well 1.2B

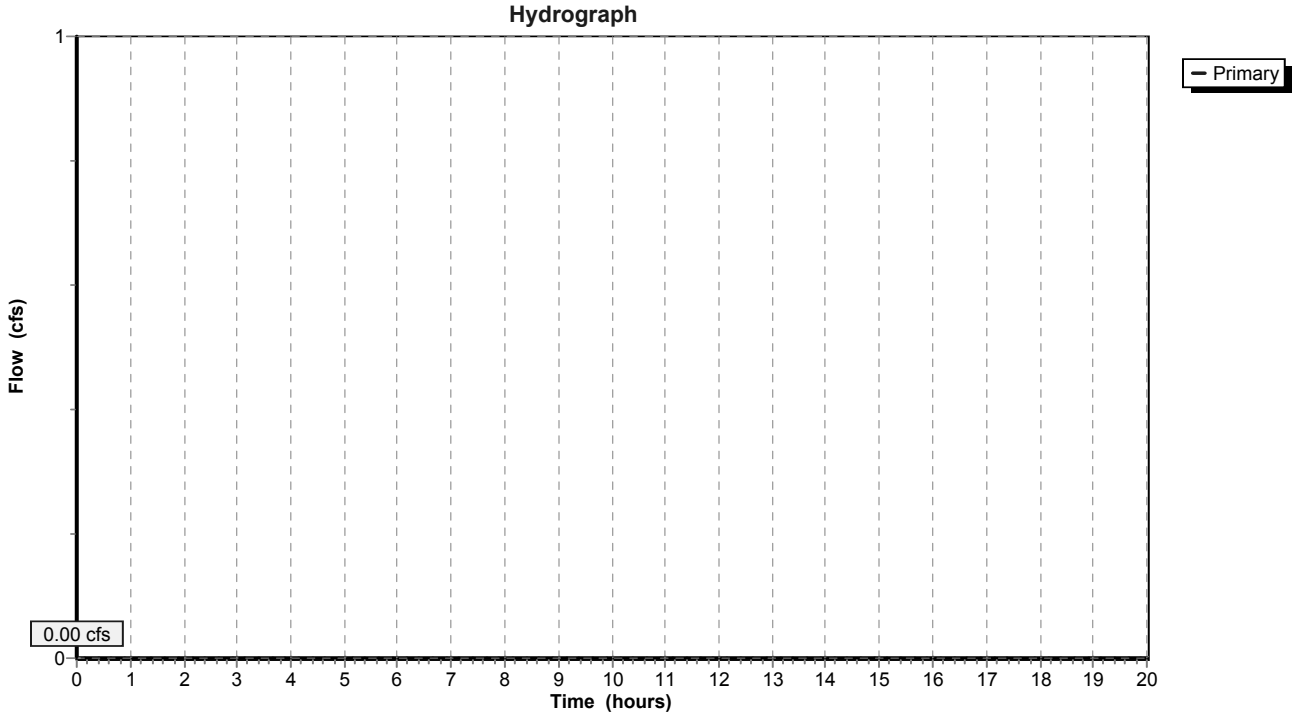


## Summary for Link L Well 1.2C: L Well 1.2C

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2C: L Well 1.2C



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>1.28"
Flow Length=583' Tc=11.3 min CN=65 Runoff=17.95 cfs 1.436 af

**SubcatchmentE 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>2.15"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.24 cfs 0.016 af

**SubcatchmentE 1.0B: (blank)** Runoff Area=33,902 sf 25.51% Impervious Runoff Depth>0.61"
Flow Length=186' Tc=6.0 min CN=53 Runoff=0.48 cfs 0.039 af

**SubcatchmentE 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>1.28"
Flow Length=277' Tc=6.0 min CN=65 Runoff=10.26 cfs 0.695 af

**SubcatchmentE 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>0.86"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=1.21 cfs 0.087 af

**SubcatchmentE 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>2.57"
Flow Length=346' Tc=6.0 min CN=82 Runoff=8.42 cfs 0.578 af

**SubcatchmentE 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>0.59"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=1.23 cfs 0.208 af

**SubcatchmentE 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>0.76"
Flow Length=252' Tc=7.5 min CN=56 Runoff=1.08 cfs 0.085 af

**SubcatchmentE 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>0.71"
Flow Length=139' Tc=6.0 min CN=55 Runoff=4.13 cfs 0.316 af

**SubcatchmentE 1.1B-4: (blank)** Runoff Area=38,504 sf 0.00% Impervious Runoff Depth>1.04"
Tc=0.0 min CN=61 Runoff=1.28 cfs 0.077 af

**SubcatchmentE 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>0.75"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=2.44 cfs 0.312 af

**SubcatchmentE 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>0.92"
Flow Length=344' Tc=6.0 min CN=59 Runoff=1.53 cfs 0.109 af

**SubcatchmentE 1.2A-2: (blank)** Runoff Area=48,650 sf 0.01% Impervious Runoff Depth>0.56"
Flow Length=93' Tc=6.0 min CN=52 Runoff=0.61 cfs 0.052 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>2.31"
Flow Length=448' Tc=6.0 min CN=79 Runoff=5.40 cfs 0.367 af

**SubcatchmentE 1.2B-1: (blank)** Runoff Area=28,861 sf 2.32% Impervious Runoff Depth>1.09"
Flow Length=182' Tc=8.0 min CN=62 Runoff=0.82 cfs 0.060 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>2.57"
Flow Length=193' Tc=6.0 min CN=82 Runoff=3.29 cfs 0.226 af

**SubcatchmentE 1.2C-1: (blank)** Runoff Area=15,993 sf 0.21% Impervious Runoff Depth>1.35"
Flow Length=98' Tc=6.0 min CN=66 Runoff=0.61 cfs 0.041 af

**SubcatchmentE 1.2C-2: (blank)** Runoff Area=20,935 sf 0.00% Impervious Runoff Depth>1.03"
Flow Length=288' Tc=7.7 min CN=61 Runoff=0.56 cfs 0.041 af

**SubcatchmentE 1.3A: (blank)** Runoff Area=201,598 sf 29.96% Impervious Runoff Depth>1.21"
Flow Length=1,196' Tc=20.9 min CN=64 Runoff=4.43 cfs 0.465 af

**SubcatchmentE 4.0: (blank)** Runoff Area=604,094 sf 9.70% Impervious Runoff Depth>0.84"
Flow Length=1,859' Tc=50.0 min CN=58 Runoff=5.30 cfs 0.968 af

**SubcatchmentE-CULV-S: (blank)** Runoff Area=196,467 sf 0.93% Impervious Runoff Depth>1.21"
Flow Length=319' Tc=9.5 min CN=64 Runoff=5.96 cfs 0.456 af

**SubcatchmentRG-E-1: (blank)** Runoff Area=104,917 sf 0.00% Impervious Runoff Depth>1.69"
Flow Length=750' Tc=7.6 min CN=71 Runoff=4.84 cfs 0.339 af

**SubcatchmentRG-E-2: (blank)** Runoff Area=20,767 sf 0.08% Impervious Runoff Depth>2.23"
Flow Length=270' Tc=6.0 min CN=78 Runoff=1.31 cfs 0.088 af

**SubcatchmentRG-E-4A: (blank)** Runoff Area=21,054 sf 0.00% Impervious Runoff Depth>1.84"
Flow Length=114' Tc=6.0 min CN=73 Runoff=1.10 cfs 0.074 af

**SubcatchmentRG-E-4B: (blank)** Runoff Area=22,865 sf 0.00% Impervious Runoff Depth>2.65"
Flow Length=197' Tc=6.0 min CN=83 Runoff=1.68 cfs 0.116 af

**SubcatchmentRG-E-7: (blank)** Runoff Area=41,427 sf 0.00% Impervious Runoff Depth>3.32"
Flow Length=88' Tc=6.0 min CN=90 Runoff=3.62 cfs 0.263 af

**SubcatchmentRG-E-8: (blank)** Runoff Area=28,390 sf 0.01% Impervious Runoff Depth>1.91"
Flow Length=252' Tc=6.0 min CN=74 Runoff=1.55 cfs 0.104 af

**SubcatchmentRG-E-9A: (blank)** Runoff Area=43,781 sf 0.00% Impervious Runoff Depth>1.99"
Flow Length=372' Tc=8.2 min CN=75 Runoff=2.33 cfs 0.166 af

**SubcatchmentRG-E-9B: (blank)** Runoff Area=22,781 sf 0.00% Impervious Runoff Depth>0.98"
Flow Length=186' Tc=6.0 min CN=60 Runoff=0.61 cfs 0.043 af

**SubcatchmentRG-W-1: (blank)** Runoff Area=65,101 sf 0.00% Impervious Runoff Depth>1.99"
Flow Length=495' Tc=6.0 min CN=75 Runoff=3.69 cfs 0.248 af

**SubcatchmentRG-W-2: (blank)** Runoff Area=111,691 sf 0.00% Impervious Runoff Depth>1.41"
Flow Length=336' Tc=6.0 min CN=67 Runoff=4.48 cfs 0.302 af

**SubcatchmentRG-W-3: (blank)** Runoff Area=91,227 sf 0.00% Impervious Runoff Depth>1.22"
Flow Length=97' Tc=6.0 min CN=64 Runoff=3.12 cfs 0.212 af

**SubcatchmentRG-W-3A: (blank)** Runoff Area=37,790 sf 0.00% Impervious Runoff Depth>2.93"
Flow Length=365' Tc=6.0 min CN=86 Runoff=3.01 cfs 0.212 af

**SubcatchmentRG-W-4: (blank)** Runoff Area=100,346 sf 0.00% Impervious Runoff Depth>1.91"
Flow Length=452' Tc=6.1 min CN=74 Runoff=5.46 cfs 0.367 af

**SubcatchmentRG-W-5: (blank)** Runoff Area=42,562 sf 0.79% Impervious Runoff Depth>1.48"
Flow Length=182' Tc=6.0 min CN=68 Runoff=1.79 cfs 0.120 af

**SubcatchmentROOF-1: (blank)** Runoff Area=4,580 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.51 cfs 0.037 af

**SubcatchmentROOF-10: (blank)** Runoff Area=4,268 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.48 cfs 0.034 af

**SubcatchmentROOF-100: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-101: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-102: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-103: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-104: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-105: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-106: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-107: (blank)** Runoff Area=1,154 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-108: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-109: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-11: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.56 cfs 0.040 af

**SubcatchmentROOF-110: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-111: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.025 af

**SubcatchmentROOF-112: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-113: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-114: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.025 af

**SubcatchmentROOF-115: (blank)** Runoff Area=2,606 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.29 cfs 0.021 af

**SubcatchmentROOF-117: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-118: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.29 cfs 0.021 af

**SubcatchmentROOF-119: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-11MAIL: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-12: (blank)** Runoff Area=2,311 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-120: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-121: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.29 cfs 0.021 af

**SubcatchmentROOF-122: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-123: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.29 cfs 0.021 af

**SubcatchmentROOF-13: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-14: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-15: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-16: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-17: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.025 af

**SubcatchmentROOF-18: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-19: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-2: (blank)** Runoff Area=5,339 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.60 cfs 0.043 af

**SubcatchmentROOF-20: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-21: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-22: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-23: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-24: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.025 af

**SubcatchmentROOF-25: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-26: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.037 af

**SubcatchmentROOF-27: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.035 af

**SubcatchmentROOF-28: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-29: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.037 af

**SubcatchmentROOF-3: (blank)** Runoff Area=11,005 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=1.24 cfs 0.088 af

**SubcatchmentROOF-30: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.037 af

**SubcatchmentROOF-31: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.29 cfs 0.021 af

**SubcatchmentROOF-32: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-33: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-34: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-35: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-36: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-37: (blank)** Runoff Area=1,153 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-38: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-39: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-4: (blank)** Runoff Area=9,675 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=1.09 cfs 0.078 af

**SubcatchmentROOF-40: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-41: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-42: (blank)** Runoff Area=1,505 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-43: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.012 af

**SubcatchmentROOF-44: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-45: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-46: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-47: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-48: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-49: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-5: (blank)** Runoff Area=9,831 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=1.10 cfs 0.079 af

**SubcatchmentROOF-50: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-51: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-52: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-53: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-54: (blank)** Runoff Area=2,936 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-55: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-56: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.037 af

**SubcatchmentROOF-57: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-58: (blank)** Runoff Area=2,942 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-59: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.035 af

**SubcatchmentROOF-6: (blank)** Runoff Area=9,941 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=1.12 cfs 0.080 af

**SubcatchmentROOF-60: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-61: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.035 af

**SubcatchmentROOF-62: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-63: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-64: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.035 af

**SubcatchmentROOF-65: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.035 af

**SubcatchmentROOF-66: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-67: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.037 af

**SubcatchmentROOF-68: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.035 af

**SubcatchmentROOF-69: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-7: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.56 cfs 0.040 af

**SubcatchmentROOF-70: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-71: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-72: (blank)** Runoff Area=1,156 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-73: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-74: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-75: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-76: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-77: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-78: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-79: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-8: (blank)** Runoff Area=11,381 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=1.28 cfs 0.091 af

**SubcatchmentROOF-80: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-81: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-82: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-83: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-84: (blank)** Runoff Area=1,149 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-85: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-86: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-87: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-88: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-89: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-9: (blank)** Runoff Area=4,992 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.56 cfs 0.040 af

**SubcatchmentROOF-90: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.037 af

**SubcatchmentROOF-91: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.33 cfs 0.024 af

**SubcatchmentROOF-92: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.019 af

**SubcatchmentROOF-93: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.29 cfs 0.021 af

**SubcatchmentROOF-94: (blank)** Runoff Area=1,301 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.010 af

**SubcatchmentROOF-95: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-96: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.50 cfs 0.035 af

**SubcatchmentROOF-97: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.037 af

**SubcatchmentROOF-98: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-99: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.13 cfs 0.009 af

**SubcatchmentROOF-BS1: (blank)** Runoff Area=84 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL20: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.02 cfs 0.001 af

**SubcatchmentROOF-MAIL29: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL5: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.02 cfs 0.001 af

**SubcatchmentROOF-MAIL64: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL8: (blank)** Runoff Area=97 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL91: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAINT11: (blank)** Runoff Area=1,104 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.12 cfs 0.009 af

**SubcatchmentROOF-PL11: (blank)** Runoff Area=1,431 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.011 af

**SubcatchmentROOF-PL6: (blank)** Runoff Area=1,429 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.011 af

**SubcatchmentROOF-POOL: (blank)** Runoff Area=449 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.05 cfs 0.004 af

**SubcatchmentROOF-RECY: (blank)** Runoff Area=854 sf 0.00% Impervious Runoff Depth>4.19"
Tc=0.0 min CN=98 Runoff=0.10 cfs 0.007 af

**SubcatchmentS-CB-E-1: (blank)** Runoff Area=47,382 sf 0.00% Impervious Runoff Depth>2.23"
Flow Length=297' Tc=6.0 min CN=78 Runoff=2.99 cfs 0.202 af

**SubcatchmentS-CB-INF-E-3: (blank)** Runoff Area=25,604 sf 0.00% Impervious Runoff Depth>3.43"
Tc=0.0 min CN=91 Runoff=2.63 cfs 0.168 af

**SubcatchmentS-CB-INF-E-4A: (blank)** Runoff Area=25,704 sf 0.00% Impervious Runoff Depth>3.74"
Tc=0.0 min CN=94 Runoff=2.77 cfs 0.184 af

**SubcatchmentS-DET-1: (blank)** Runoff Area=17,810 sf 0.18% Impervious Runoff Depth>1.15"
Flow Length=96' Tc=9.6 min CN=63 Runoff=0.51 cfs 0.039 af

**SubcatchmentS-DET-3: (blank)** Runoff Area=17,177 sf 0.00% Impervious Runoff Depth>1.34"
Flow Length=131' Tc=8.8 min CN=66 Runoff=0.60 cfs 0.044 af

**SubcatchmentS-INF-E-1: (blank)** Runoff Area=51,657 sf 0.00% Impervious Runoff Depth>2.22"
Flow Length=363' Tc=8.3 min CN=78 Runoff=3.05 cfs 0.220 af

**SubcatchmentS-INF-E-2: (blank)** Runoff Area=50,824 sf 0.00% Impervious Runoff Depth>2.65"
Flow Length=358' Tc=6.6 min CN=83 Runoff=3.69 cfs 0.258 af

**SubcatchmentS-INF-E-3: (blank)** Runoff Area=74,846 sf 0.00% Impervious Runoff Depth>2.06"
Flow Length=616' Tc=13.2 min CN=76 Runoff=3.55 cfs 0.295 af

**SubcatchmentS-LD-1: (blank)** Runoff Area=46,138 sf 4.25% Impervious Runoff Depth>1.27"
Flow Length=447' Tc=13.4 min CN=65 Runoff=1.31 cfs 0.113 af

**SubcatchmentS-LD-11: (blank)** Runoff Area=18,104 sf 0.00% Impervious Runoff Depth>1.35"
Tc=0.0 min CN=66 Runoff=0.80 cfs 0.047 af

**SubcatchmentS-LD-2: (blank)** Runoff Area=74,501 sf 9.20% Impervious Runoff Depth>1.48"
Flow Length=214' Tc=6.0 min CN=68 Runoff=3.14 cfs 0.211 af

**SubcatchmentS-LD-4: (blank)** Runoff Area=94,445 sf 9.85% Impervious Runoff Depth>1.99"
Flow Length=345' Tc=8.3 min CN=75 Runoff=5.01 cfs 0.359 af

**SubcatchmentW 10.0: (blank)** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>1.61"
Flow Length=509' Tc=8.8 min CN=70 Runoff=4.50 cfs 0.329 af

**SubcatchmentW 2.0: (blank)** Runoff Area=331,247 sf 3.38% Impervious Runoff Depth>0.51"
Flow Length=793' Tc=15.6 min CN=51 Runoff=2.51 cfs 0.324 af

**SubcatchmentW 3.1: (blank)** Runoff Area=57,507 sf 19.47% Impervious Runoff Depth>1.76"
Flow Length=413' Tc=8.1 min CN=72 Runoff=2.72 cfs 0.194 af

**SubcatchmentW 3.2: (blank)** Runoff Area=34,449 sf 0.01% Impervious Runoff Depth>1.03"
Flow Length=456' Tc=12.9 min CN=61 Runoff=0.78 cfs 0.068 af

**SubcatchmentW 3.3: (blank)** Runoff Area=88,756 sf 10.36% Impervious Runoff Depth>3.22"
Flow Length=530' Tc=6.0 min CN=89 Runoff=7.59 cfs 0.547 af

**SubcatchmentW 3.4: (blank)** Runoff Area=132,546 sf 5.02% Impervious Runoff Depth>0.15"
Flow Length=460' Tc=14.6 min CN=41 Runoff=0.08 cfs 0.037 af

**SubcatchmentW 9.1A: (blank)** Runoff Area=64,234 sf 61.01% Impervious Runoff Depth>2.84"
Flow Length=323' Tc=6.0 min CN=85 Runoff=4.99 cfs 0.349 af

**SubcatchmentW 9.1B: (blank)** Runoff Area=24,364 sf 16.02% Impervious Runoff Depth>1.16"
Flow Length=235' Tc=6.0 min CN=63 Runoff=0.79 cfs 0.054 af

**SubcatchmentW-CULV-N: (blank)** Runoff Area=74,124 sf 5.73% Impervious Runoff Depth>0.31"
Flow Length=84' Tc=6.0 min CN=46 Runoff=0.27 cfs 0.044 af

**SubcatchmentW-D-1: (blank)** Runoff Area=26,114 sf 0.00% Impervious Runoff Depth>0.24"
Flow Length=312' Tc=22.9 min CN=44 Runoff=0.04 cfs 0.012 af

**SubcatchmentW-D-3: (blank)** Runoff Area=6,640 sf 9.99% Impervious Runoff Depth>0.21"
Flow Length=89' Slope=0.1229 '/' Tc=6.0 min CN=43 Runoff=0.01 cfs 0.003 af

**Reach R-SWALE1: (new Reach)** Avg. Flow Depth=0.02' Max Vel=0.62 fps Inflow=0.82 cfs 0.060 af
n=0.035 L=377.0' S=0.0531 '/' Capacity=189.21 cfs Outflow=0.60 cfs 0.059 af

**Reach R-SWALE2: (new Reach)** Avg. Flow Depth=0.12' Max Vel=1.35 fps Inflow=10.36 cfs 0.769 af
n=0.035 L=174.0' S=0.0172 '/' Capacity=107.87 cfs Outflow=10.04 cfs 0.765 af

**Reach R-SWALE3: (new Reach)** Avg. Flow Depth=0.10' Max Vel=0.91 fps Inflow=12.95 cfs 0.978 af
n=0.035 L=302.0' S=0.0099 '/' Capacity=161.76 cfs Outflow=11.10 cfs 0.967 af

**Pond DET-1: 387** Peak Elev=169.38' Storage=5,780 cf Inflow=2.68 cfs 0.214 af
Outflow=0.43 cfs 0.087 af

**Pond DET-2: 391** Peak Elev=165.06' Storage=3,254 cf Inflow=3.60 cfs 0.247 af
Outflow=1.56 cfs 0.207 af

**Pond DET-3: 395** Peak Elev=175.03' Storage=3,968 cf Inflow=3.24 cfs 0.254 af
Outflow=1.44 cfs 0.199 af

**Pond INF-ROOF-100: 368** Peak Elev=173.33' Storage=2,526 cf Inflow=0.81 cfs 0.058 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-110: 299** Peak Elev=166.74' Storage=116 cf Inflow=0.78 cfs 0.056 af
Outflow=0.76 cfs 0.054 af

**Pond INF-ROOF-114: 297** Peak Elev=164.16' Storage=2,360 cf Inflow=1.22 cfs 0.087 af
Outflow=0.39 cfs 0.034 af

**Pond INF-ROOF-117: 295** Peak Elev=164.03' Storage=1,392 cf Inflow=0.55 cfs 0.039 af
Outflow=0.03 cfs 0.008 af

**Pond INF-ROOF-123: 119** Peak Elev=148.75' Storage=2,868 cf Inflow=1.53 cfs 0.109 af
Outflow=0.80 cfs 0.045 af

**Pond INF-ROOF-13: 384** Peak Elev=181.61' Storage=1,261 cf Inflow=0.41 cfs 0.029 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-16: 375** Peak Elev=183.46' Storage=1,717 cf Inflow=0.55 cfs 0.039 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-19: 377** Peak Elev=178.54' Storage=1,487 cf Inflow=0.68 cfs 0.048 af
Outflow=0.07 cfs 0.014 af

**Pond INF-ROOF-23: 372** Peak Elev=184.51' Storage=1,977 cf Inflow=0.65 cfs 0.047 af
Outflow=0.01 cfs 0.001 af

**Pond INF-ROOF-25: 382** Peak Elev=176.02' Storage=1,391 cf Inflow=0.52 cfs 0.037 af
Outflow=0.02 cfs 0.005 af

**Pond INF-ROOF-28:** Peak Elev=174.85' Storage=1,174 cf Inflow=1.34 cfs 0.096 af
Outflow=1.31 cfs 0.070 af

**Pond INF-ROOF-3: 370** Peak Elev=190.07' Storage=4,716 cf Inflow=1.77 cfs 0.126 af
Outflow=0.12 cfs 0.018 af

**Pond INF-ROOF-36: 366** Peak Elev=190.11' Storage=2,096 cf Inflow=1.04 cfs 0.074 af
Outflow=0.25 cfs 0.026 af

**Pond INF-ROOF-43: 364** Peak Elev=190.02' Storage=1,572 cf Inflow=0.52 cfs 0.037 af
Outflow=0.02 cfs 0.001 af

**Pond INF-ROOF-53: 362** Peak Elev=190.03' Storage=2,620 cf Inflow=0.85 cfs 0.061 af
Outflow=0.03 cfs 0.001 af

**Pond INF-ROOF-55: 314** Peak Elev=190.06' Storage=3,144 cf Inflow=1.21 cfs 0.087 af
Outflow=0.08 cfs 0.014 af

**Pond INF-ROOF-62: 310** Peak Elev=190.23' Storage=1,048 cf Inflow=0.66 cfs 0.047 af
Outflow=0.74 cfs 0.023 af

**Pond INF-ROOF-63: 308** Peak Elev=190.56' Storage=3,144 cf Inflow=2.50 cfs 0.178 af
Outflow=2.60 cfs 0.106 af

**Pond INF-ROOF-67: 316** Peak Elev=190.31' Storage=1,048 cf Inflow=1.01 cfs 0.072 af
Outflow=1.11 cfs 0.048 af

**Pond INF-ROOF-71: 312** Peak Elev=190.50' Storage=2,620 cf Inflow=1.78 cfs 0.127 af
Outflow=2.26 cfs 0.067 af

**Pond INF-ROOF-76: 318** Peak Elev=190.04' Storage=2,620 cf Inflow=1.00 cfs 0.071 af
Outflow=0.05 cfs 0.011 af

**Pond INF-ROOF-89: 338** Peak Elev=190.04' Storage=4,716 cf Inflow=1.55 cfs 0.111 af
Outflow=0.05 cfs 0.002 af

**Pond INF-ROOF-90: 336** Peak Elev=190.05' Storage=3,144 cf Inflow=1.20 cfs 0.086 af
Outflow=0.08 cfs 0.013 af

**Pond INF-ROOF-94: 342** Peak Elev=190.05' Storage=1,572 cf Inflow=0.67 cfs 0.048 af
Outflow=0.08 cfs 0.011 af

**Pond INF-ROOF-95: 340** Peak Elev=190.08' Storage=1,572 cf Inflow=0.75 cfs 0.054 af
Outflow=0.14 cfs 0.018 af

**Pond INF-ROOF-96: 344** Peak Elev=190.31' Storage=1,048 cf Inflow=1.01 cfs 0.072 af
Outflow=1.11 cfs 0.048 af

**Pond P E 1.1A: 284** Peak Elev=133.60' Storage=25,164 cf Inflow=8.42 cfs 0.578 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B: 283** Peak Elev=145.90' Storage=63,965 cf Inflow=16.75 cfs 1.470 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.2A: 282** Peak Elev=134.85' Storage=42,069 cf Inflow=11.10 cfs 0.967 af
Outflow=0.00 cfs 0.000 af

**Pond P E-CULV-S: 231** Peak Elev=168.68' Storage=1,241 cf Inflow=5.96 cfs 0.456 af
Outflow=5.69 cfs 0.446 af

**Pond P INF-E-1:** Peak Elev=165.22' Storage=6,195 cf Inflow=3.11 cfs 0.231 af
Discarded=0.02 cfs 0.023 af Primary=0.25 cfs 0.072 af Outflow=0.27 cfs 0.095 af

**Pond P INF-E-2: 142** Peak Elev=167.25' Storage=3,480 cf Inflow=3.69 cfs 0.259 af
Discarded=0.01 cfs 0.012 af Primary=3.69 cfs 0.179 af Outflow=3.70 cfs 0.191 af

**Pond P INF-E-3:** Peak Elev=171.98' Storage=19,530 cf Inflow=12.39 cfs 1.105 af
Discarded=0.02 cfs 0.034 af Primary=6.64 cfs 0.662 af Outflow=6.66 cfs 0.697 af

**Pond P INF-E-4A: 145** Peak Elev=171.07' Storage=5,174 cf Inflow=3.37 cfs 0.237 af
Discarded=0.01 cfs 0.009 af Primary=0.24 cfs 0.130 af Outflow=0.25 cfs 0.139 af

**Pond P INF-E-4B: 140** Peak Elev=172.22' Storage=3,845 cf Inflow=2.77 cfs 0.184 af
Discarded=0.01 cfs 0.012 af Primary=1.52 cfs 0.122 af Outflow=1.53 cfs 0.133 af

**Pond P MH-CULV-NA: 114** Peak Elev=150.16' Inflow=18.47 cfs 1.570 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=18.47 cfs 1.570 af

**Pond P MH-CULV-NB: 115** Peak Elev=149.97' Inflow=18.47 cfs 1.570 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=18.47 cfs 1.570 af

**Pond P RG-E-7:** Peak Elev=173.99' Storage=3,001 cf Inflow=3.62 cfs 0.263 af
Outflow=3.37 cfs 0.208 af

**Pond P RG-E-9A:** Peak Elev=166.00' Storage=582 cf Inflow=5.54 cfs 0.408 af
Outflow=5.45 cfs 0.403 af

**Pond P RG-E-9B: 244** Peak Elev=150.67' Storage=5,454 cf Inflow=6.07 cfs 0.449 af
Outflow=5.87 cfs 0.337 af

**Pond P RG-W-5A: 250** Peak Elev=163.64' Storage=93 cf Inflow=2.29 cfs 0.180 af
Outflow=2.36 cfs 0.178 af

**Pond P RG-W-5B: 252** Peak Elev=162.64' Storage=72 cf Inflow=2.36 cfs 0.178 af
Outflow=2.39 cfs 0.177 af

**Pond P RG-W-5C: 254** Peak Elev=161.64' Storage=920 cf Inflow=2.39 cfs 0.177 af
Outflow=2.39 cfs 0.159 af

**Pond P S-CB-E-1: 263** Peak Elev=171.68' Storage=278 cf Inflow=3.03 cfs 0.209 af
Outflow=3.03 cfs 0.205 af

**Pond P W 3.1: 5** Peak Elev=156.09' Storage=7,741 cf Inflow=7.82 cfs 0.774 af
Discarded=0.01 cfs 0.009 af Primary=7.69 cfs 0.595 af Outflow=7.70 cfs 0.604 af

**Pond P W 3.4: 13** Peak Elev=181.14' Storage=1,623 cf Inflow=0.08 cfs 0.037 af
Outflow=0.00 cfs 0.000 af

**Pond P W 9.1B: 14** Peak Elev=157.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

**Pond P W-CULV-N: 227** Peak Elev=153.12' Storage=558 cf Inflow=20.18 cfs 1.566 af
36.0" x 36.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=18.47 cfs 1.570 af

**Pond P W-D-3: 111** Peak Elev=158.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.00 cfs 0.000 af

**Pond P-RG-E-1:** Peak Elev=142.01' Storage=5,174 cf Inflow=5.19 cfs 0.392 af
Primary=2.77 cfs 0.324 af Secondary=0.00 cfs 0.000 af Outflow=2.77 cfs 0.324 af

**Pond P-RG-E-2:** Peak Elev=162.65' Storage=831 cf Inflow=1.31 cfs 0.088 af
Primary=1.21 cfs 0.074 af Secondary=0.00 cfs 0.000 af Outflow=1.21 cfs 0.074 af

**Pond P-RG-E-4A:** Peak Elev=172.05' Storage=761 cf Inflow=1.10 cfs 0.074 af
Outflow=0.63 cfs 0.065 af

**Pond P-RG-E-4B:** Peak Elev=170.03' Storage=1,567 cf Inflow=1.69 cfs 0.117 af
Outflow=1.22 cfs 0.093 af

**Pond P-RG-E-8:** Peak Elev=174.97' Storage=3,372 cf Inflow=1.55 cfs 0.104 af
Outflow=0.07 cfs 0.028 af

**Pond P-RG-W-2: 306** Peak Elev=171.57' Storage=8,490 cf Inflow=9.07 cfs 0.646 af
Outflow=5.03 cfs 0.513 af

**Pond P-RG-W-3:** Peak Elev=170.03' Storage=20,249 cf Inflow=6.12 cfs 0.495 af
Outflow=0.26 cfs 0.030 af

**Pond P-RG-W-4:** Peak Elev=171.56' Storage=4,353 cf Inflow=5.46 cfs 0.367 af
Outflow=4.44 cfs 0.296 af

**Pond R-CULV-1: PIPE 1** Peak Elev=162.64' Inflow=2.94 cfs 0.451 af
Primary=2.94 cfs 0.451 af Secondary=0.00 cfs 0.000 af Outflow=2.94 cfs 0.451 af

**Pond R-CULV-10: PIPE 10** Peak Elev=138.36' Inflow=18.47 cfs 2.398 af
Primary=18.47 cfs 2.398 af Secondary=0.00 cfs 0.000 af Outflow=18.47 cfs 2.398 af

**Pond R-CULV-2: PIPE 2** Peak Elev=159.12' Inflow=10.52 cfs 1.321 af
Primary=10.52 cfs 1.321 af Secondary=0.00 cfs 0.000 af Outflow=10.52 cfs 1.321 af

**Pond R-CULV-3: PIPE 3** Peak Elev=156.63' Inflow=14.97 cfs 1.841 af
Primary=14.97 cfs 1.841 af Secondary=0.00 cfs 0.000 af Outflow=14.97 cfs 1.841 af

**Pond R-CULV-4: PIPE 4** Peak Elev=151.96' Inflow=14.97 cfs 1.913 af
Primary=14.97 cfs 1.913 af Secondary=0.00 cfs 0.000 af Outflow=14.97 cfs 1.913 af

**Pond R-CULV-5: PIPE 5** Peak Elev=151.07' Inflow=15.13 cfs 2.000 af
Primary=15.13 cfs 2.000 af Secondary=0.00 cfs 0.000 af Outflow=15.13 cfs 2.000 af

**Pond R-CULV-6: PIPE 6** Peak Elev=149.37' Inflow=15.71 cfs 2.074 af
Primary=15.71 cfs 2.074 af Secondary=0.00 cfs 0.000 af Outflow=15.71 cfs 2.074 af

**Pond R-CULV-7: PIPE 7** Peak Elev=146.37' Inflow=15.71 cfs 2.074 af
Primary=15.71 cfs 2.074 af Secondary=0.00 cfs 0.000 af Outflow=15.71 cfs 2.074 af

**Pond R-CULV-8: PIPE 8** Peak Elev=142.45' Inflow=15.71 cfs 2.074 af
Primary=15.71 cfs 2.074 af Secondary=0.00 cfs 0.000 af Outflow=15.71 cfs 2.074 af

**Pond R-CULV-9: PIPE 9** Peak Elev=140.24' Inflow=15.71 cfs 2.074 af
Primary=15.71 cfs 2.074 af Secondary=0.00 cfs 0.000 af Outflow=15.71 cfs 2.074 af

**Link DP CULV: outflow from culvert** Inflow=18.47 cfs 2.398 af
Primary=18.47 cfs 2.398 af

**Link DP North: DP North** Inflow=25.91 cfs 3.891 af
Primary=25.91 cfs 3.891 af

**Link DP Sudbury: DP Sudbury** Inflow=72.91 cfs 9.341 af
Primary=72.91 cfs 9.341 af

**Link DP Wellhead: DP Wellhead** Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=10.50 cfs 1.025 af
Primary=10.50 cfs 1.025 af

**Link L E 1.0: L E 1.0** Inflow=47.77 cfs 5.450 af
Primary=47.77 cfs 5.450 af

**Link L E 4.0: L E 4.0** Inflow=5.30 cfs 0.968 af
Primary=5.30 cfs 0.968 af

**Link L W 10.0: L W 10.0** Inflow=4.50 cfs 0.329 af
Primary=4.50 cfs 0.329 af

**Link L W 2.0: L W 2.0** Inflow=3.06 cfs 0.430 af
Primary=3.06 cfs 0.430 af

**Link L W 3.0: L W 3.0** Inflow=7.69 cfs 0.595 af
Primary=7.69 cfs 0.595 af

**Link L W 9.0: L W 9.0** Inflow=18.47 cfs 1.570 af
Primary=18.47 cfs 1.570 af

**Link L Well 1.1B: L Well 1.1B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2A: L Well 1.2A**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2B: L Well 1.2B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2C: L Well 1.2C**
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 130.598 ac Runoff Volume = 15.982 af Average Runoff Depth = 1.47"**
**93.35% Pervious = 121.914 ac 6.65% Impervious = 8.684 ac**

## Summary for Subcatchment E 1.0: (blank)

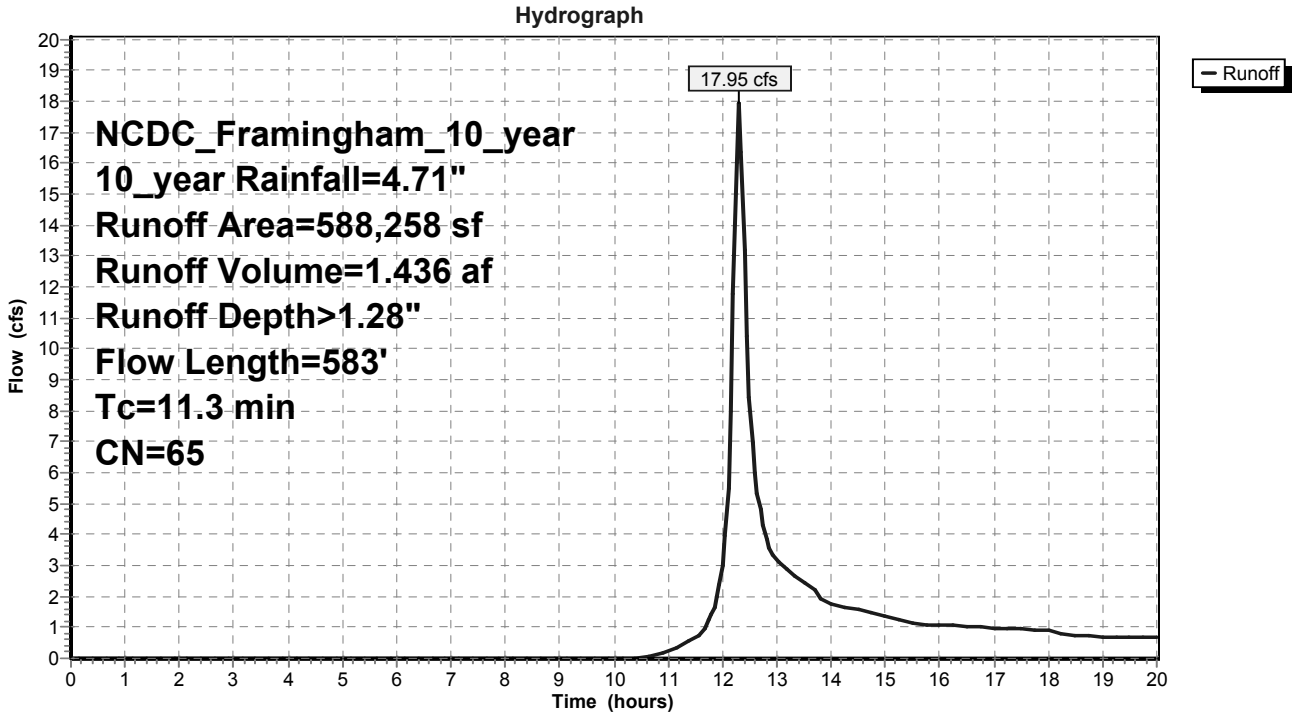
Runoff = 17.95 cfs @ 12.30 hrs, Volume= 1.436 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

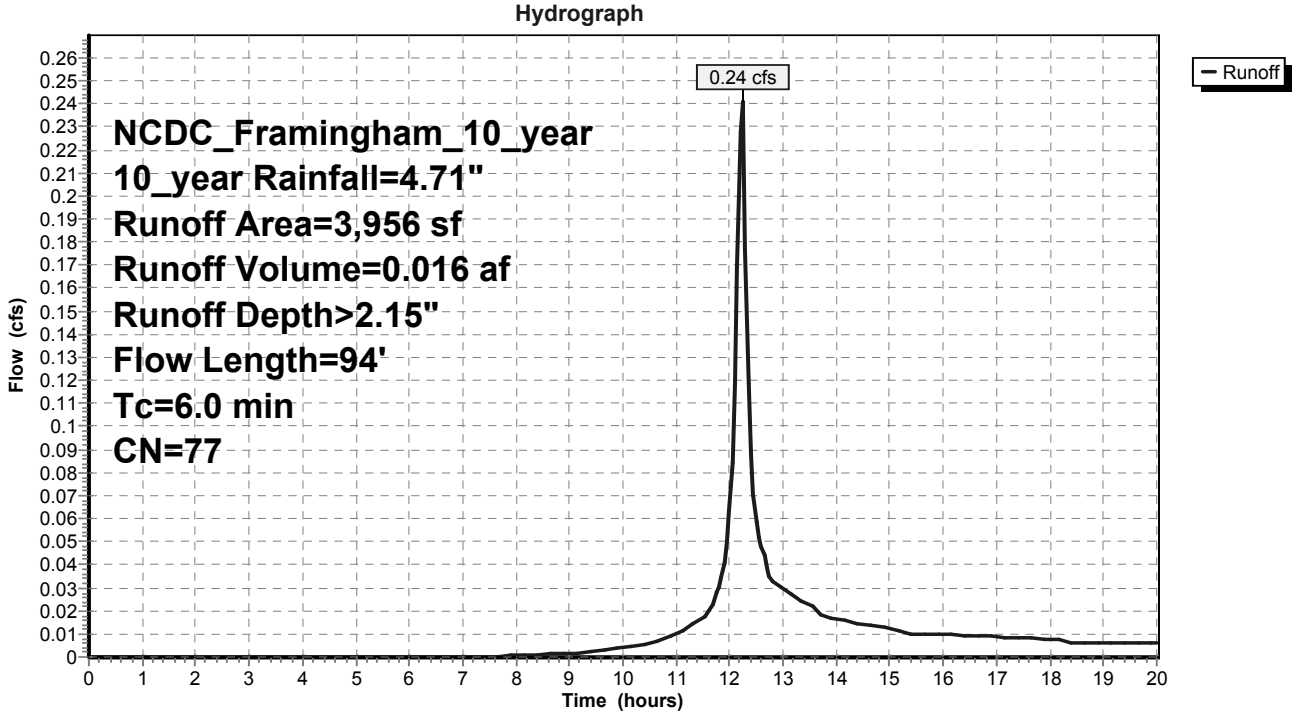
Runoff = 0.24 cfs @ 12.23 hrs, Volume= 0.016 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: (blank)

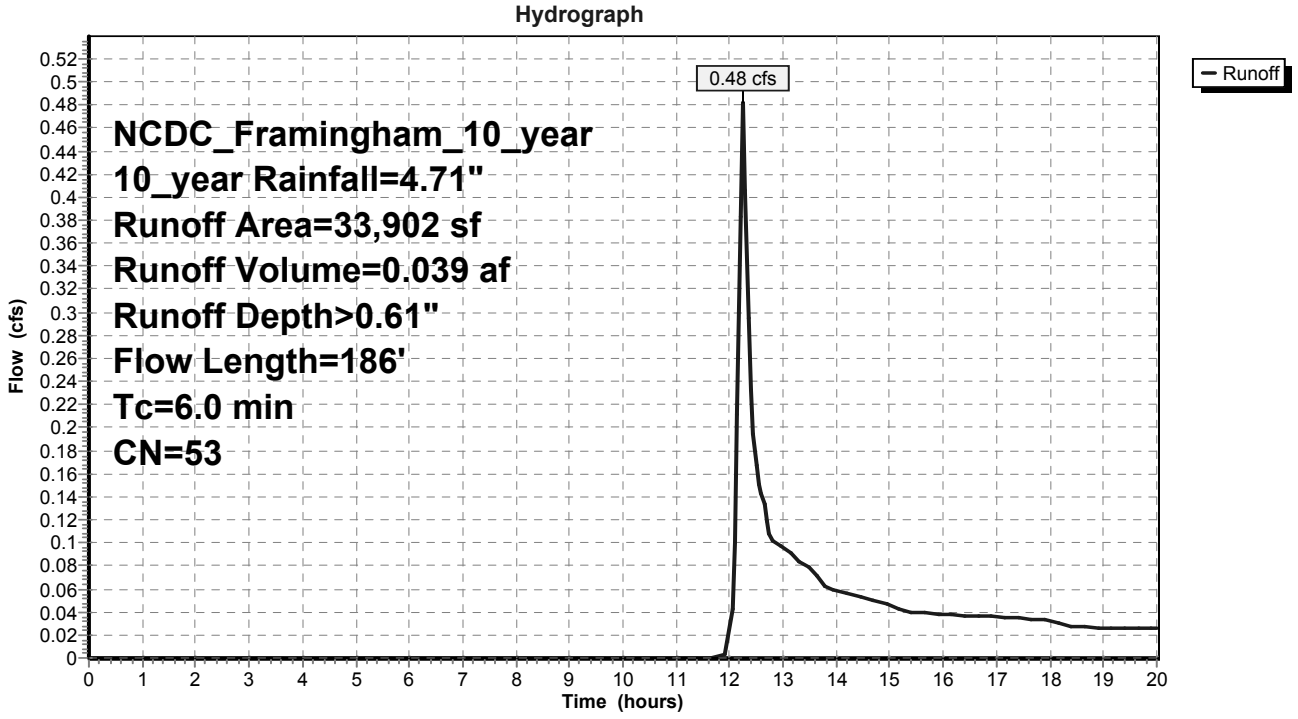
Runoff = 0.48 cfs @ 12.25 hrs, Volume= 0.039 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,518 | 39 | GRASS, 0% imperv, HSG A |
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 13,308 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,902 | 53 | Weighted Average |
| | 25,252 | | 74.49% Pervious Area |
| | 8,650 | | 25.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.5 | 34 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.5 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: (blank)



## Summary for Subcatchment E 1.0C: (blank)

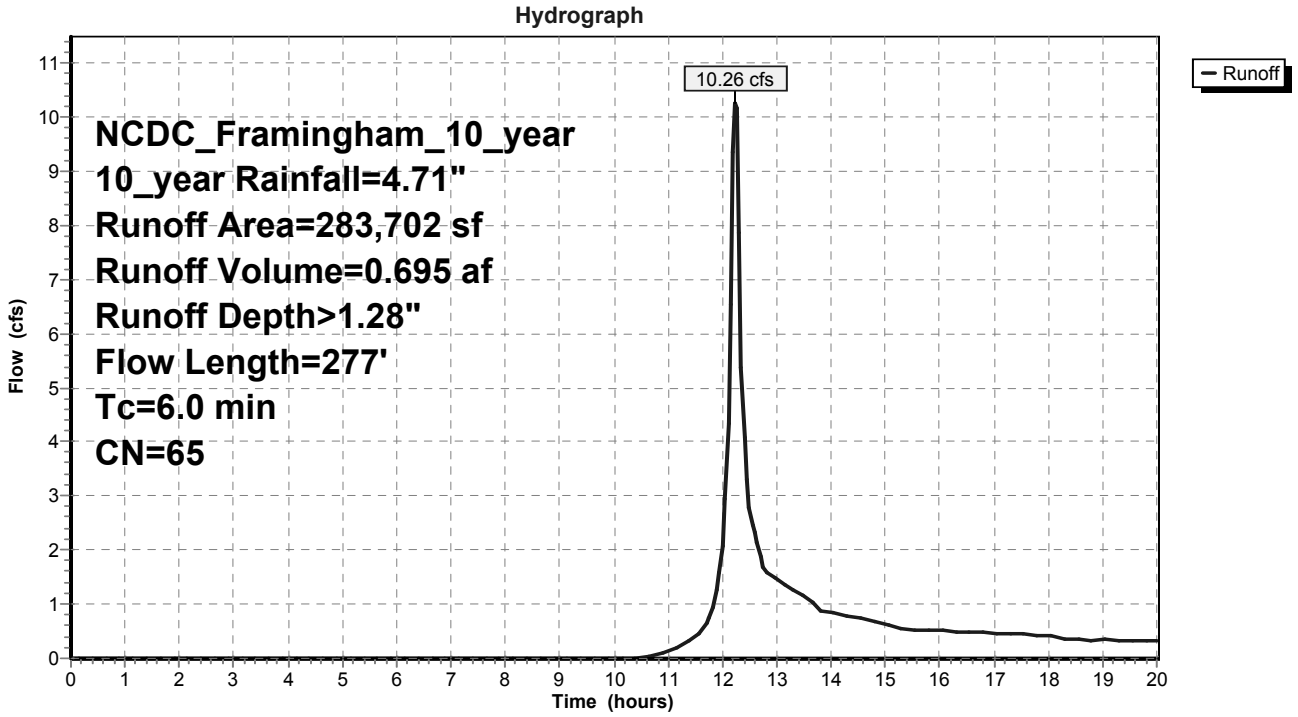
Runoff = 10.26 cfs @ 12.24 hrs, Volume= 0.695 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

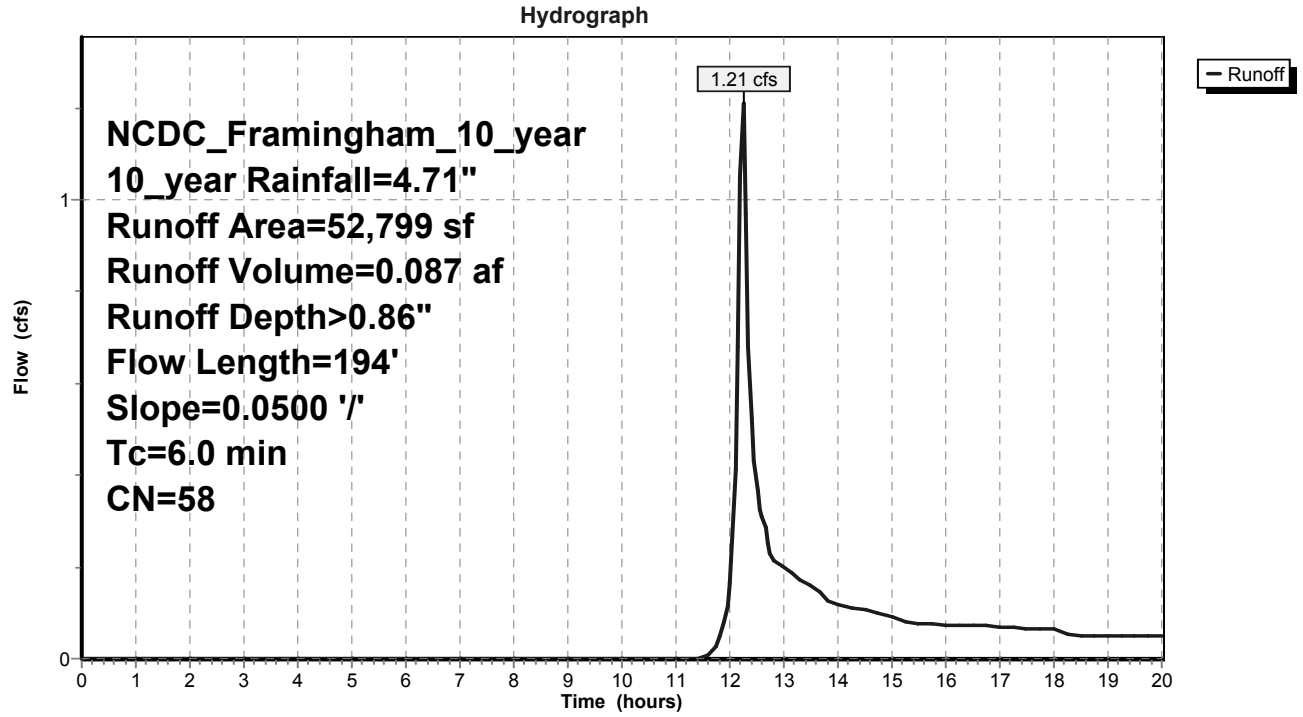
Runoff = 1.21 cfs @ 12.24 hrs, Volume= 0.087 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

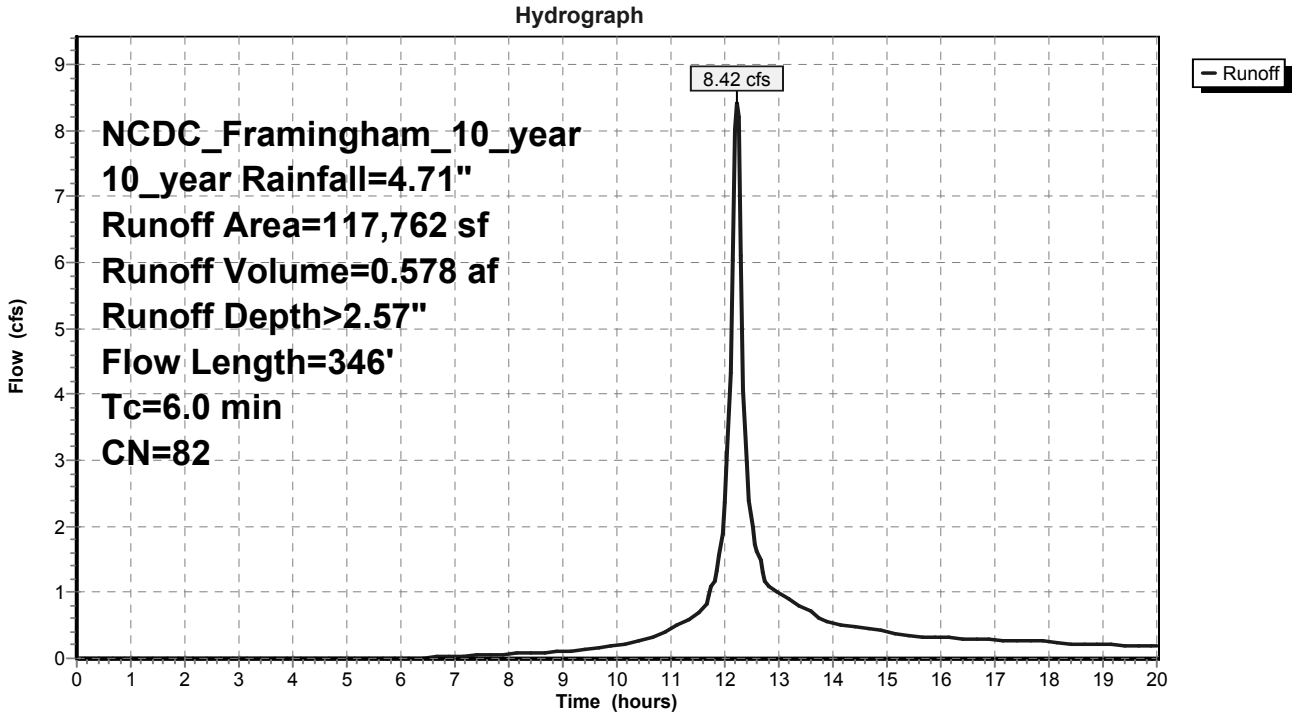
Runoff = 8.42 cfs @ 12.23 hrs, Volume= 0.578 af, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

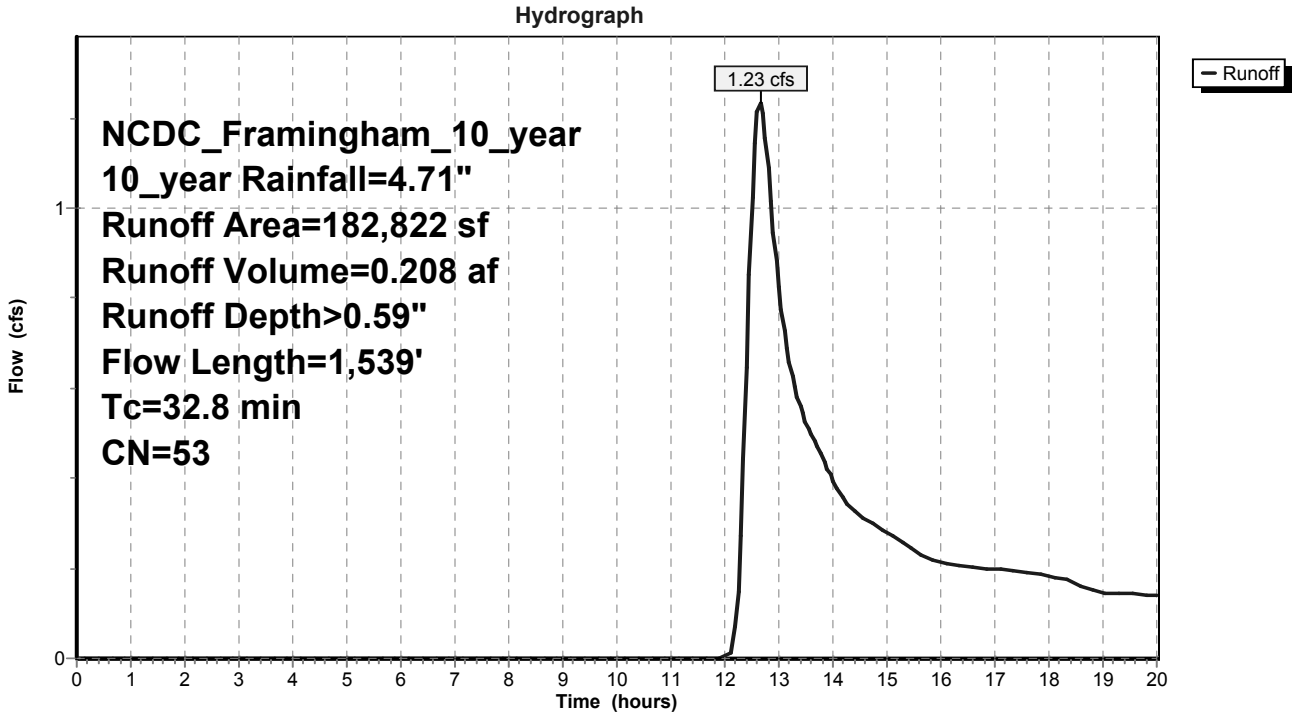
Runoff = 1.23 cfs @ 12.65 hrs, Volume= 0.208 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

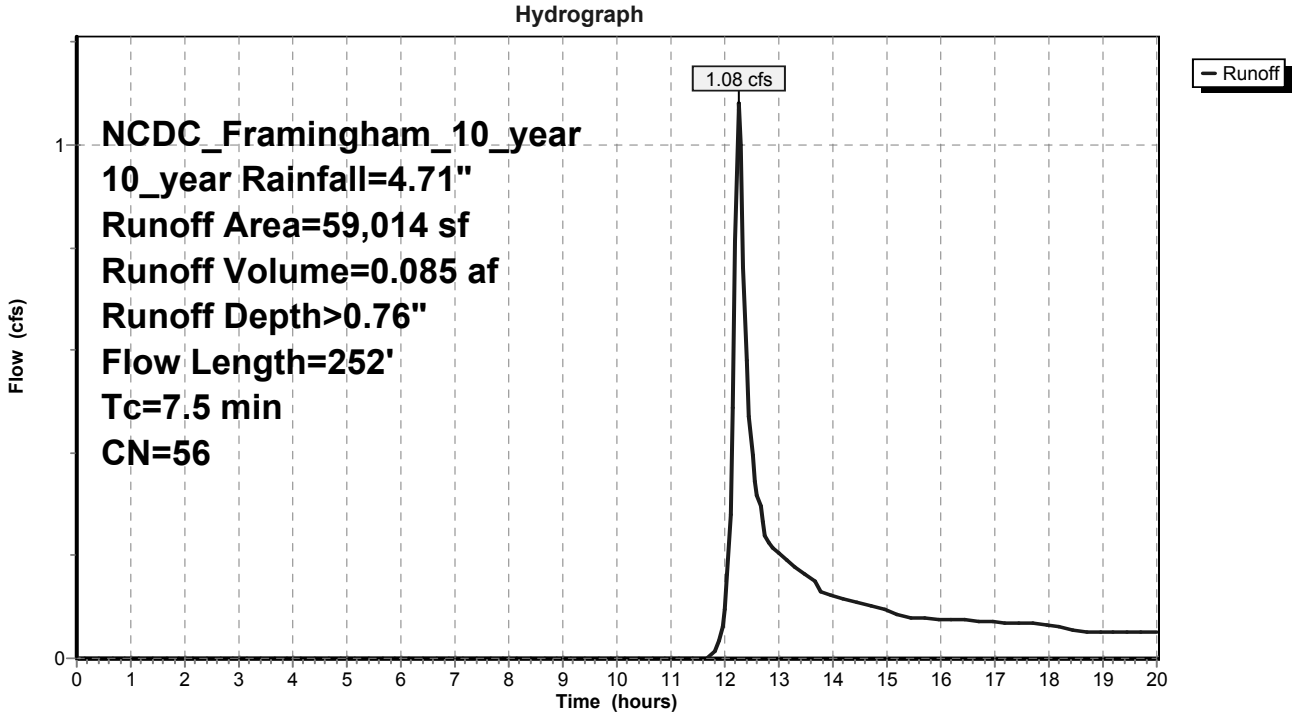
Runoff = 1.08 cfs @ 12.26 hrs, Volume= 0.085 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

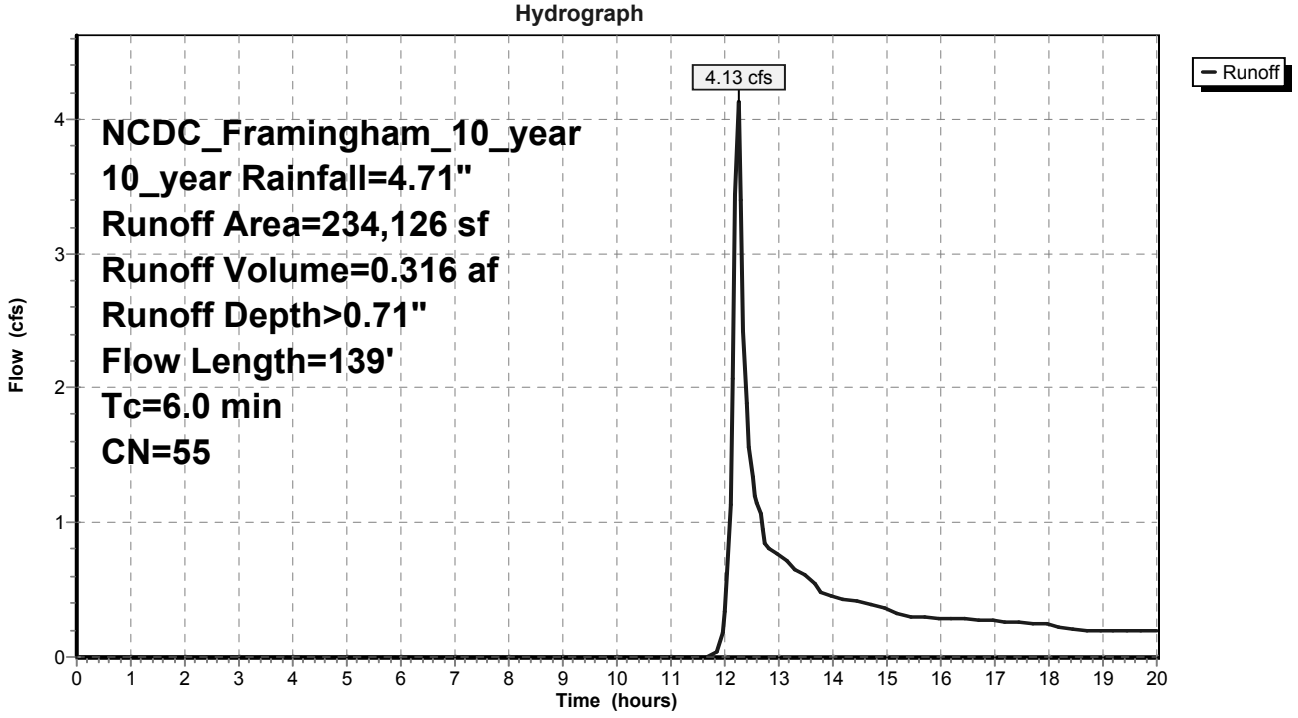
Runoff = 4.13 cfs @ 12.25 hrs, Volume= 0.316 af, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



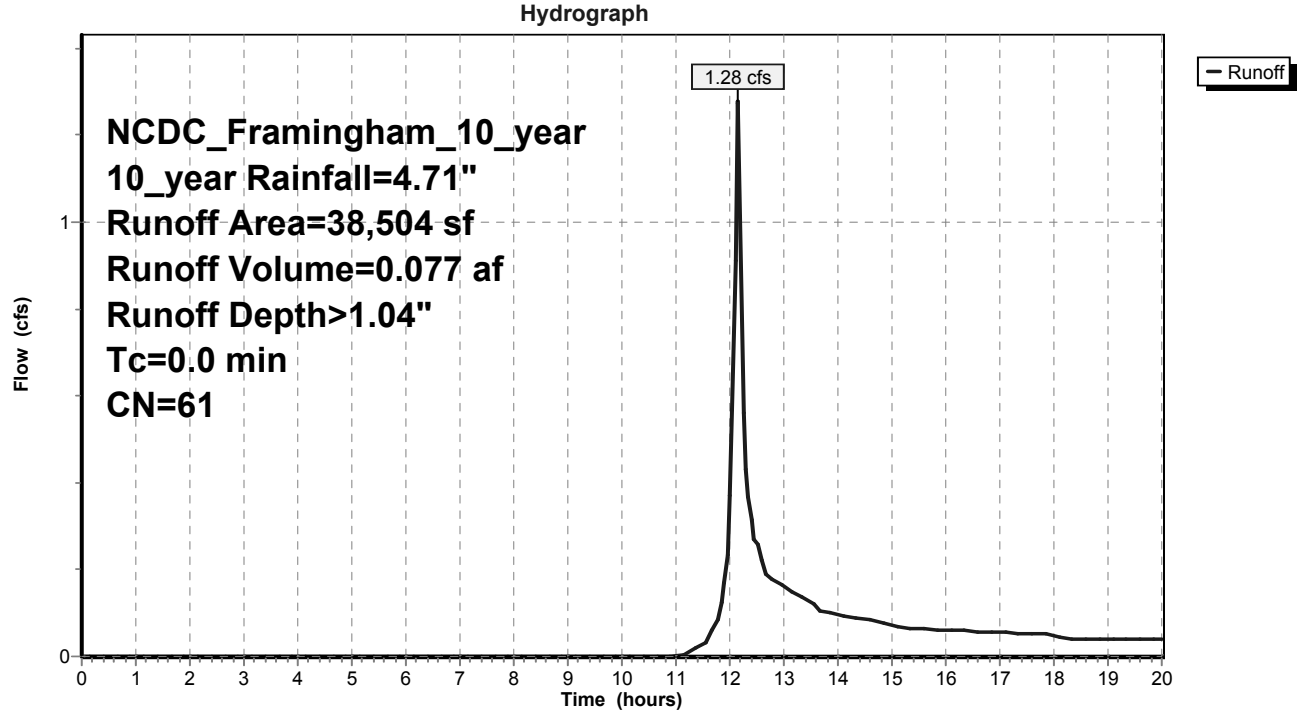
## Summary for Subcatchment E 1.1B-4: (blank)

Runoff = 1.28 cfs @ 12.15 hrs, Volume= 0.077 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,690 | 39 | GRASS, 0% imperv, HSG A |
| * | 34,430 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 55 | WOODS, 0% imperv, HSG B |
| * | 398 | 98 | DECK, 100% imperv, HSG B |
| * | 984 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 38,504 | 61 | Weighted Average |
| | 38,504 | | 100.00% Pervious Area |

## Subcatchment E 1.1B-4: (blank)



## Summary for Subcatchment E 1.2A: (blank)

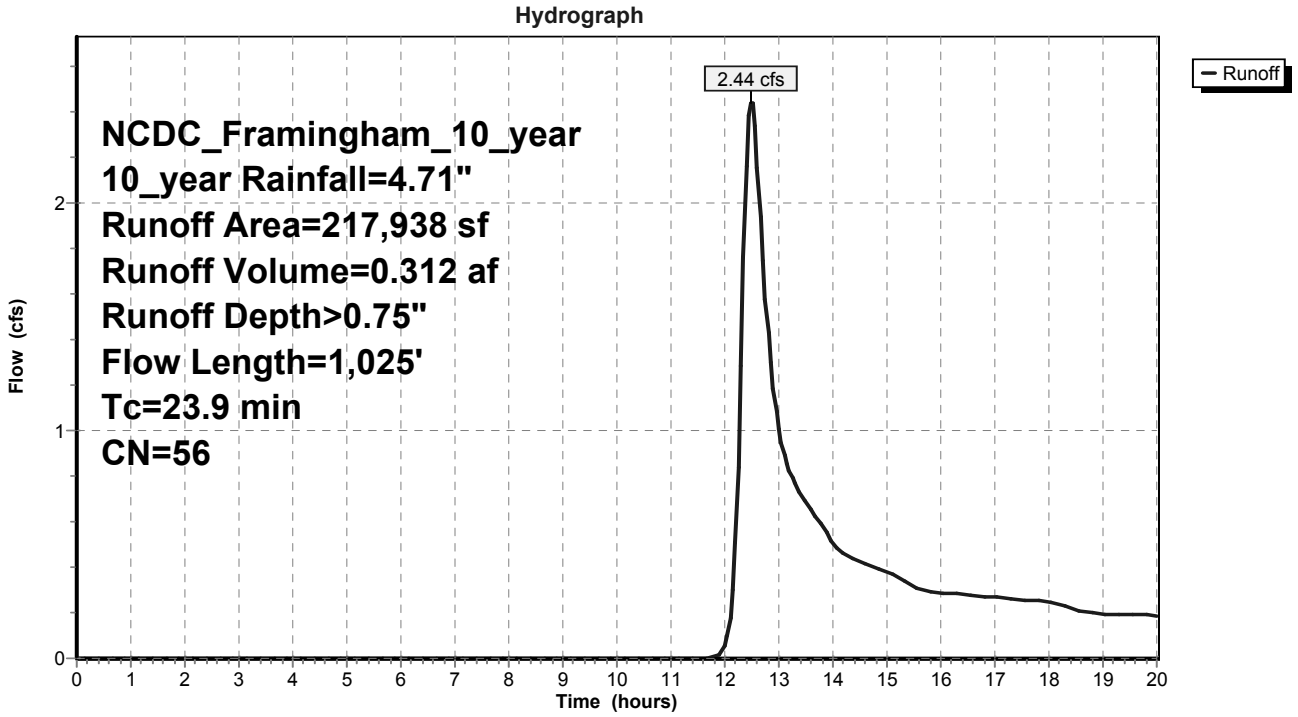
Runoff = 2.44 cfs @ 12.49 hrs, Volume= 0.312 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

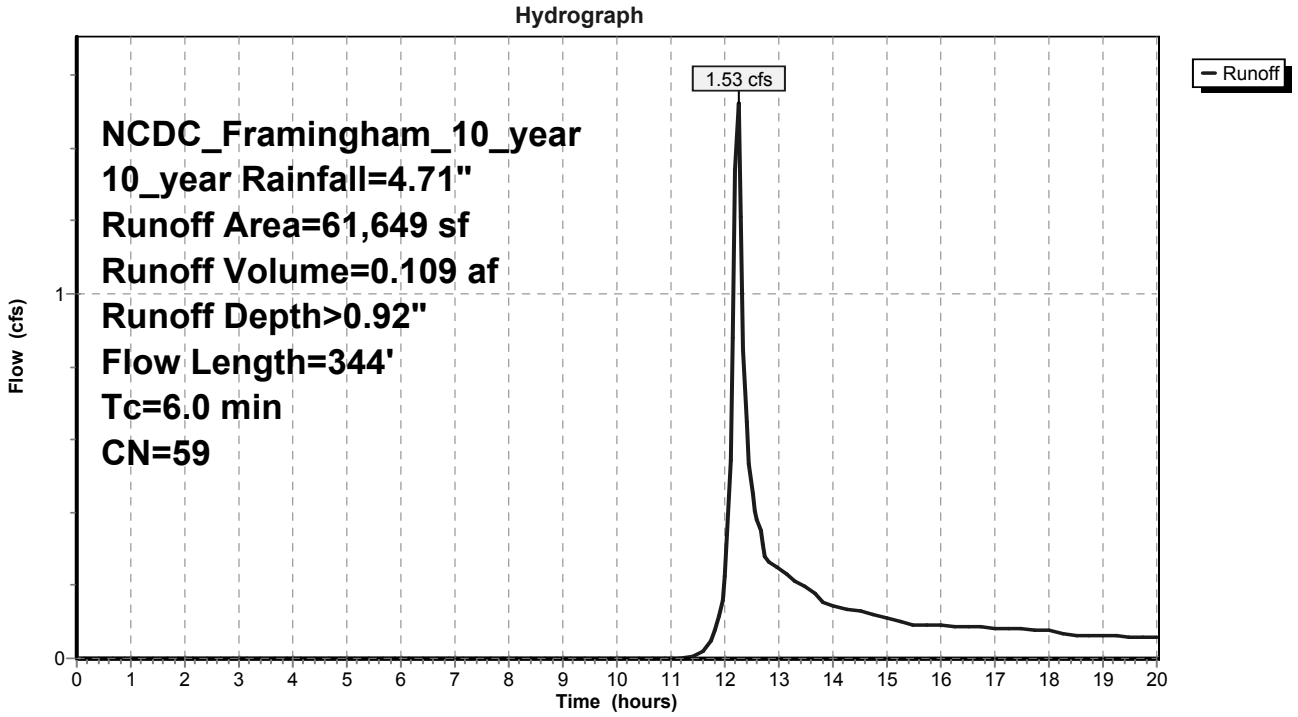
Runoff = 1.53 cfs @ 12.24 hrs, Volume= 0.109 af, Depth> 0.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: (blank)

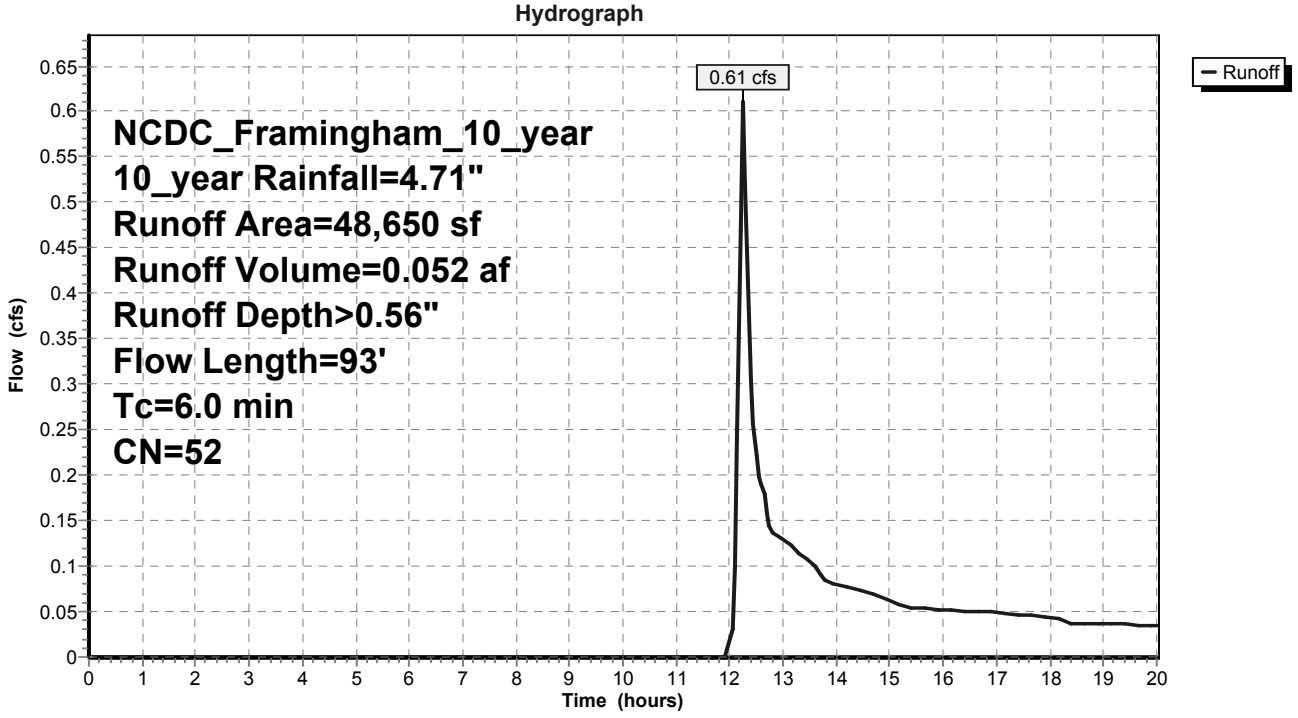
Runoff = 0.61 cfs @ 12.26 hrs, Volume= 0.052 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,296 | 39 | GRASS, 0% imperv, HSG A |
| * | 28,321 | 61 | GRASS, 0% imperv, HSG B |
| * | 1 | 30 | WOODS, 0% imperv, HSG A |
| * | 24 | 55 | WOODS, 0% imperv, HSG B |
| * | 0 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG B |
| | 48,650 | 52 | Weighted Average |
| | 48,646 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.8 | 50 | 0.1251 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 43 | 0.1289 | 2.51 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.1 | 93 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-2: (blank)



## Summary for Subcatchment E 1.2B: (blank)

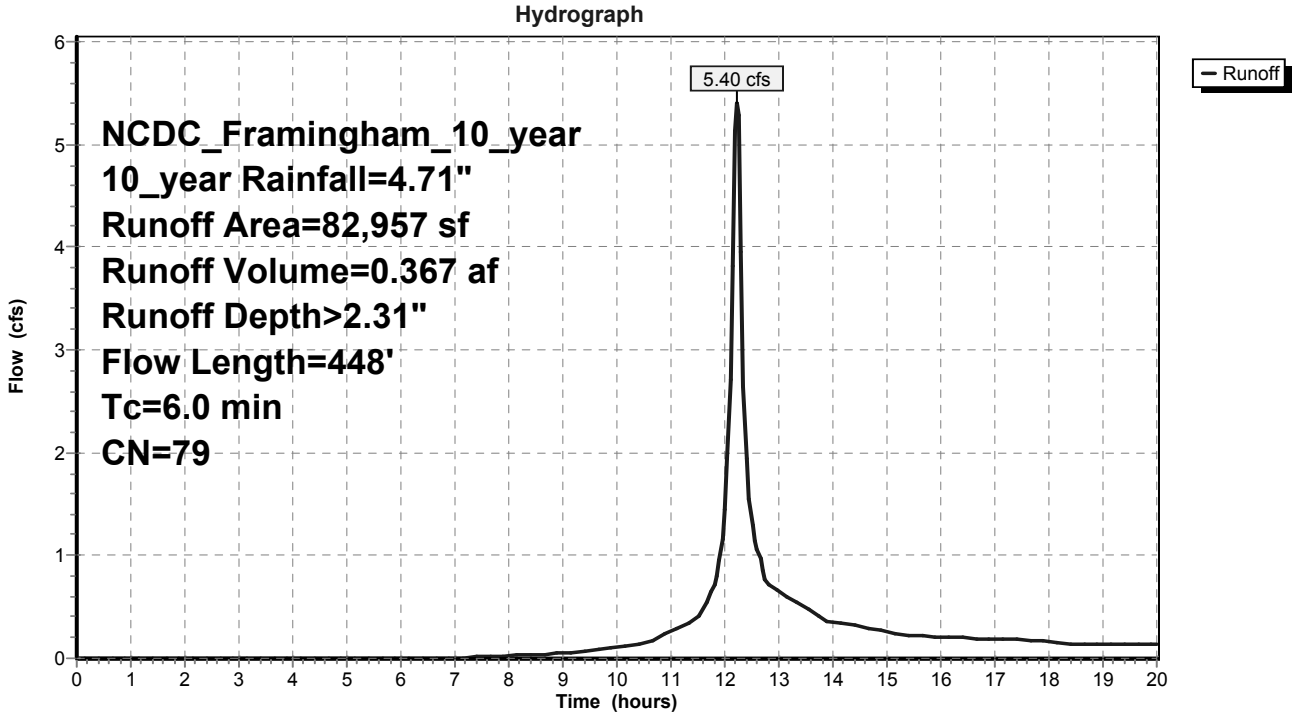
Runoff = 5.40 cfs @ 12.23 hrs, Volume= 0.367 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: (blank)

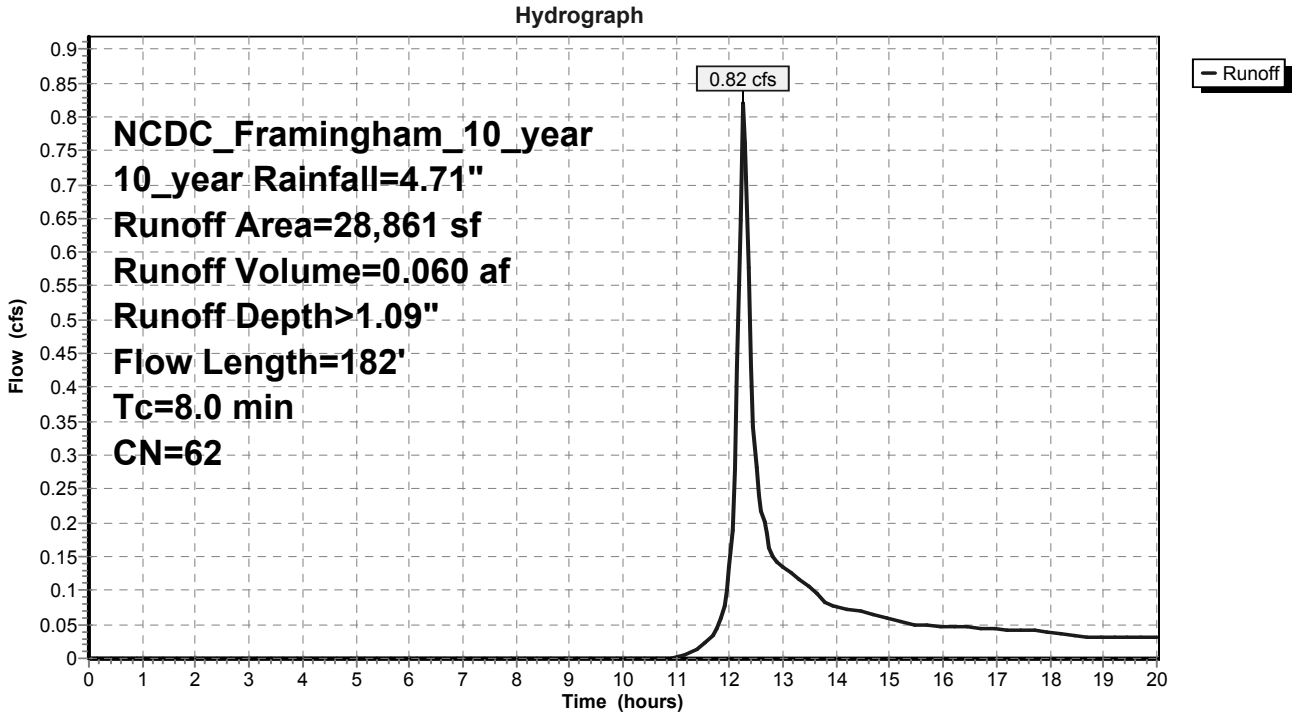
Runoff = 0.82 cfs @ 12.26 hrs, Volume= 0.060 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,232 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,162 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,032 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 145 | 98 | DECK, 100% imperv, HSG B |
| * | 0 | 98 | IMP, 100% imperv, HSG B |
| * | 289 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,861 | 62 | Weighted Average |
| | 28,190 | | 97.68% Pervious Area |
| | 671 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.9 | 50 | 0.0129 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 127 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 3 | 0.0270 | 0.82 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0294 | 2.76 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 182 | Total | | | |

## Subcatchment E 1.2B-1: (blank)



## Summary for Subcatchment E 1.2C: (blank)

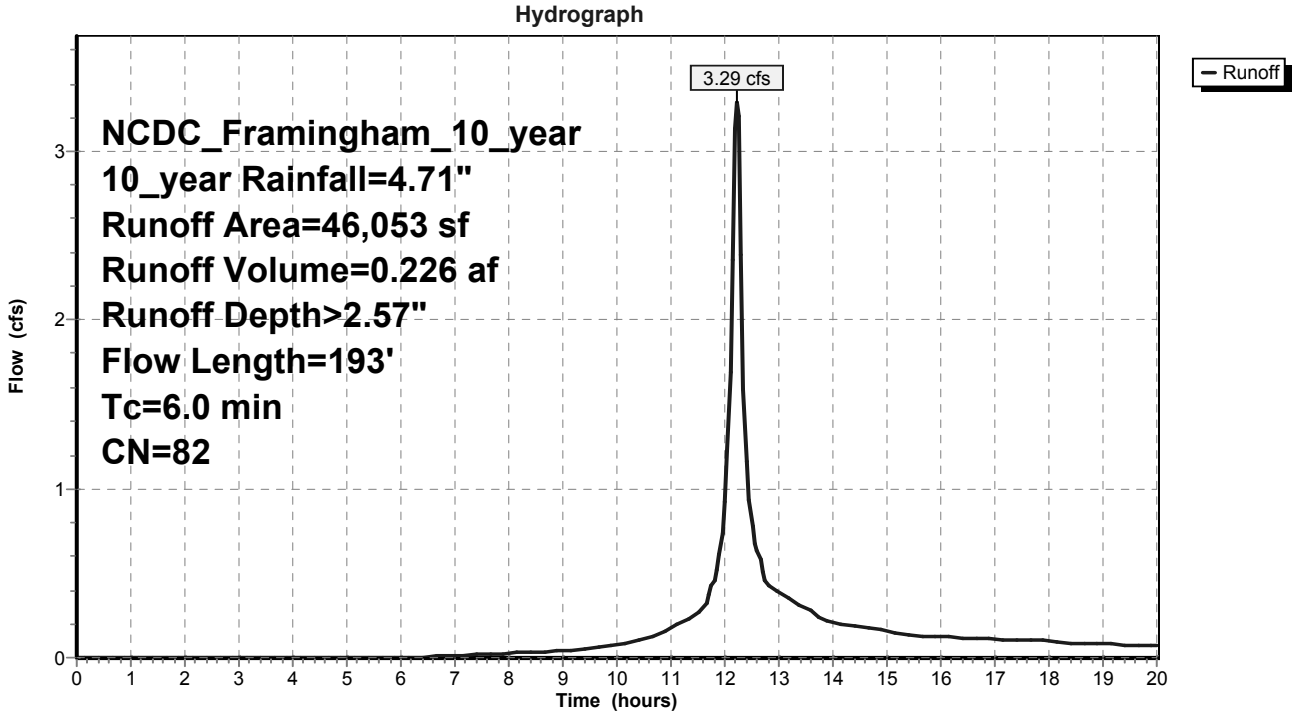
Runoff = 3.29 cfs @ 12.23 hrs, Volume= 0.226 af, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: (blank)

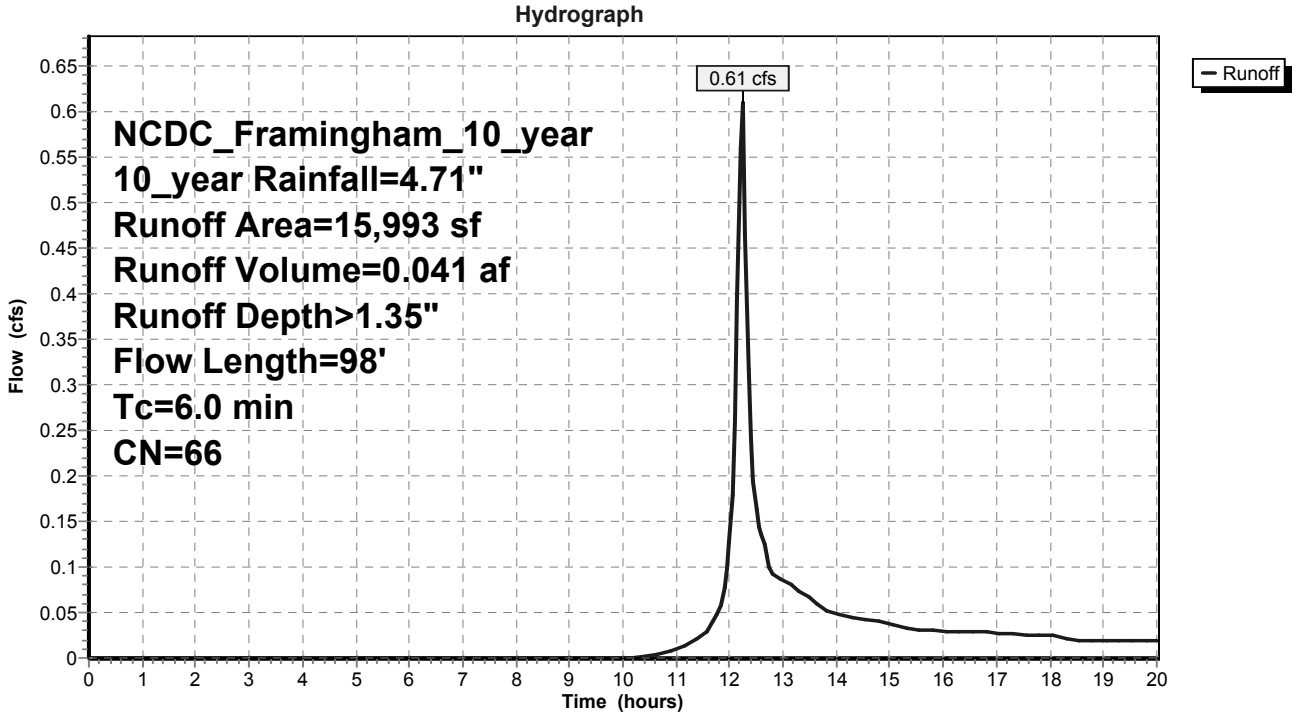
Runoff = 0.61 cfs @ 12.24 hrs, Volume= 0.041 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,637 | 61 | GRASS, 0% imperv, HSG B |
| * | 53 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 449 | 98 | DECK, 100% imperv, HSG B |
| * | 2 | 98 | IMP, 100% imperv, HSG B |
| * | 1,852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 15,993 | 66 | Weighted Average |
| | 15,959 | | 99.79% Pervious Area |
| | 34 | | 0.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.6 | 50 | 0.1160 | 0.32 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 48 | 0.3500 | 2.96 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 98 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: (blank)



## Summary for Subcatchment E 1.2C-2: (blank)

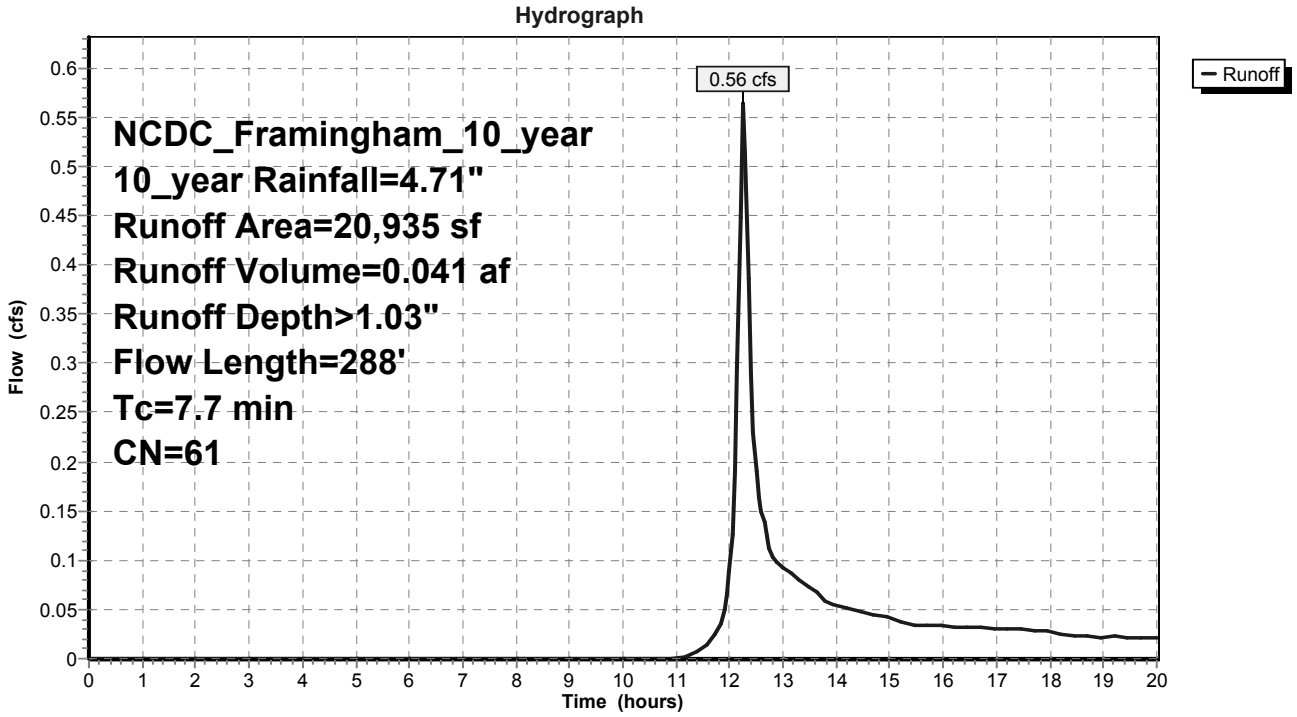
Runoff = 0.56 cfs @ 12.26 hrs, Volume= 0.041 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,831 | 61 | GRASS, 0% imperv, HSG B |
| * | 99 | 55 | WOODS, 0% imperv, HSG B |
| * | 4 | 98 | ROOF, 100% imperv, HSG B |
| | 20,935 | 61 | Weighted Average |
| | 20,935 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 238 | 0.0295 | 1.20 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 7.7 | 288 | Total | | | |

## Subcatchment E 1.2C-2: (blank)



## Summary for Subcatchment E 1.3A: (blank)

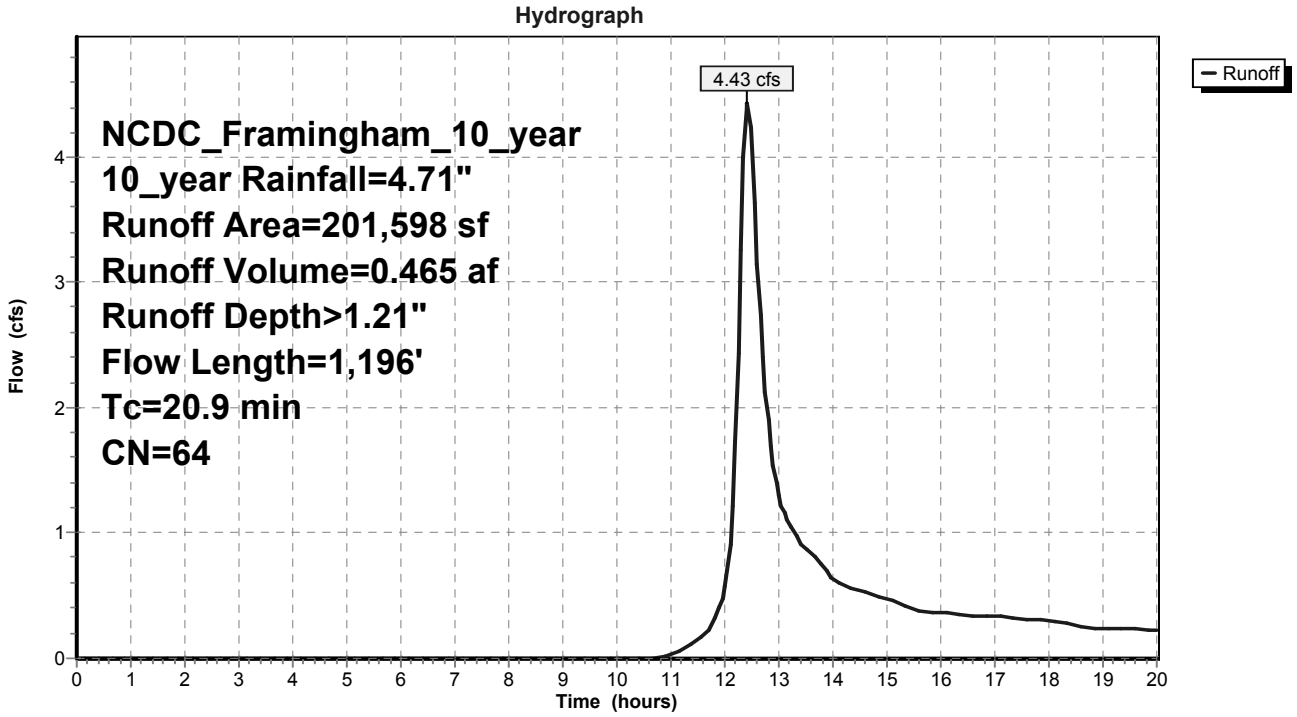
Runoff = 4.43 cfs @ 12.43 hrs, Volume= 0.465 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,522 | 39 | GRASS, 0% imperv, HSG A |
| * | 23,999 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 4,288 | 30 | WOODS, 0% imperv, HSG A |
| * | 61,112 | 55 | WOODS, 0% imperv, HSG B |
| * | 82,137 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 201,598 | 64 | Weighted Average |
| | 141,195 | | 70.04% Pervious Area |
| | 60,402 | | 29.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 1 | 1.6445 | 6.41 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 12 | 0.0806 | 4.57 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 54 | 0.0186 | 0.68 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.9 | 1,196 | Total | | | |

## Subcatchment E 1.3A: (blank)



## Summary for Subcatchment E 4.0: (blank)

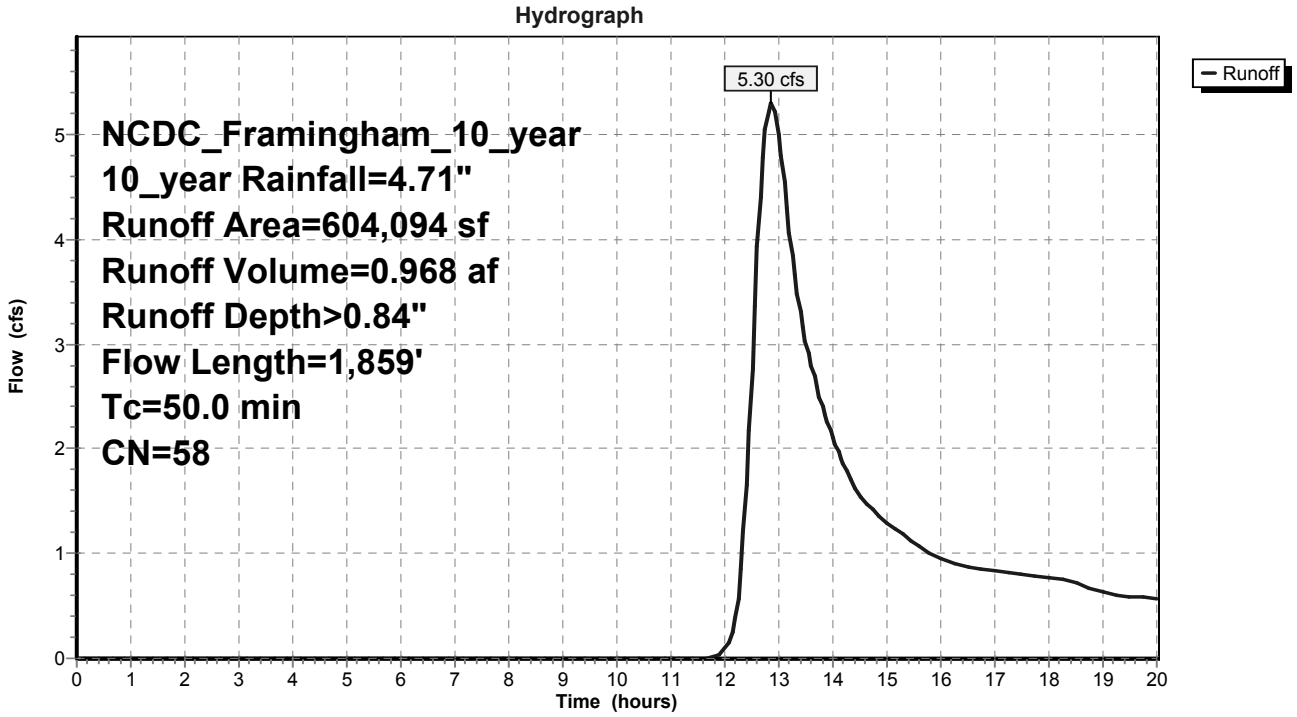
Runoff = 5.30 cfs @ 12.86 hrs, Volume= 0.968 af, Depth> 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 82,277 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 20,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,226 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,230 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 100% imperv, HSG A |
| * | 6,325 | 98 | Water, 100% imperv, HSG C |
| * | 12,063 | 98 | Water, 100% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 604,094 | 58 | Weighted Average |
| | 545,526 | | 90.30% Pervious Area |
| | 58,568 | | 9.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 6.5 | 194 | 0.0399 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 17.3 | 227 | 0.0076 | 0.22 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 50.0 | 1,859 | Total | | | |

## Subcatchment E 4.0: (blank)



## Summary for Subcatchment E-CULV-S: (blank)

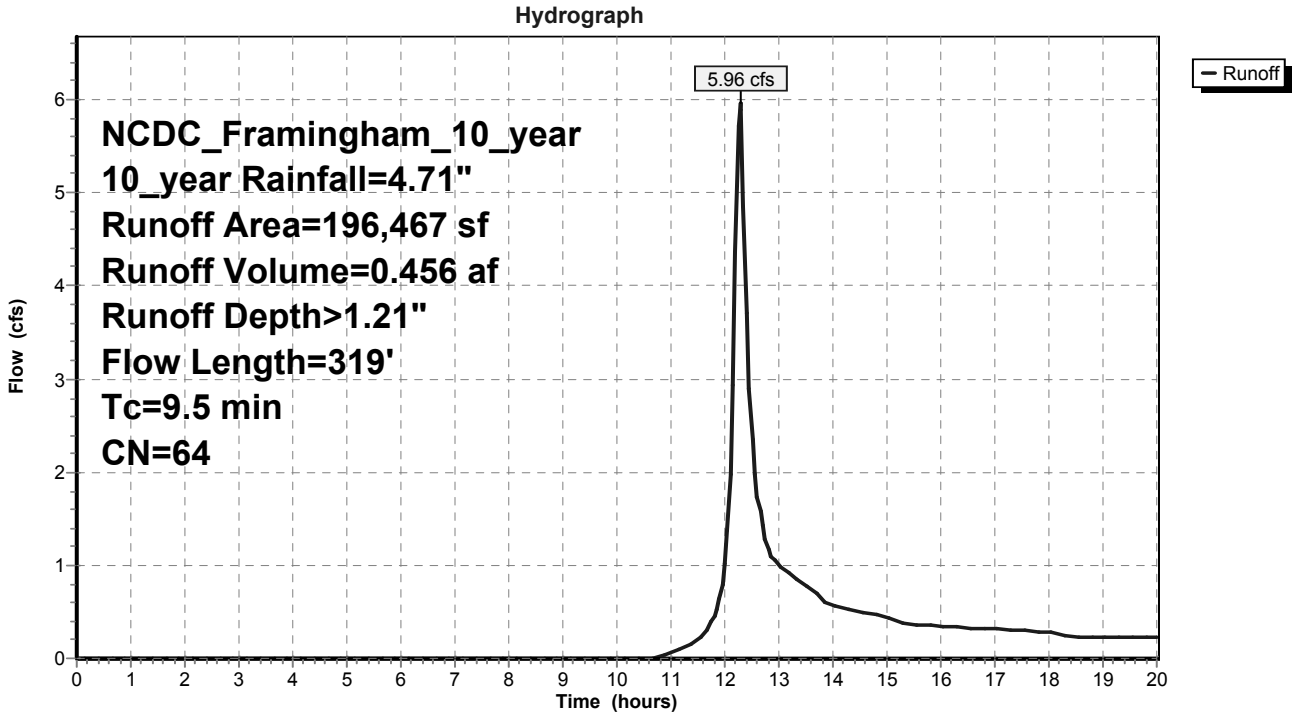
Runoff = 5.96 cfs @ 12.28 hrs, Volume= 0.456 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,373 | 39 | GRASS, 0% imperv, HSG A |
| * | 153,204 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,809 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 18,529 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 8 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 196,467 | 64 | Weighted Average |
| | 194,642 | | 99.07% Pervious Area |
| | 1,826 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 128 | 0.1151 | 2.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 141 | 0.0163 | 2.59 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 9.5 | 319 | Total | | | |

## Subcatchment E-CULV-S: (blank)



## Summary for Subcatchment RG-E-1: (blank)

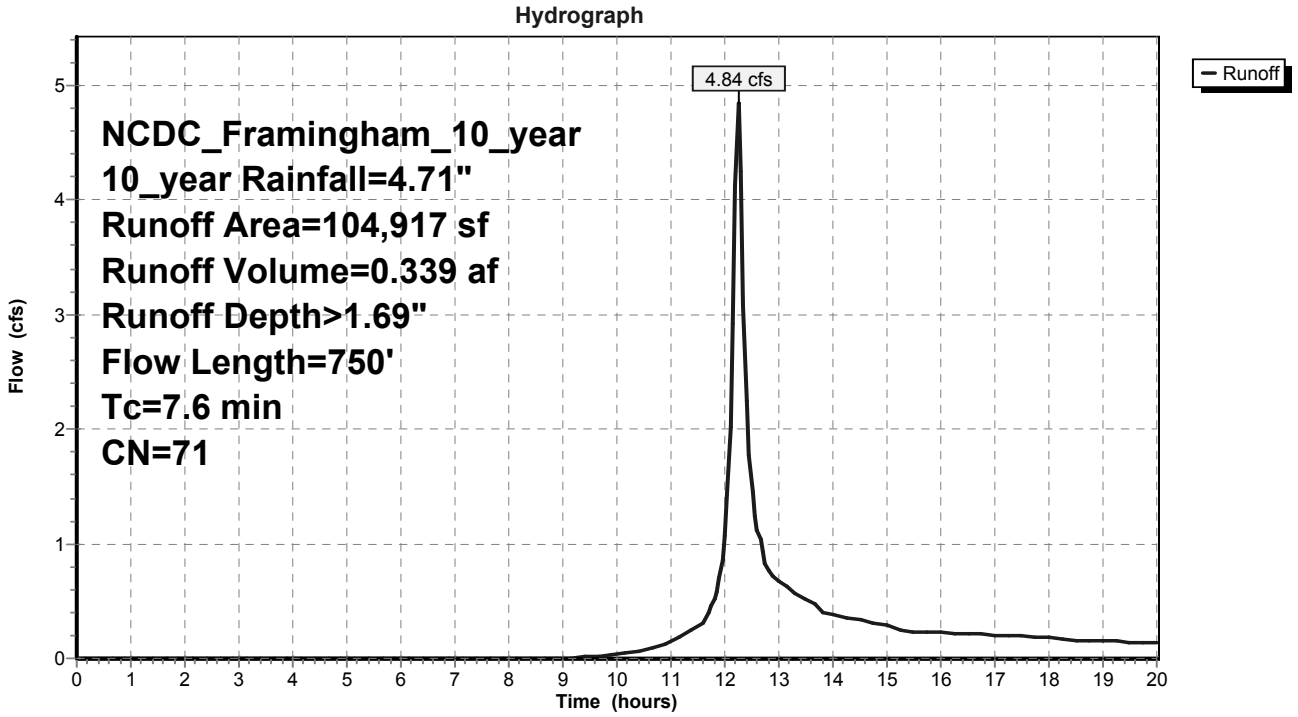
Runoff = 4.84 cfs @ 12.25 hrs, Volume= 0.339 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 54,529 | 61 | GRASS, 0% imperv, HSG B |
| * | 171 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 98 | DECK, 100% imperv, HSG A |
| * | 700 | 98 | DECK, 100% imperv, HSG B |
| * | 3,592 | 98 | IMP, 100% imperv, HSG A |
| * | 29,105 | 98 | IMP, 100% imperv, HSG B |
| * | 27 | 98 | ROOF, 100% imperv, HSG B |
| * | 262 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,962 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 104,917 | 71 | Weighted Average |
| | 104,917 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2000 | 0.36 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.3 | 700 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.6 | 750 | Total | | | |

## Subcatchment RG-E-1: (blank)



## Summary for Subcatchment RG-E-2: (blank)

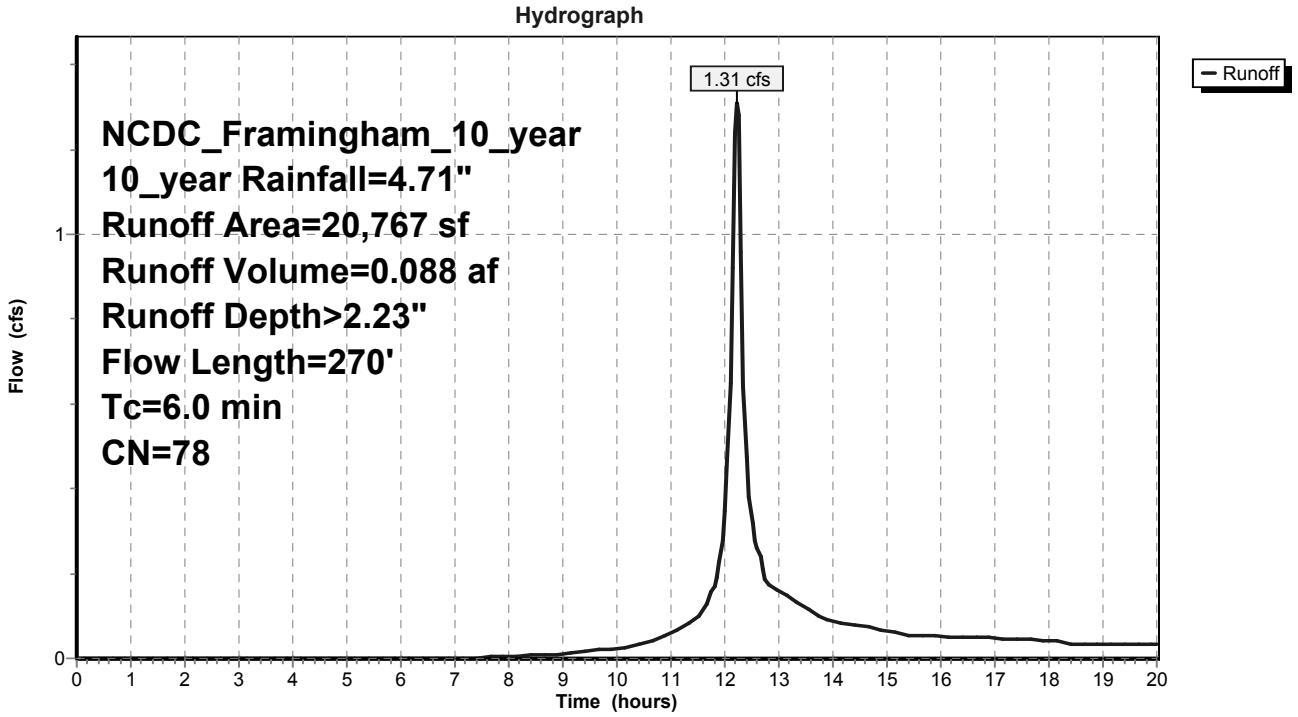
Runoff = 1.31 cfs @ 12.23 hrs, Volume= 0.088 af, Depth> 2.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 11,066 | 61 | GRASS, 0% imperv, HSG B |
| * | 27 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 142 | 98 | DECK, 100% imperv, HSG B |
| * | 9,131 | 98 | IMP, 100% imperv, HSG B |
| * | 402 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 20,767 | 78 | Weighted Average |
| | 20,750 | | 99.92% Pervious Area |
| | 18 | | 0.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0110 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 38 | 0.0310 | 3.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 7 | 0.0034 | 0.41 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.9 | 175 | 0.0486 | 1.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.3 | 270 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-2: (blank)



## Summary for Subcatchment RG-E-4A: (blank)

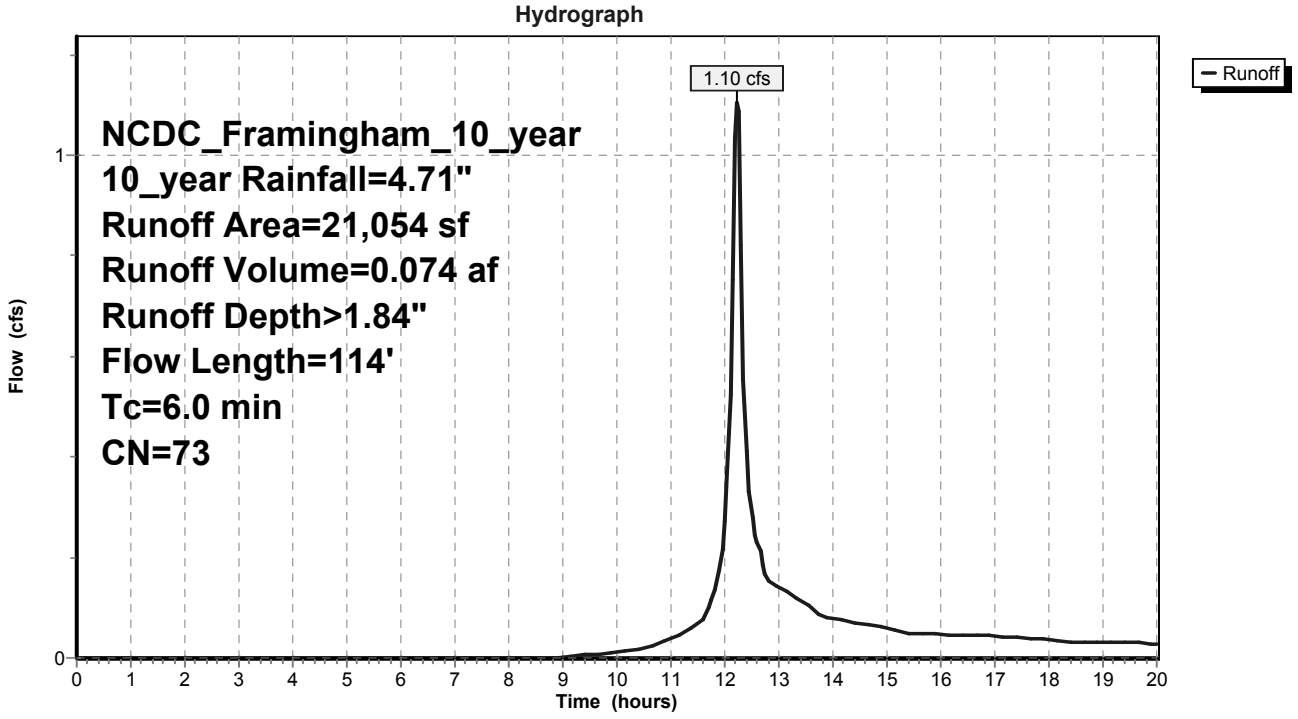
Runoff = 1.10 cfs @ 12.23 hrs, Volume= 0.074 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,476 | 61 | GRASS, 0% imperv, HSG B |
| * | 408 | 98 | DECK, 100% imperv, HSG B |
| * | 4,883 | 98 | IMP, 100% imperv, HSG B |
| * | 1,286 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 21,054 | 73 | Weighted Average |
| | 21,054 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0344 | 1.44 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 2 | 0.0253 | 3.23 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 62 | 0.0359 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.4 | 114 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4A: (blank)



## Summary for Subcatchment RG-E-4B: (blank)

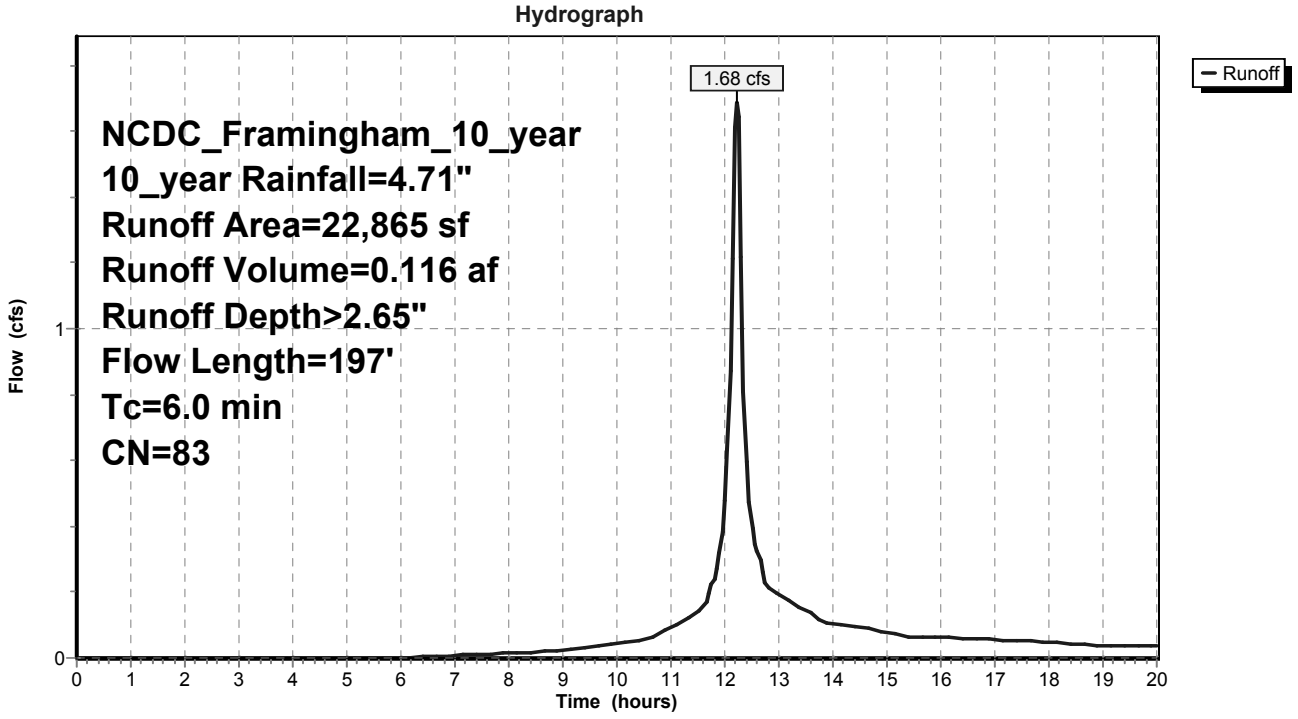
Runoff = 1.68 cfs @ 12.23 hrs, Volume= 0.116 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,428 | 61 | GRASS, 0% imperv, HSG B |
| * | 293 | 98 | DECK, 100% imperv, HSG B |
| * | 11,895 | 98 | IMP, 100% imperv, HSG B |
| * | 1,250 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,865 | 83 | Weighted Average |
| | 22,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.8 | 50 | 0.0137 | 1.00 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.9 | 138 | 0.0142 | 2.42 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.1488 | 2.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.8 | 197 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4B: (blank)



## Summary for Subcatchment RG-E-7: (blank)

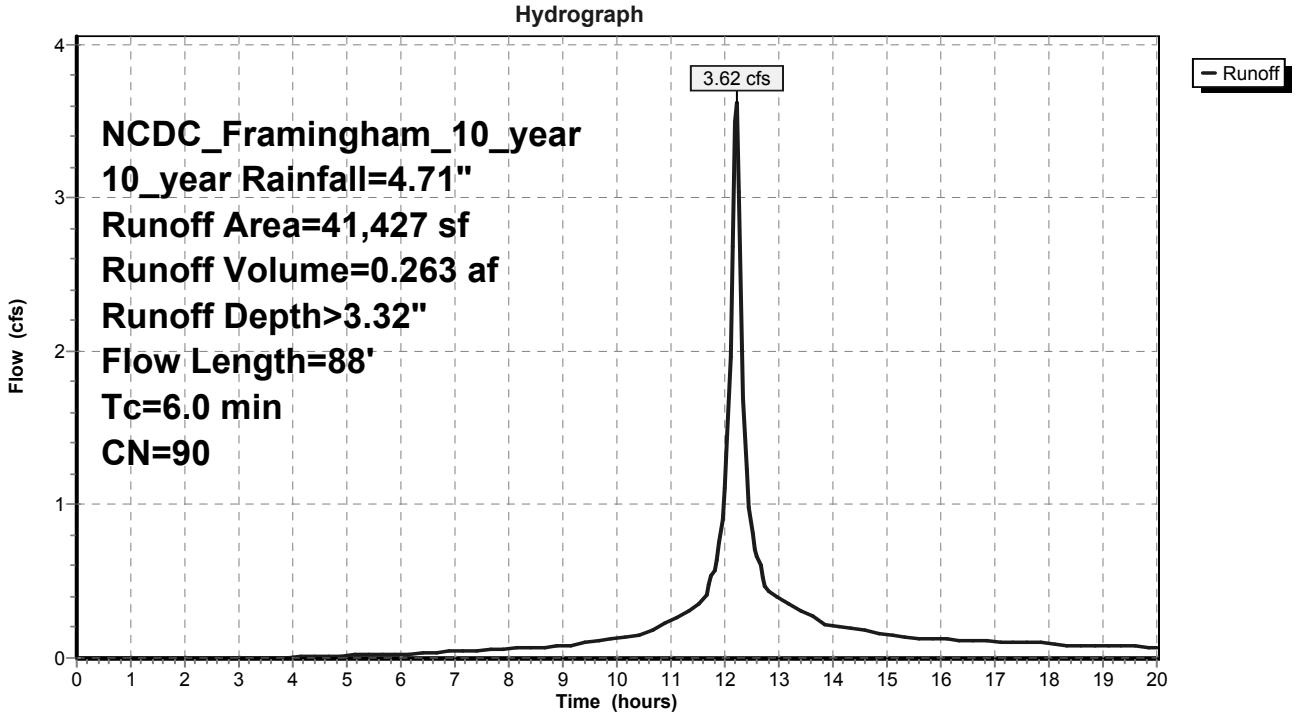
Runoff = 3.62 cfs @ 12.23 hrs, Volume= 0.263 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,373 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,458 | 98 | IMP, 100% imperv, HSG B |
| * | 3,411 | 98 | ROOF, 100% imperv, HSG B |
| * | 185 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 41,427 | 90 | Weighted Average |
| | 41,427 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0269 | 1.31 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 27 | 0.0251 | 3.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 11 | 0.0299 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 88 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-7: (blank)



## Summary for Subcatchment RG-E-8: (blank)

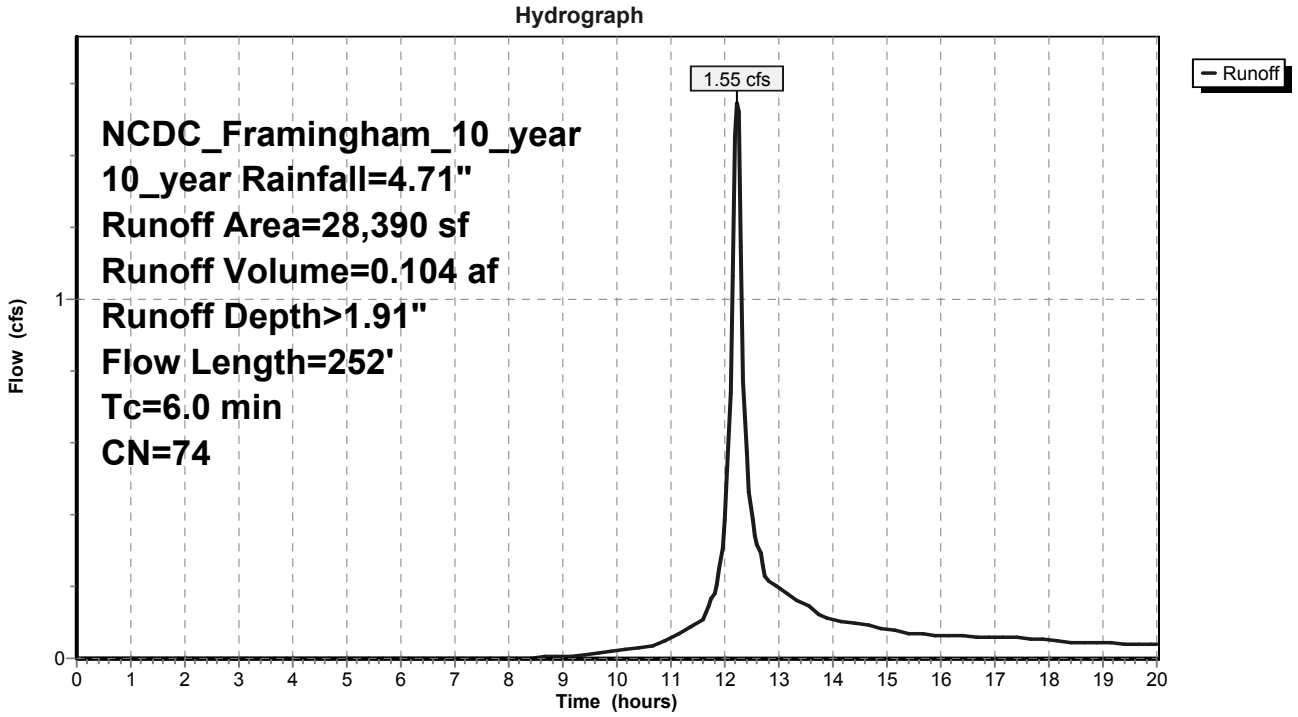
Runoff = 1.55 cfs @ 12.23 hrs, Volume= 0.104 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 18,045 | 61 | GRASS, 0% imperv, HSG B |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 355 | 98 | DECK, 100% imperv, HSG B |
| * | 9,134 | 98 | IMP, 100% imperv, HSG B |
| * | 852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,390 | 74 | Weighted Average |
| | 28,387 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0517 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 32 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0331 | 3.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 51 | 0.0546 | 4.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.1 | 113 | 0.0620 | 1.74 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 252 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-8: (blank)



## Summary for Subcatchment RG-E-9A: (blank)

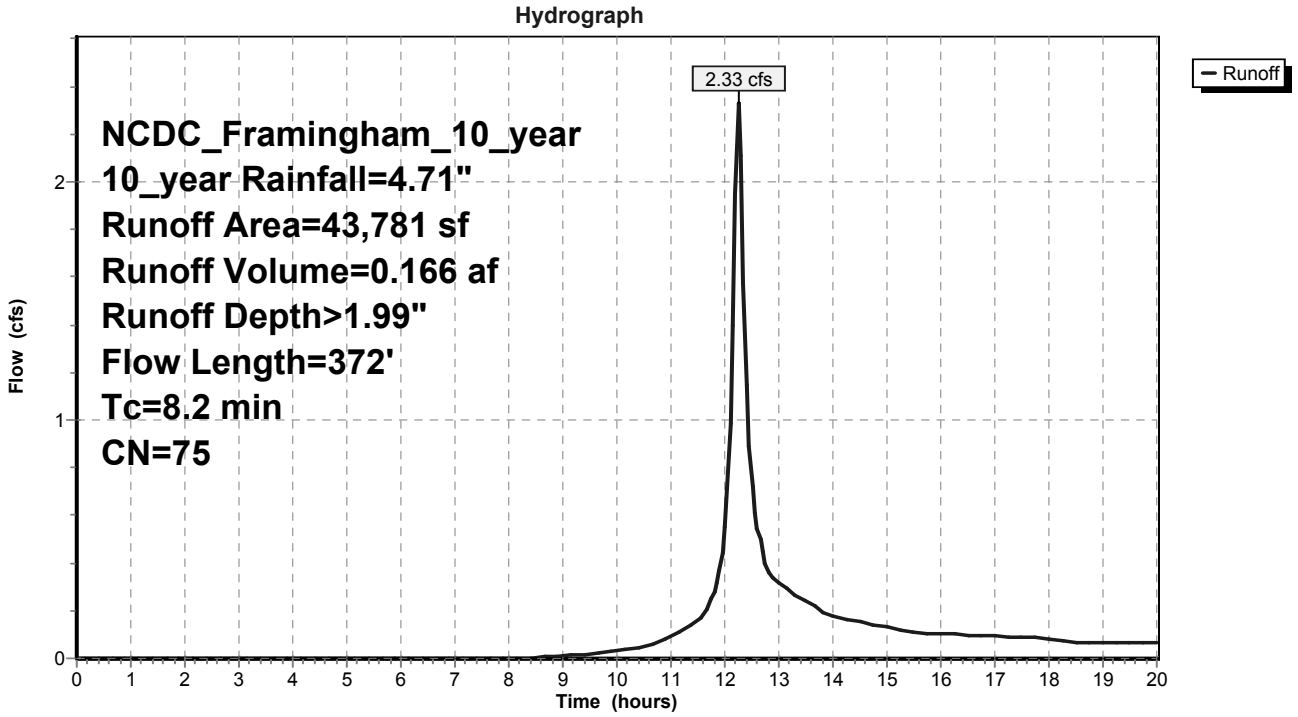
Runoff = 2.33 cfs @ 12.26 hrs, Volume= 0.166 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 10,864 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,515 | 61 | GRASS, 0% imperv, HSG B |
| * | 314 | 98 | DECK, 100% imperv, HSG A |
| * | 336 | 98 | DECK, 100% imperv, HSG B |
| * | 5,552 | 98 | IMP, 100% imperv, HSG A |
| * | 13,443 | 98 | IMP, 100% imperv, HSG B |
| * | 800 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 2,957 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 43,781 | 75 | Weighted Average |
| | 43,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 42 | 0.0271 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 8 | 0.0426 | 1.08 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.0 | 158 | 0.0180 | 2.72 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.9 | 65 | 0.0068 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0114 | 5.72 | 4.49 | **Pipe Channel, Smooth surfaces** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 |
| 0.6 | 66 | 0.0646 | 1.78 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.2 | 372 | Total | | | |

## Subcatchment RG-E-9A: (blank)



## Summary for Subcatchment RG-E-9B: (blank)

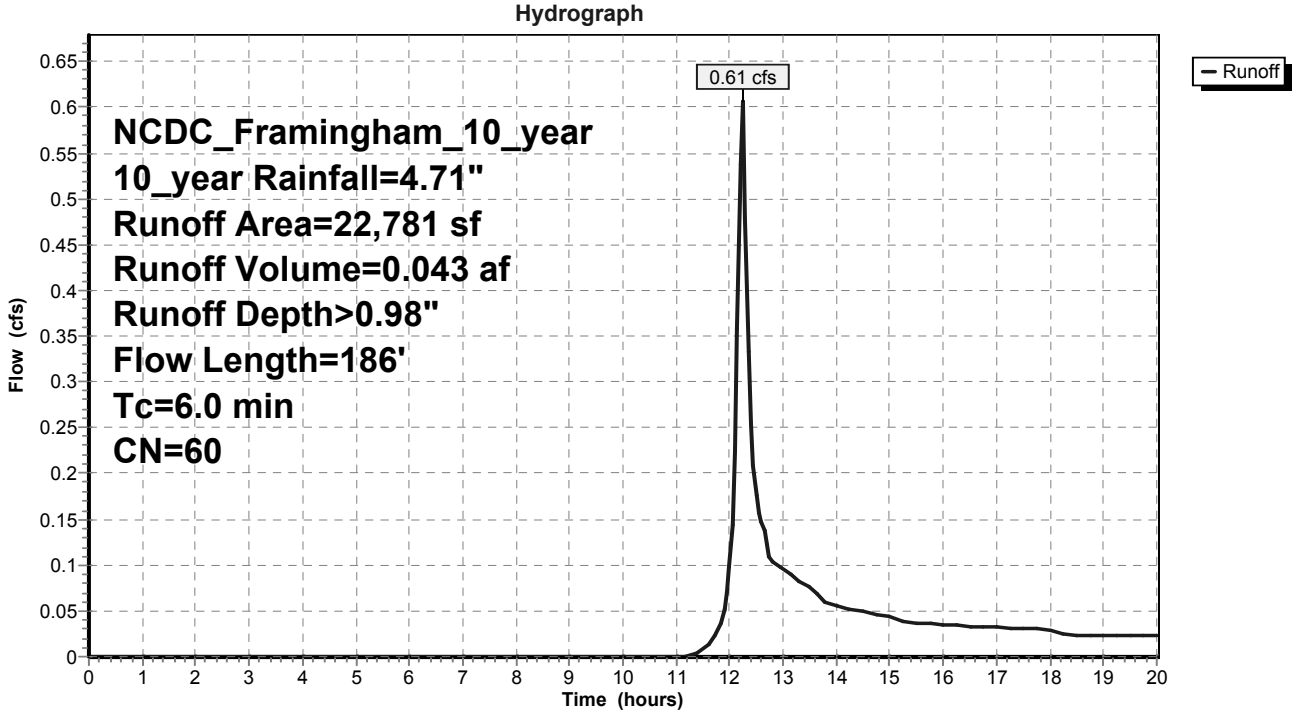
Runoff = 0.61 cfs @ 12.24 hrs, Volume= 0.043 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,064 | 39 | GRASS, 0% imperv, HSG A |
| * | 2,638 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 98 | DECK, 100% imperv, HSG A |
| * | 829 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 6,248 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,781 | 60 | Weighted Average |
| | 22,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.4 | 50 | 0.0010 | 0.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.3 | 80 | 0.3019 | 3.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.3 | 56 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.0 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-9B: (blank)



## Summary for Subcatchment RG-W-1: (blank)

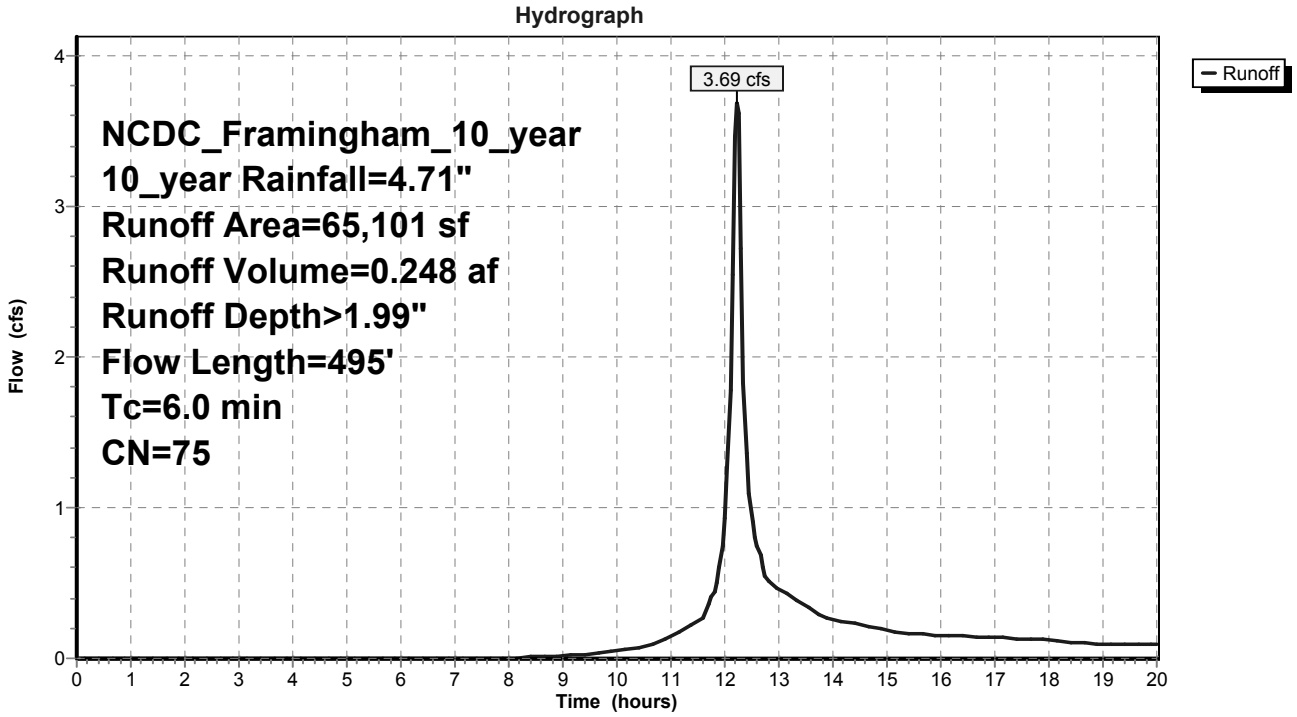
Runoff = 3.69 cfs @ 12.23 hrs, Volume= 0.248 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,550 | 39 | GRASS, 0% imperv, HSG A |
| * | 14,690 | 61 | GRASS, 0% imperv, HSG B |
| * | 733 | 98 | DECK, 100% imperv, HSG A |
| * | 379 | 98 | DECK, 100% imperv, HSG B |
| * | 23,694 | 98 | IMP, 100% imperv, HSG A |
| * | 7,512 | 98 | IMP, 100% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,345 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 194 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 65,101 | 75 | Weighted Average |
| | 65,101 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0185 | 1.12 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.8 | 280 | 0.0159 | 2.56 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.3 | 165 | 0.0281 | 1.17 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.8 | 495 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-1: (blank)



## Summary for Subcatchment RG-W-2: (blank)

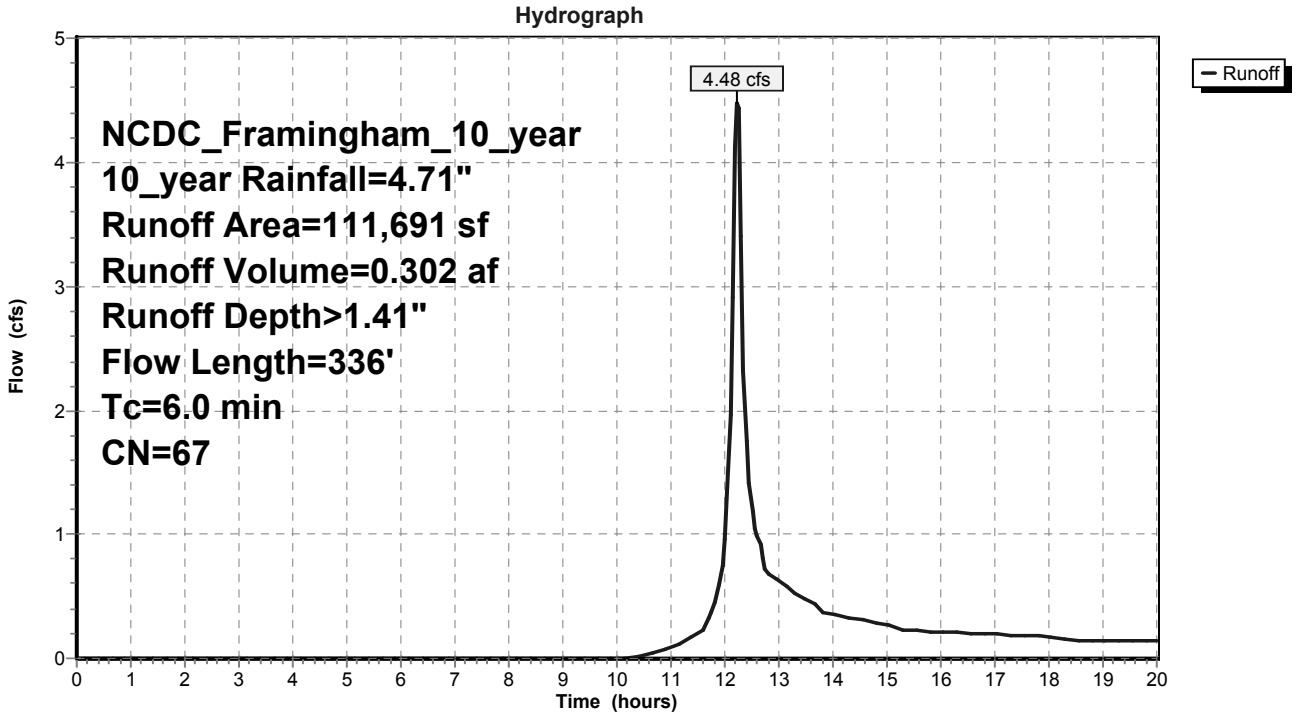
Runoff = 4.48 cfs @ 12.24 hrs, Volume= 0.302 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,818 | 39 | GRASS, 0% imperv, HSG A |
| * | 48,934 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,542 | 98 | DECK, 100% imperv, HSG A |
| * | 2,092 | 98 | DECK, 100% imperv, HSG B |
| * | 10,373 | 98 | IMP, 100% imperv, HSG A |
| * | 19,162 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG A |
| * | 864 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 111,691 | 67 | Weighted Average |
| | 111,691 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.2 | 33 | 0.0376 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 4 | 0.0215 | 0.73 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 13 | 0.0217 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.0 | 274 | 0.0124 | 2.26 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 11 | 0.1347 | 2.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 336 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-2: (blank)



## Summary for Subcatchment RG-W-3: (blank)

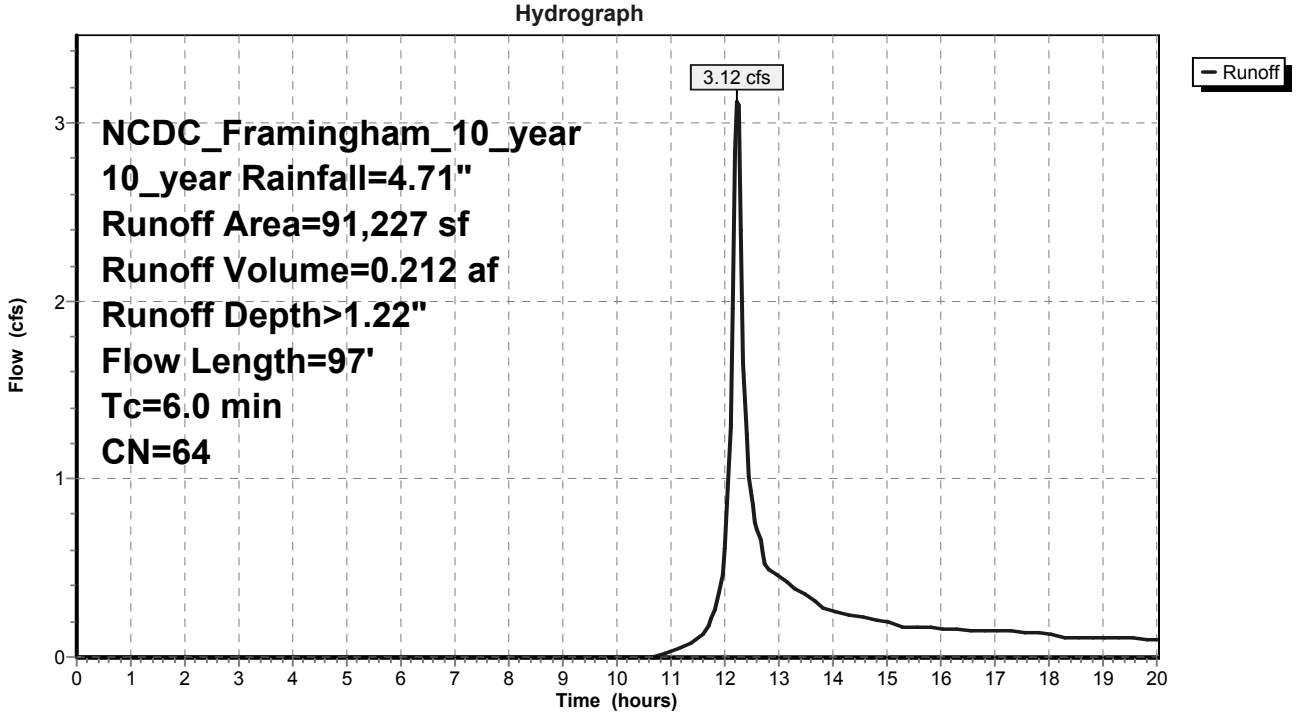
Runoff = 3.12 cfs @ 12.24 hrs, Volume= 0.212 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,998 | 39 | GRASS, 0% imperv, HSG A |
| * | 60,494 | 61 | GRASS, 0% imperv, HSG B |
| * | 751 | 98 | DECK, 100% imperv, HSG A |
| * | 1,912 | 98 | DECK, 100% imperv, HSG B |
| * | 11,505 | 98 | IMP, 100% imperv, HSG A |
| * | 1,575 | 98 | IMP, 100% imperv, HSG B |
| * | 12 | 98 | ROOF, 100% imperv, HSG B |
| * | 980 | 98 | SIDEWALK, 100% imperv, HSG A |
| | 91,227 | 64 | Weighted Average |
| | 91,227 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | 50 | 0.0296 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 47 | 0.2223 | 3.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.2 | 97 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3: (blank)



## Summary for Subcatchment RG-W-3A: (blank)

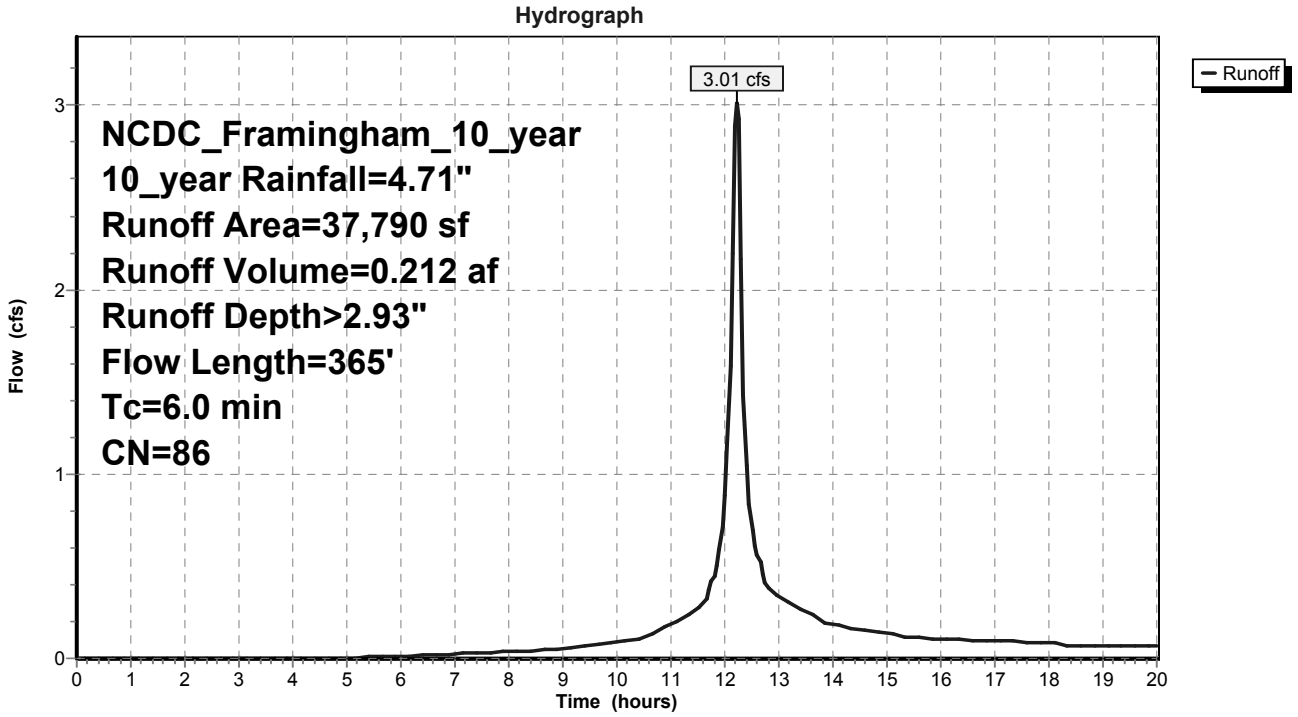
Runoff = 3.01 cfs @ 12.23 hrs, Volume= 0.212 af, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,877 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,646 | 61 | GRASS, 0% imperv, HSG B |
| * | 52 | 98 | DECK, 100% imperv, HSG A |
| * | 386 | 98 | DECK, 100% imperv, HSG B |
| * | 7,875 | 98 | IMP, 100% imperv, HSG A |
| * | 16,446 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| * | 340 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,166 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 37,790 | 86 | Weighted Average |
| | 37,790 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.4 | 50 | 0.0037 | 0.59 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.1 | 315 | 0.0153 | 2.51 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.5 | 365 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3A: (blank)



## Summary for Subcatchment RG-W-4: (blank)

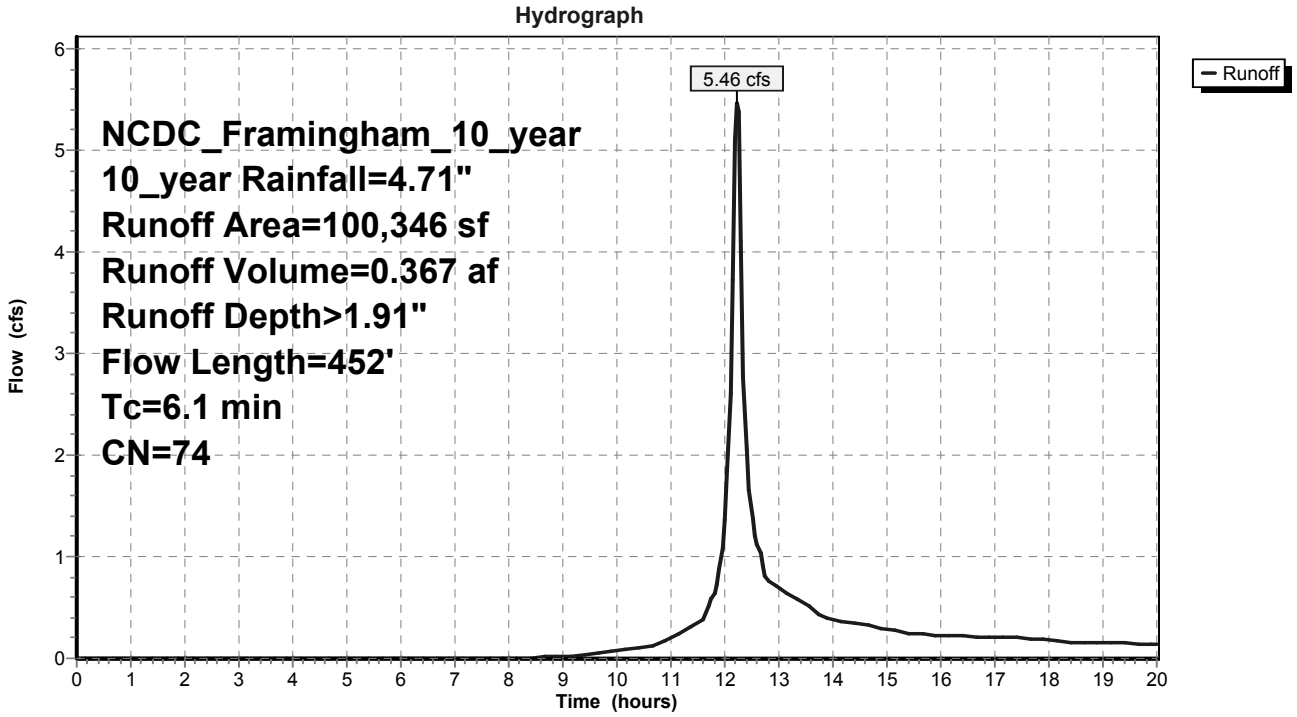
Runoff = 5.46 cfs @ 12.23 hrs, Volume= 0.367 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 820 | 39 | GRASS, 0% imperv, HSG A |
| * | 65,039 | 61 | GRASS, 0% imperv, HSG B |
| * | 108 | 98 | DECK, 100% imperv, HSG A |
| * | 657 | 98 | DECK, 100% imperv, HSG B |
| * | 19 | 98 | IMP, 100% imperv, HSG A |
| * | 32,102 | 98 | IMP, 100% imperv, HSG B |
| * | 76 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,525 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 100,346 | 74 | Weighted Average |
| | 100,346 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0228 | 1.22 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 127 | 0.0184 | 2.76 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.6 | 275 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.1 | 452 | Total | | | |

## Subcatchment RG-W-4: (blank)



## Summary for Subcatchment RG-W-5: (blank)

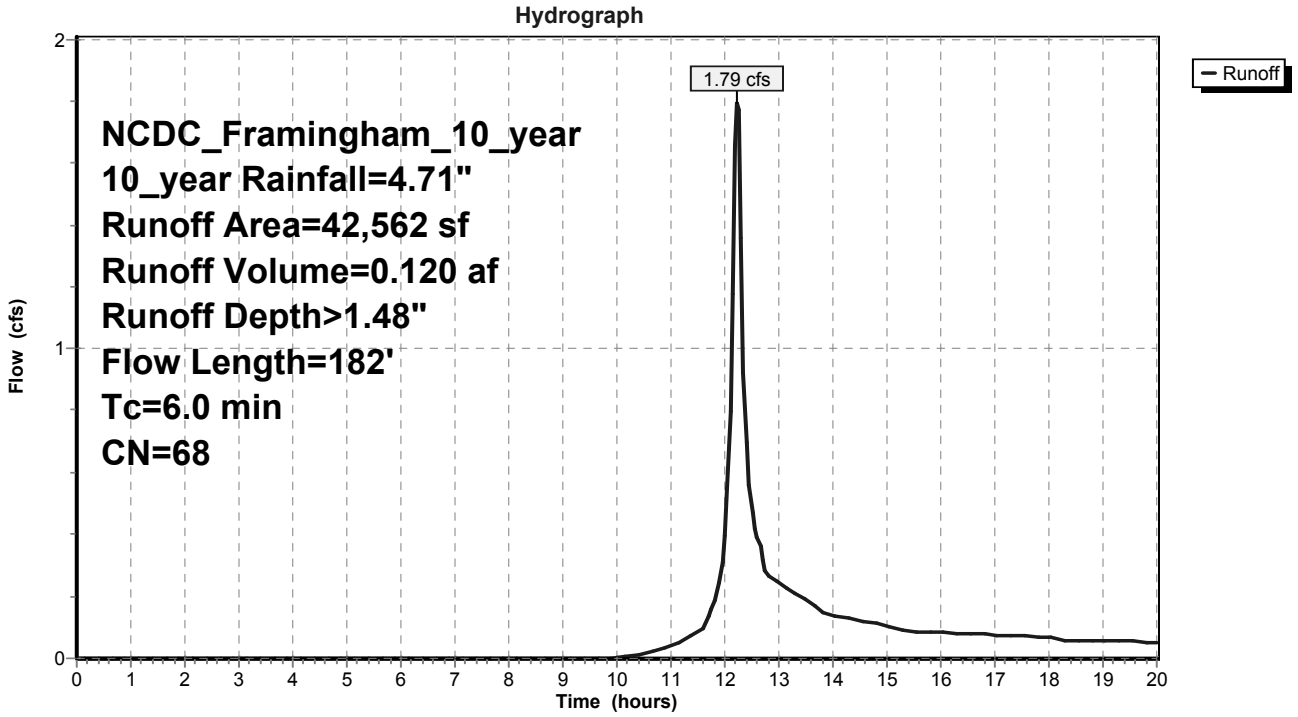
Runoff = 1.79 cfs @ 12.24 hrs, Volume= 0.120 af, Depth> 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 723 | 39 | GRASS, 0% imperv, HSG A |
| * | 31,185 | 61 | GRASS, 0% imperv, HSG B |
| * | 704 | 30 | WOODS, 0% imperv, HSG A |
| * | 126 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 219 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,120 | 98 | DECK, 100% imperv, HSG B |
| * | 205 | 98 | IMP, 100% imperv, HSG A |
| * | 7,984 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| | 42,562 | 68 | Weighted Average |
| | 42,227 | | 99.21% Pervious Area |
| | 335 | | 0.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0413 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 38 | 0.0260 | 1.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 24 | 0.0354 | 3.82 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 31 | 0.0362 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 11 | 0.0429 | 4.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.1361 | 2.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 182 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-5: (blank)



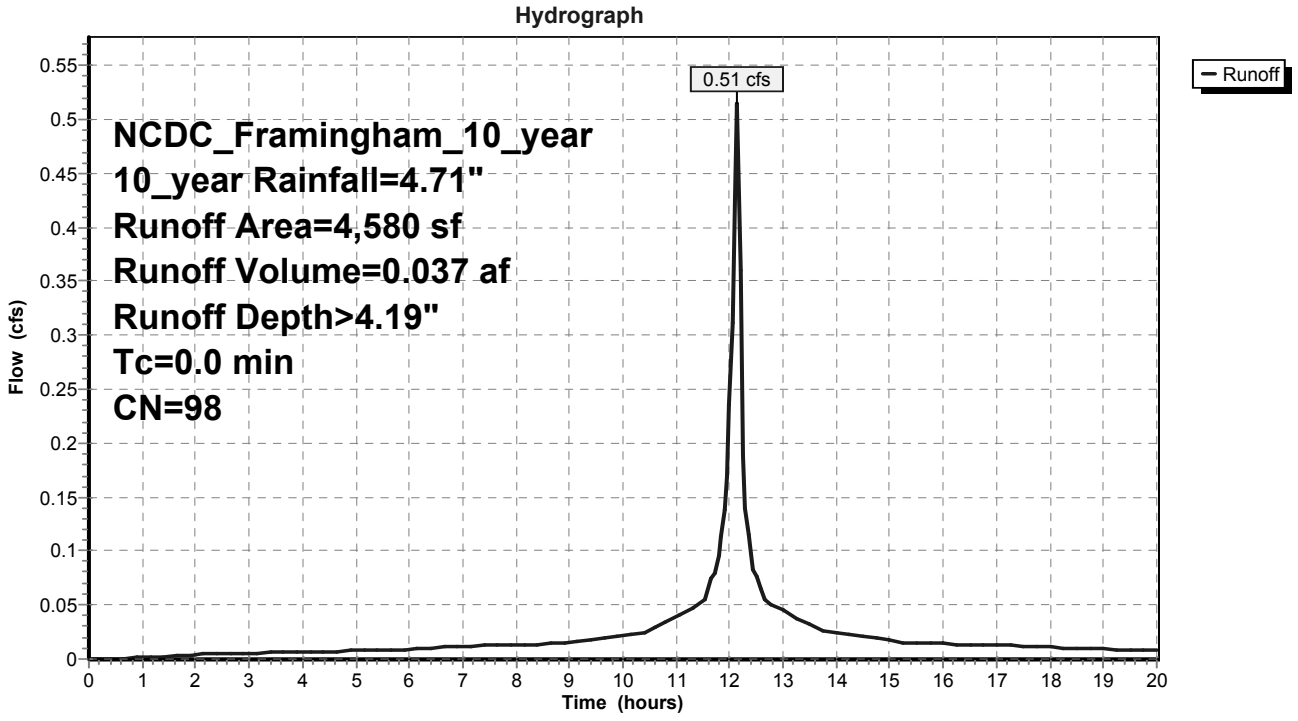
## Summary for Subcatchment ROOF-1: (blank)

Runoff = 0.51 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,478 | 98 | ROOF, 100% imperv, HSG A |
| * | 3,102 | 98 | ROOF, 100% imperv, HSG B |
| | 4,580 | 98 | Weighted Average |
| | 4,580 | | 100.00% Pervious Area |

## Subcatchment ROOF-1: (blank)



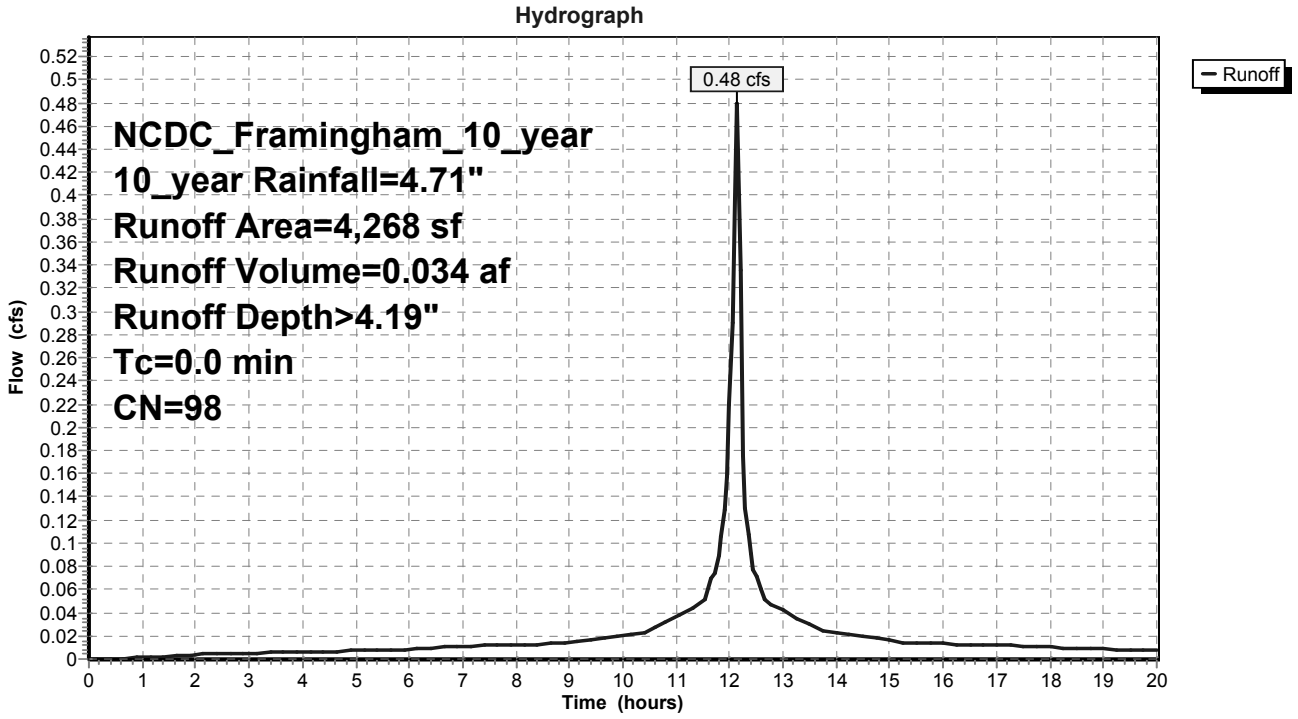
## Summary for Subcatchment ROOF-10: (blank)

Runoff = 0.48 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 3,776 | 98 | ROOF, 100% imperv, HSG B |
| | 4,268 | 98 | Weighted Average |
| | 4,268 | | 100.00% Pervious Area |

## Subcatchment ROOF-10: (blank)



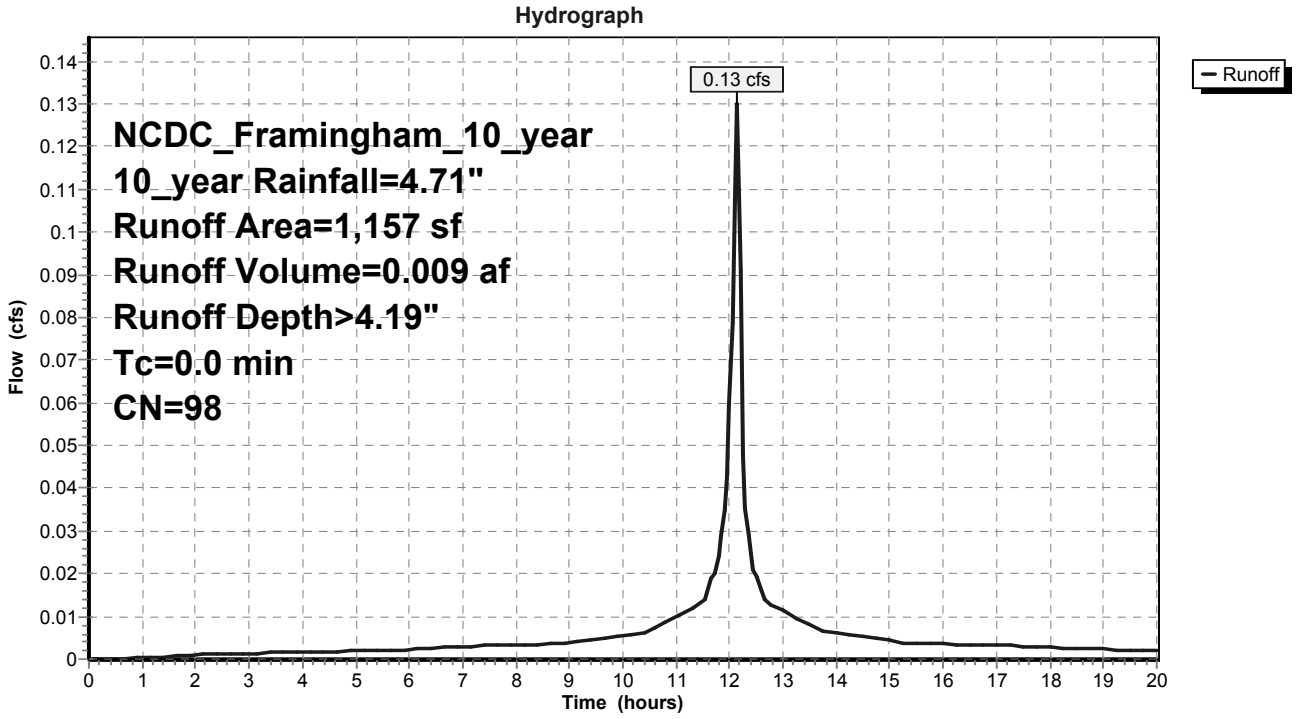
## Summary for Subcatchment ROOF-100: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-100: (blank)



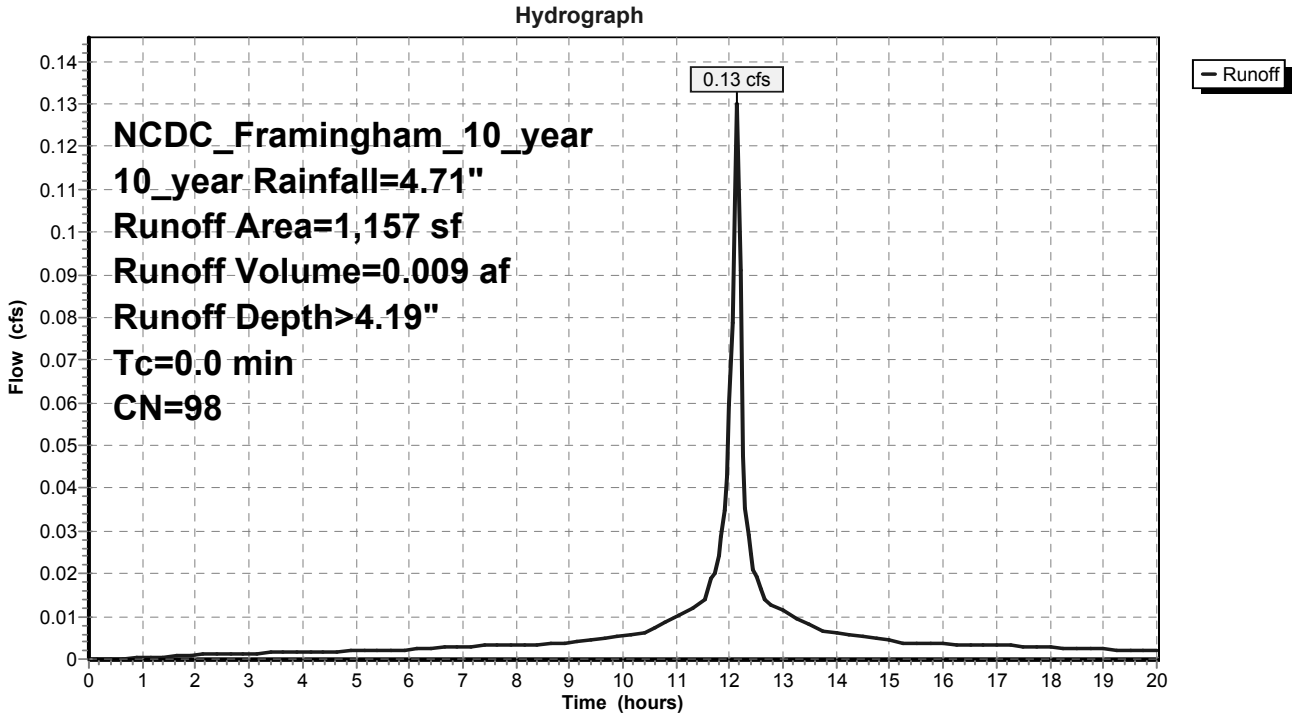
## Summary for Subcatchment ROOF-101: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-101: (blank)



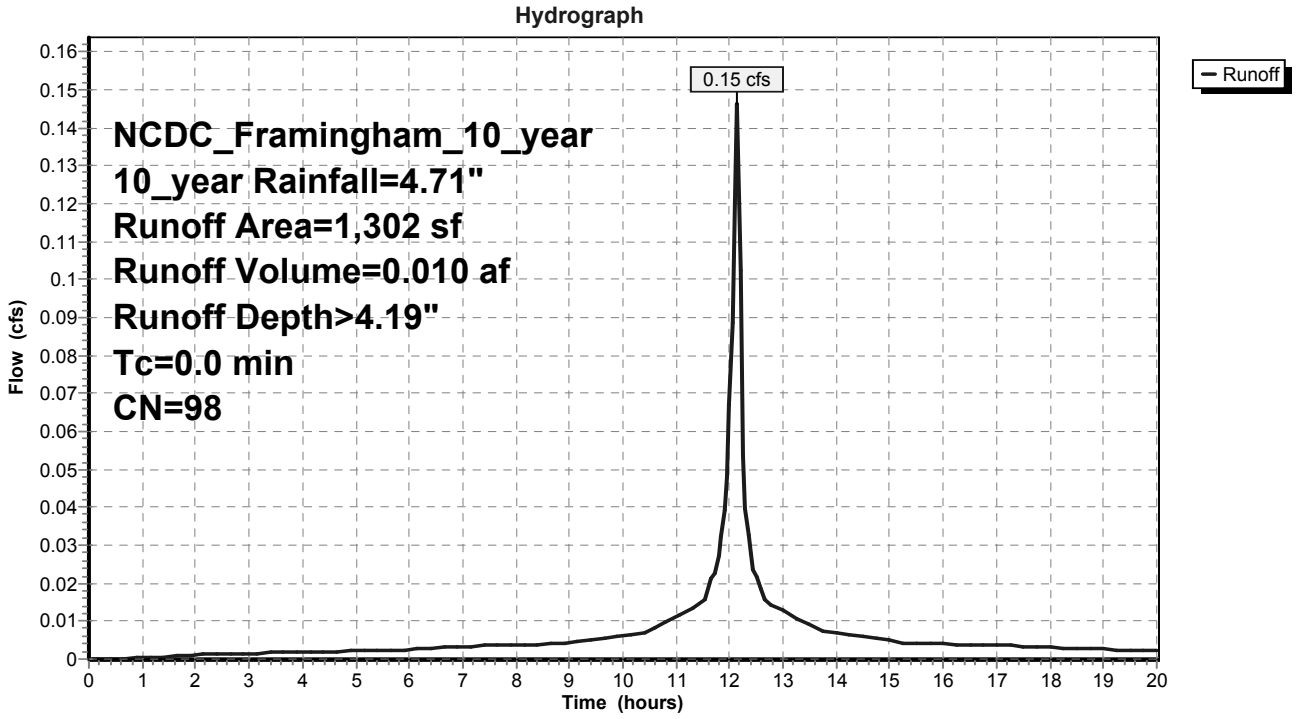
## Summary for Subcatchment ROOF-102: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-102: (blank)



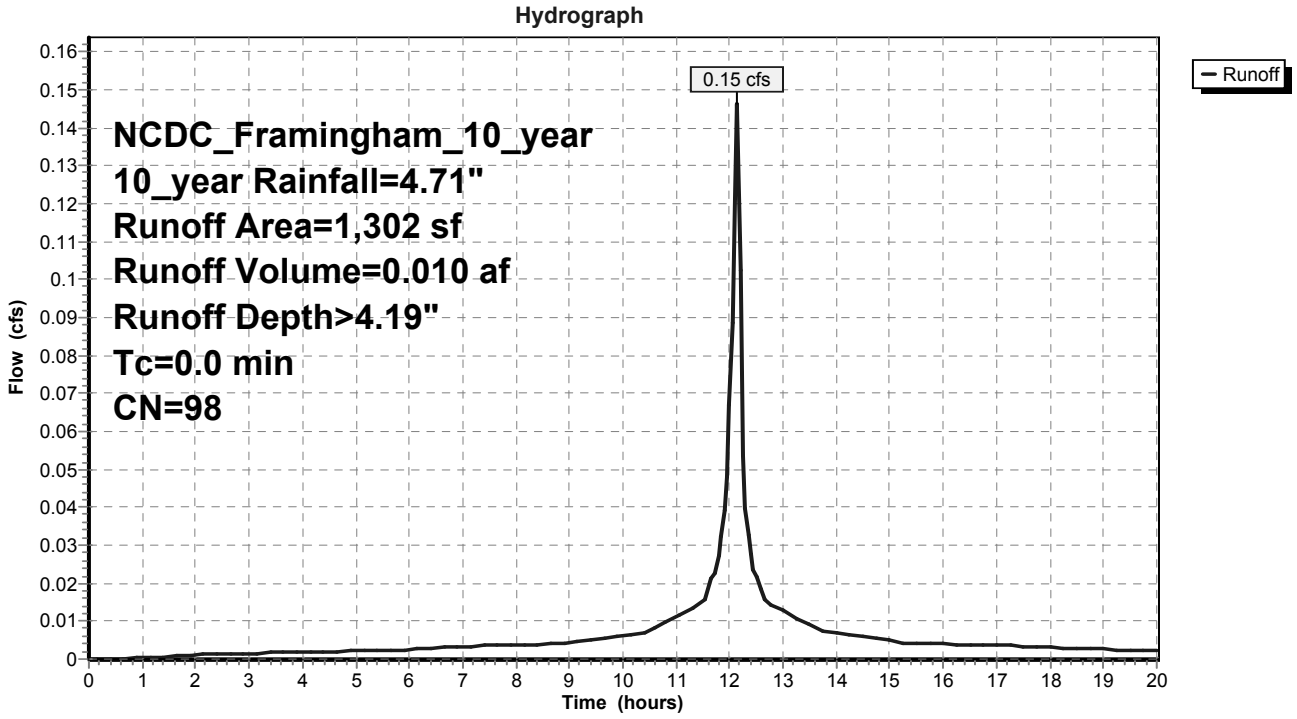
## Summary for Subcatchment ROOF-103: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-103: (blank)



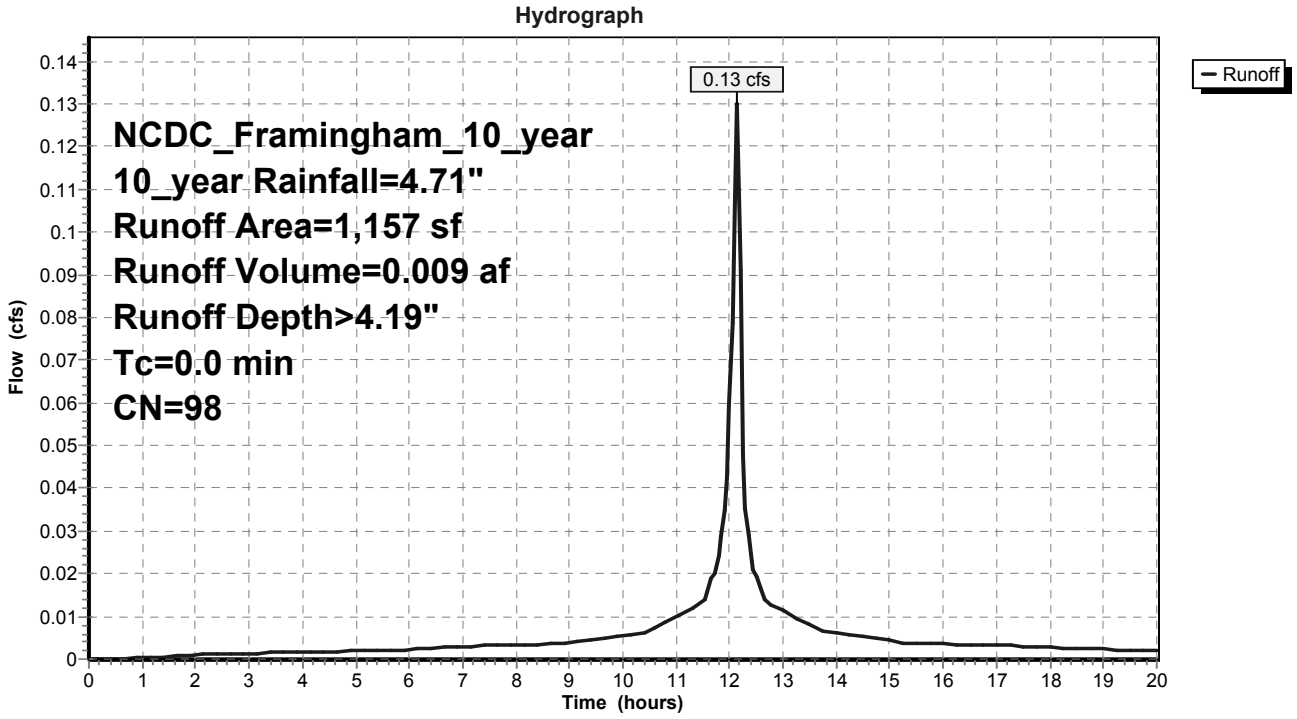
## Summary for Subcatchment ROOF-104: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-104: (blank)



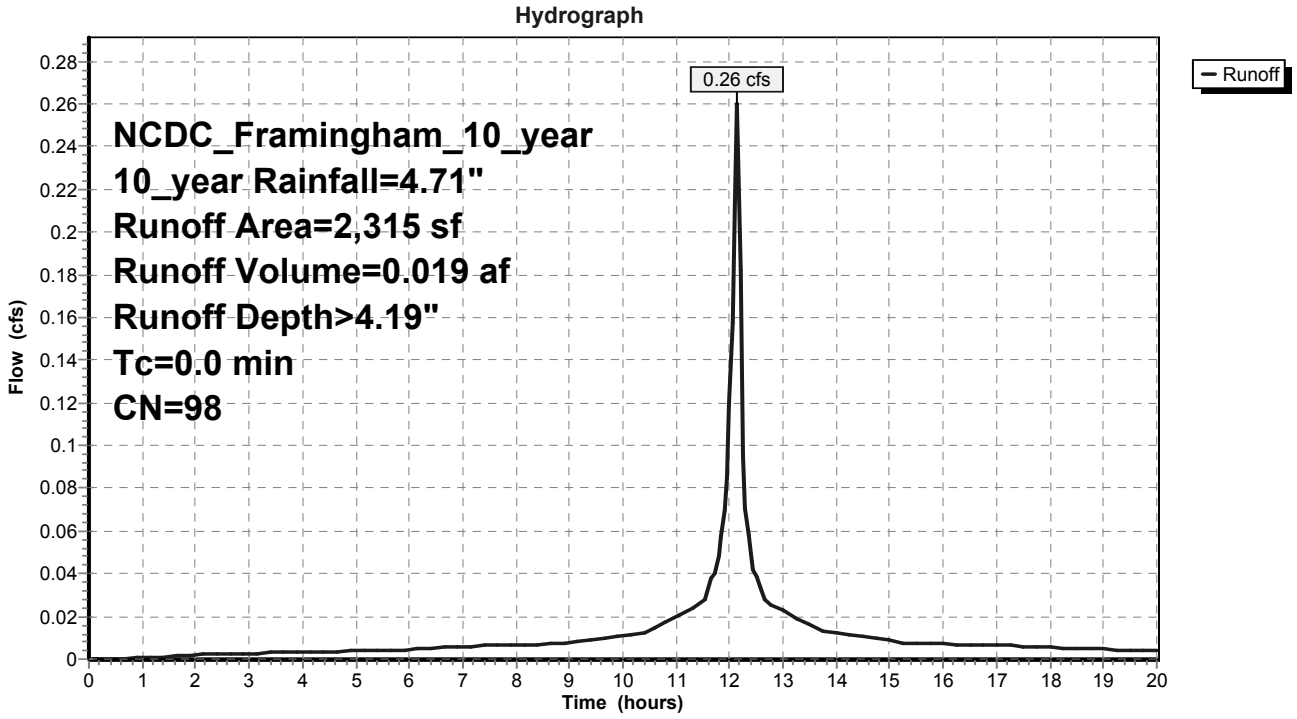
## Summary for Subcatchment ROOF-105: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-105: (blank)



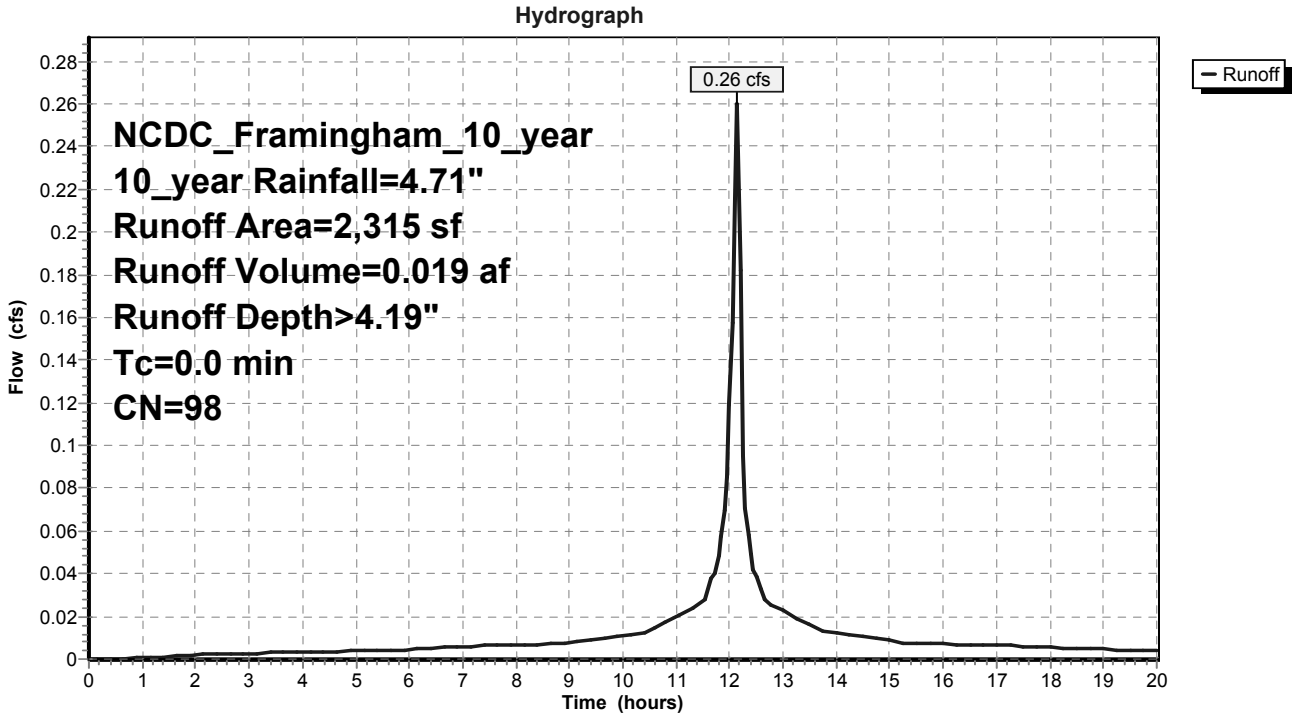
## Summary for Subcatchment ROOF-106: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-106: (blank)



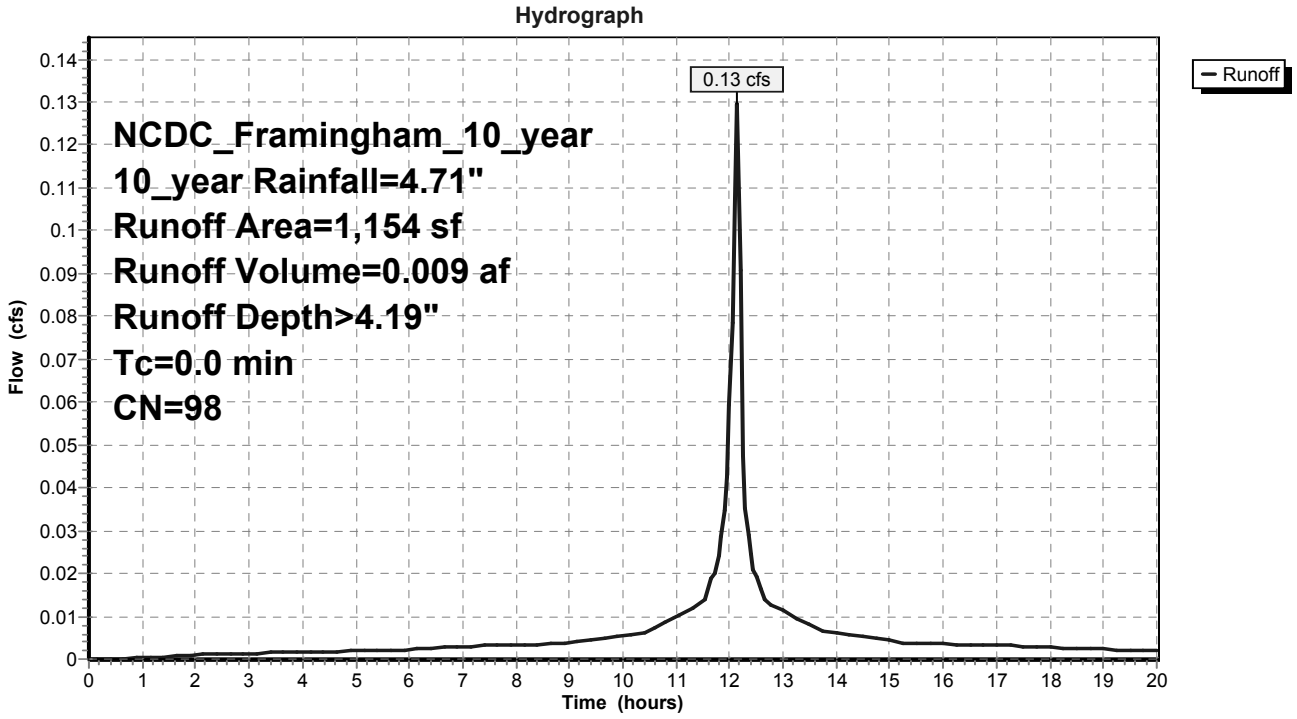
## Summary for Subcatchment ROOF-107: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,154 | 98 | ROOF, 100% imperv, HSG B |
| | 1,154 | | 100.00% Pervious Area |

## Subcatchment ROOF-107: (blank)



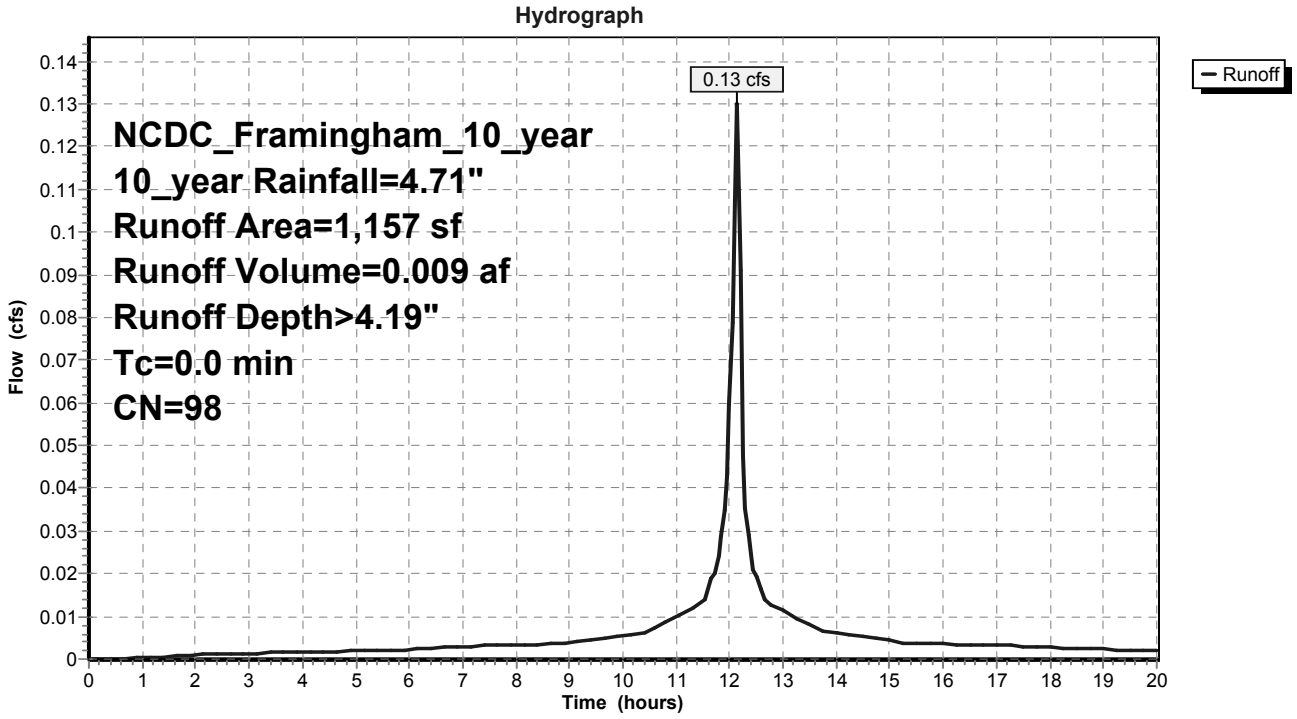
## Summary for Subcatchment ROOF-108: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-108: (blank)



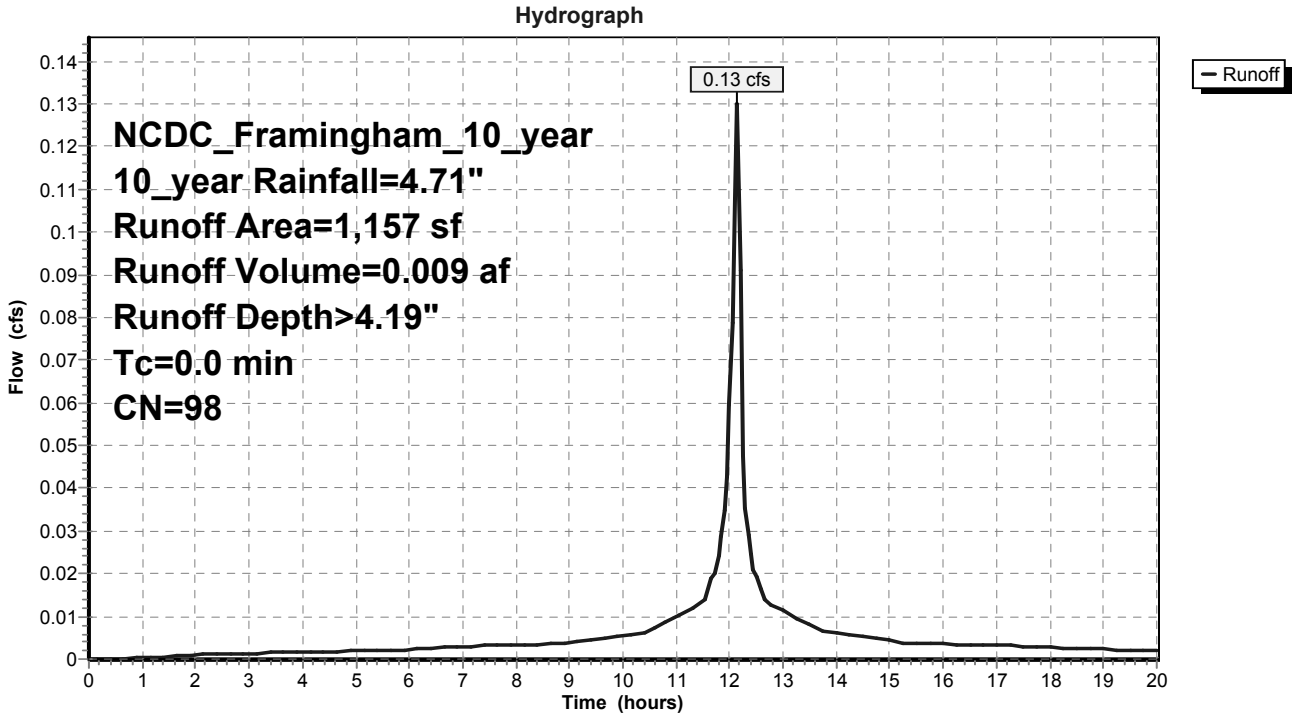
## Summary for Subcatchment ROOF-109: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-109: (blank)



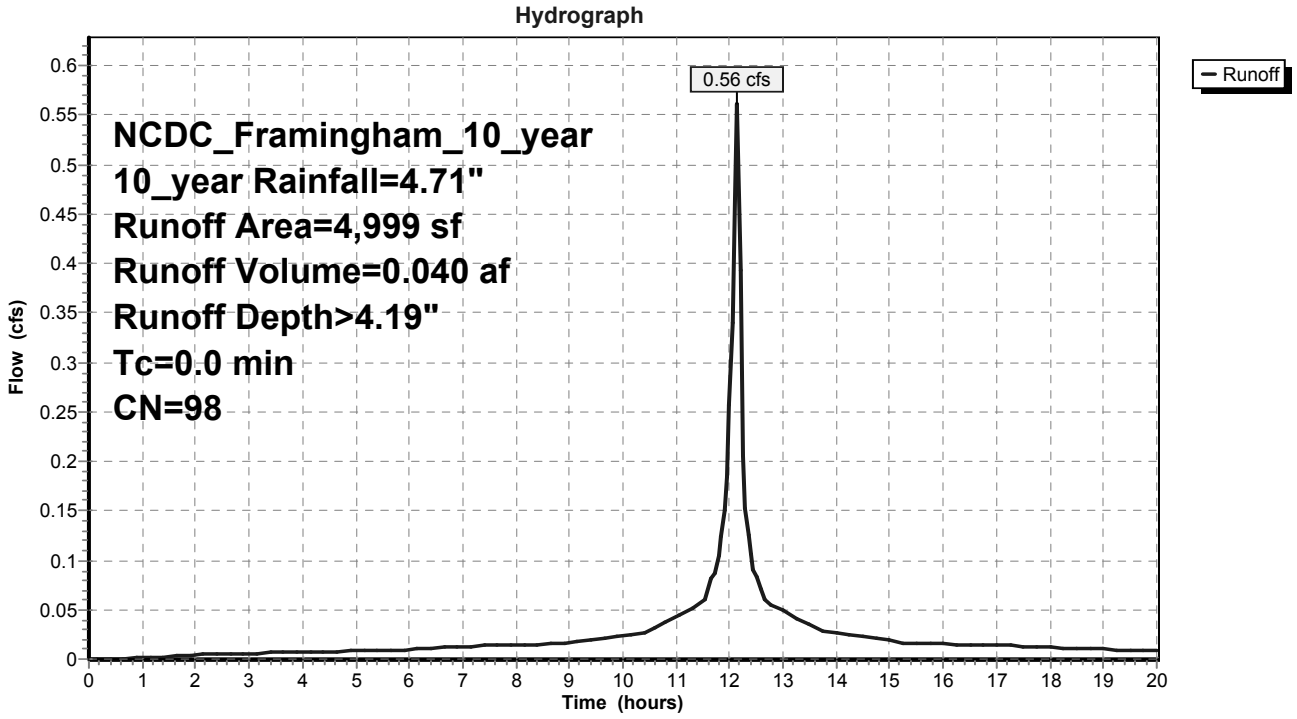
## Summary for Subcatchment ROOF-11: (blank)

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.040 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-11: (blank)



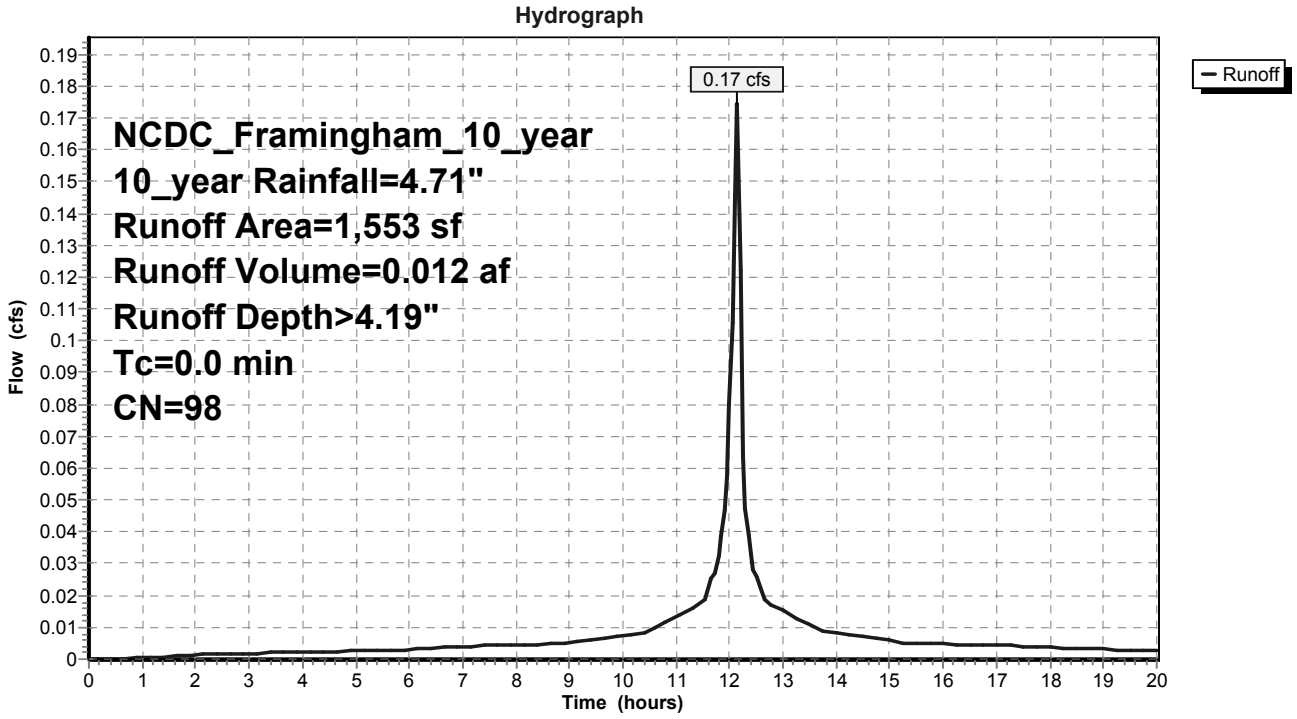
## Summary for Subcatchment ROOF-110: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-110: (blank)



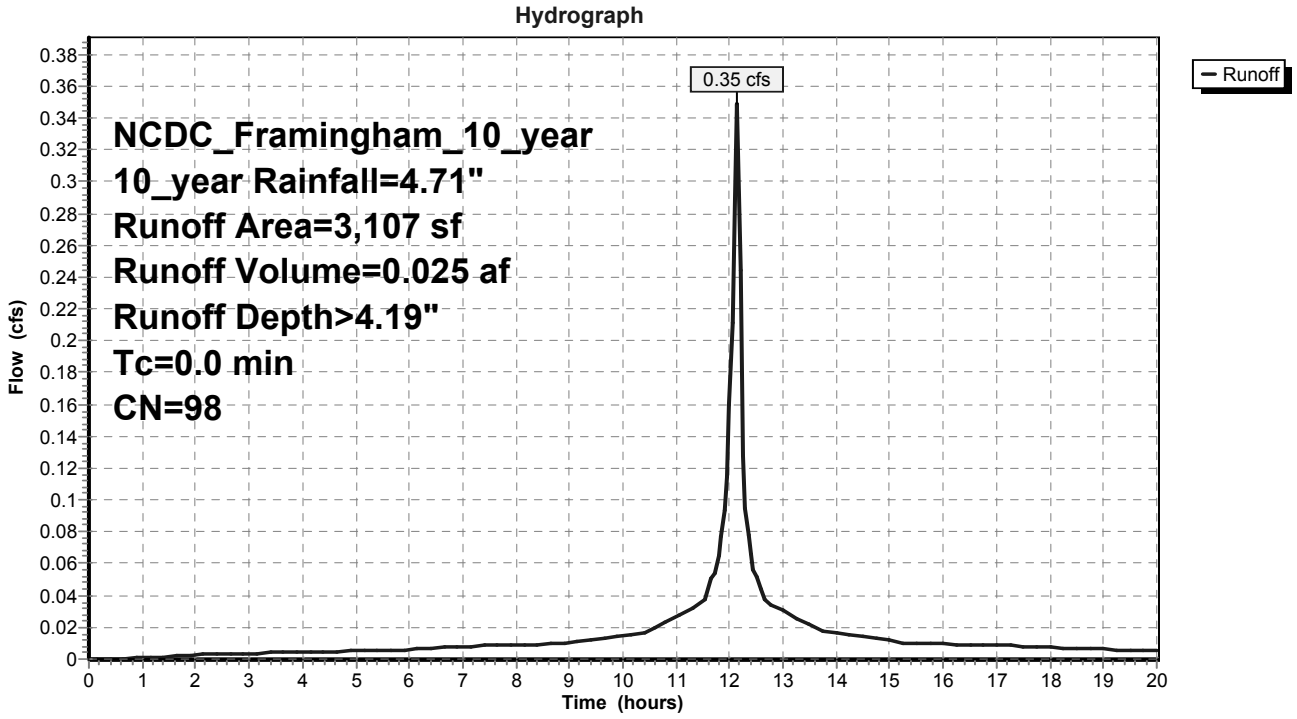
## Summary for Subcatchment ROOF-111: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.025 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-111: (blank)



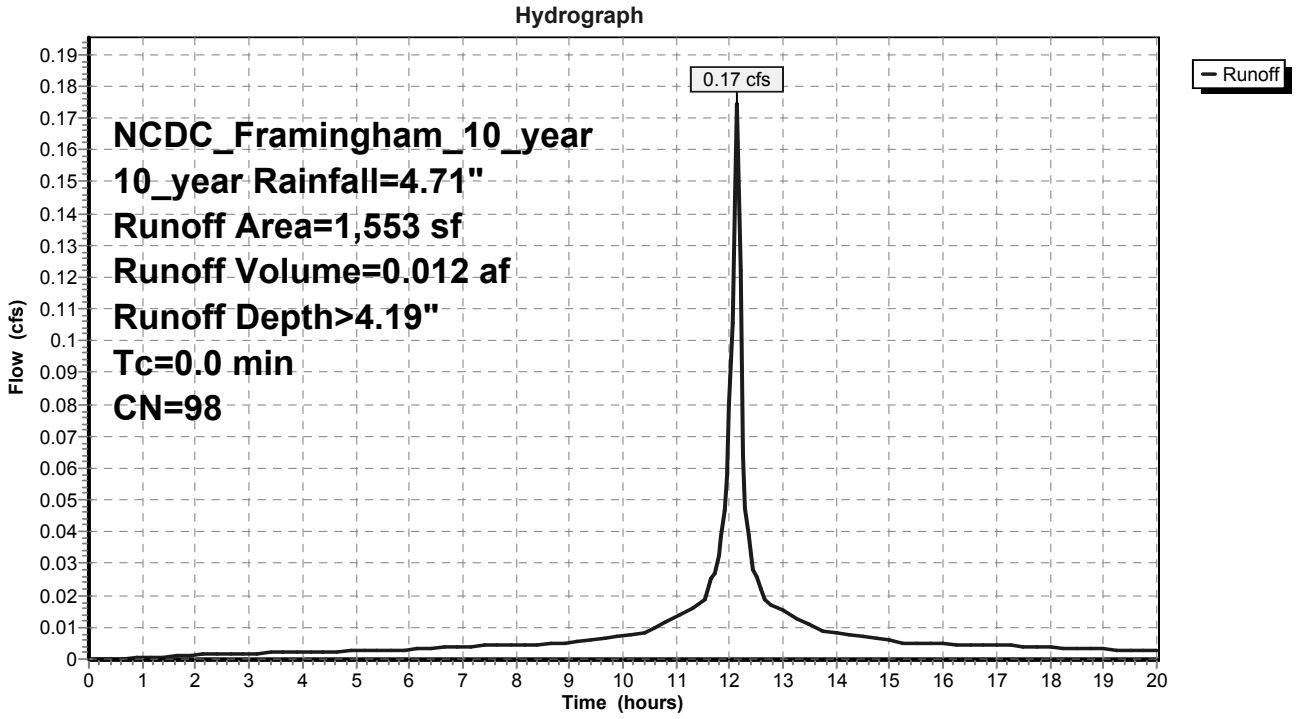
## Summary for Subcatchment ROOF-112: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-112: (blank)



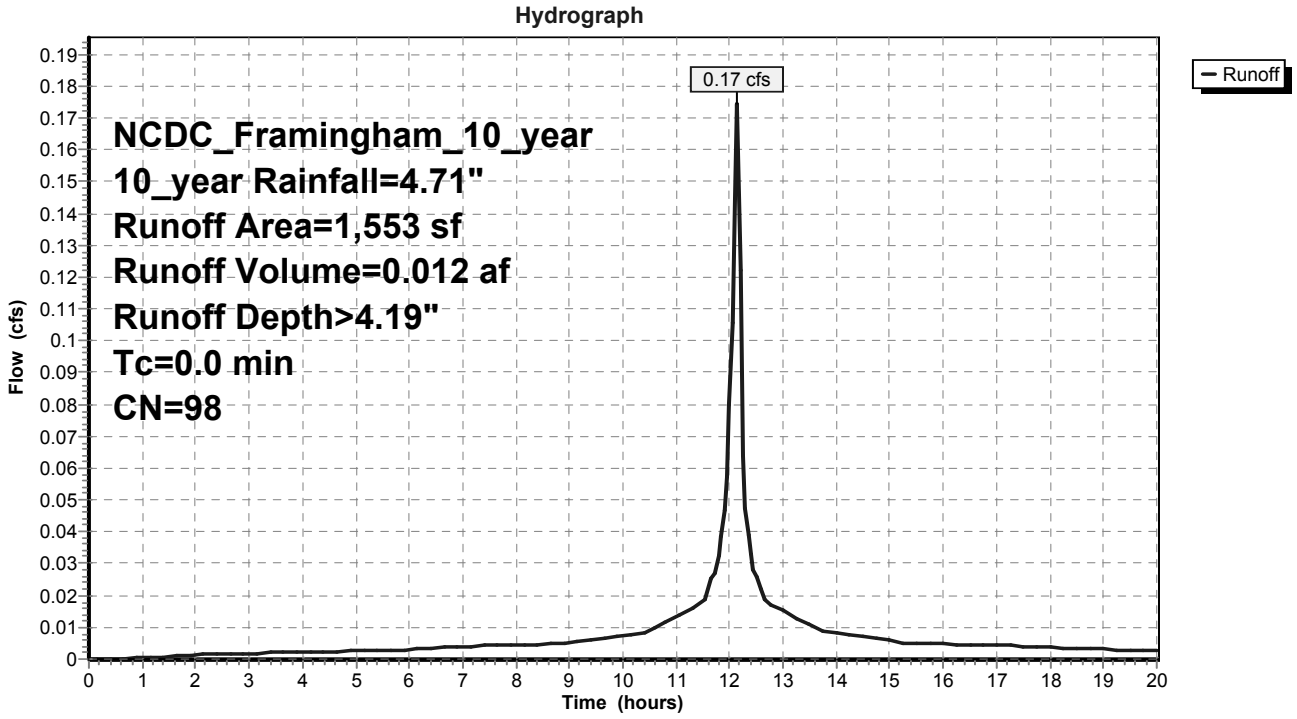
## Summary for Subcatchment ROOF-113: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-113: (blank)



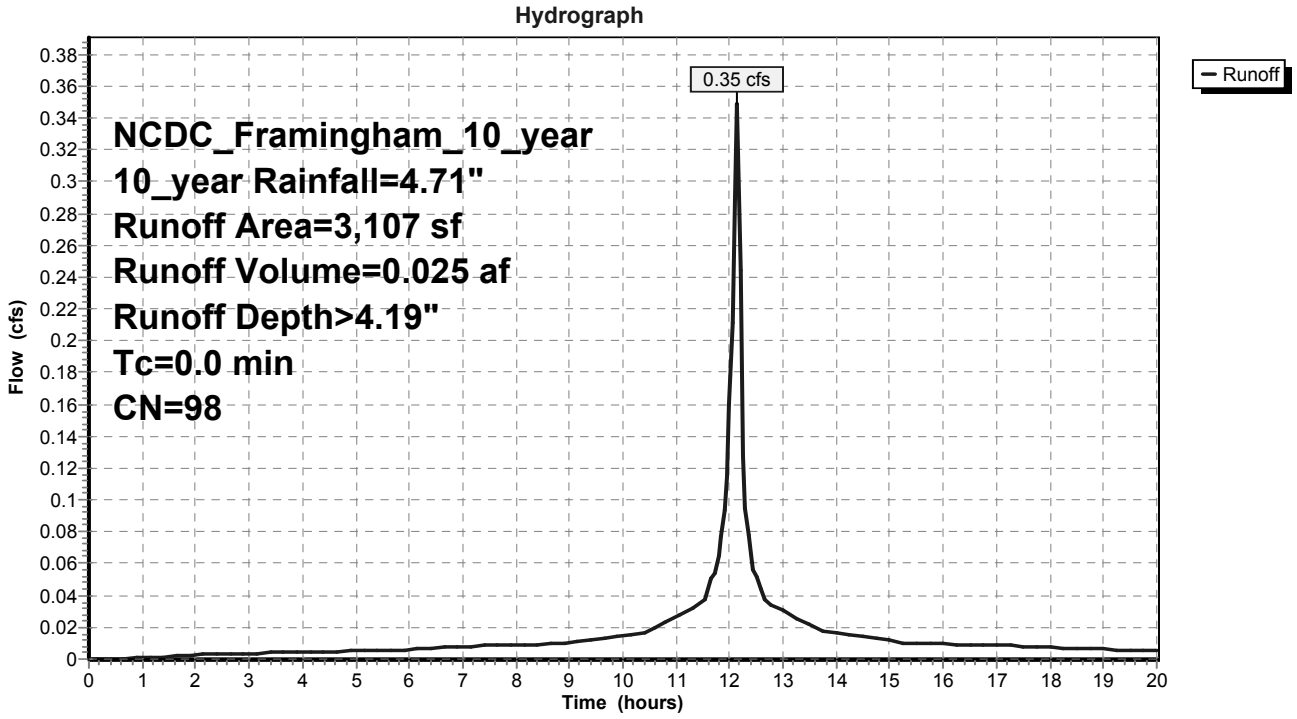
## Summary for Subcatchment ROOF-114: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.025 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-114: (blank)



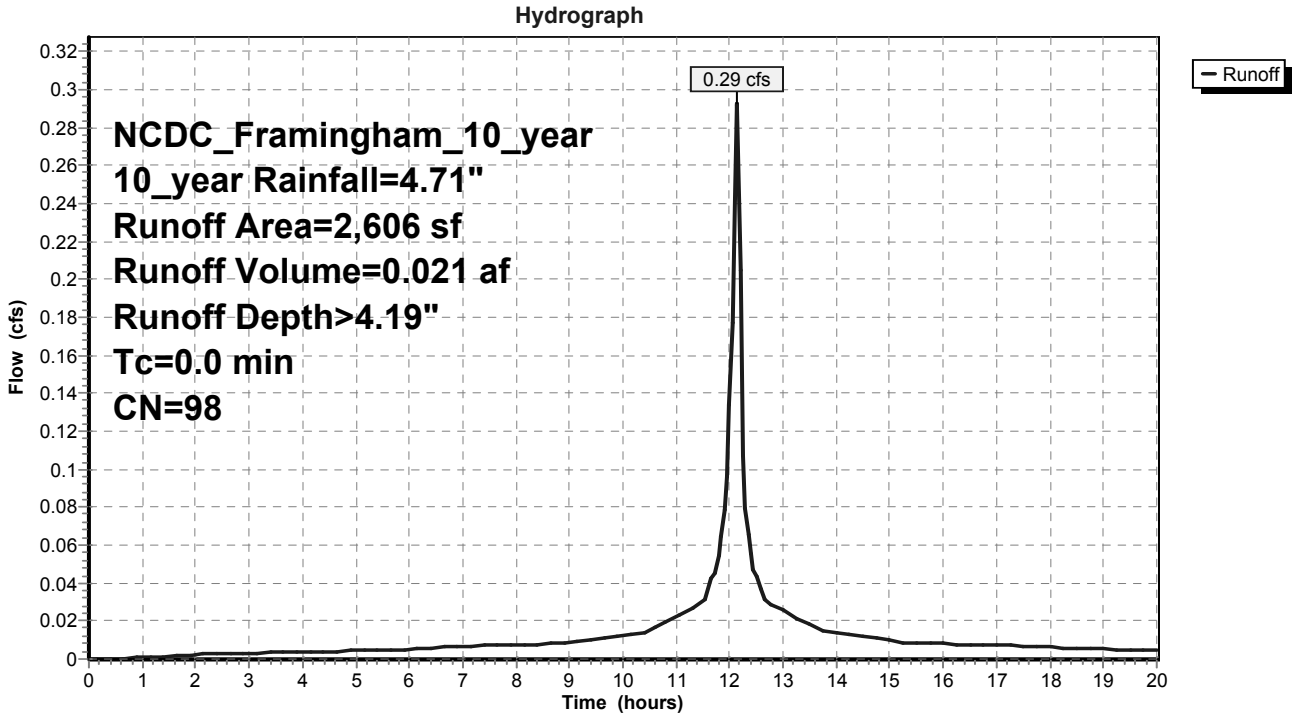
## Summary for Subcatchment ROOF-115: (blank)

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,602 | 98 | ROOF, 100% imperv, HSG B |
| | 2,606 | 98 | Weighted Average |
| | 2,606 | | 100.00% Pervious Area |

## Subcatchment ROOF-115: (blank)



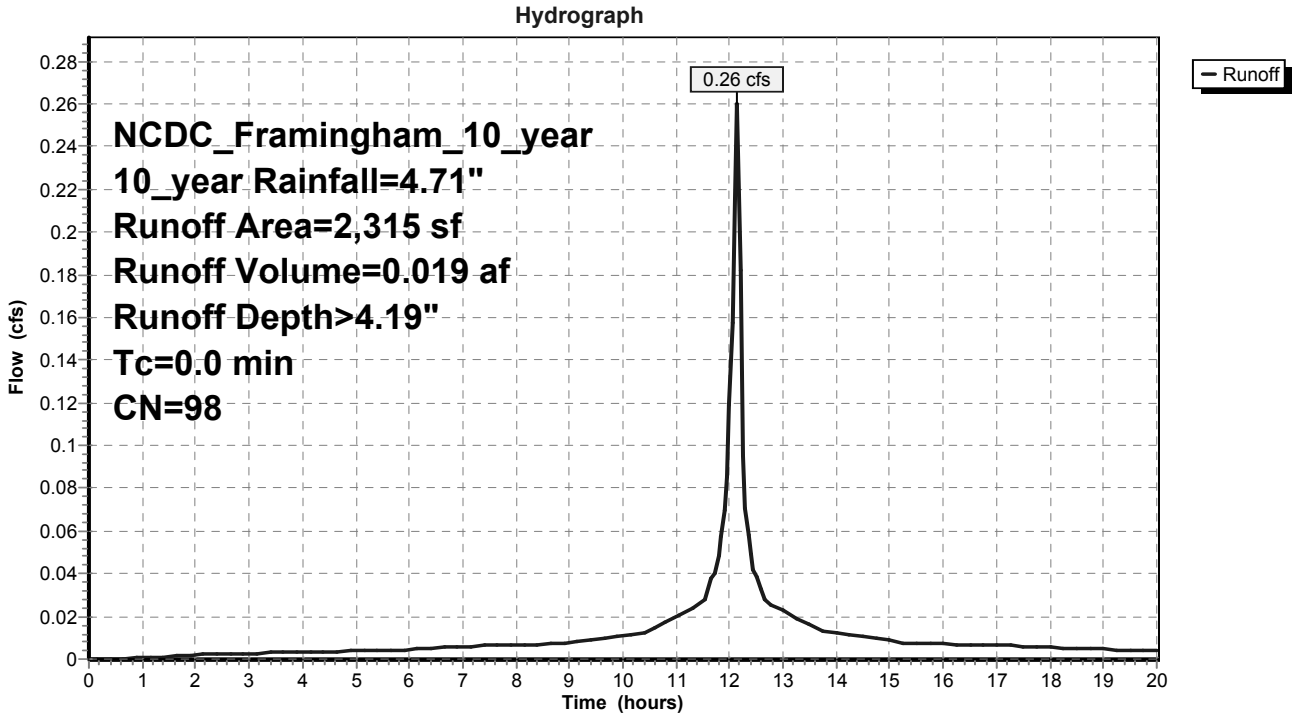
## Summary for Subcatchment ROOF-117: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-117: (blank)



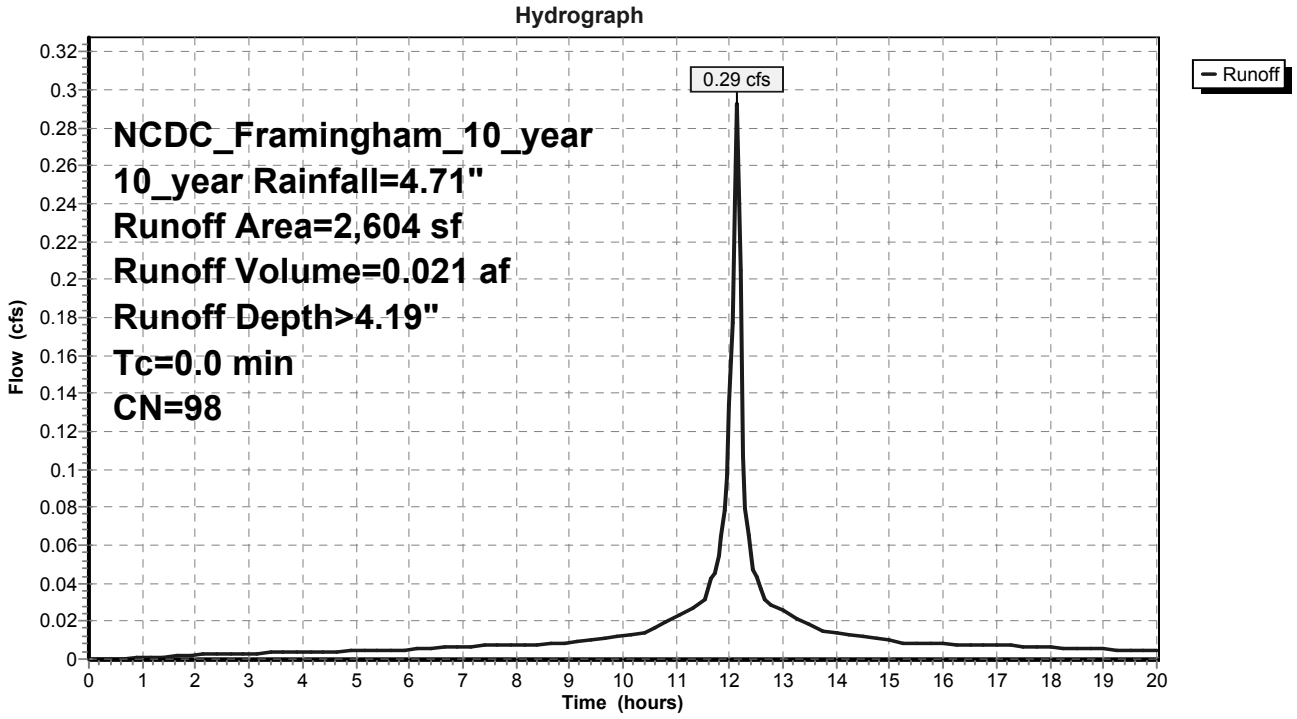
## Summary for Subcatchment ROOF-118: (blank)

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-118: (blank)



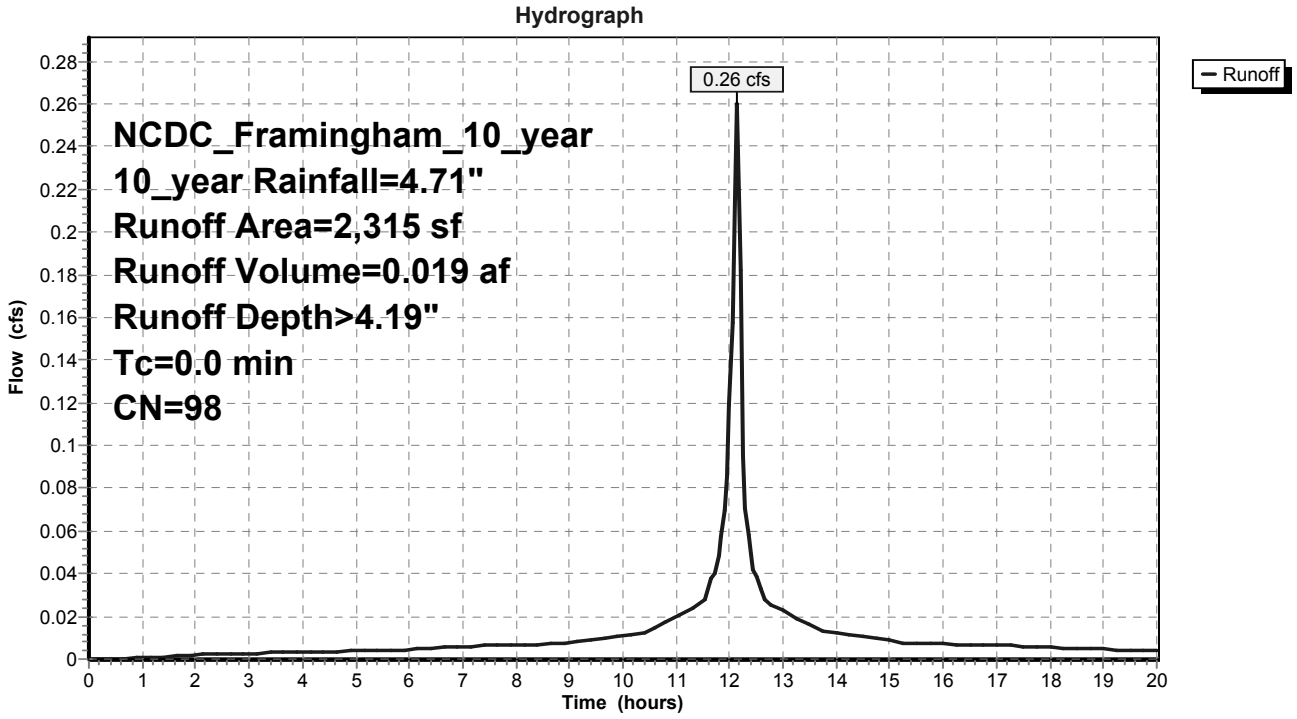
## Summary for Subcatchment ROOF-119: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-119: (blank)



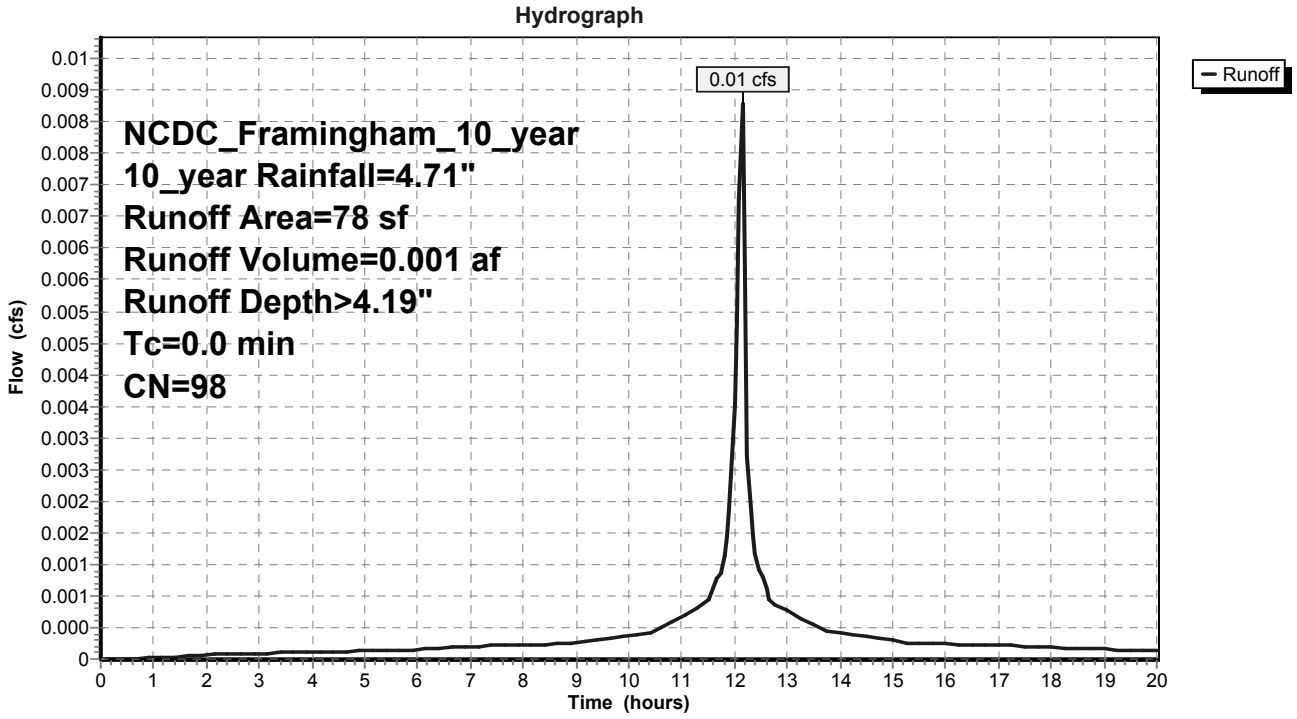
## Summary for Subcatchment ROOF-11MAIL: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-11MAIL: (blank)



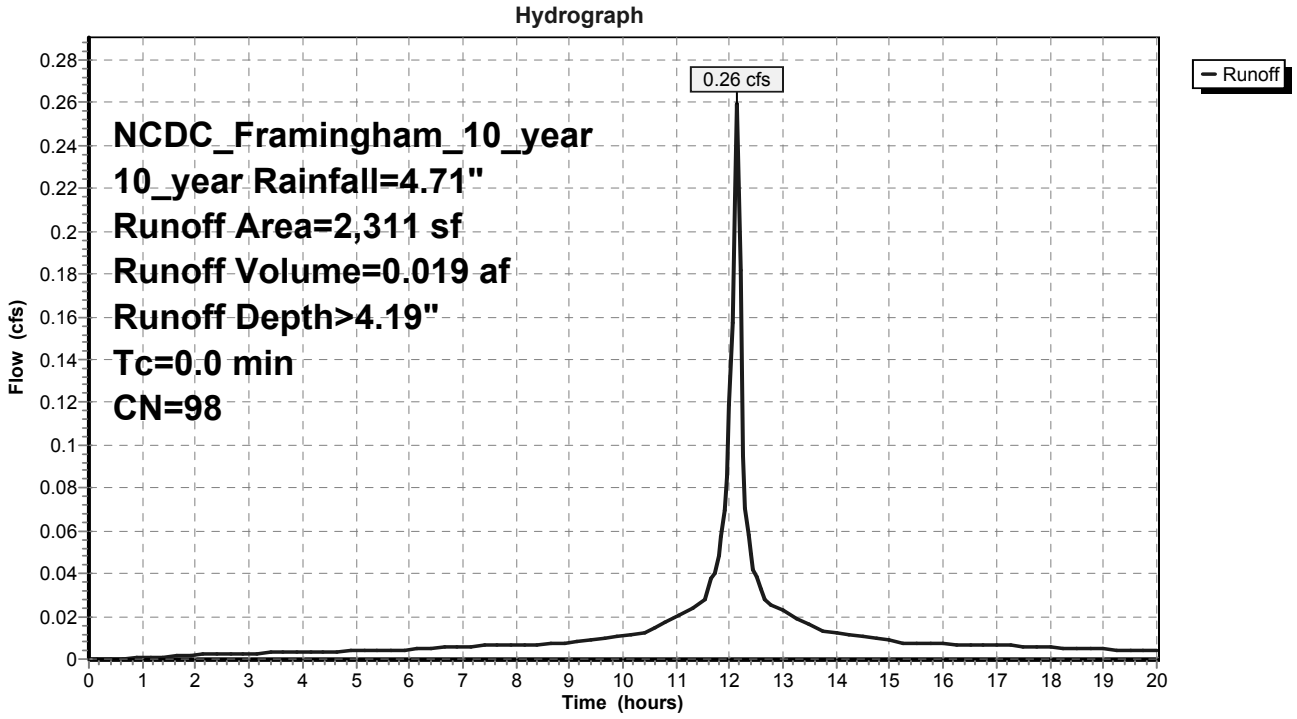
## Summary for Subcatchment ROOF-12: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,311 | 98 | ROOF, 100% imperv, HSG B |
| | 2,311 | | 100.00% Pervious Area |

## Subcatchment ROOF-12: (blank)



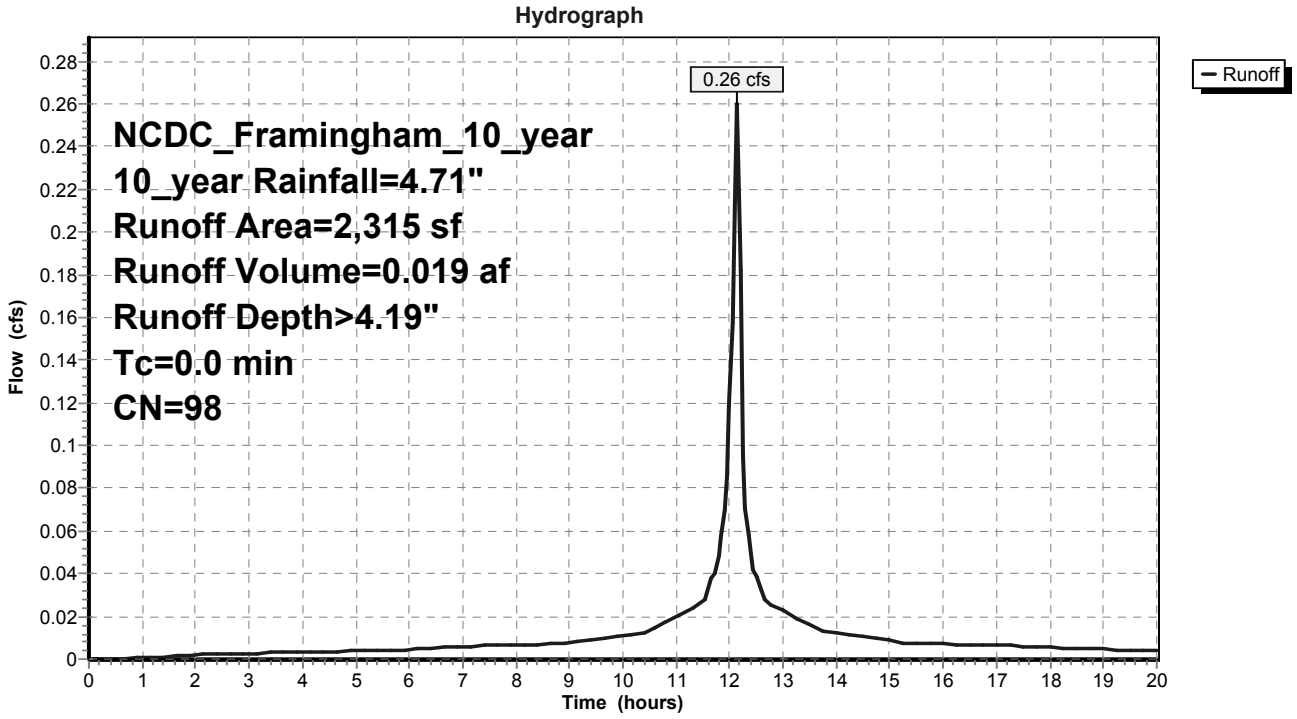
## Summary for Subcatchment ROOF-120: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-120: (blank)



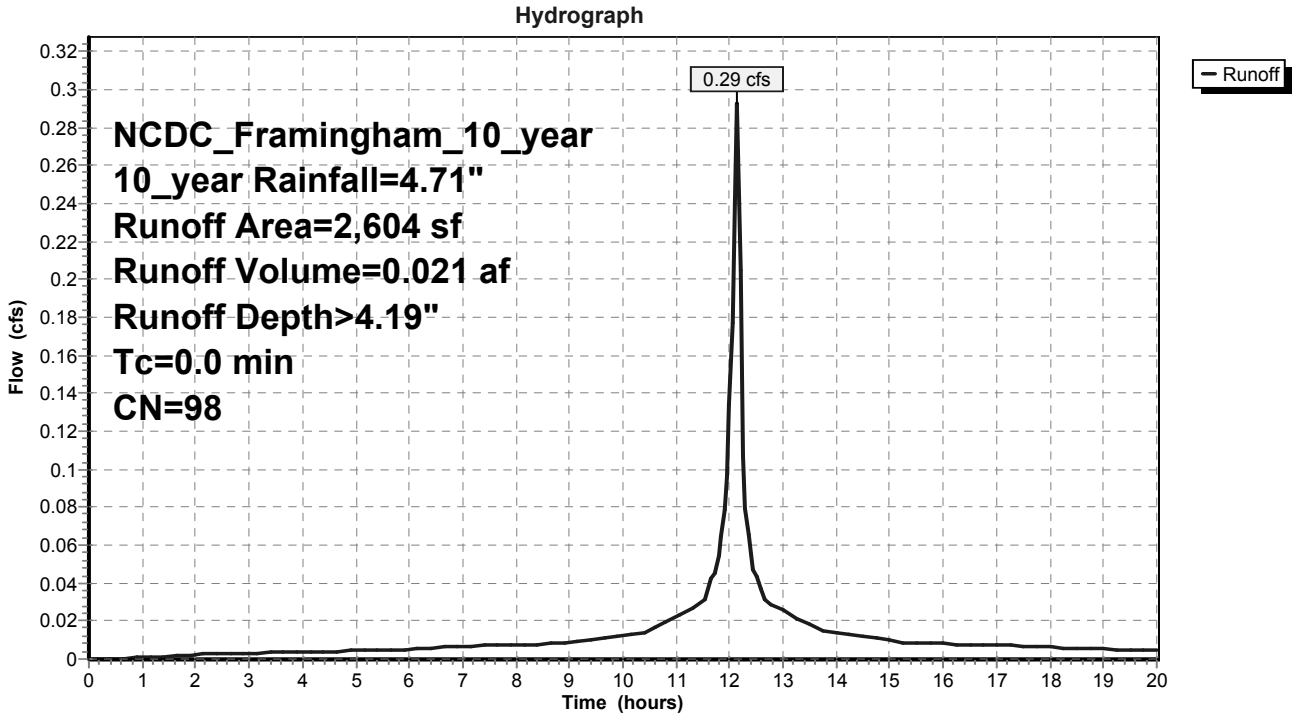
## Summary for Subcatchment ROOF-121: (blank)

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 138 | 98 | ROOF, 100% imperv, HSG A |
| * | 2,467 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-121: (blank)



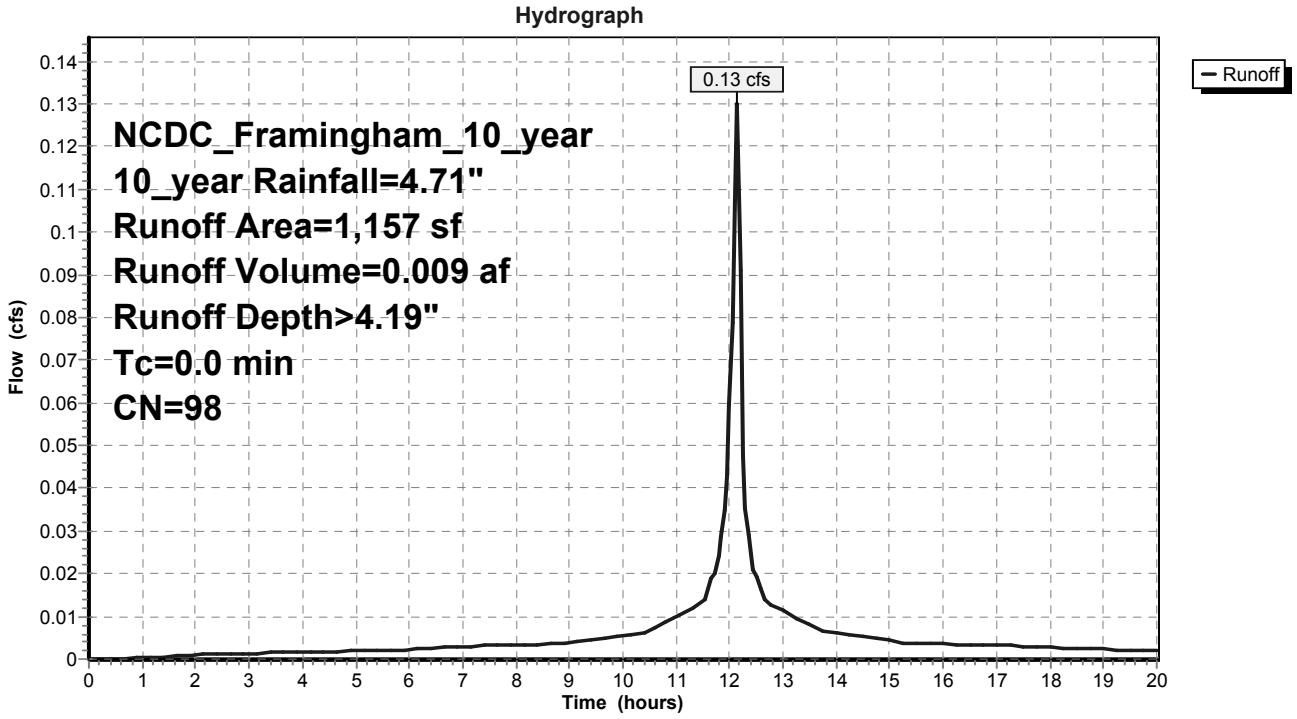
## Summary for Subcatchment ROOF-122: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-122: (blank)



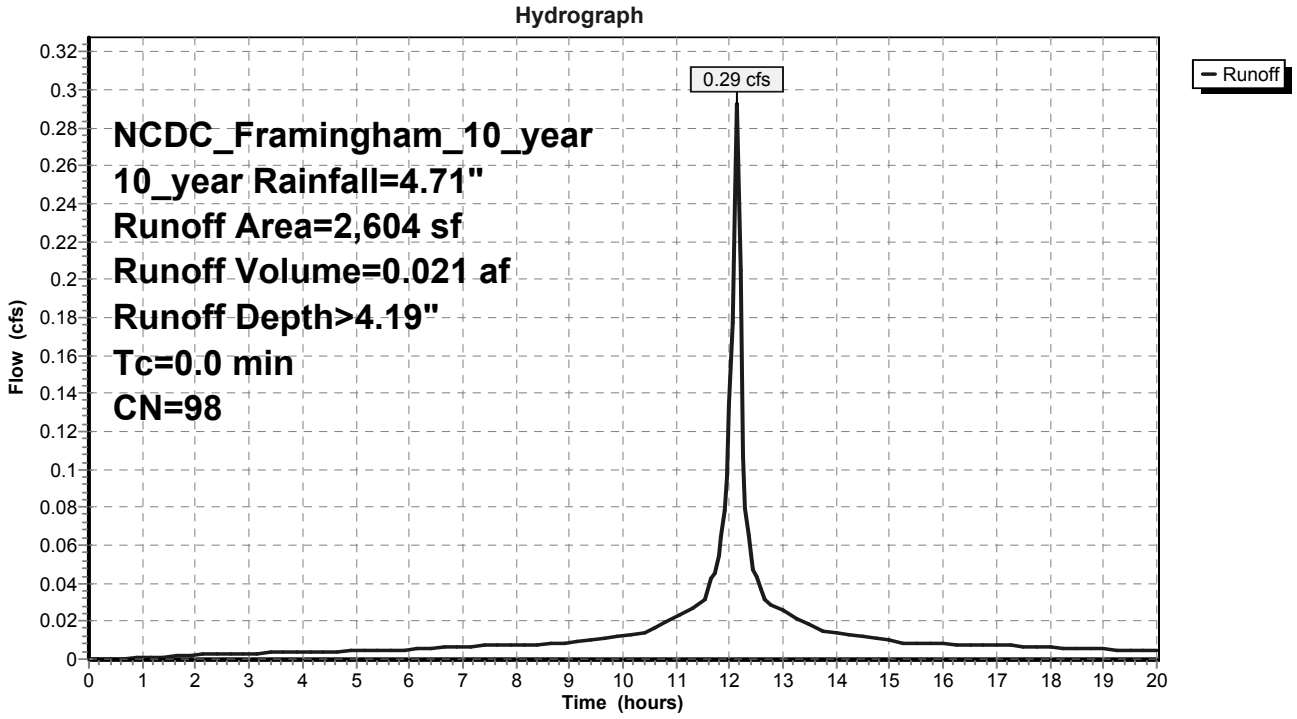
## Summary for Subcatchment ROOF-123: (blank)

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG A |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-123: (blank)



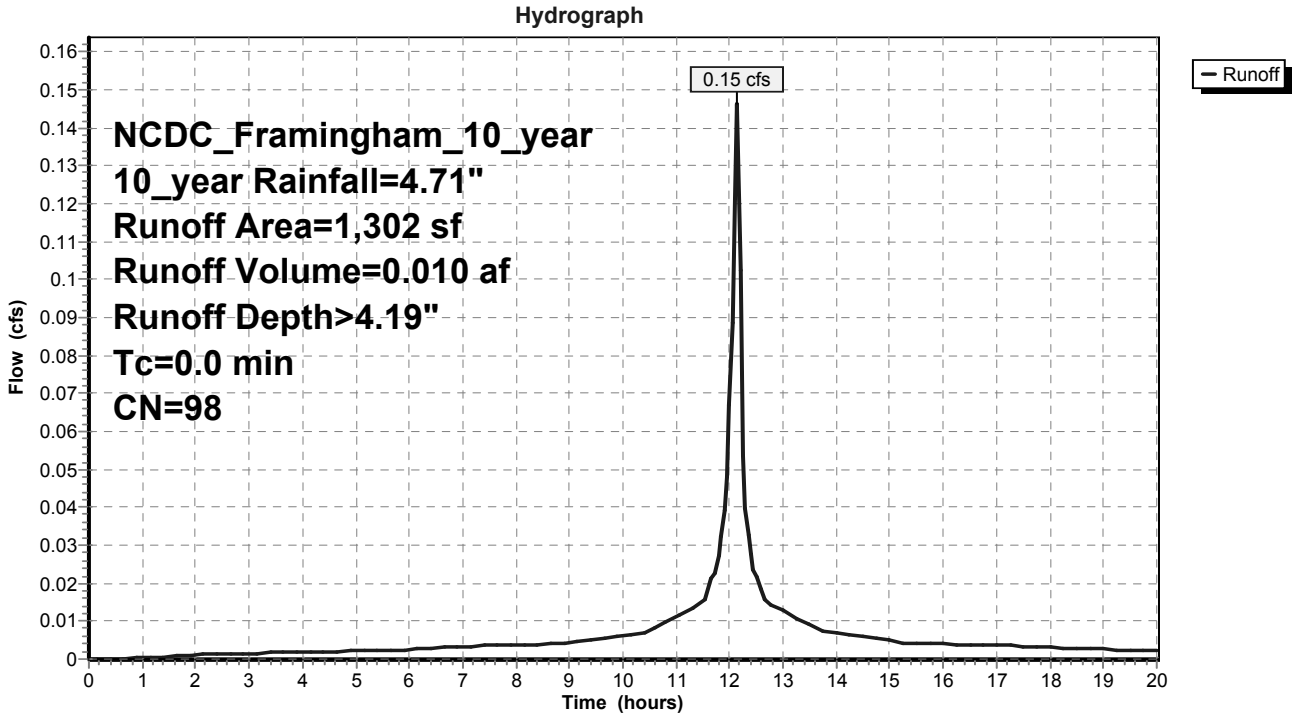
## Summary for Subcatchment ROOF-13: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-13: (blank)



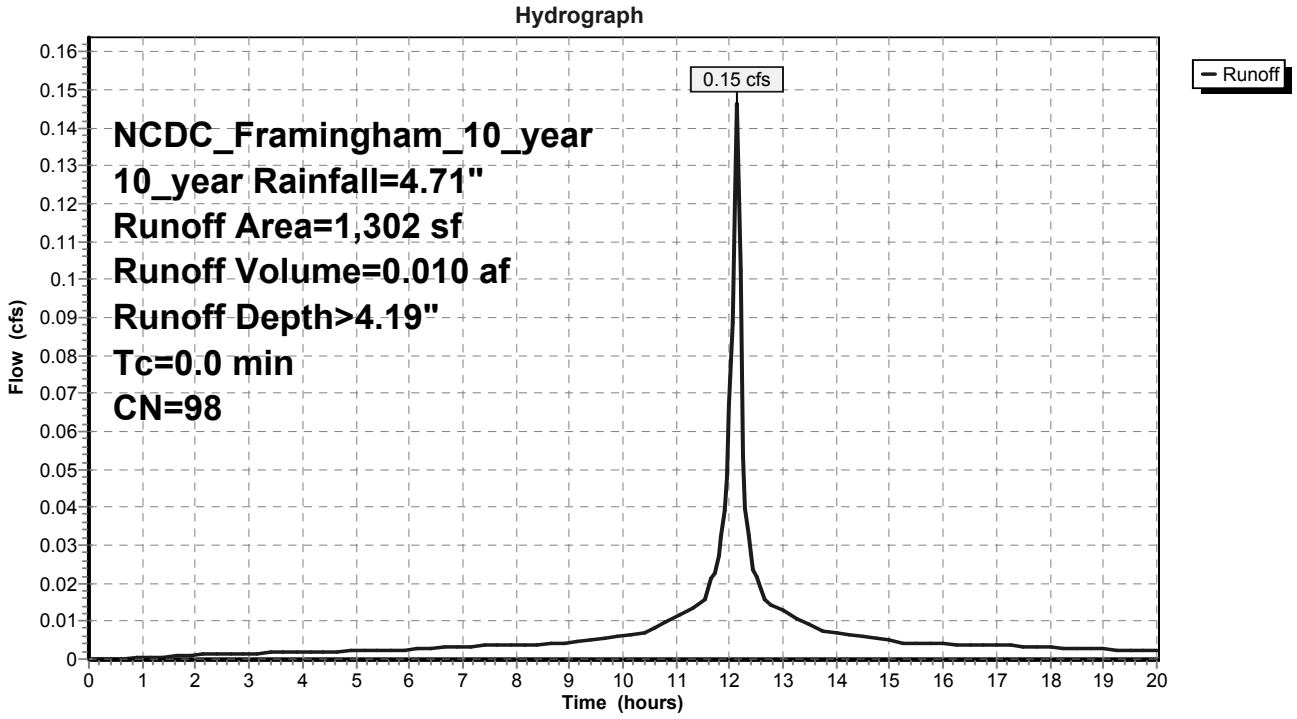
## Summary for Subcatchment ROOF-14: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-14: (blank)



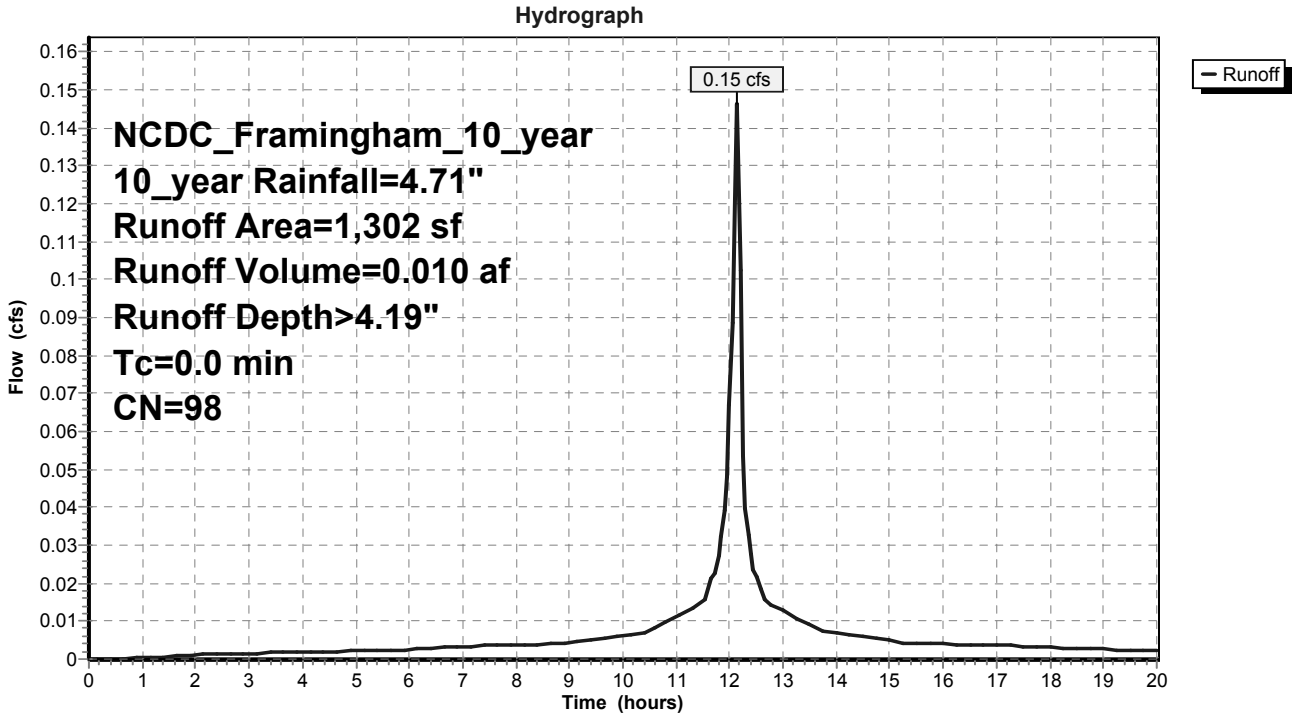
## Summary for Subcatchment ROOF-15: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-15: (blank)



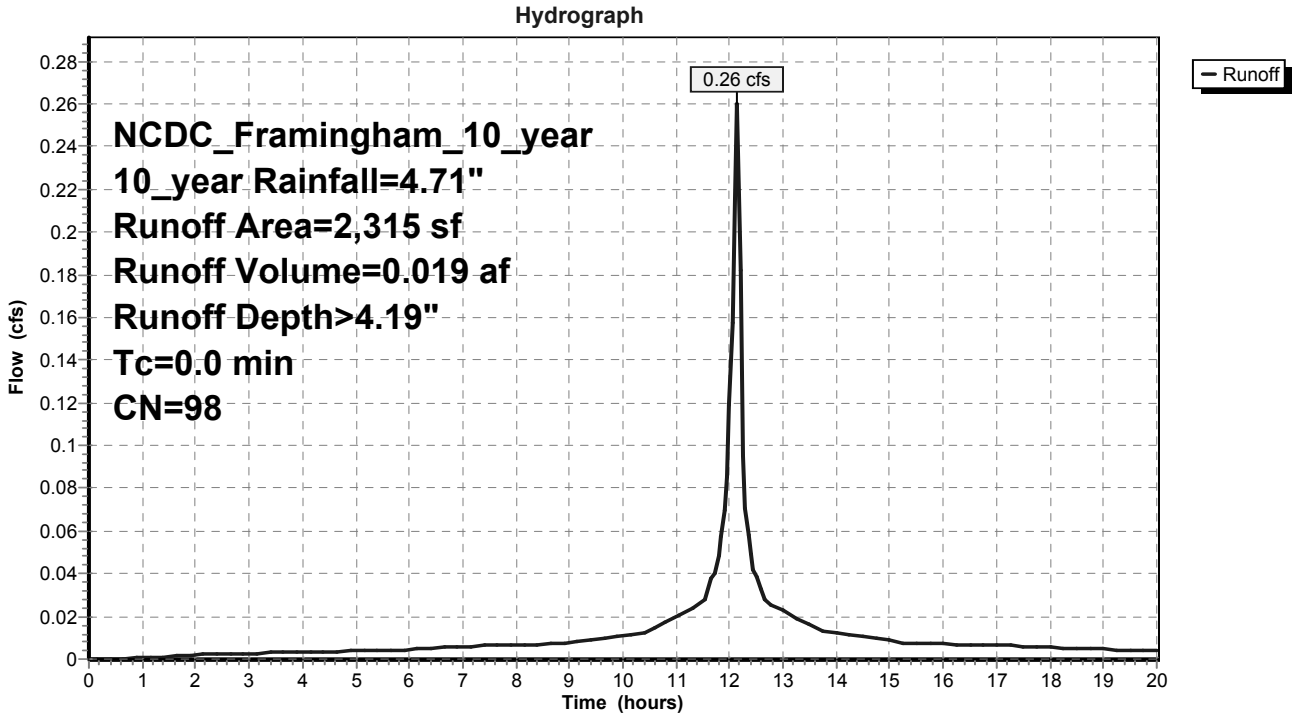
## Summary for Subcatchment ROOF-16: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-16: (blank)



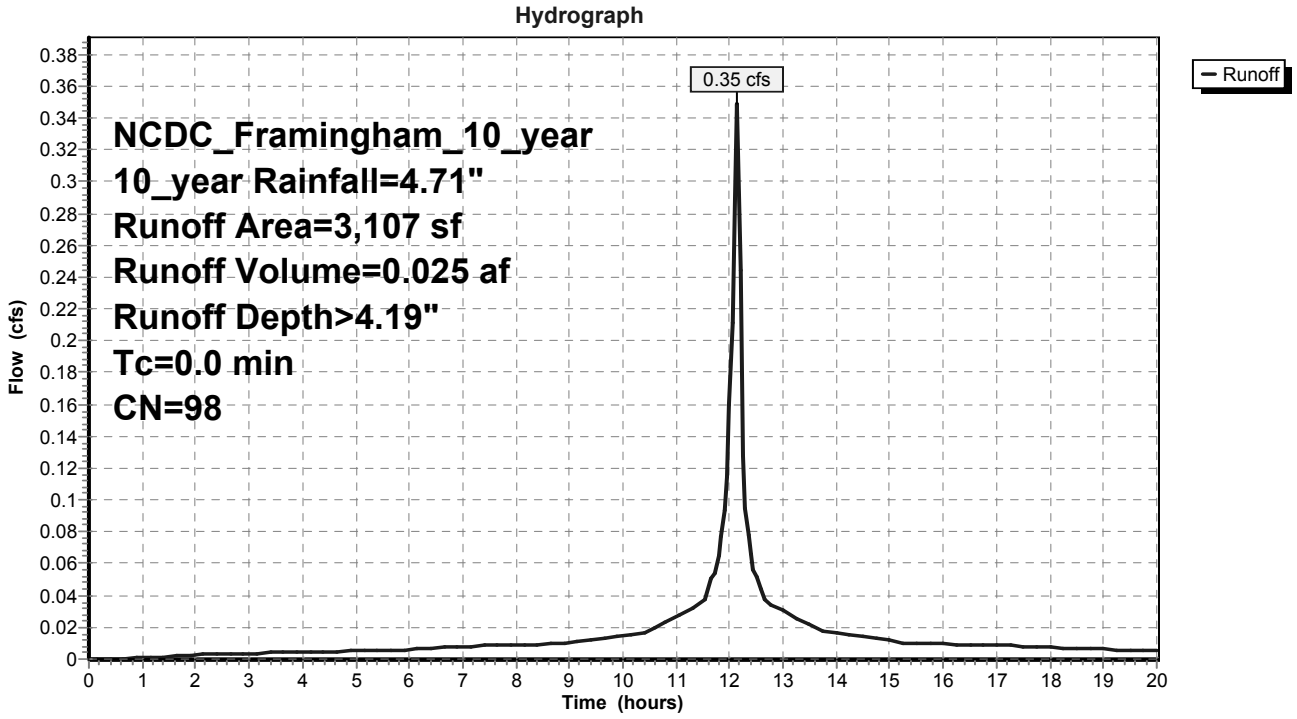
## Summary for Subcatchment ROOF-17: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.025 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-17: (blank)



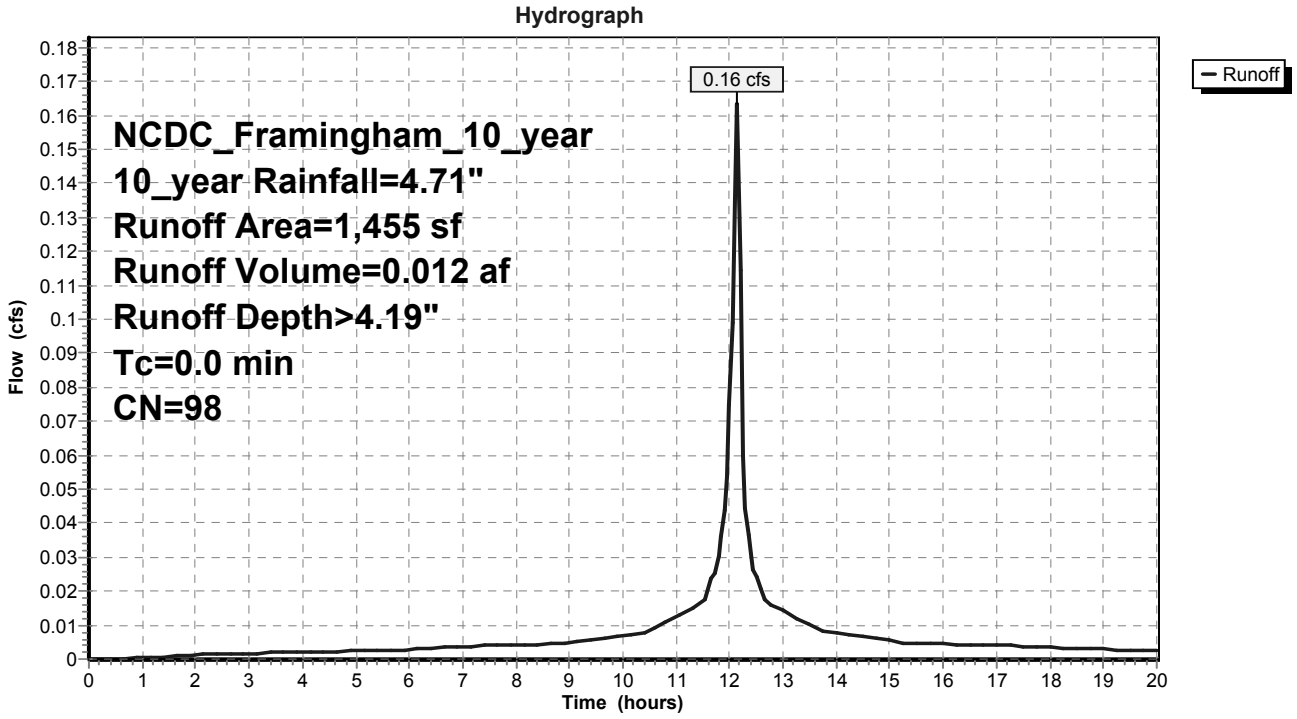
## Summary for Subcatchment ROOF-18: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-18: (blank)



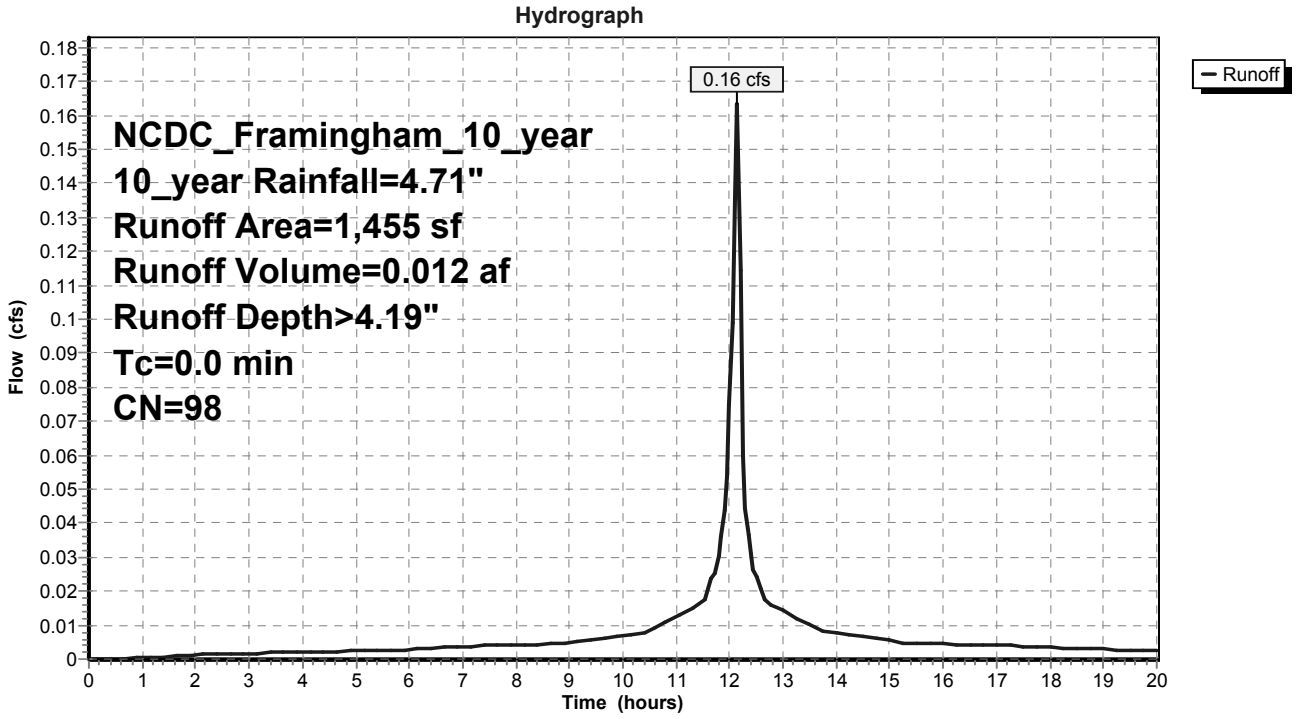
## Summary for Subcatchment ROOF-19: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-19: (blank)



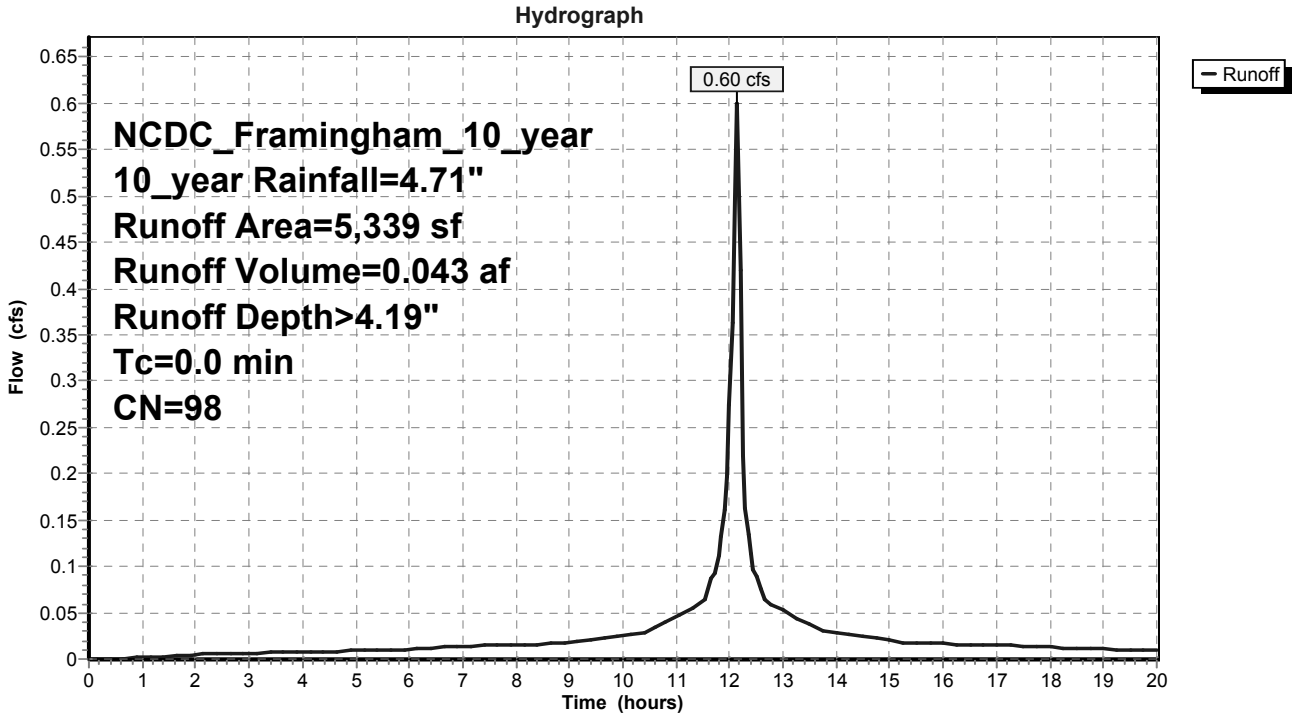
## Summary for Subcatchment ROOF-2: (blank)

Runoff = 0.60 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 5,339 | 98 | ROOF, 100% imperv, HSG B |
| | 5,339 | 98 | Weighted Average |
| | 5,339 | | 100.00% Pervious Area |

## Subcatchment ROOF-2: (blank)



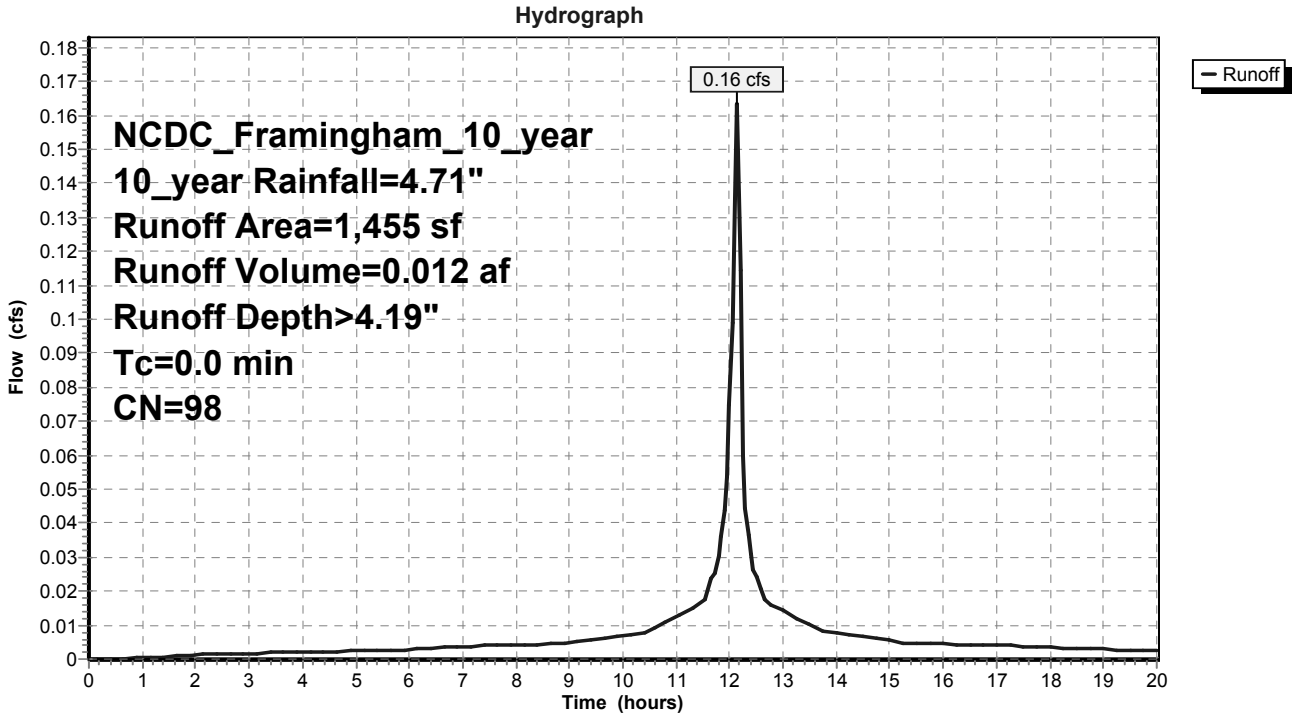
## Summary for Subcatchment ROOF-20: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-20: (blank)



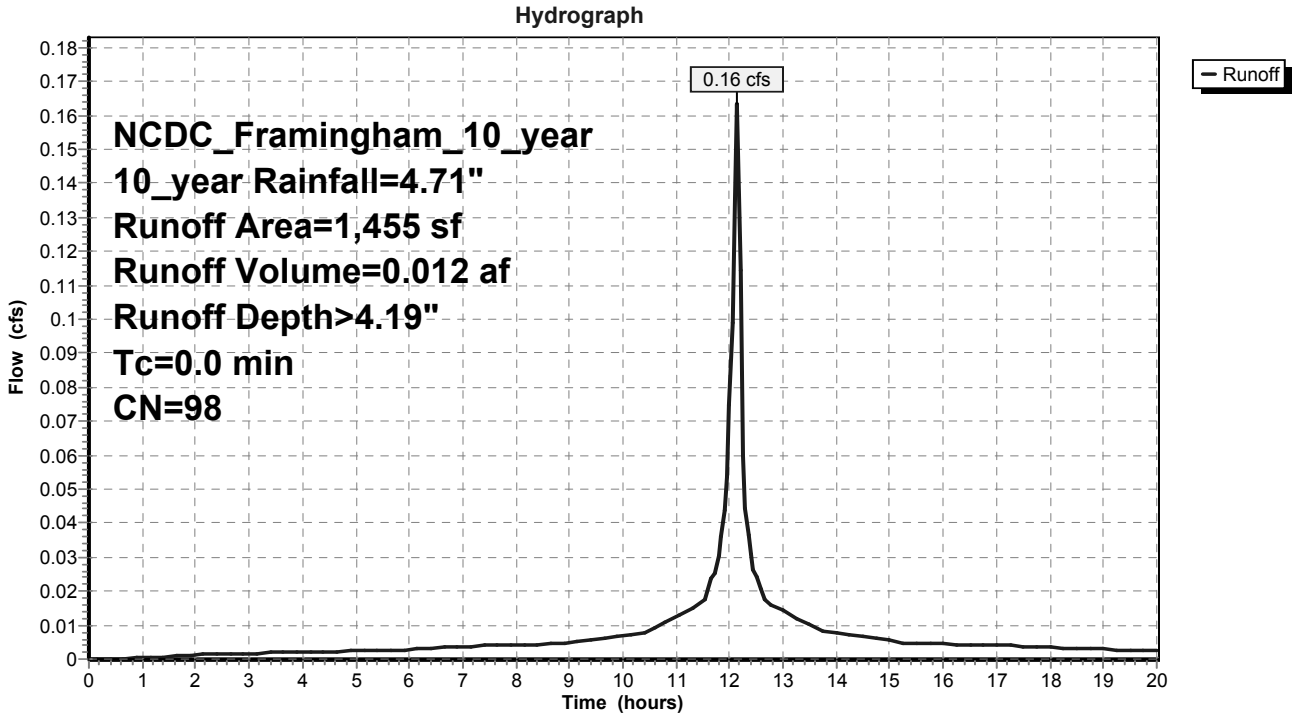
## Summary for Subcatchment ROOF-21: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-21: (blank)



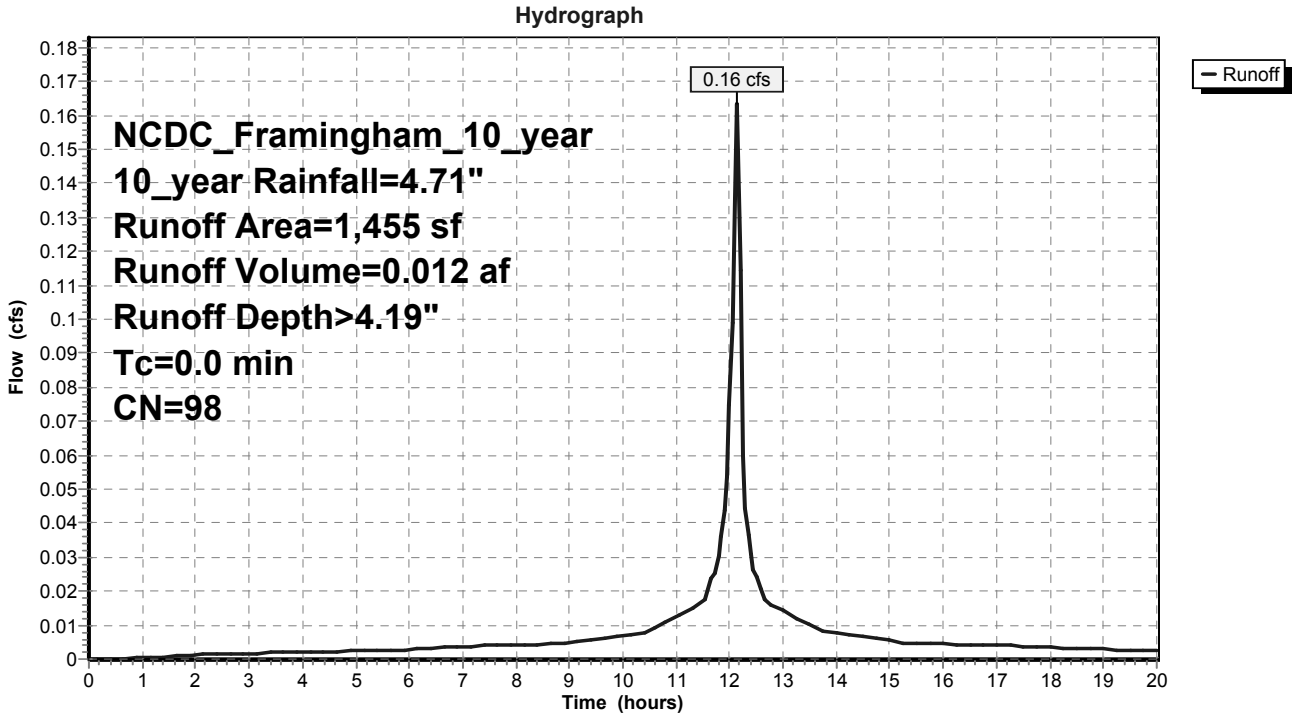
## Summary for Subcatchment ROOF-22: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-22: (blank)



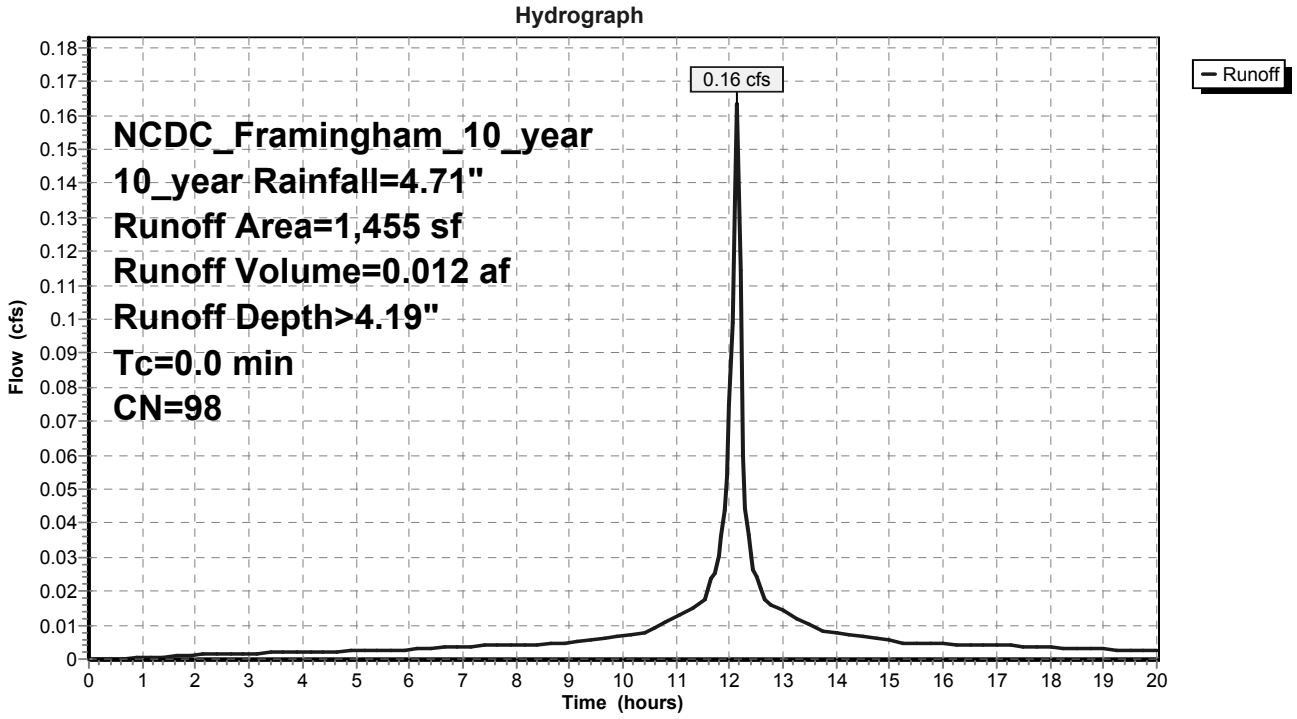
## Summary for Subcatchment ROOF-23: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-23: (blank)



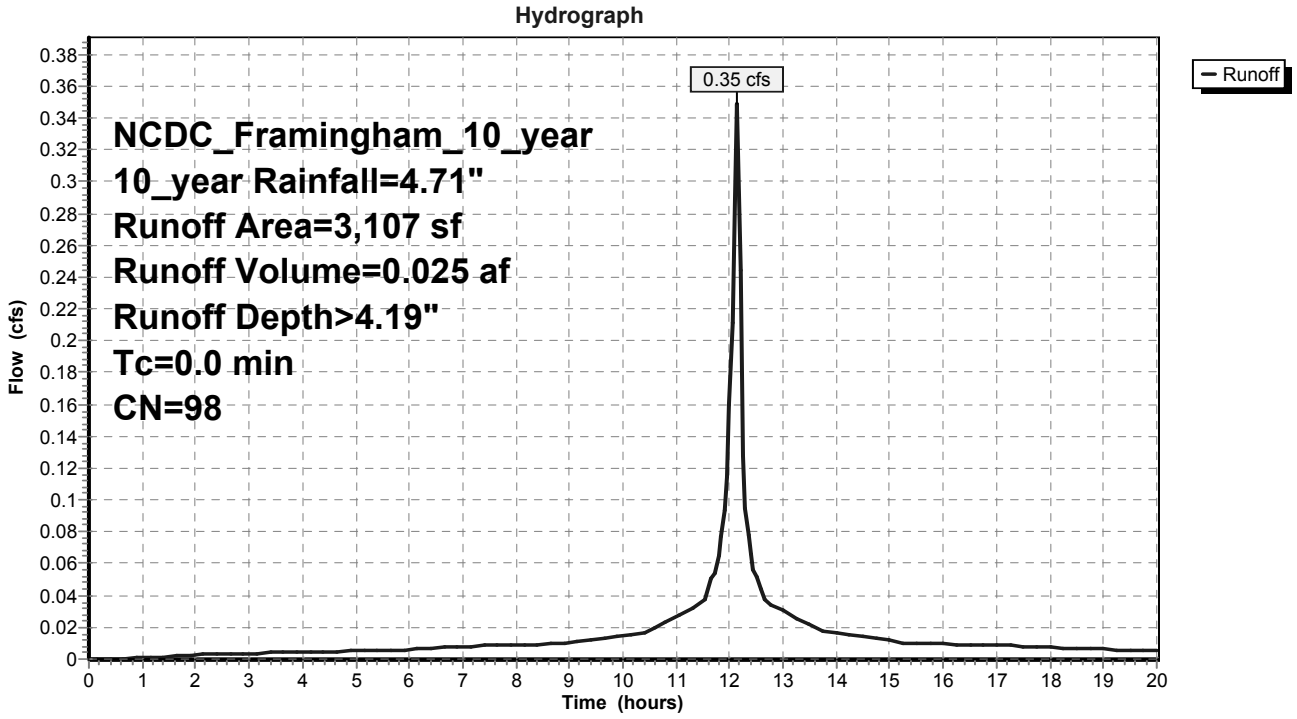
## Summary for Subcatchment ROOF-24: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.025 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-24: (blank)



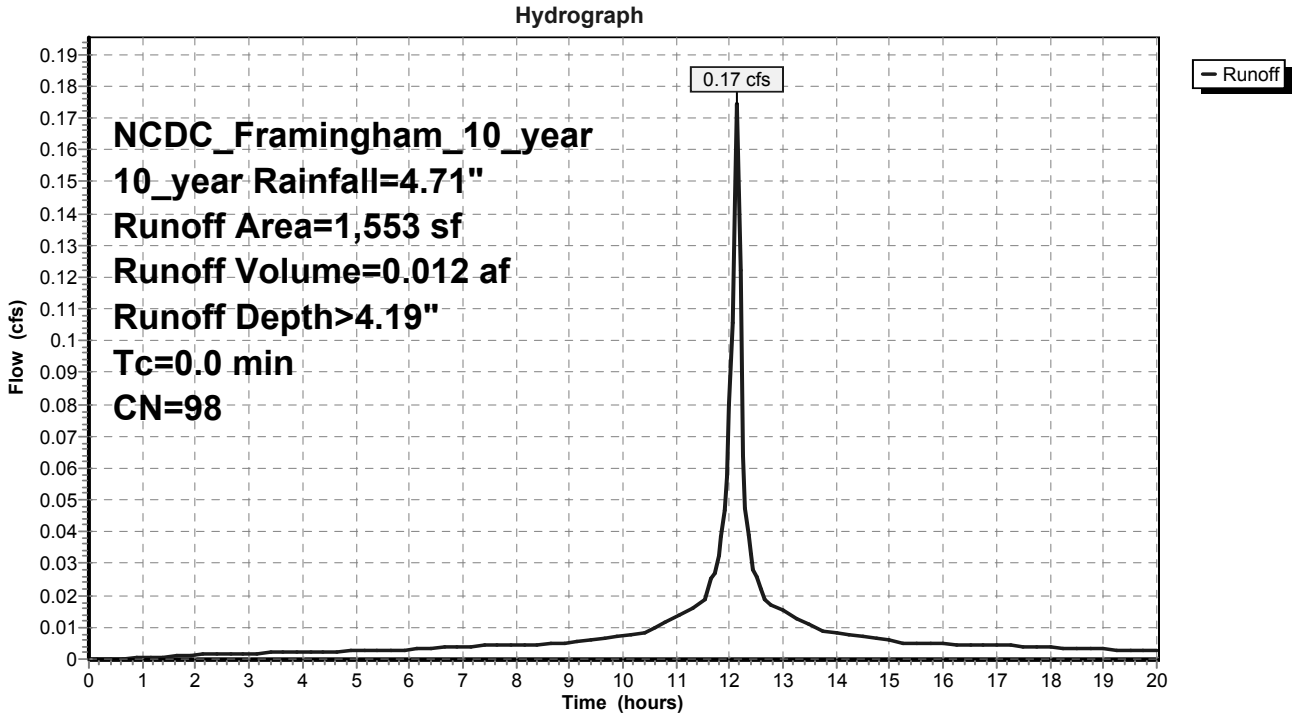
## Summary for Subcatchment ROOF-25: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-25: (blank)



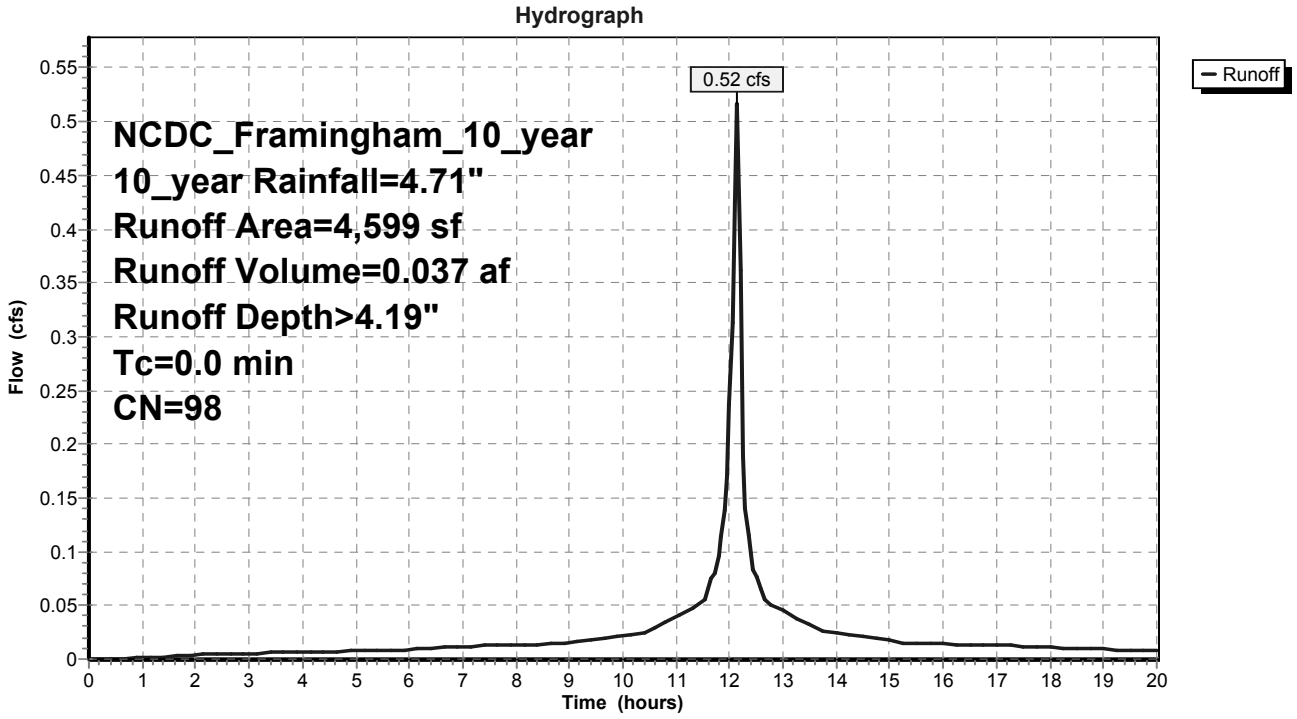
## Summary for Subcatchment ROOF-26: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-26: (blank)



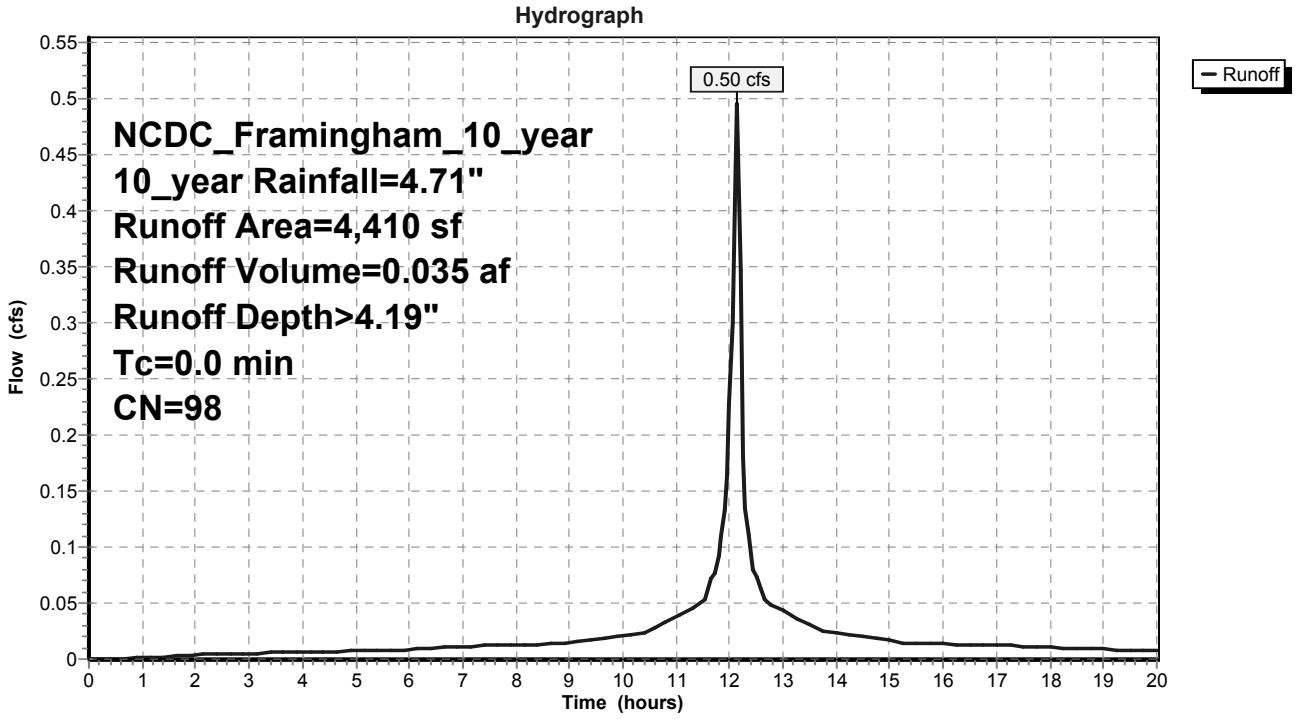
## Summary for Subcatchment ROOF-27: (blank)

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-27: (blank)



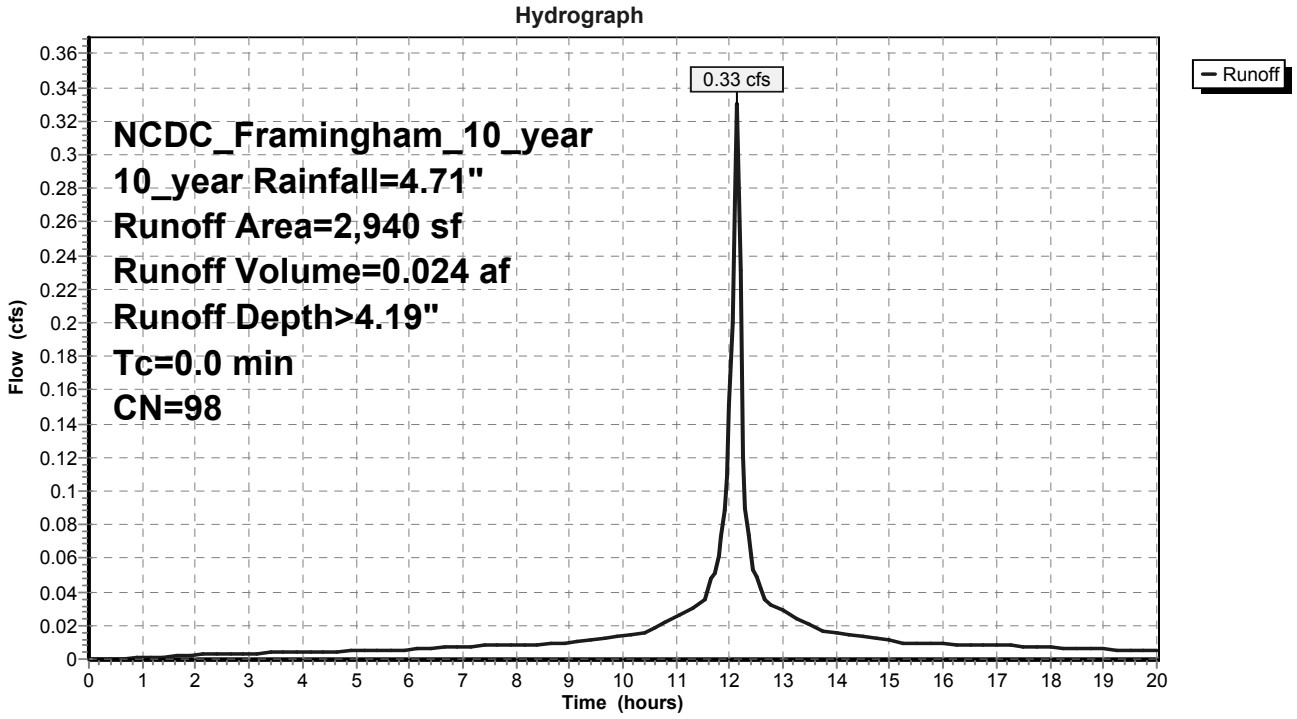
## Summary for Subcatchment ROOF-28: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-28: (blank)



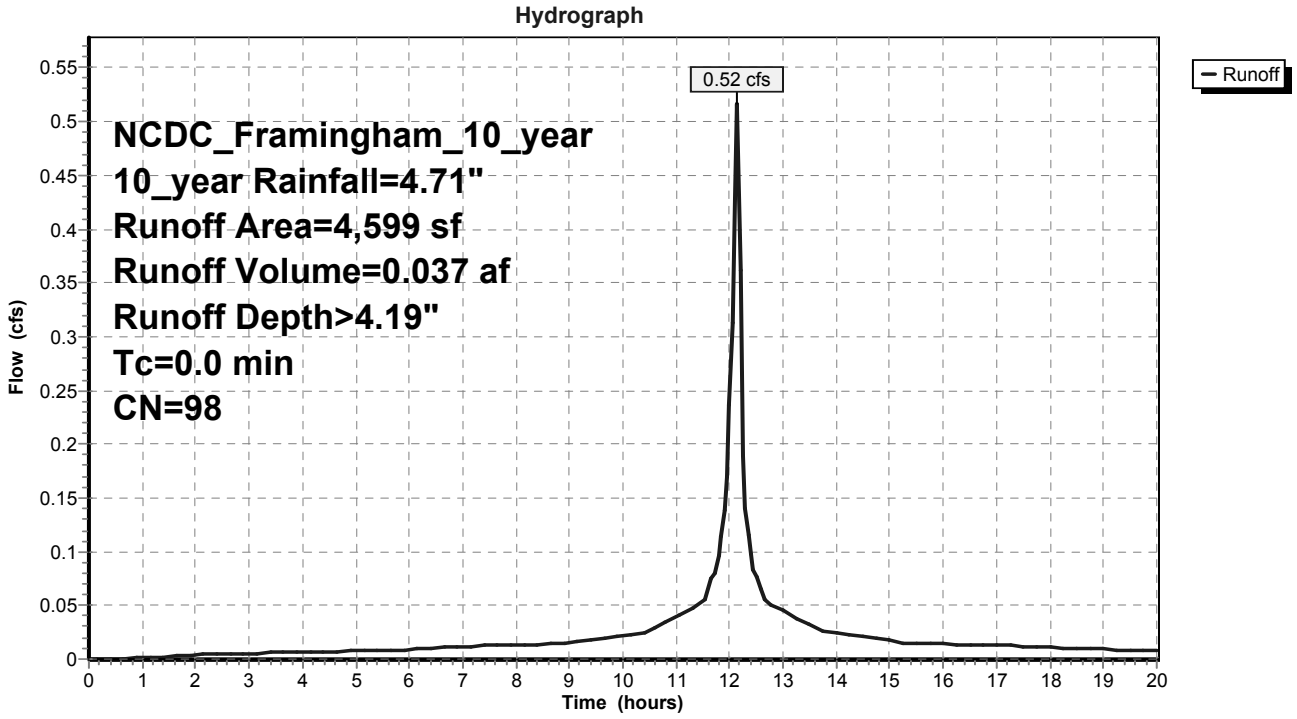
## Summary for Subcatchment ROOF-29: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-29: (blank)



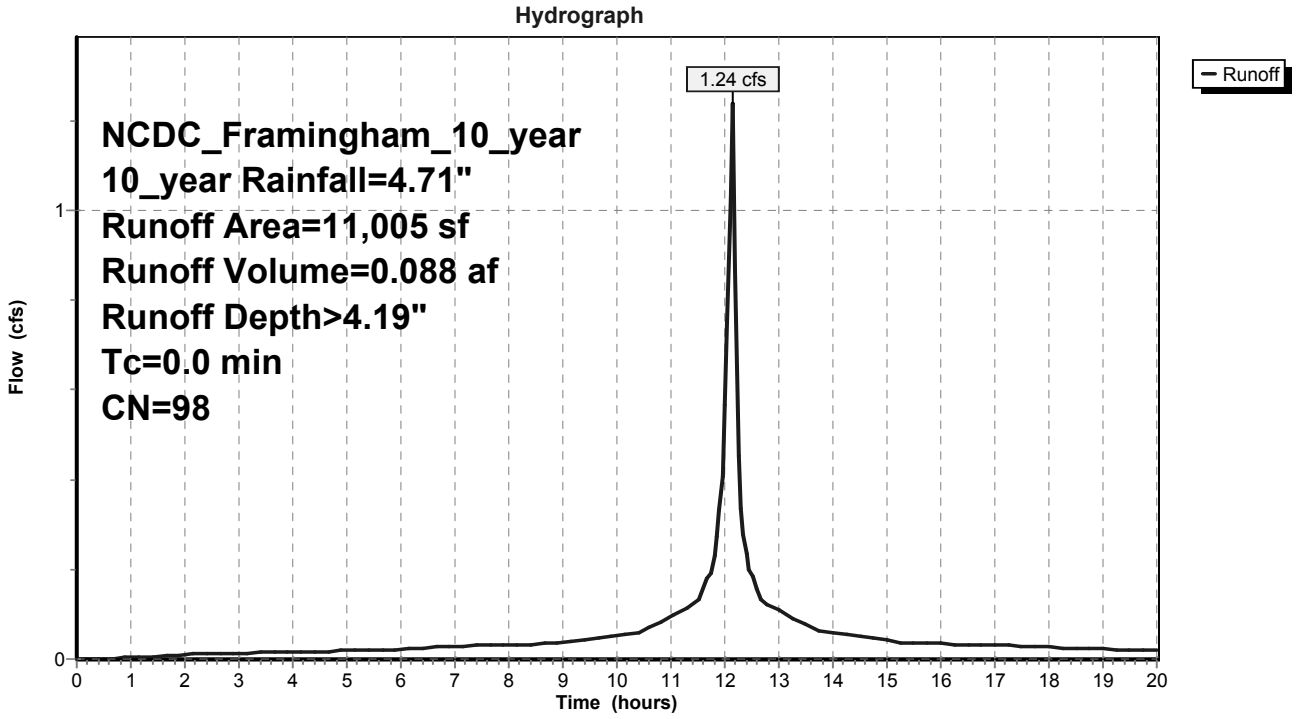
## Summary for Subcatchment ROOF-3: (blank)

Runoff = 1.24 cfs @ 12.14 hrs, Volume= 0.088 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 98 | DECK, 100% imperv, HSG B |
| * | 11,004 | 98 | ROOF, 100% imperv, HSG B |
| | 11,005 | 98 | Weighted Average |
| | 11,005 | | 100.00% Pervious Area |

## Subcatchment ROOF-3: (blank)



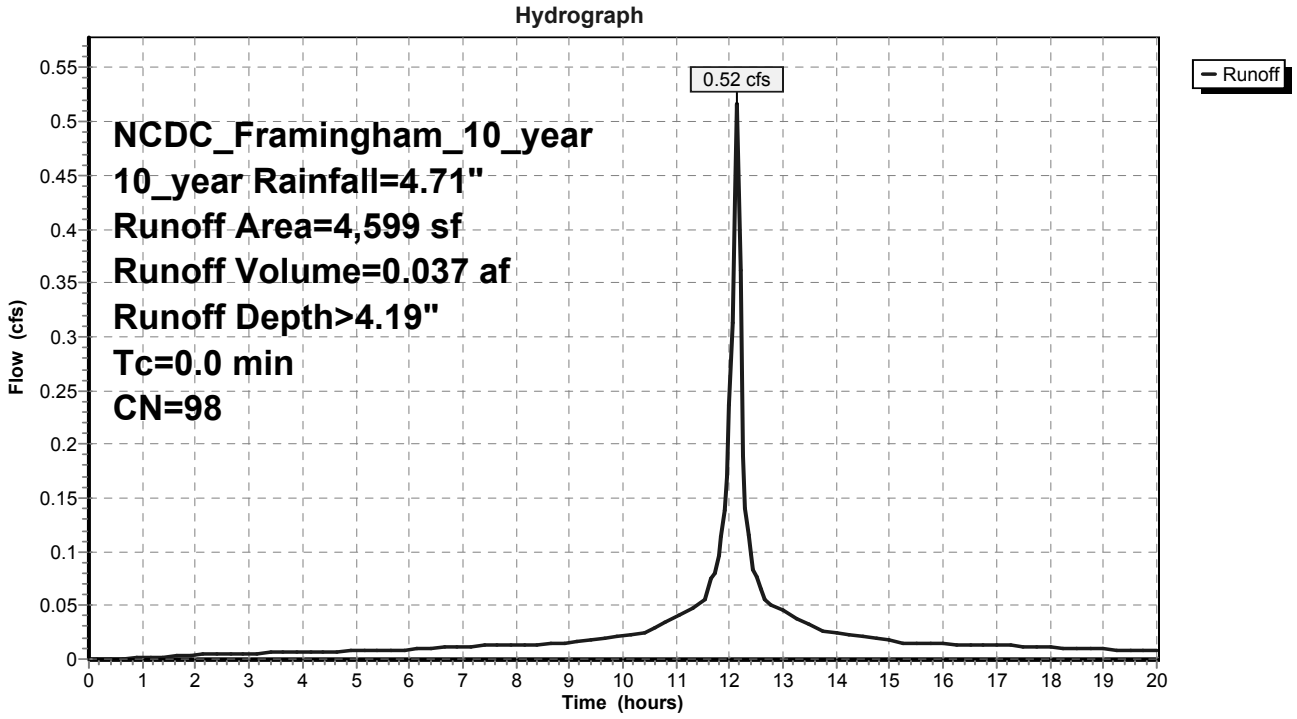
## Summary for Subcatchment ROOF-30: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-30: (blank)



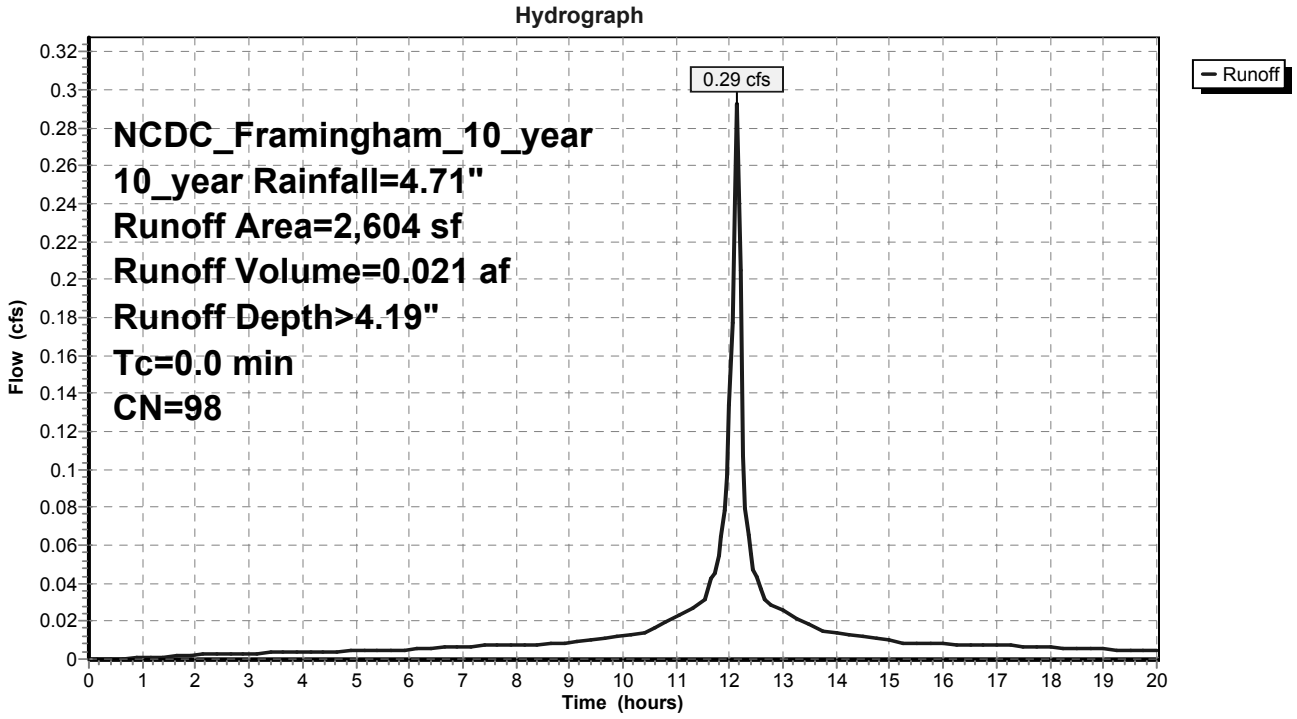
## Summary for Subcatchment ROOF-31: (blank)

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-31: (blank)



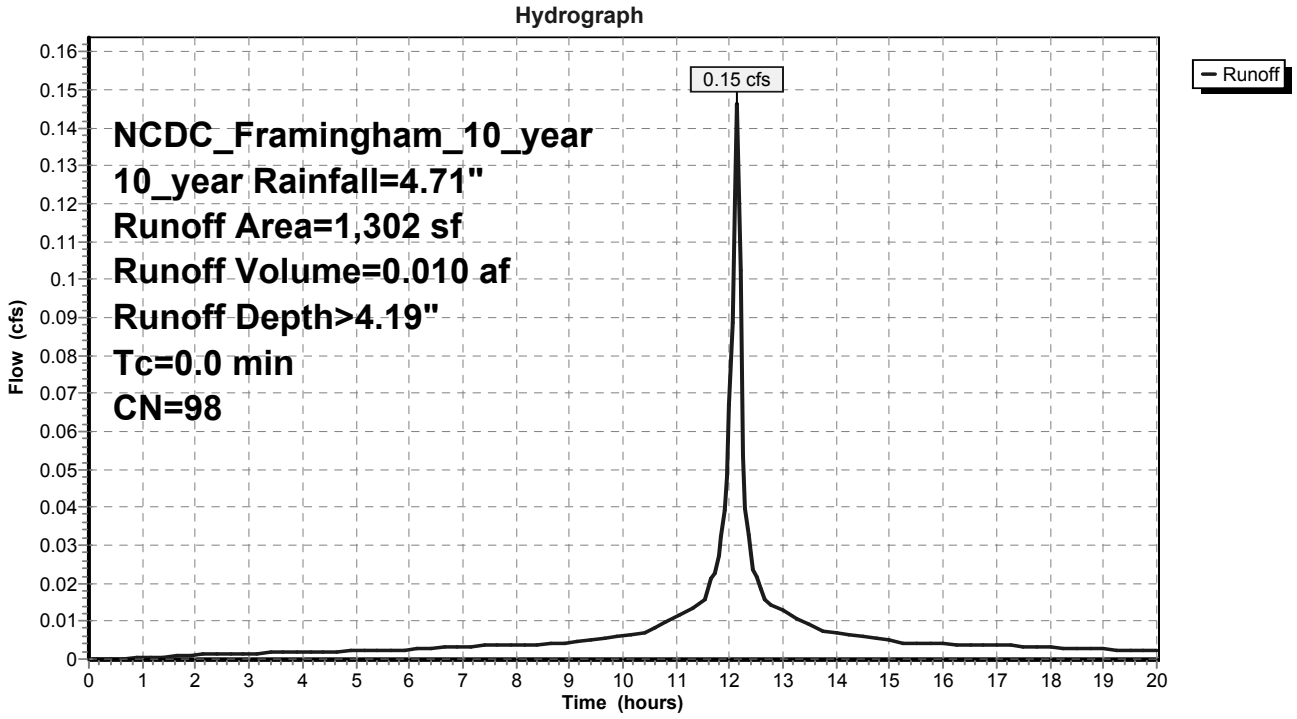
## Summary for Subcatchment ROOF-32: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-32: (blank)



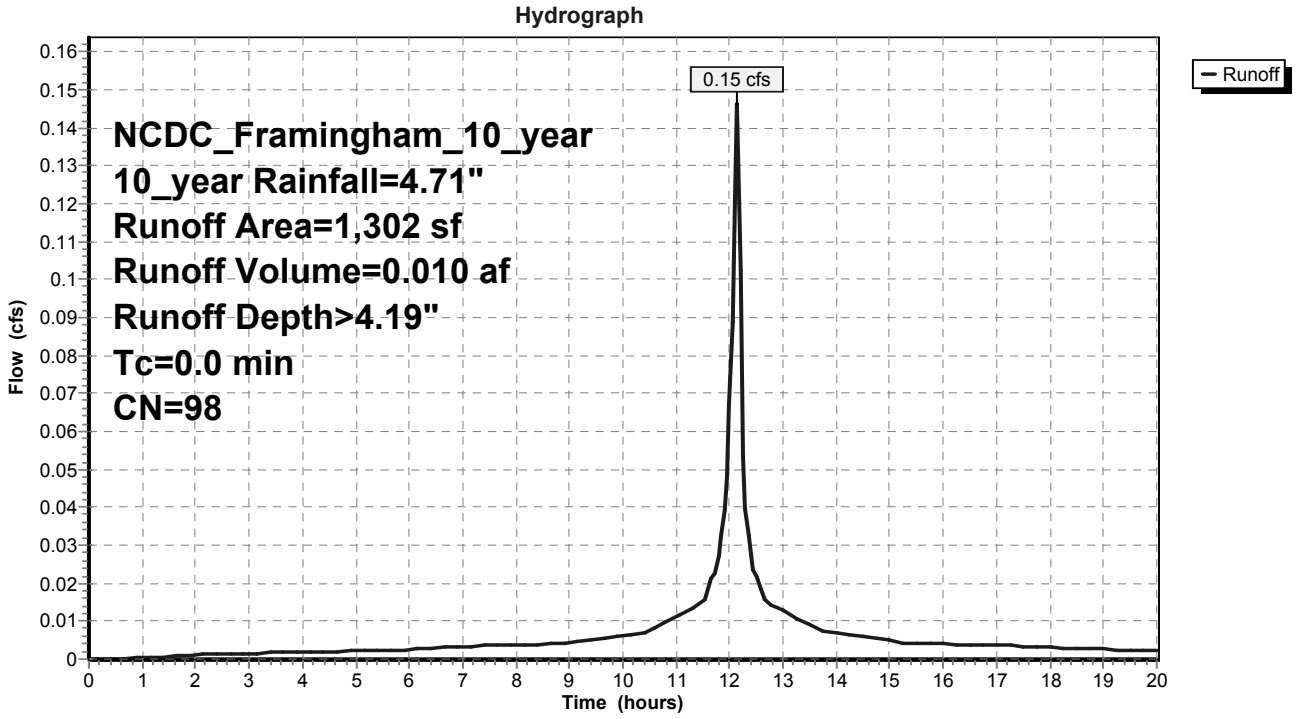
## Summary for Subcatchment ROOF-33: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-33: (blank)



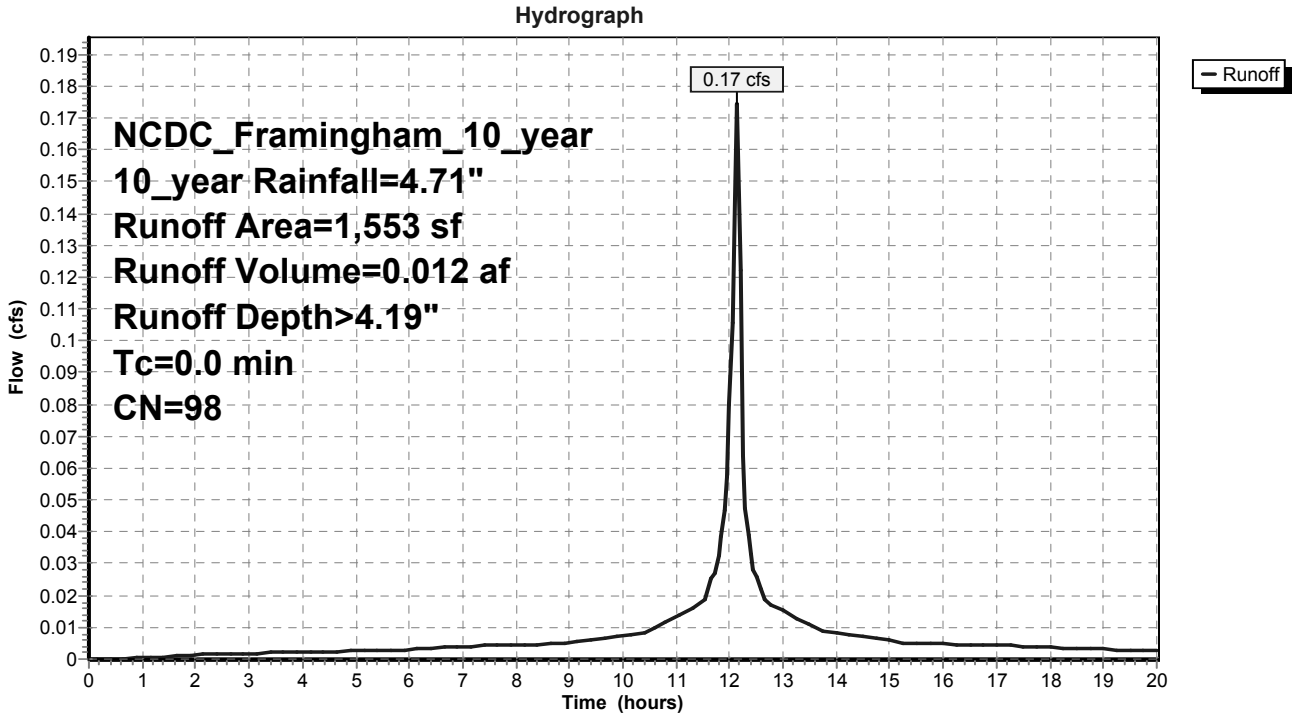
## Summary for Subcatchment ROOF-34: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-34: (blank)



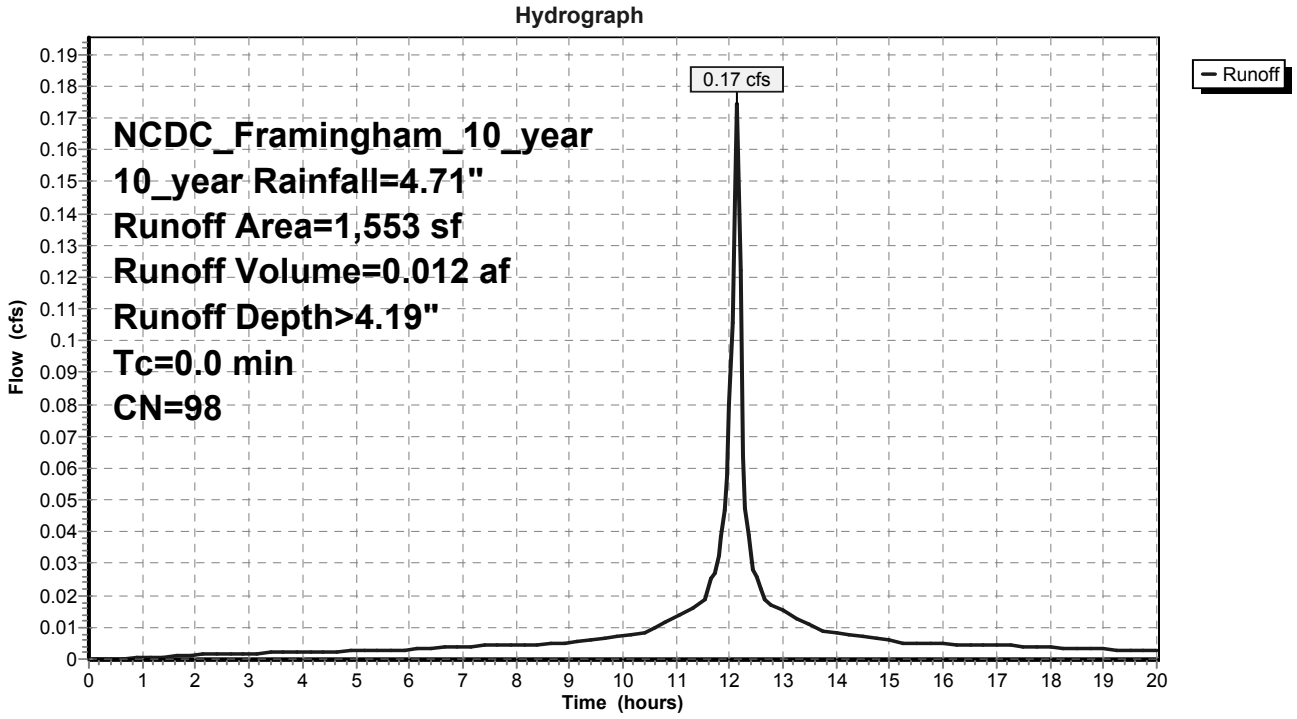
## Summary for Subcatchment ROOF-35: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-35: (blank)



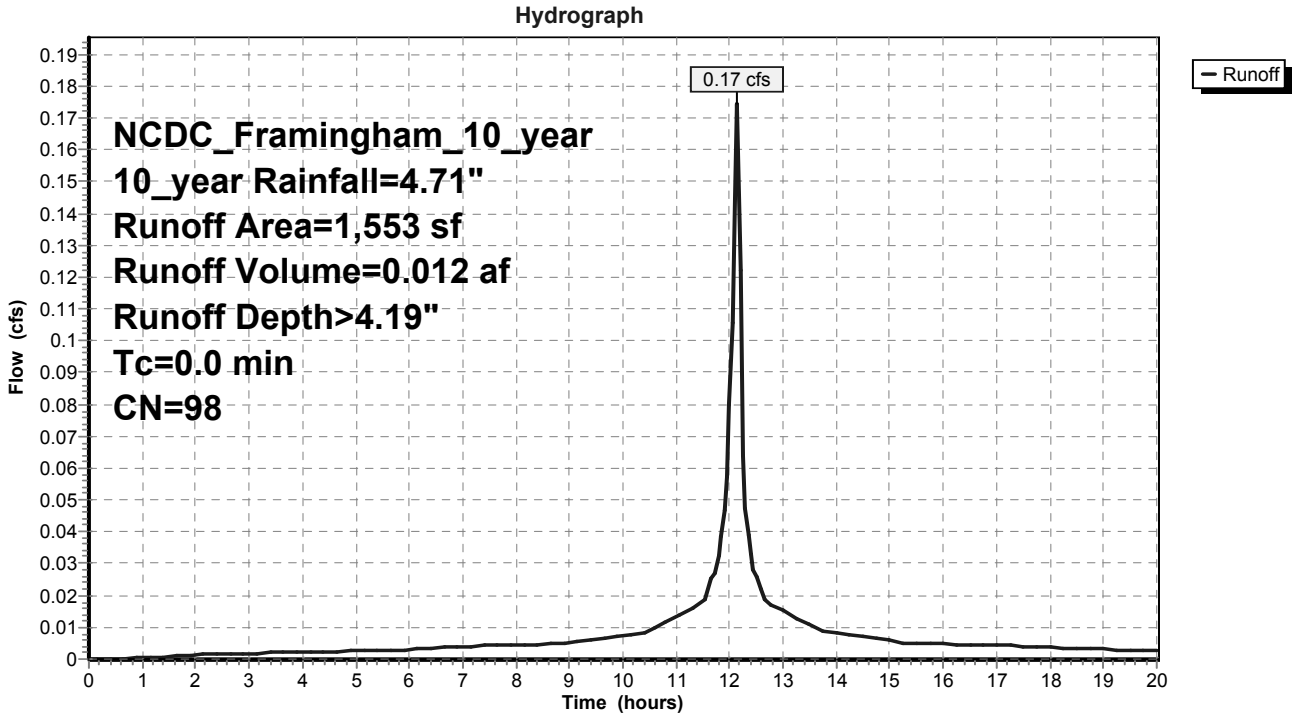
## Summary for Subcatchment ROOF-36: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-36: (blank)



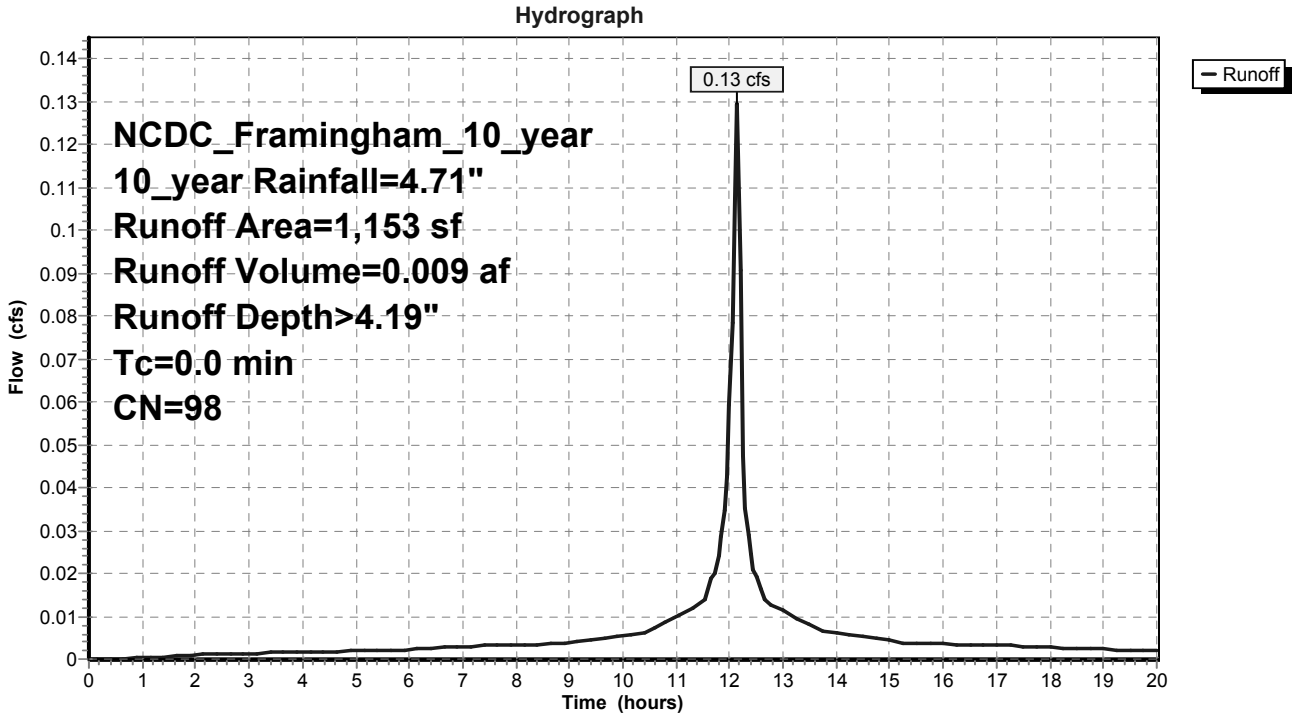
## Summary for Subcatchment ROOF-37: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,153 | 98 | ROOF, 100% imperv, HSG B |
| | 1,153 | | 100.00% Pervious Area |

## Subcatchment ROOF-37: (blank)



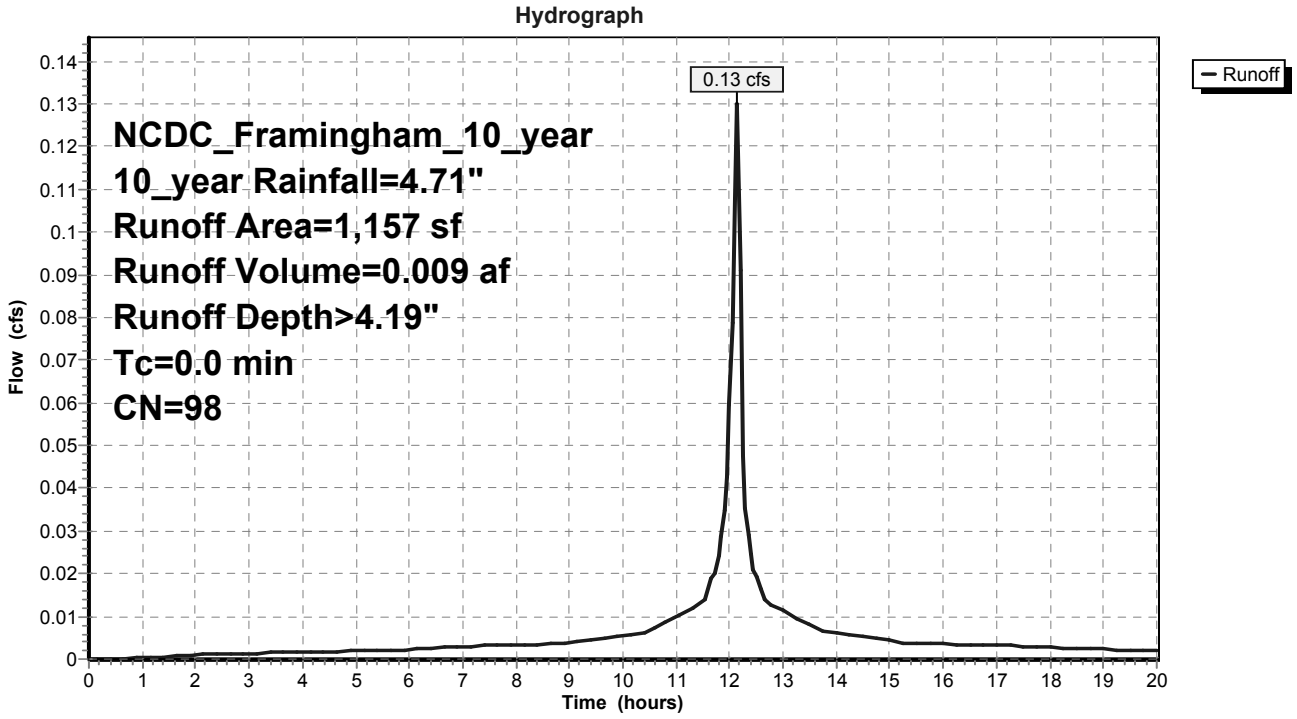
## Summary for Subcatchment ROOF-38: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-38: (blank)



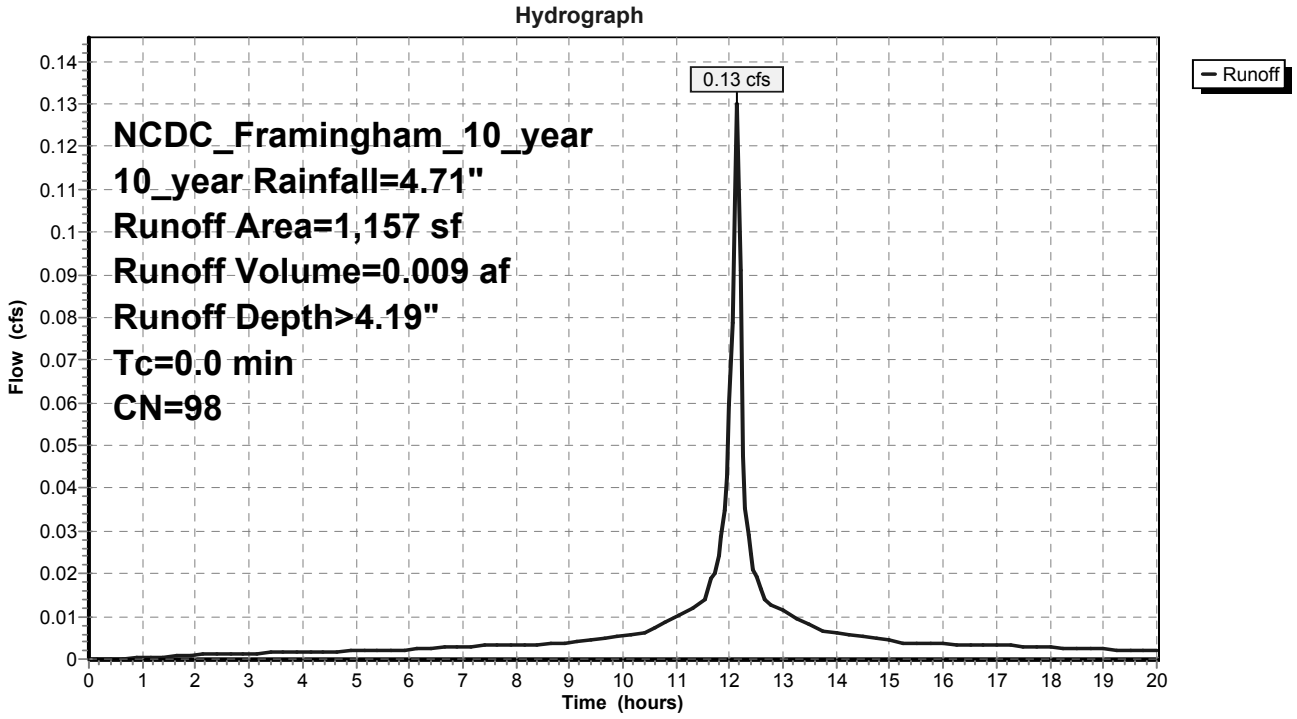
## Summary for Subcatchment ROOF-39: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-39: (blank)



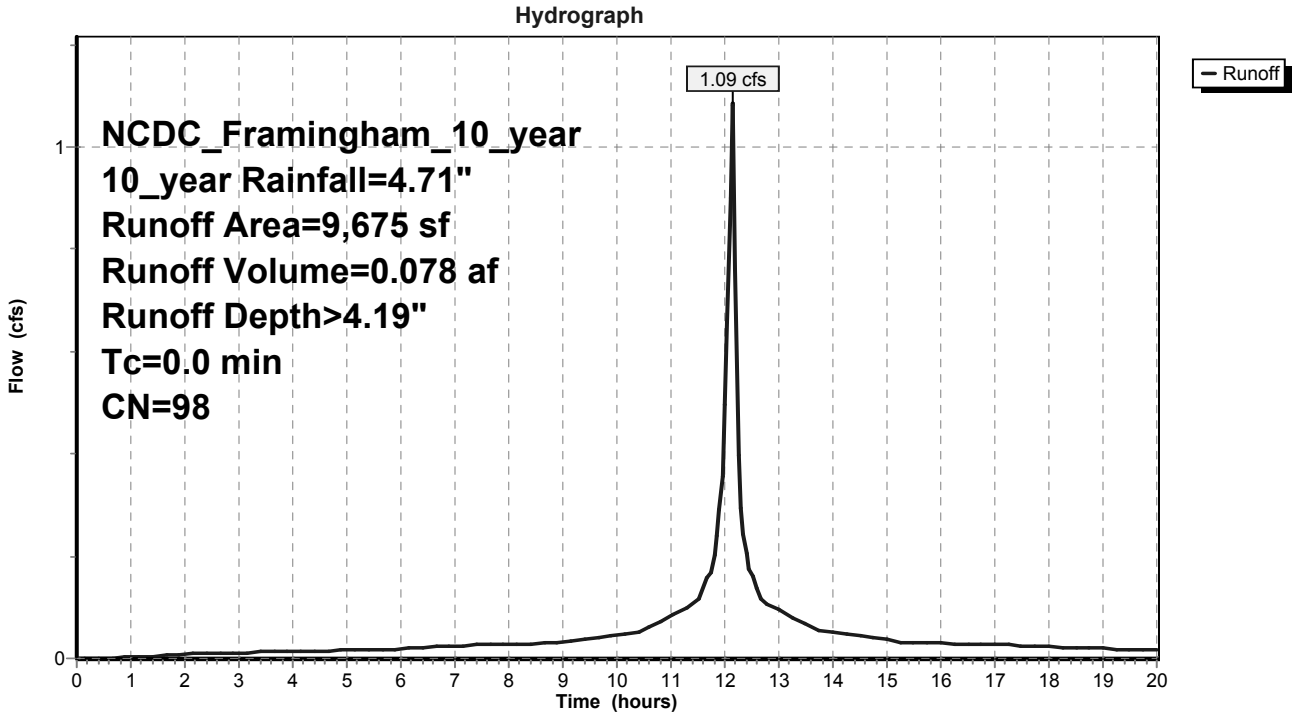
## Summary for Subcatchment ROOF-4: (blank)

Runoff = 1.09 cfs @ 12.14 hrs, Volume= 0.078 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 61 | GRASS, 0% imperv, HSG B |
| * | 72 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,675 | 98 | Weighted Average |
| | 9,675 | | 100.00% Pervious Area |

## Subcatchment ROOF-4: (blank)



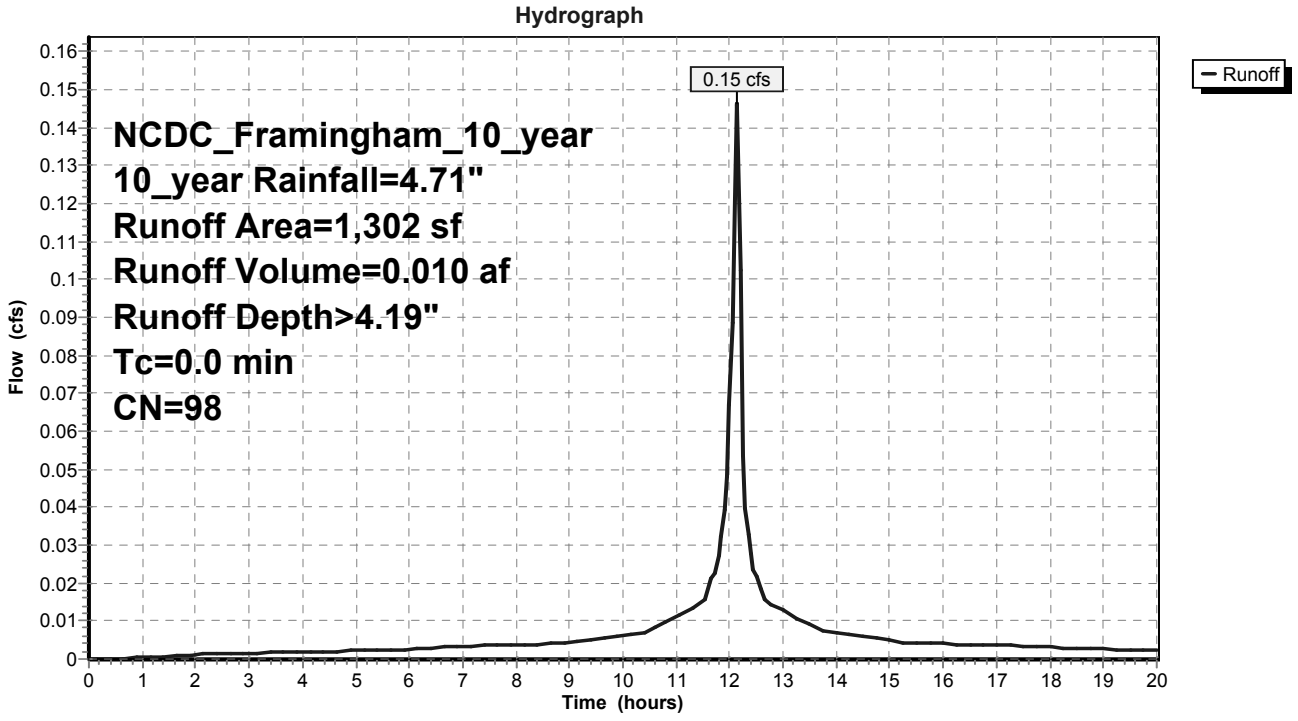
## Summary for Subcatchment ROOF-40: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 639 | 98 | ROOF, 100% imperv, HSG A |
| * | 663 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-40: (blank)



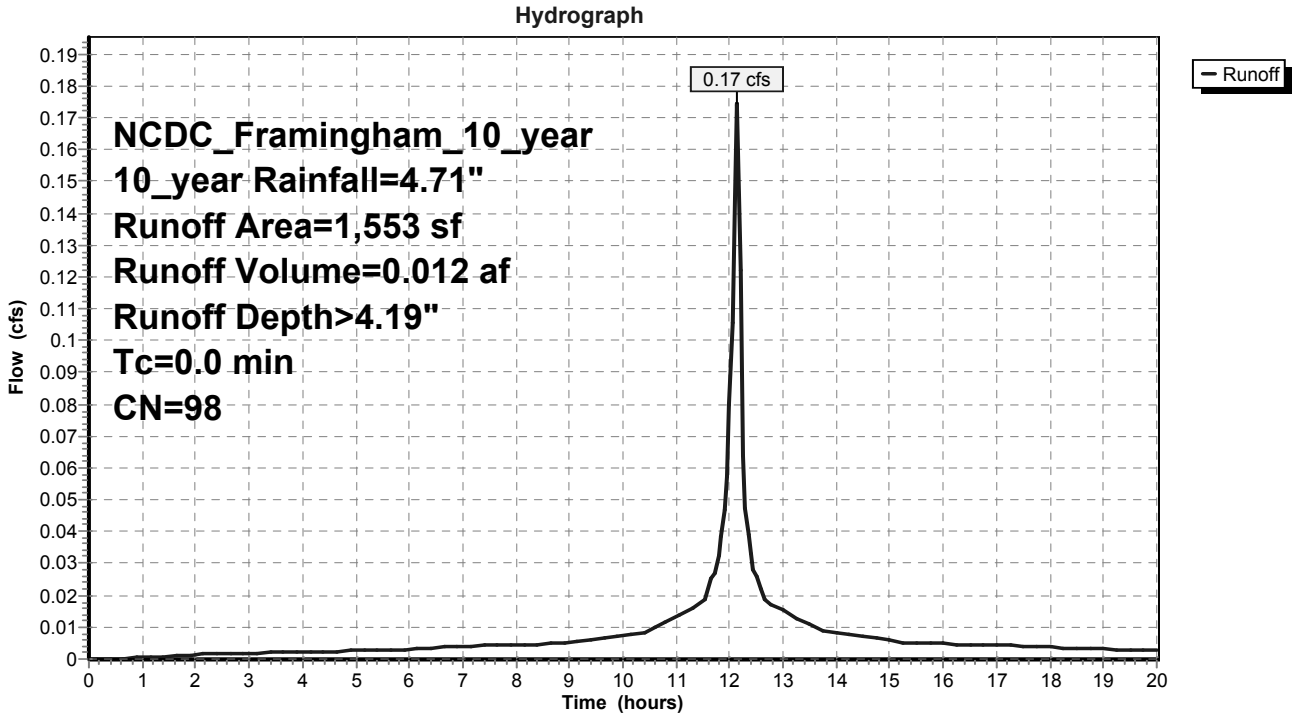
## Summary for Subcatchment ROOF-41: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,090 | 98 | ROOF, 100% imperv, HSG A |
| * | 463 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-41: (blank)



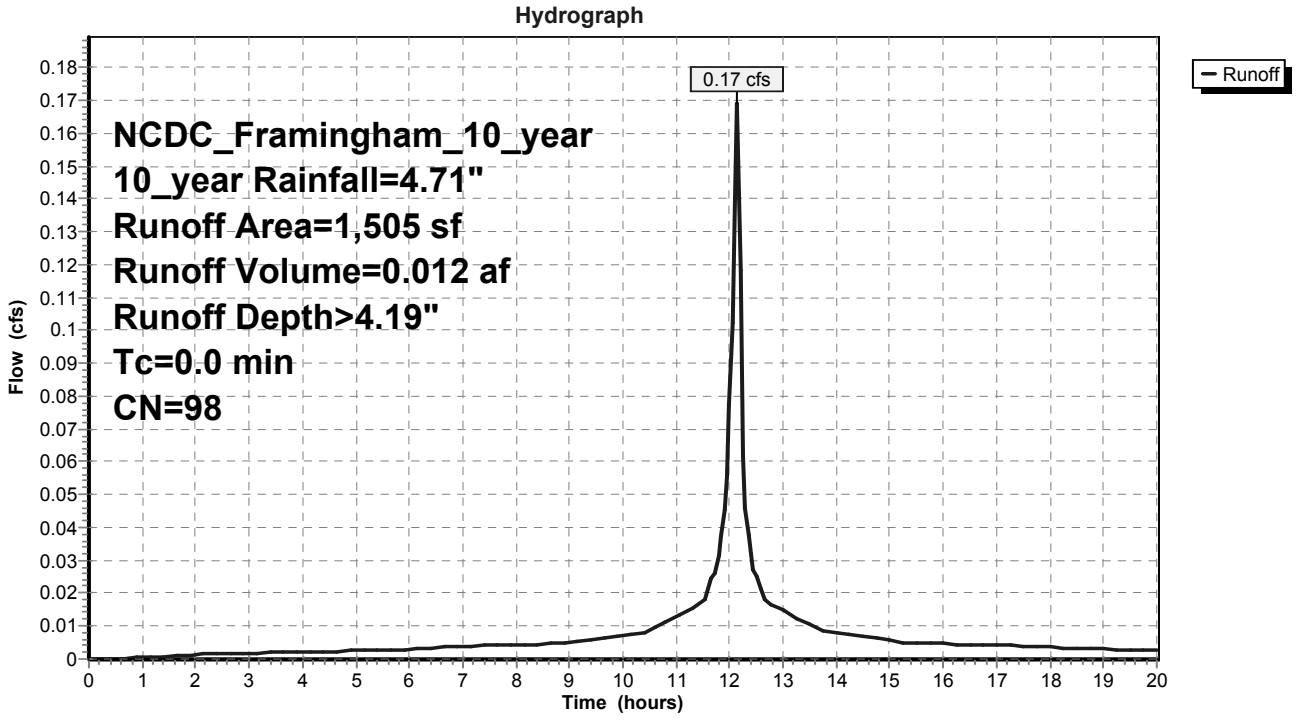
## Summary for Subcatchment ROOF-42: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 699 | 98 | ROOF, 100% imperv, HSG A |
| * | 806 | 98 | ROOF, 100% imperv, HSG B |
| | 1,505 | 98 | Weighted Average |
| | 1,505 | | 100.00% Pervious Area |

## Subcatchment ROOF-42: (blank)



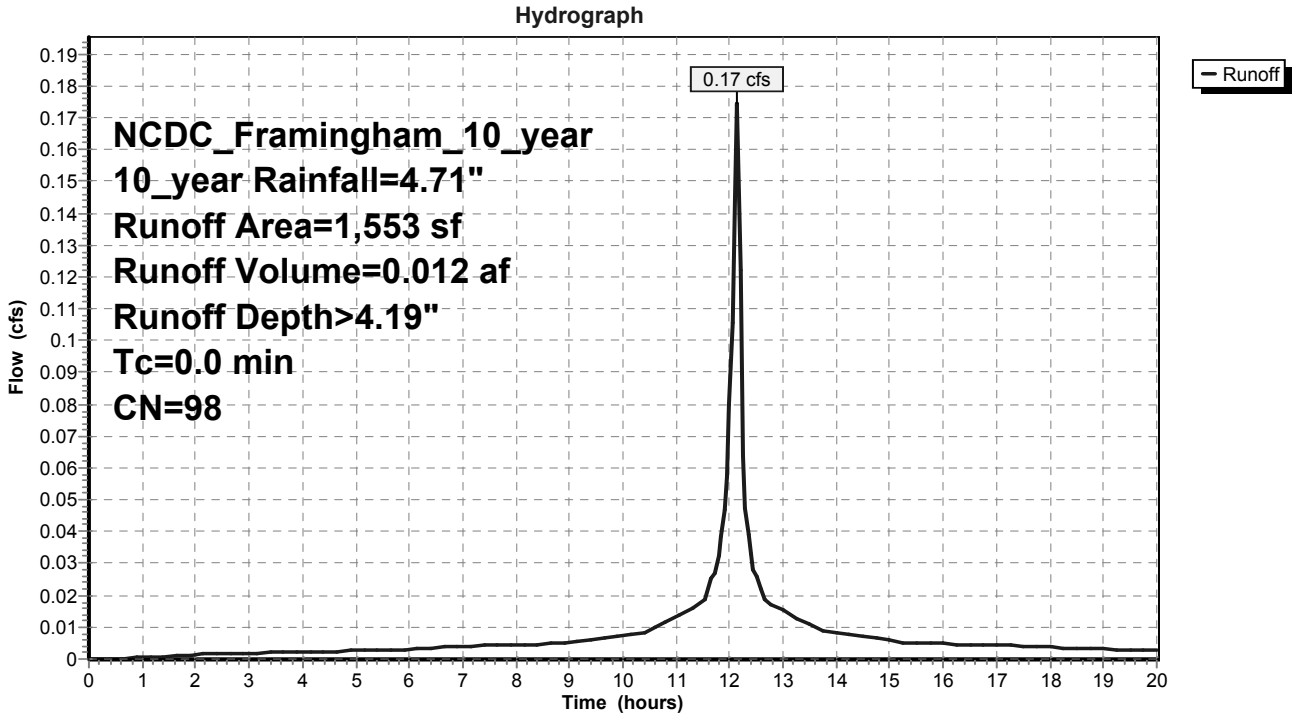
## Summary for Subcatchment ROOF-43: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 486 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,067 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-43: (blank)



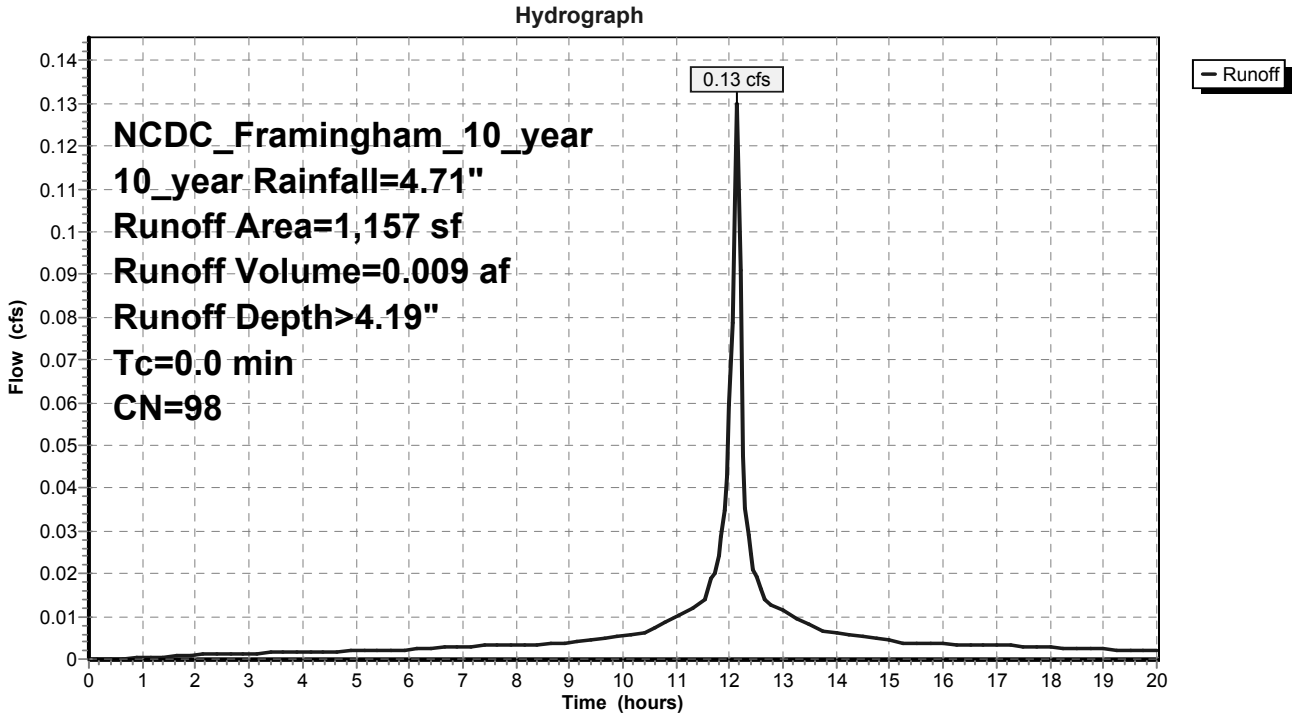
## Summary for Subcatchment ROOF-44: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-44: (blank)



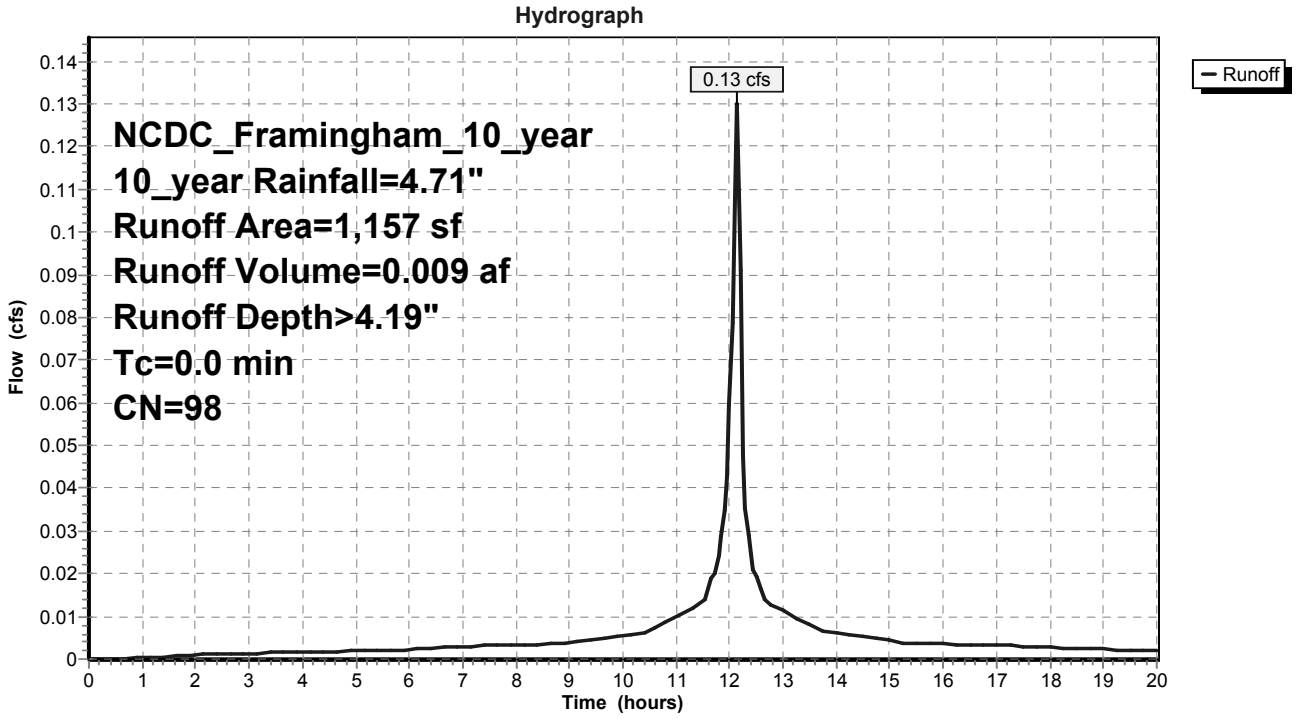
## Summary for Subcatchment ROOF-45: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-45: (blank)



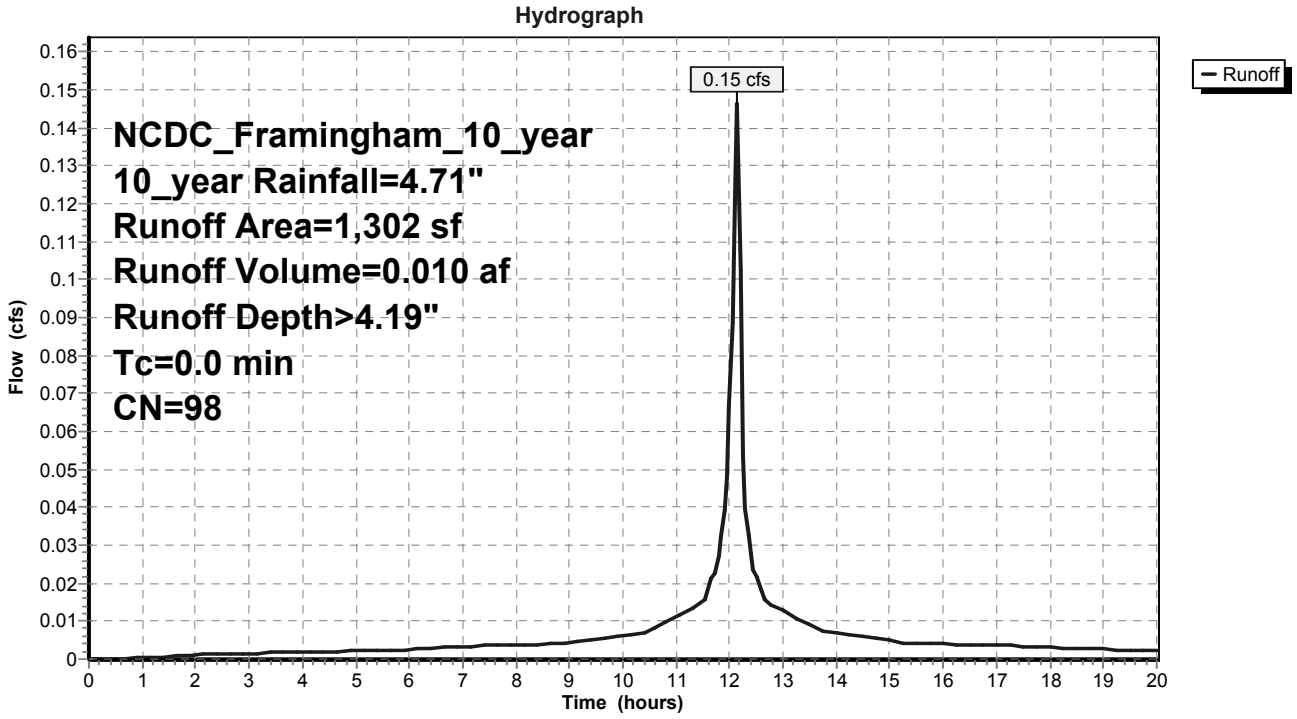
## Summary for Subcatchment ROOF-46: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-46: (blank)



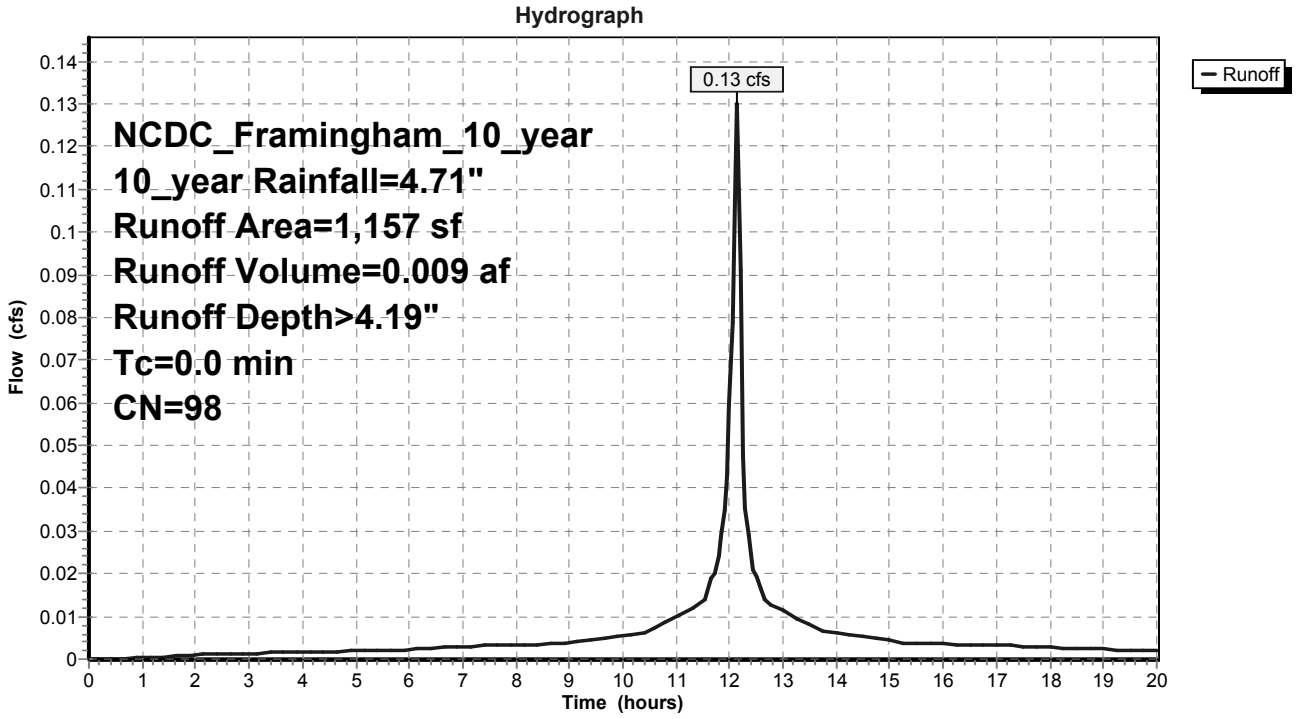
## Summary for Subcatchment ROOF-47: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-47: (blank)



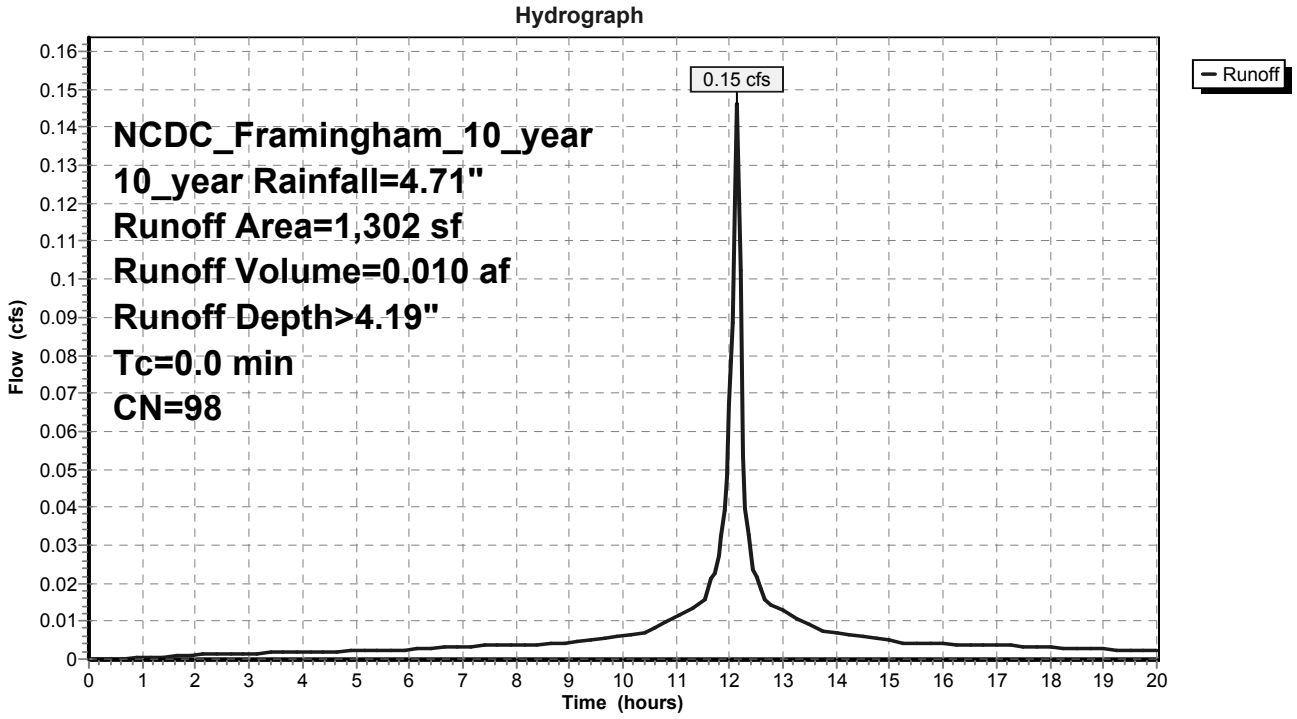
## Summary for Subcatchment ROOF-48: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-48: (blank)



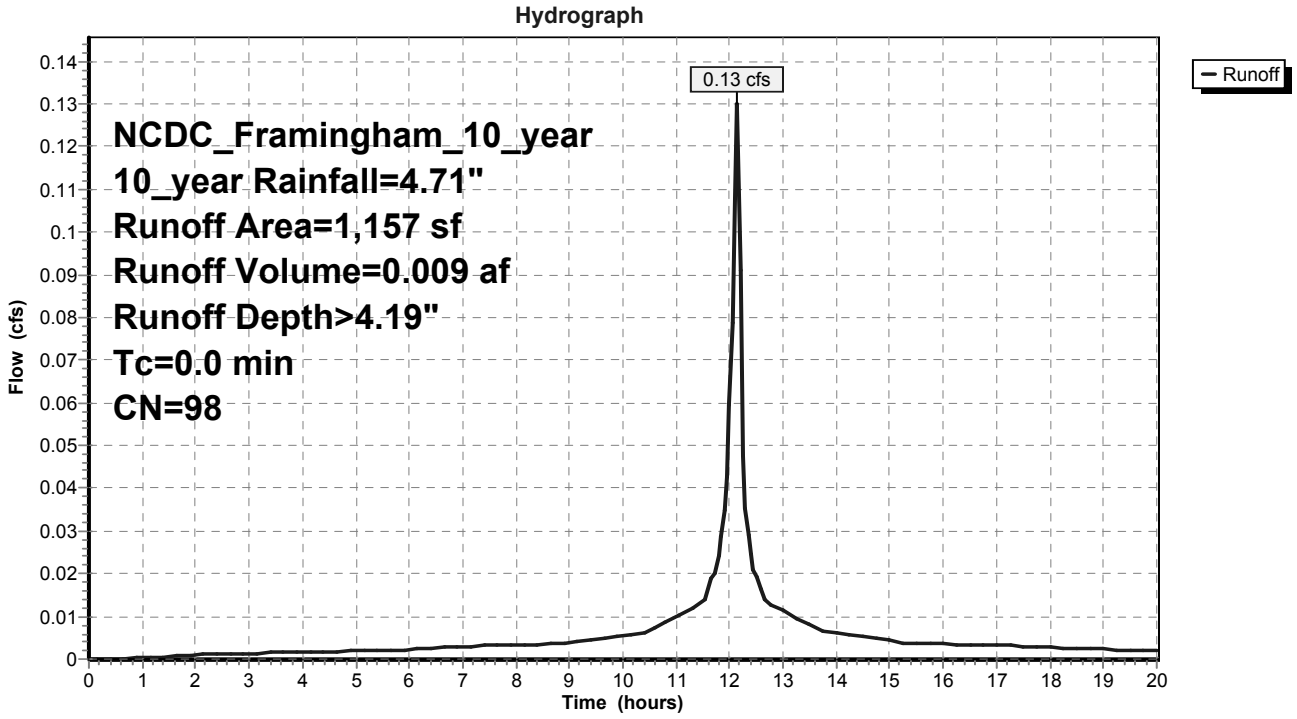
## Summary for Subcatchment ROOF-49: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-49: (blank)



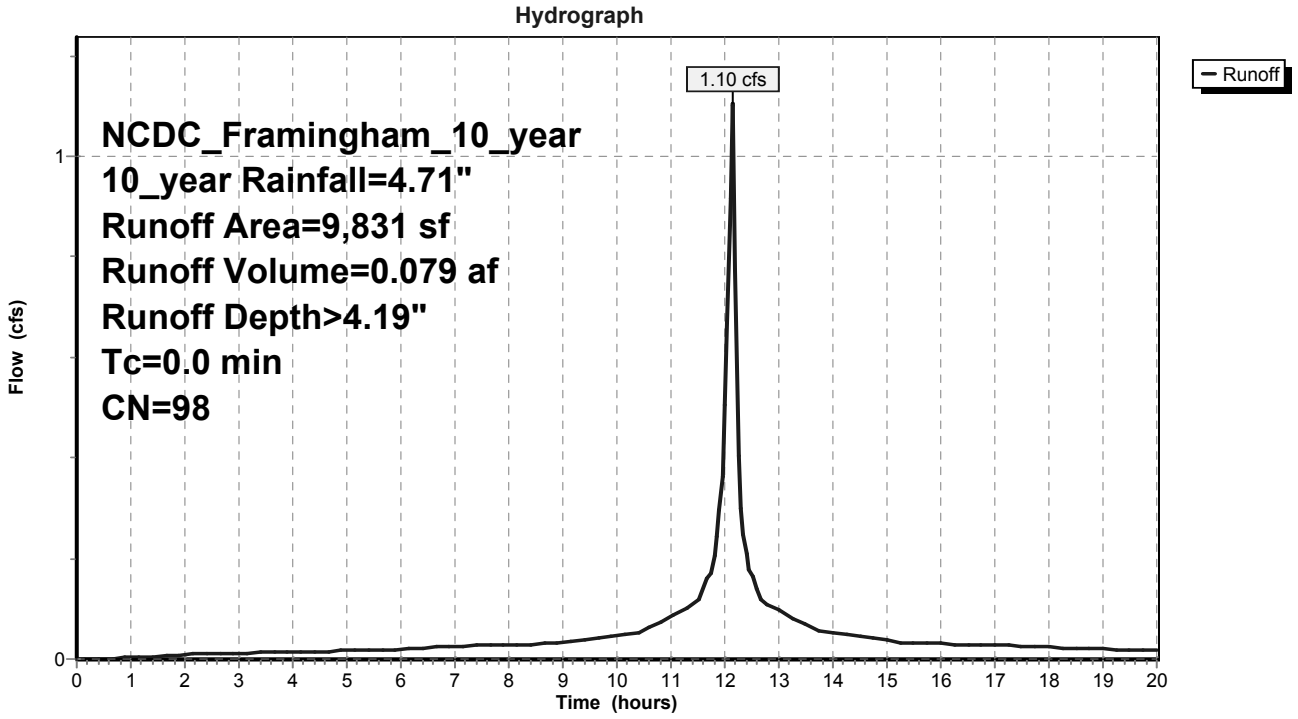
## Summary for Subcatchment ROOF-5: (blank)

Runoff = 1.10 cfs @ 12.14 hrs, Volume= 0.079 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 230 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,831 | 98 | Weighted Average |
| | 9,831 | | 100.00% Pervious Area |

## Subcatchment ROOF-5: (blank)



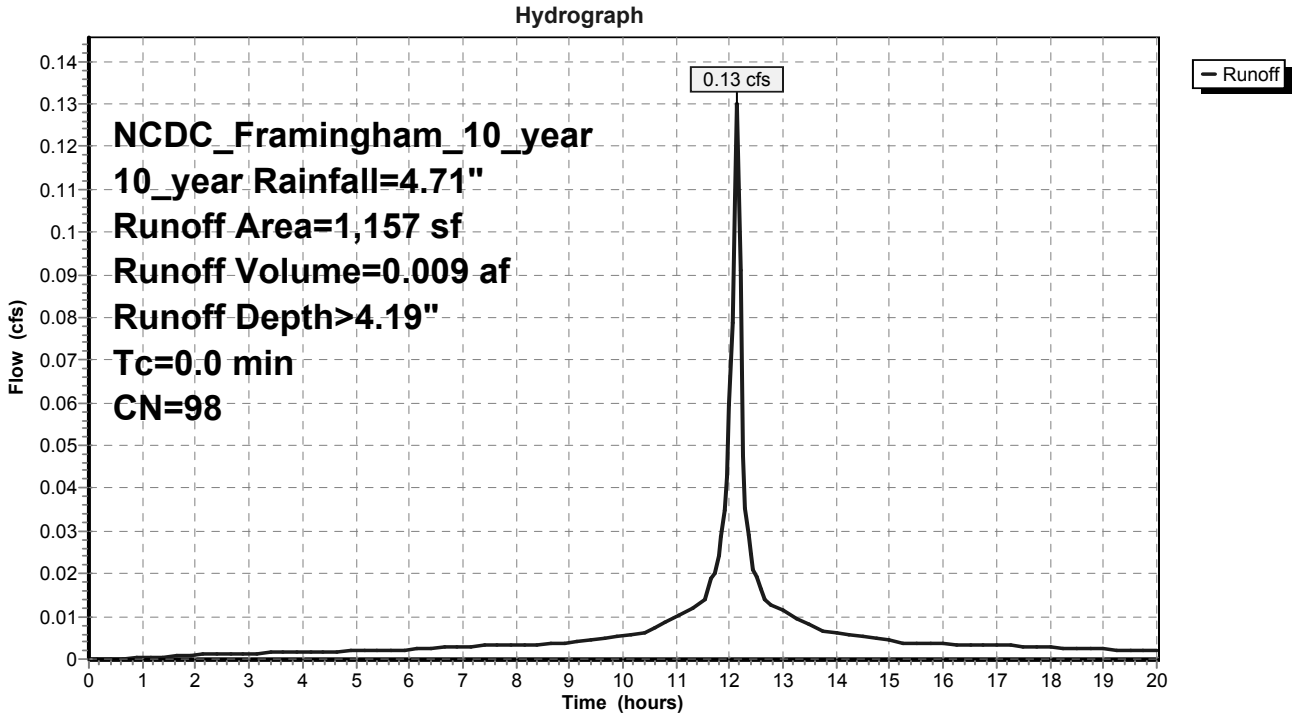
## Summary for Subcatchment ROOF-50: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-50: (blank)



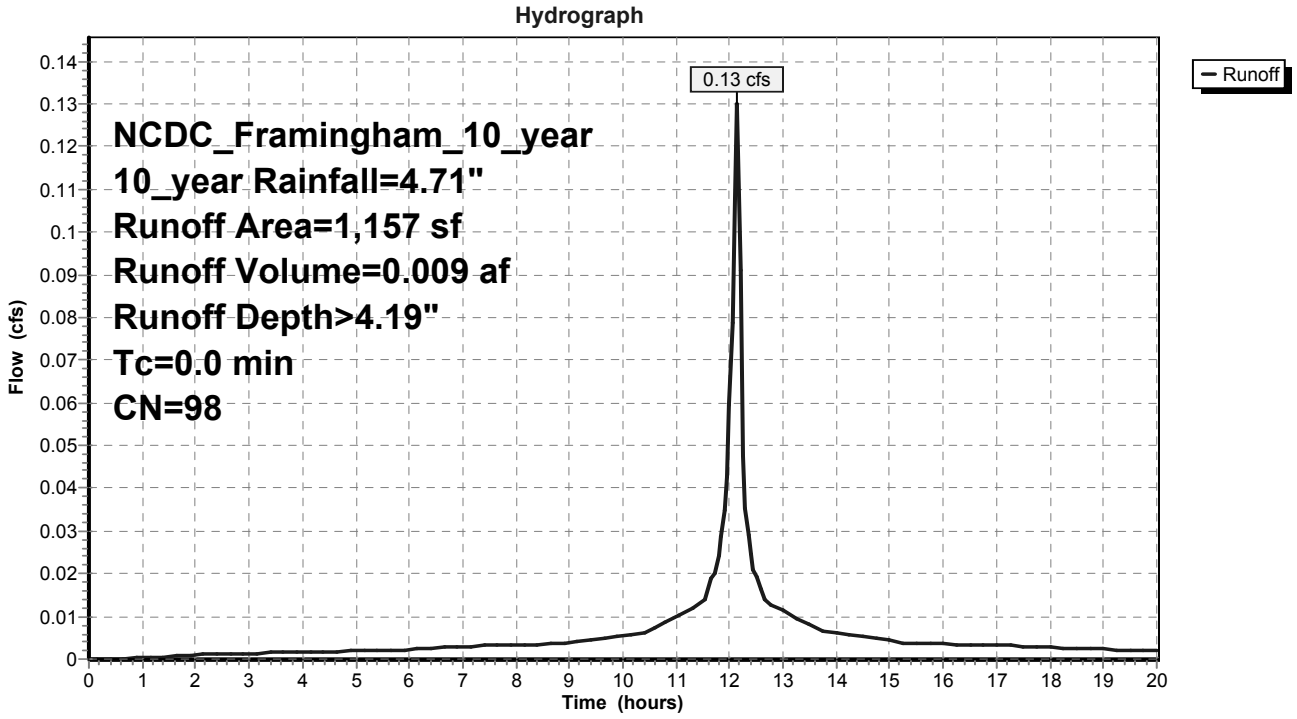
## Summary for Subcatchment ROOF-51: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-51: (blank)



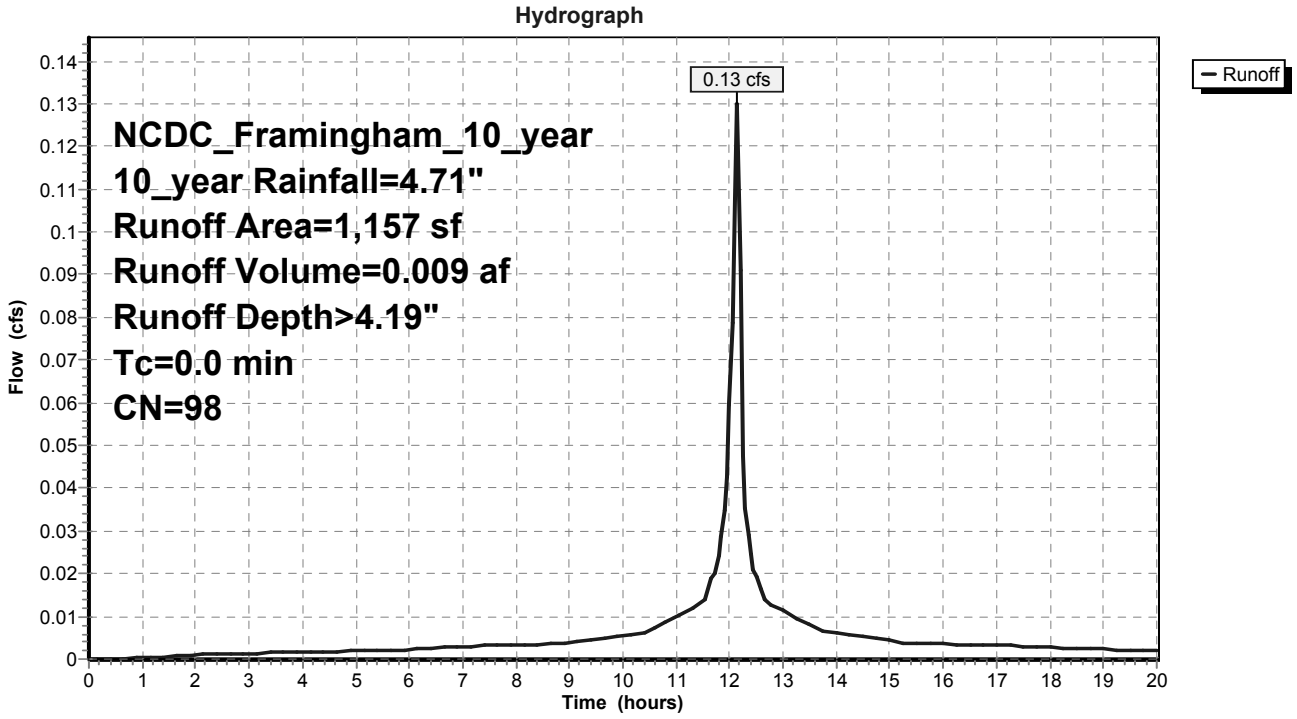
## Summary for Subcatchment ROOF-52: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-52: (blank)



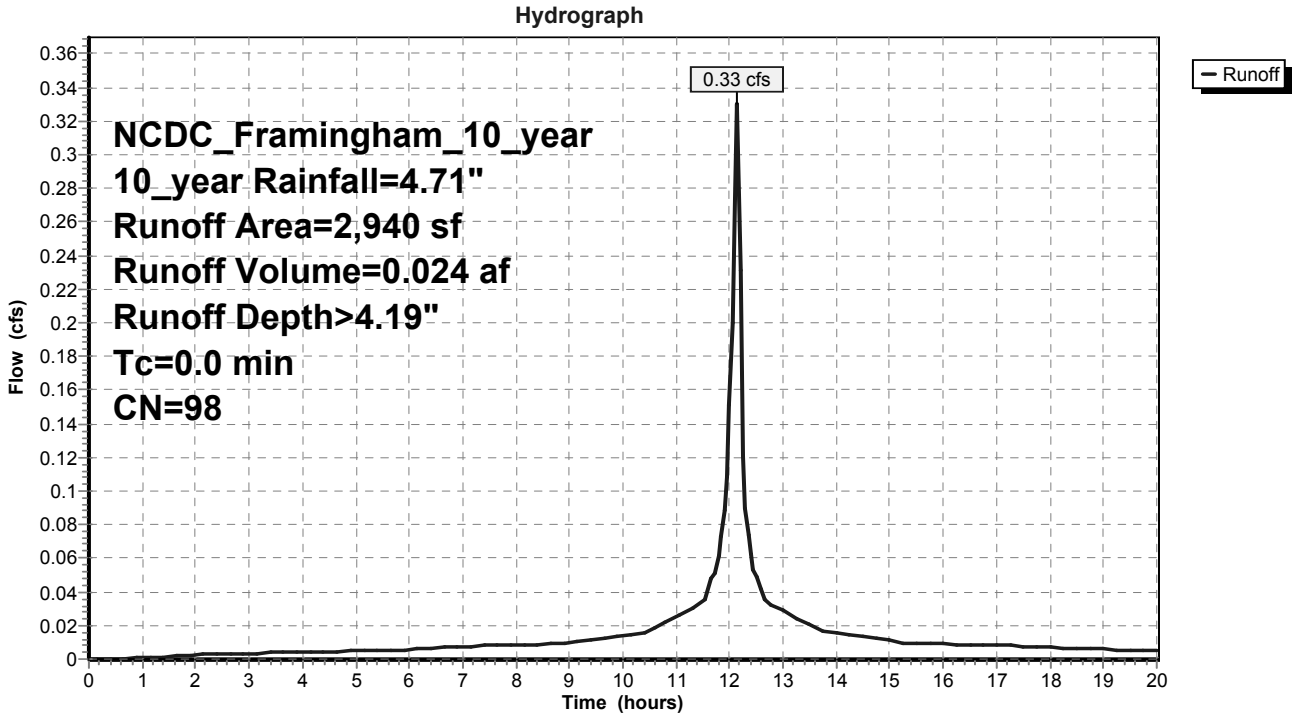
## Summary for Subcatchment ROOF-53: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-53: (blank)



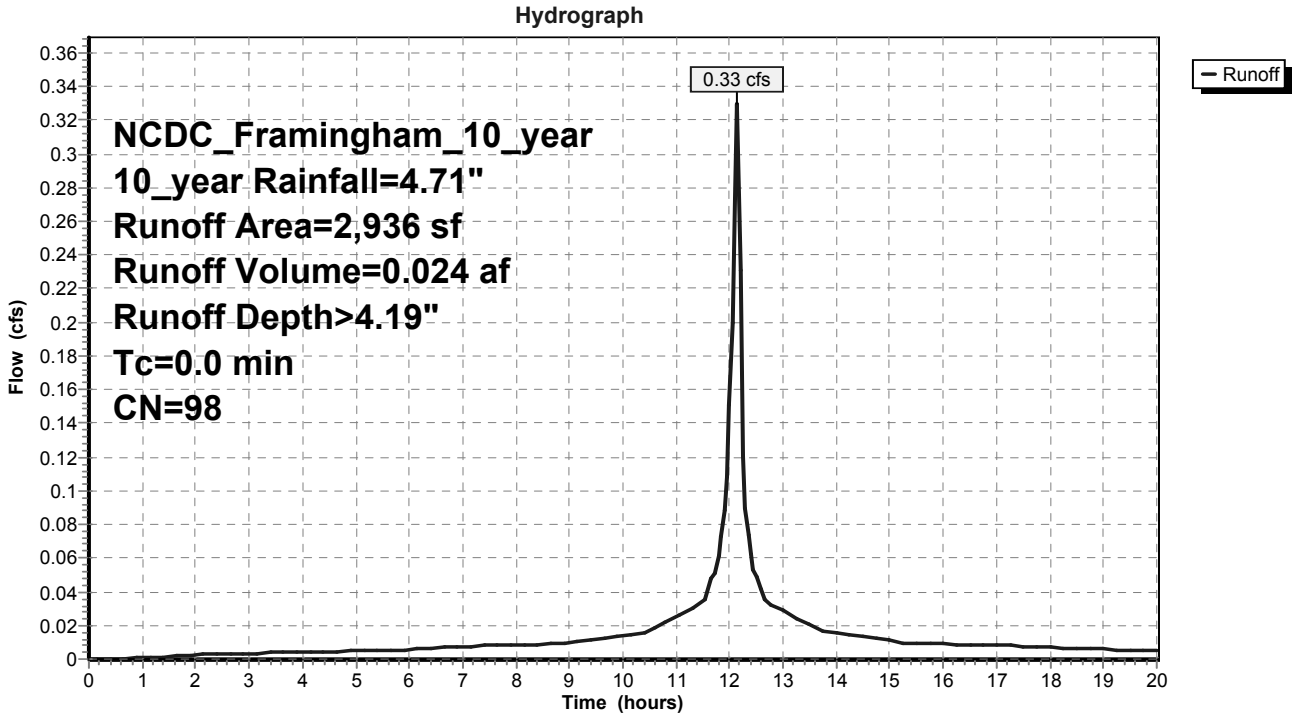
## Summary for Subcatchment ROOF-54: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,936 | 98 | ROOF, 100% imperv, HSG A |
| | 2,936 | | 100.00% Pervious Area |

## Subcatchment ROOF-54: (blank)



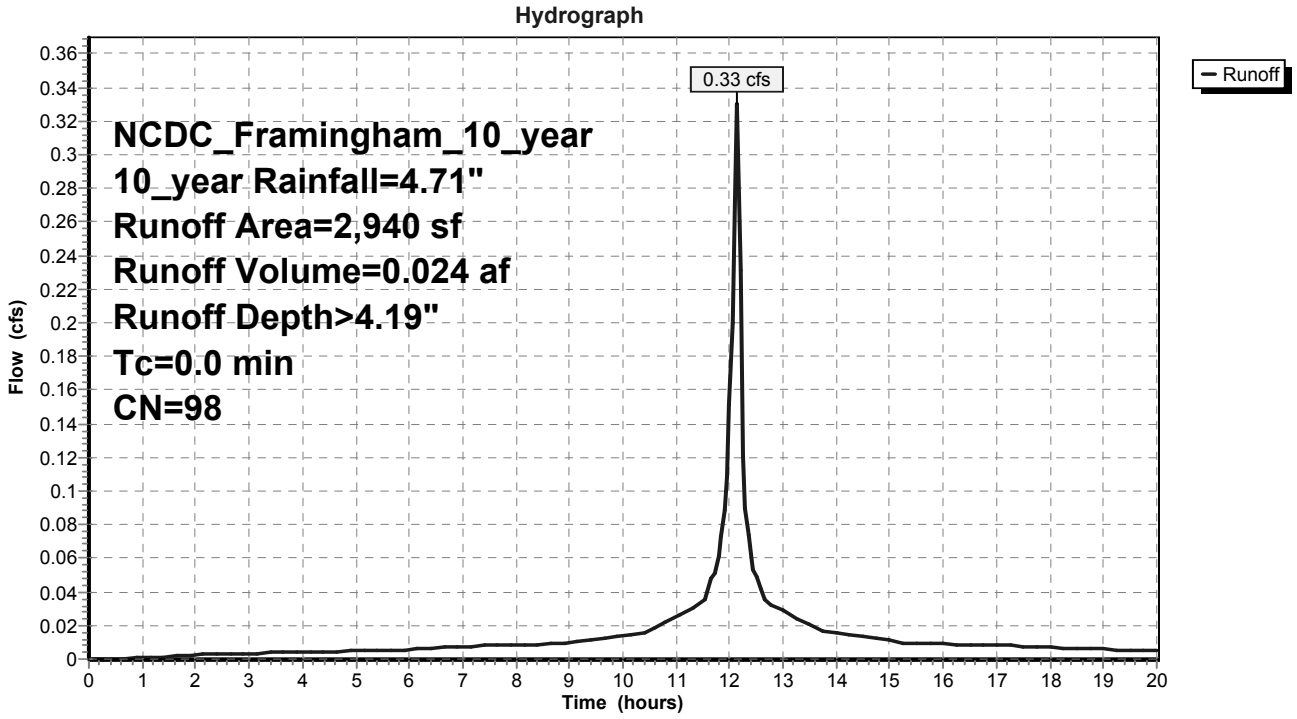
## Summary for Subcatchment ROOF-55: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-55: (blank)



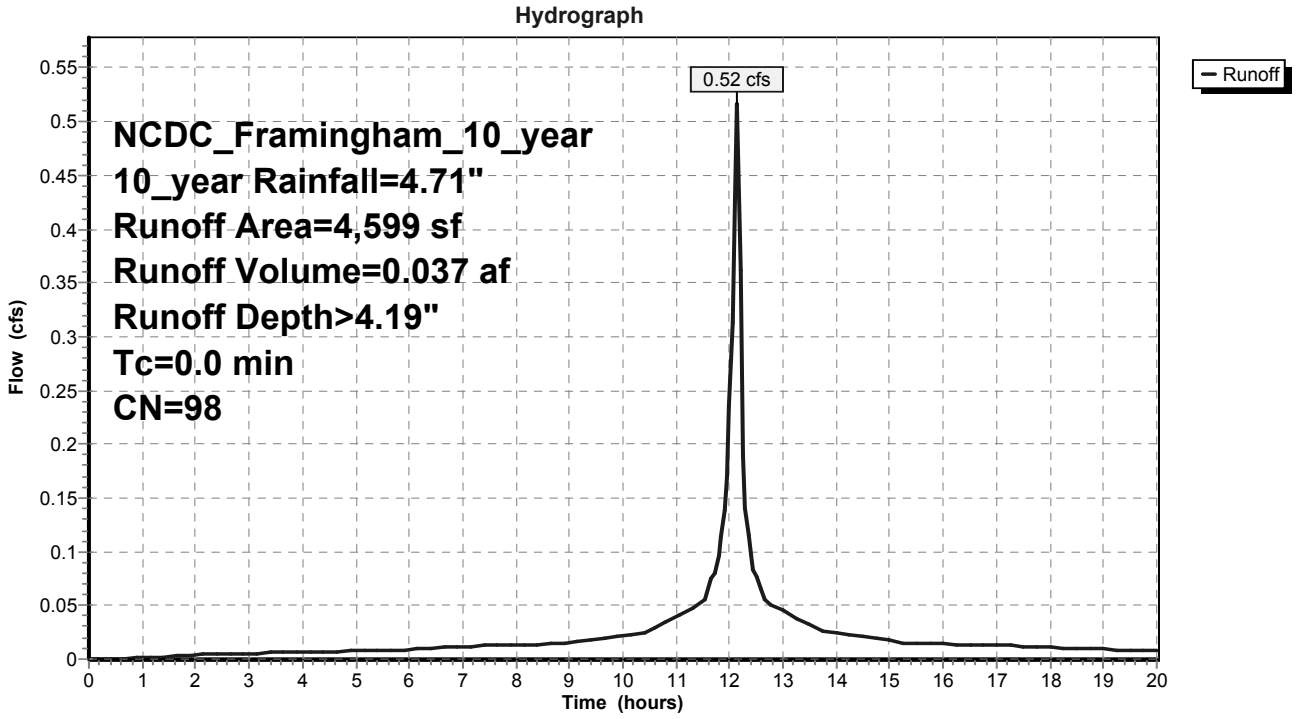
## Summary for Subcatchment ROOF-56: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG A |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-56: (blank)



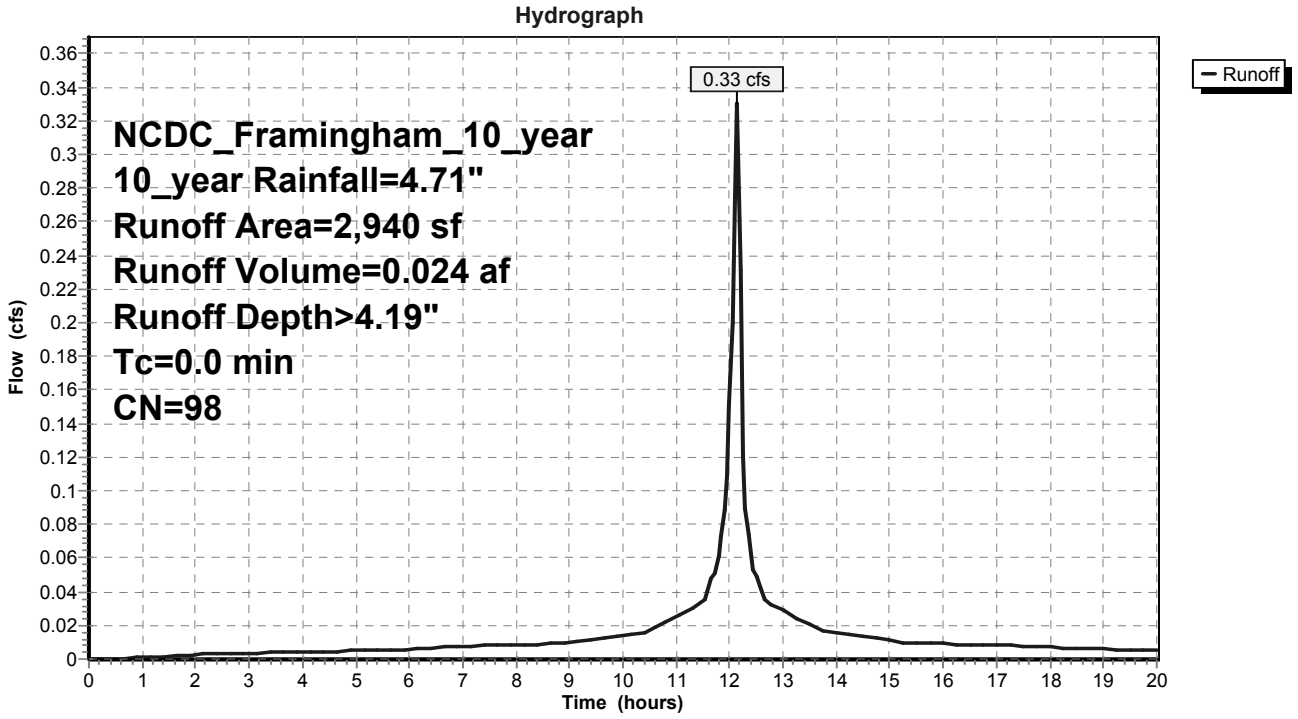
## Summary for Subcatchment ROOF-57: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,911 | 98 | ROOF, 100% imperv, HSG A |
| * | 29 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-57: (blank)



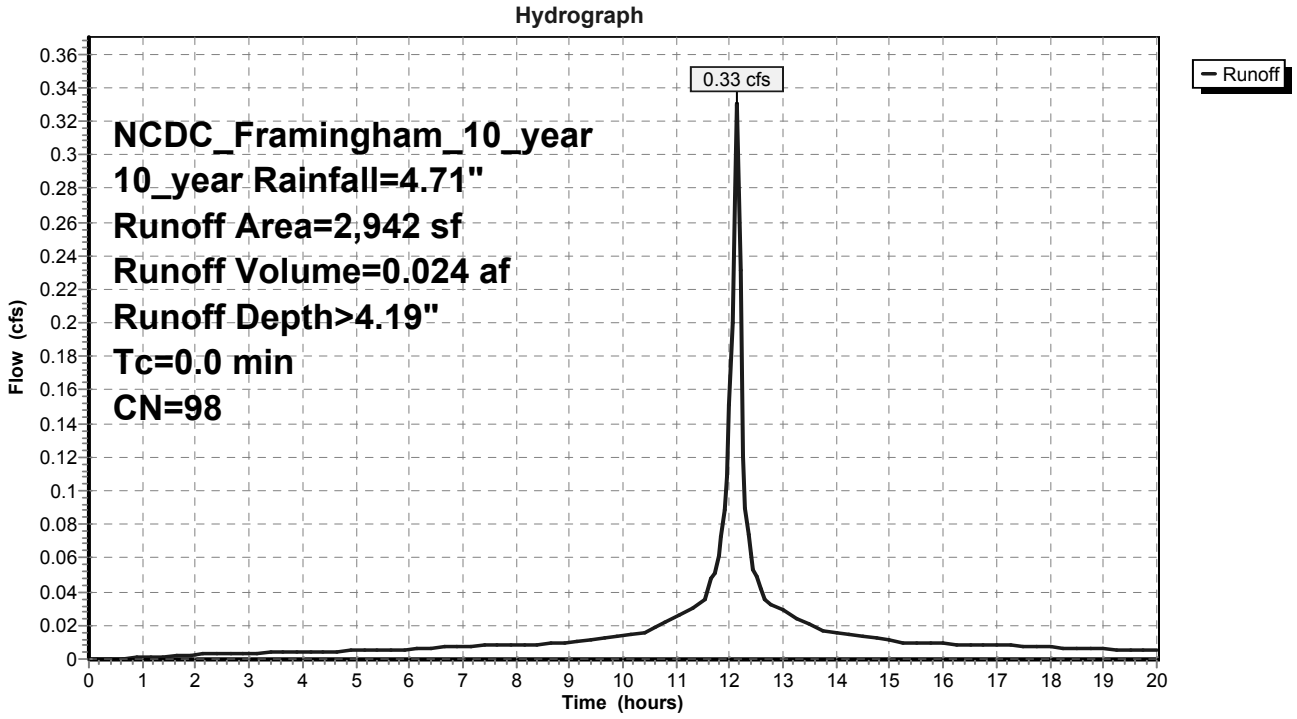
## Summary for Subcatchment ROOF-58: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22 | 98 | DECK, 100% imperv, HSG A |
| * | 2,919 | 98 | ROOF, 100% imperv, HSG A |
| | 2,942 | 98 | Weighted Average |
| | 2,942 | | 100.00% Pervious Area |

## Subcatchment ROOF-58: (blank)



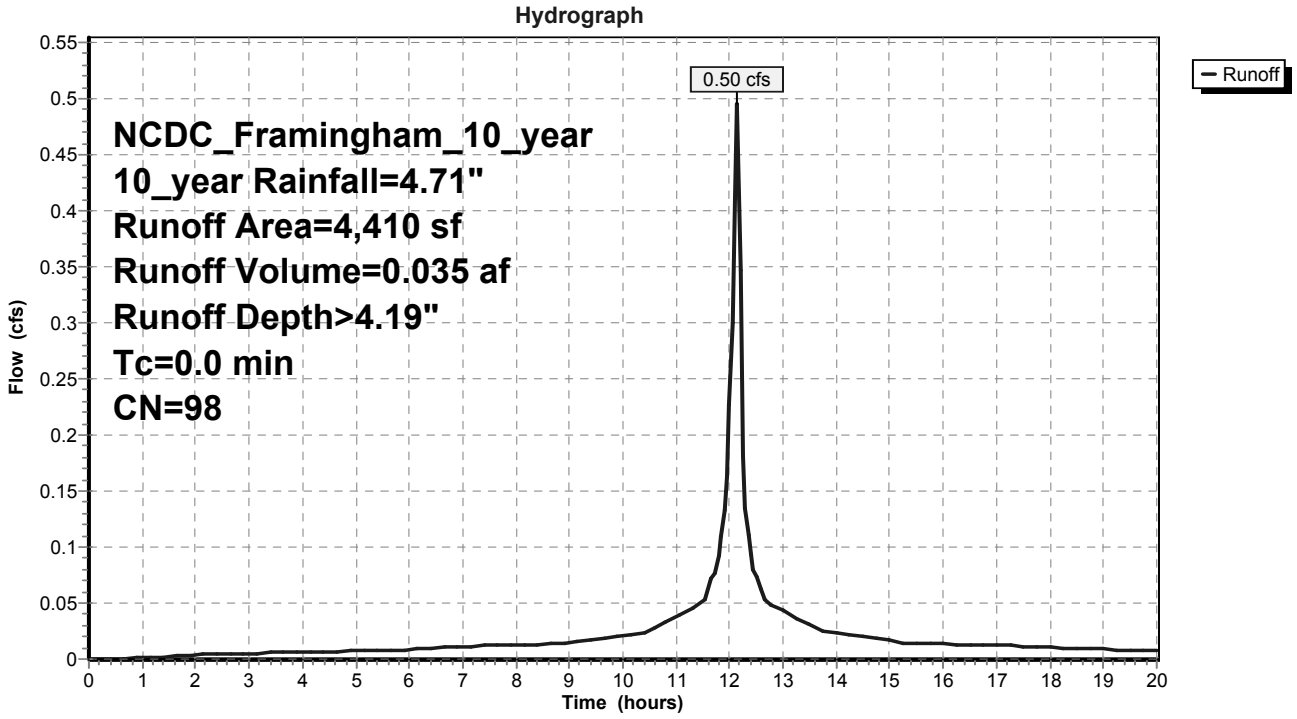
## Summary for Subcatchment ROOF-59: (blank)

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-59: (blank)



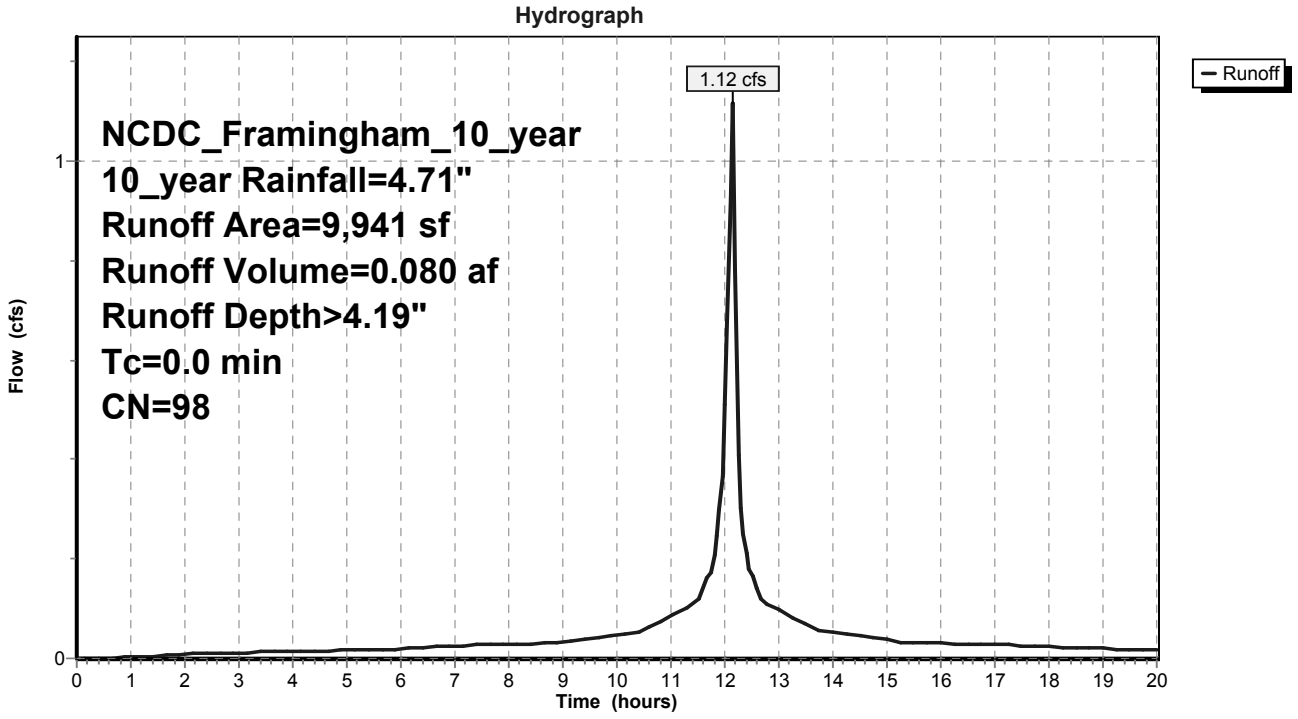
## Summary for Subcatchment ROOF-6: (blank)

Runoff = 1.12 cfs @ 12.14 hrs, Volume= 0.080 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 340 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,941 | 98 | Weighted Average |
| | 9,941 | | 100.00% Pervious Area |

## Subcatchment ROOF-6: (blank)



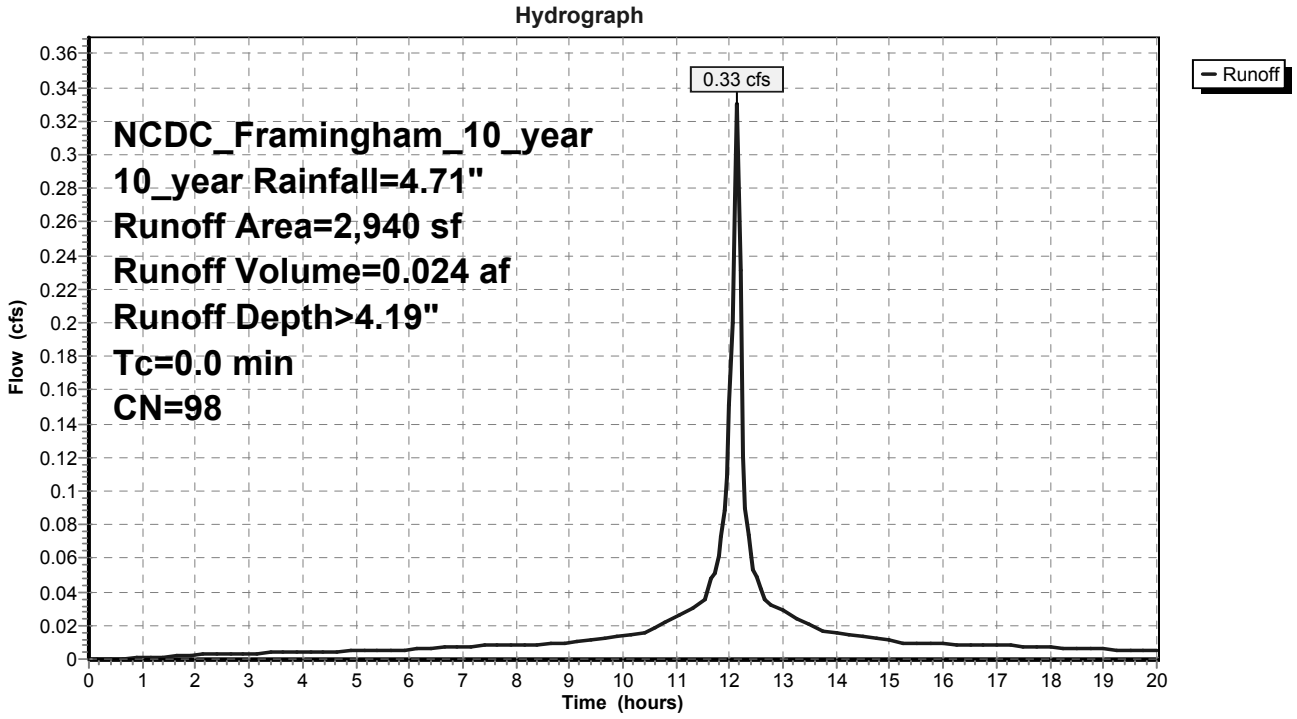
## Summary for Subcatchment ROOF-60: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-60: (blank)



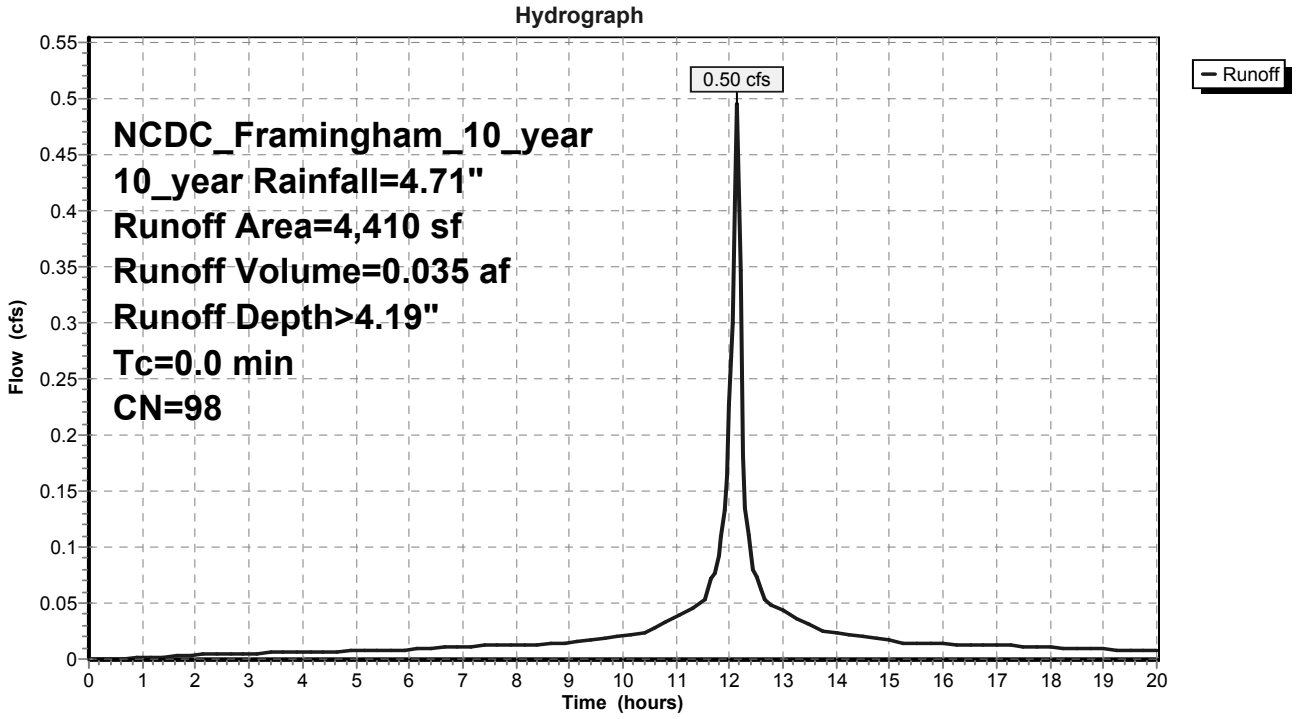
## Summary for Subcatchment ROOF-61: (blank)

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-61: (blank)



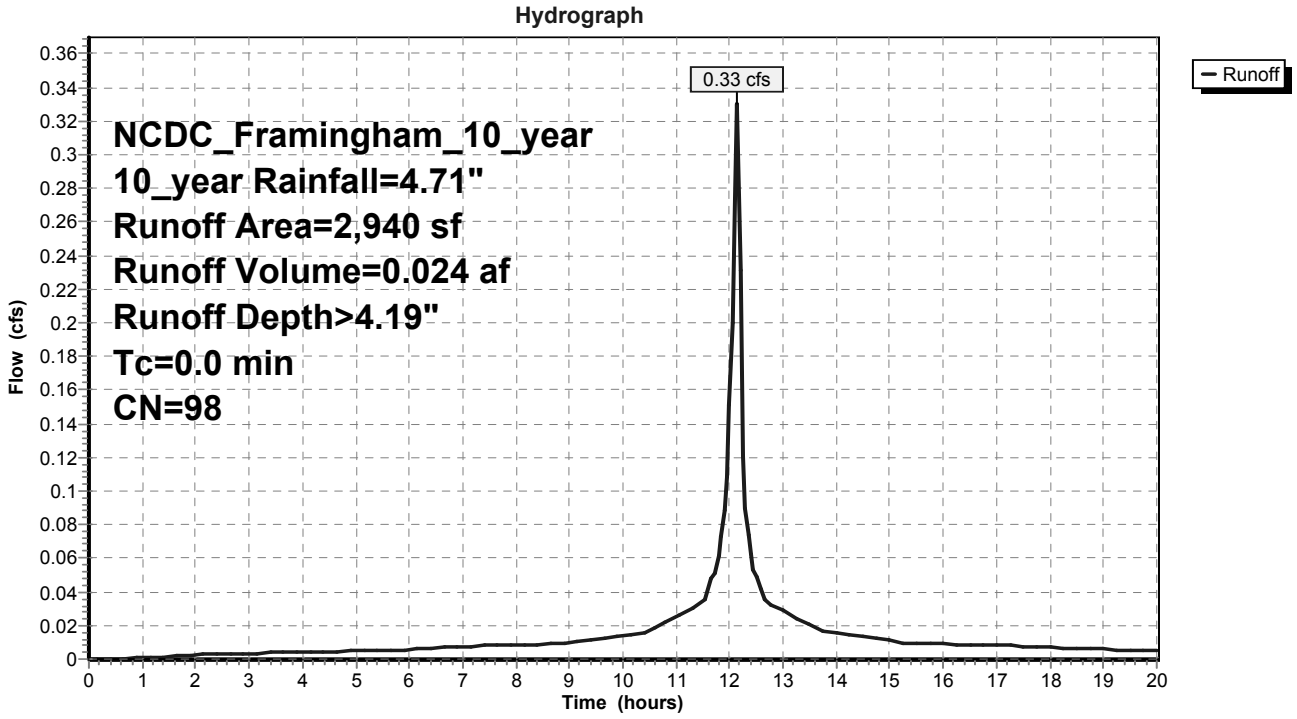
## Summary for Subcatchment ROOF-62: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-62: (blank)



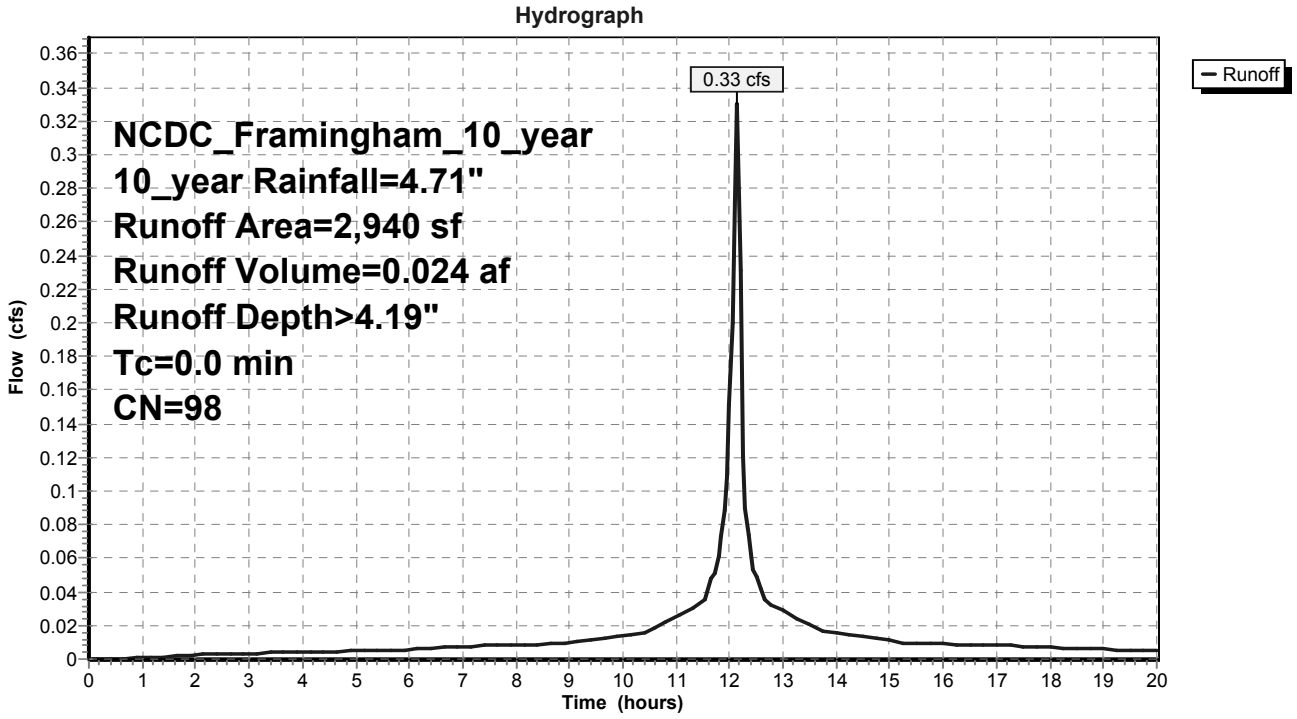
## Summary for Subcatchment ROOF-63: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-63: (blank)



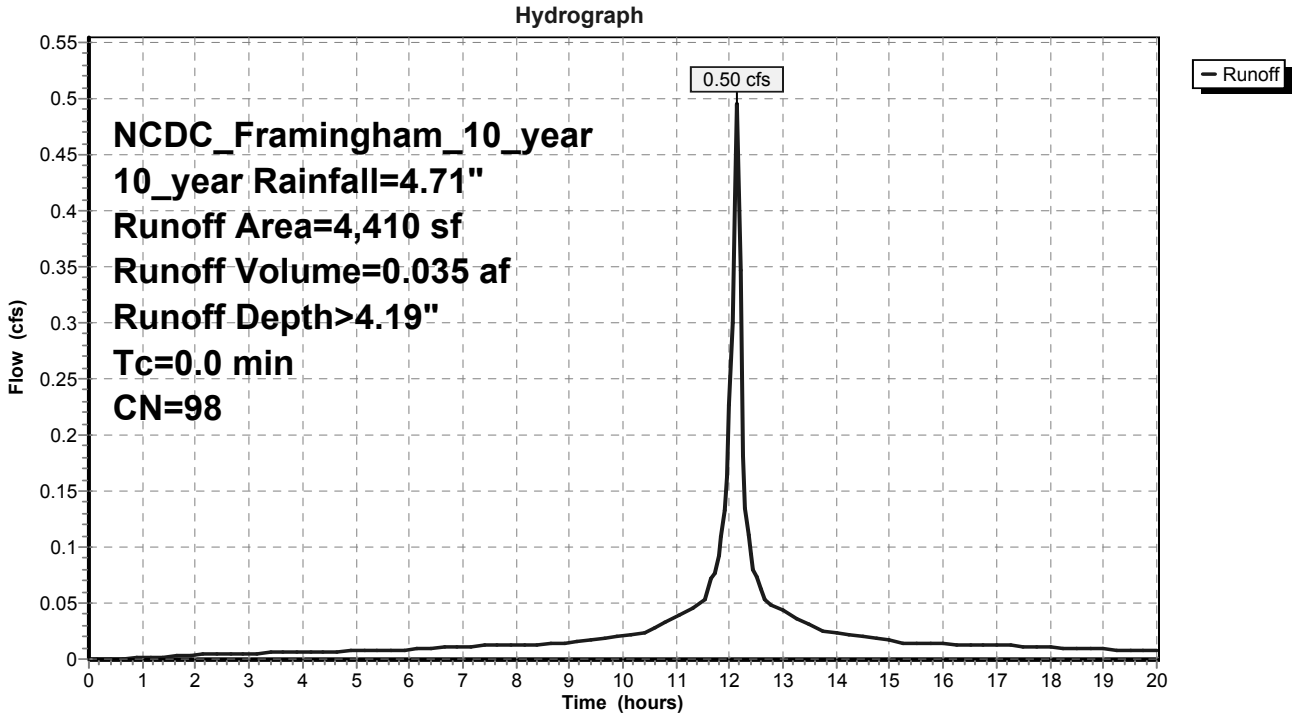
## Summary for Subcatchment ROOF-64: (blank)

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-64: (blank)



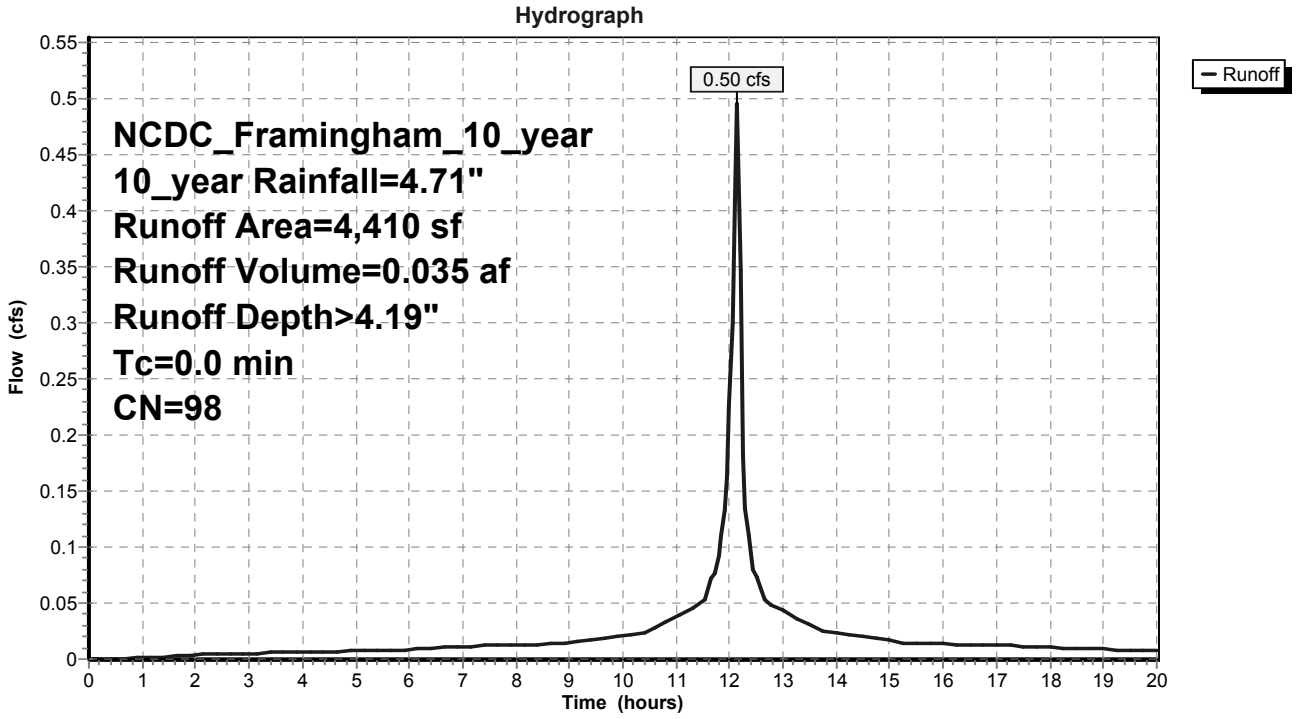
## Summary for Subcatchment ROOF-65: (blank)

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-65: (blank)



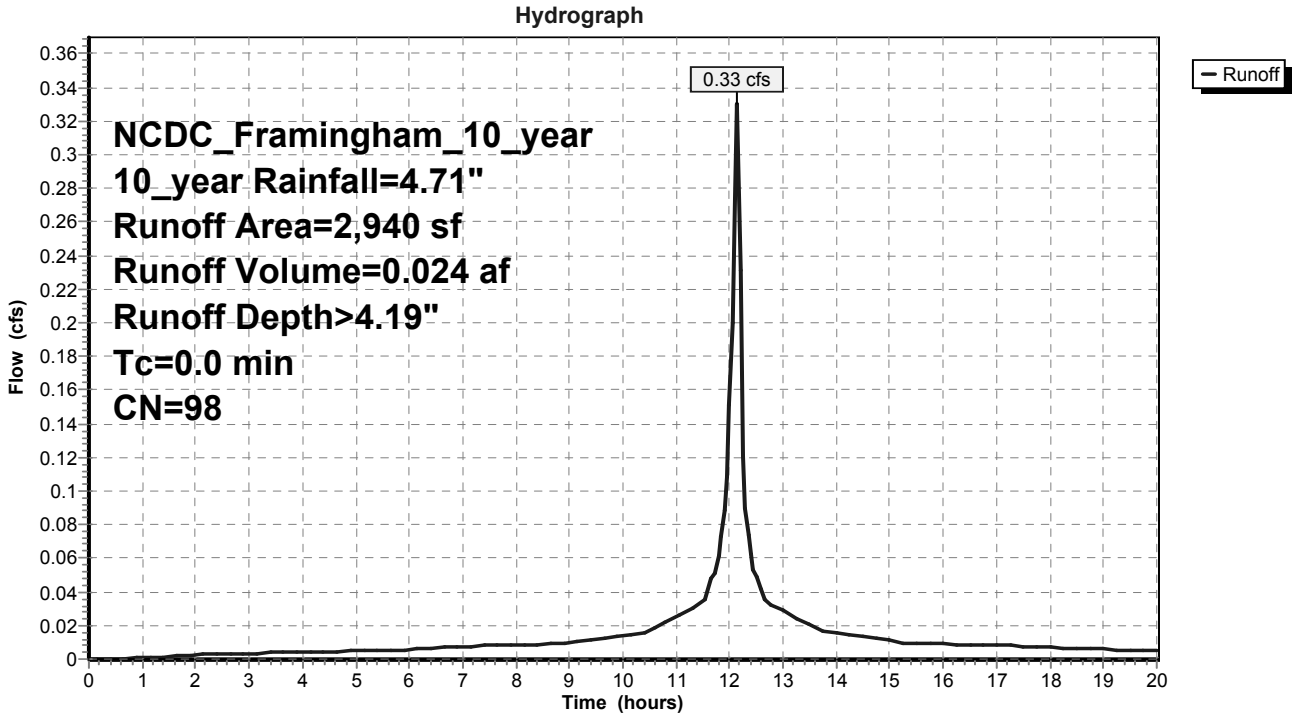
## Summary for Subcatchment ROOF-66: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-66: (blank)



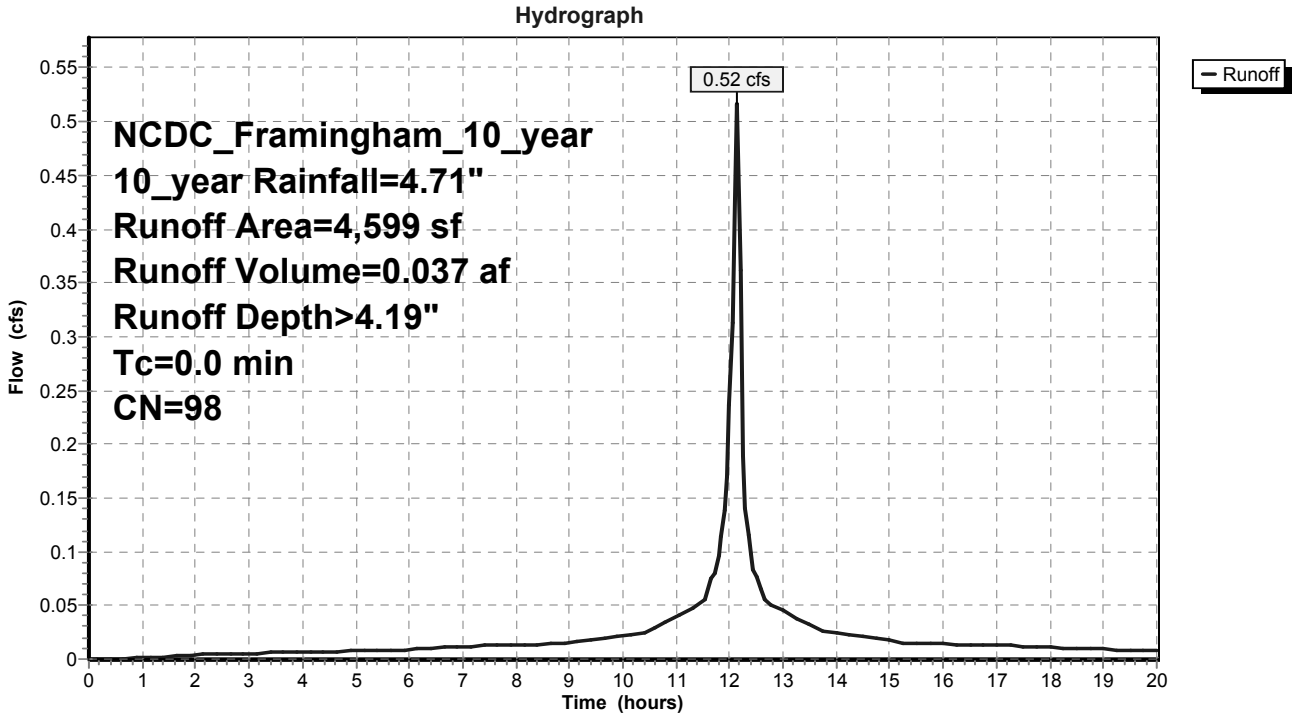
## Summary for Subcatchment ROOF-67: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-67: (blank)



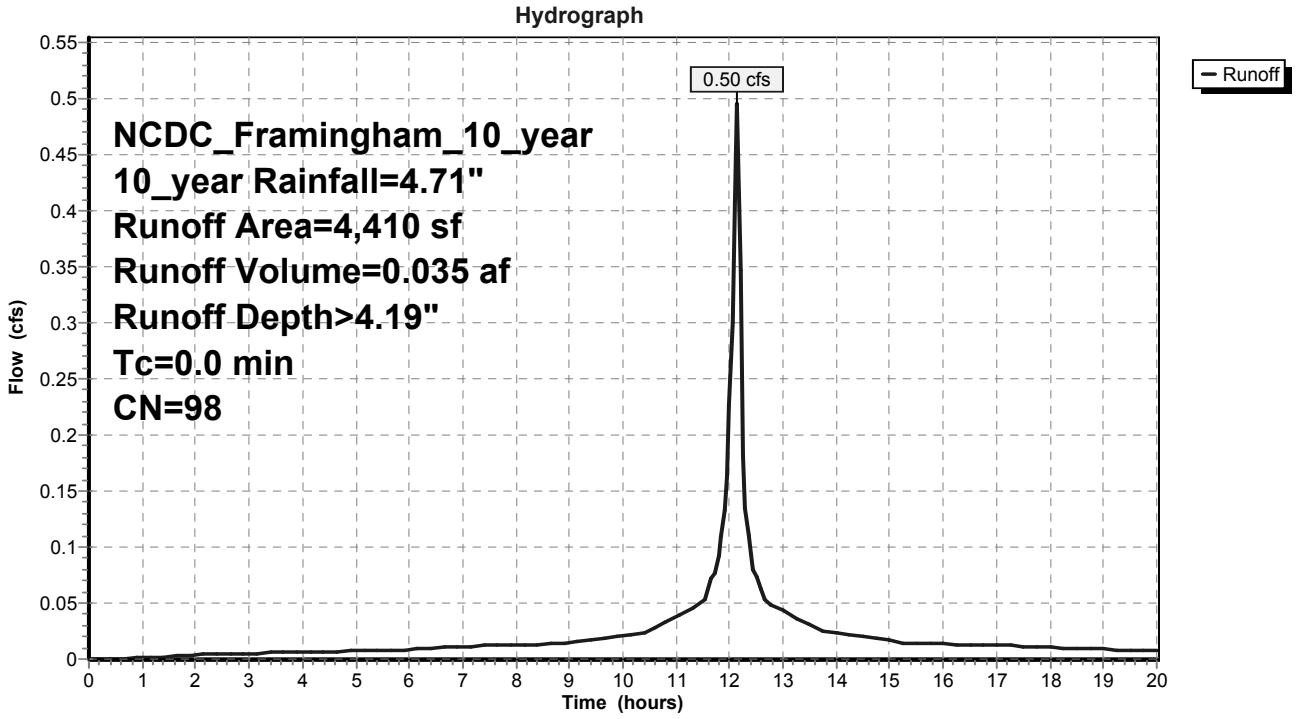
## Summary for Subcatchment ROOF-68: (blank)

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-68: (blank)



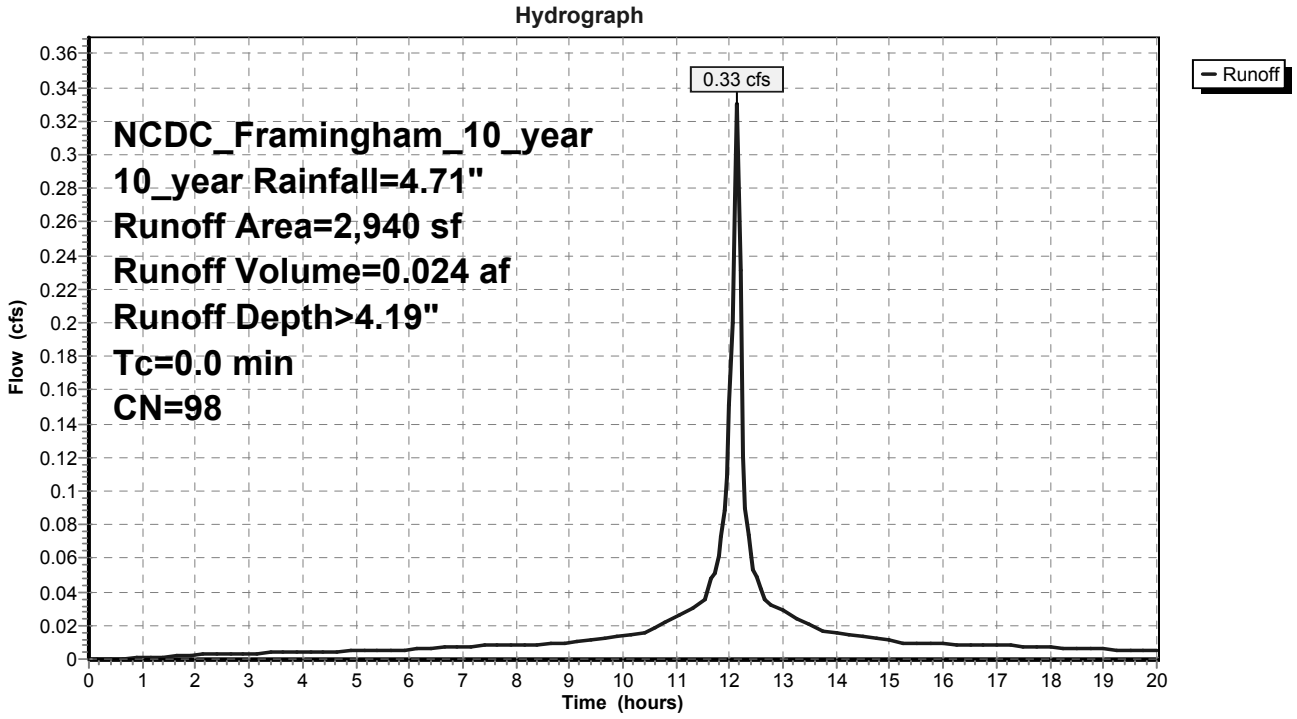
## Summary for Subcatchment ROOF-69: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-69: (blank)



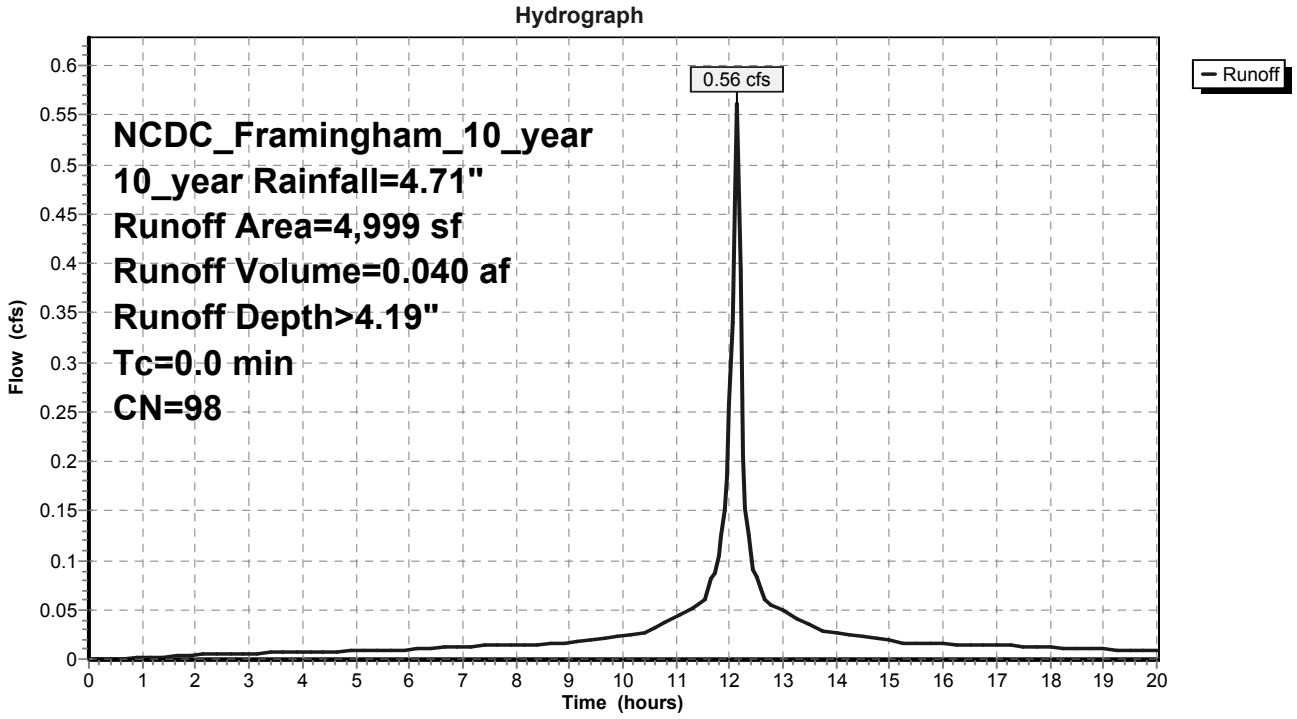
## Summary for Subcatchment ROOF-7: (blank)

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.040 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-7: (blank)



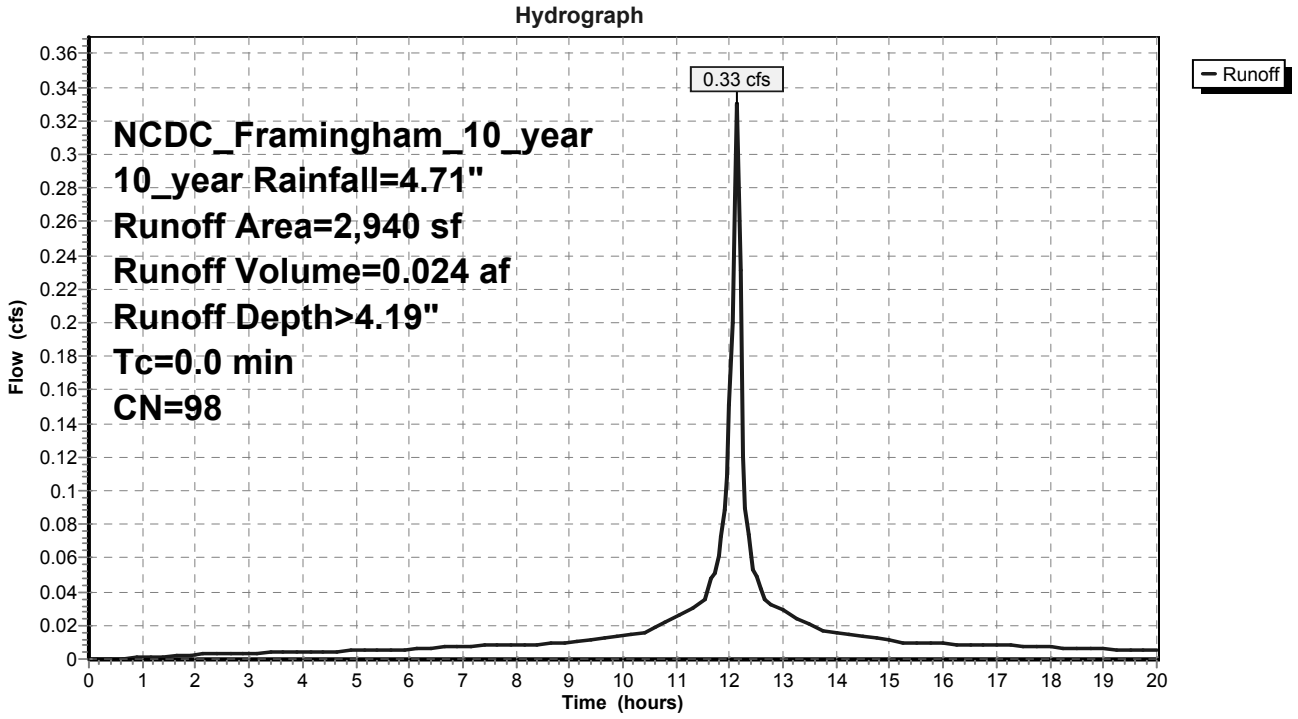
## Summary for Subcatchment ROOF-70: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,017 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,923 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-70: (blank)



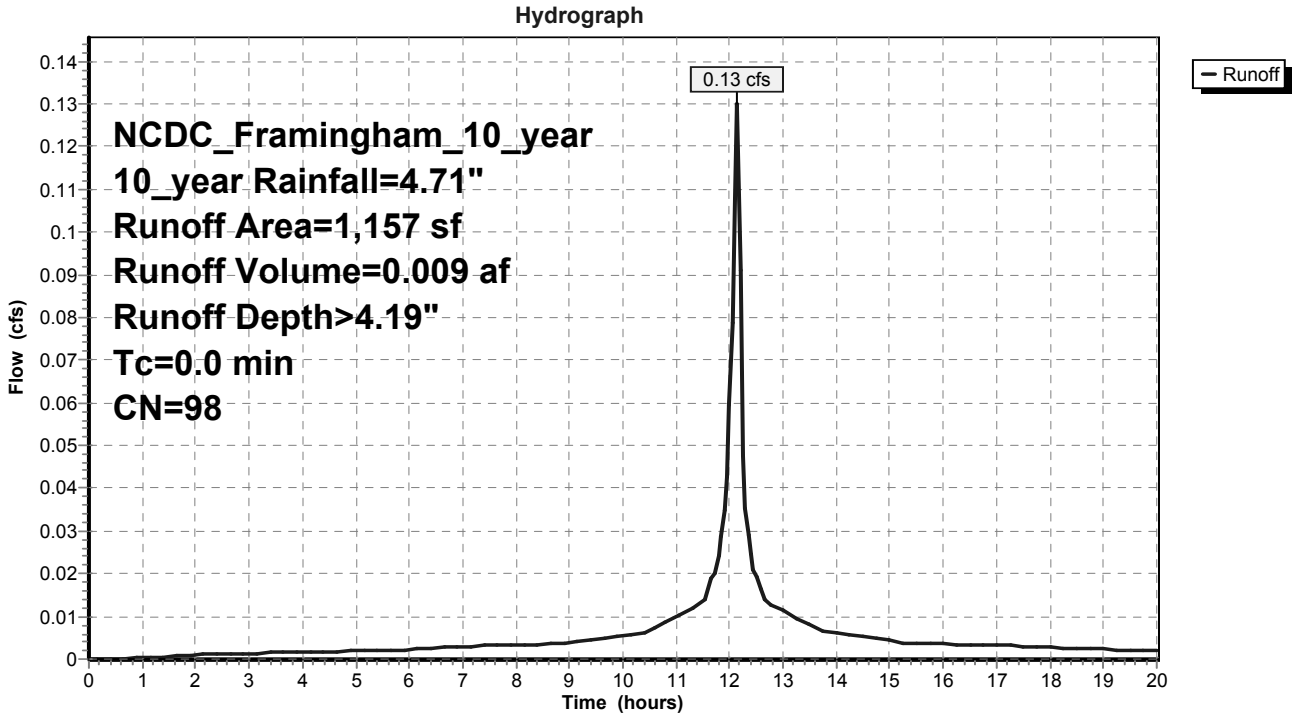
## Summary for Subcatchment ROOF-71: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-71: (blank)



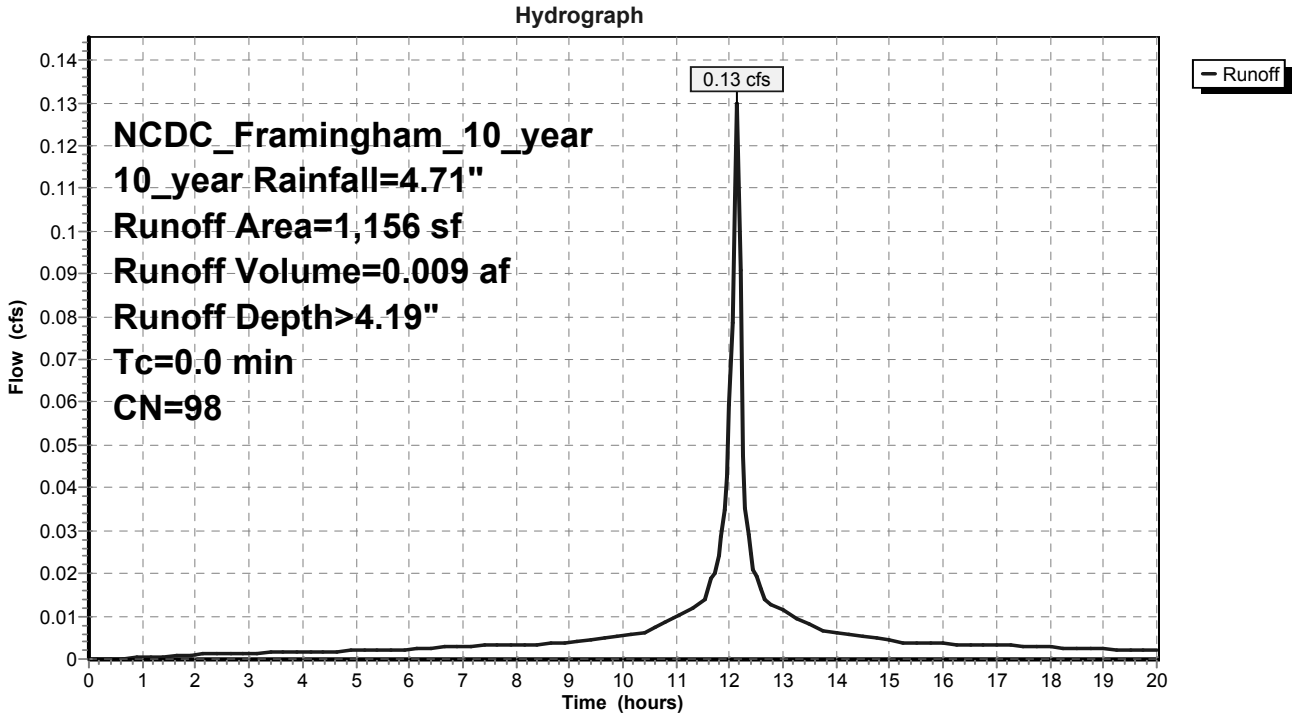
## Summary for Subcatchment ROOF-72: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 106 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,050 | 98 | ROOF, 100% imperv, HSG B |
| | 1,156 | 98 | Weighted Average |
| | 1,156 | | 100.00% Pervious Area |

## Subcatchment ROOF-72: (blank)



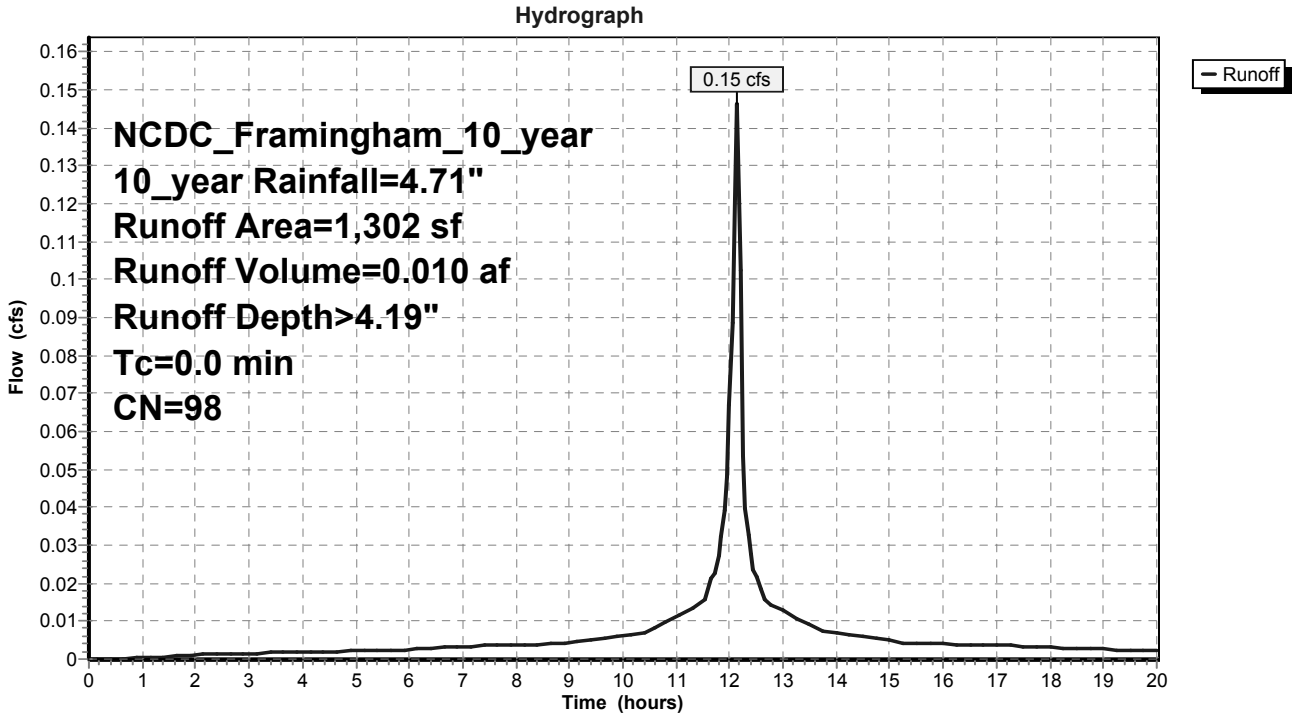
## Summary for Subcatchment ROOF-73: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-73: (blank)



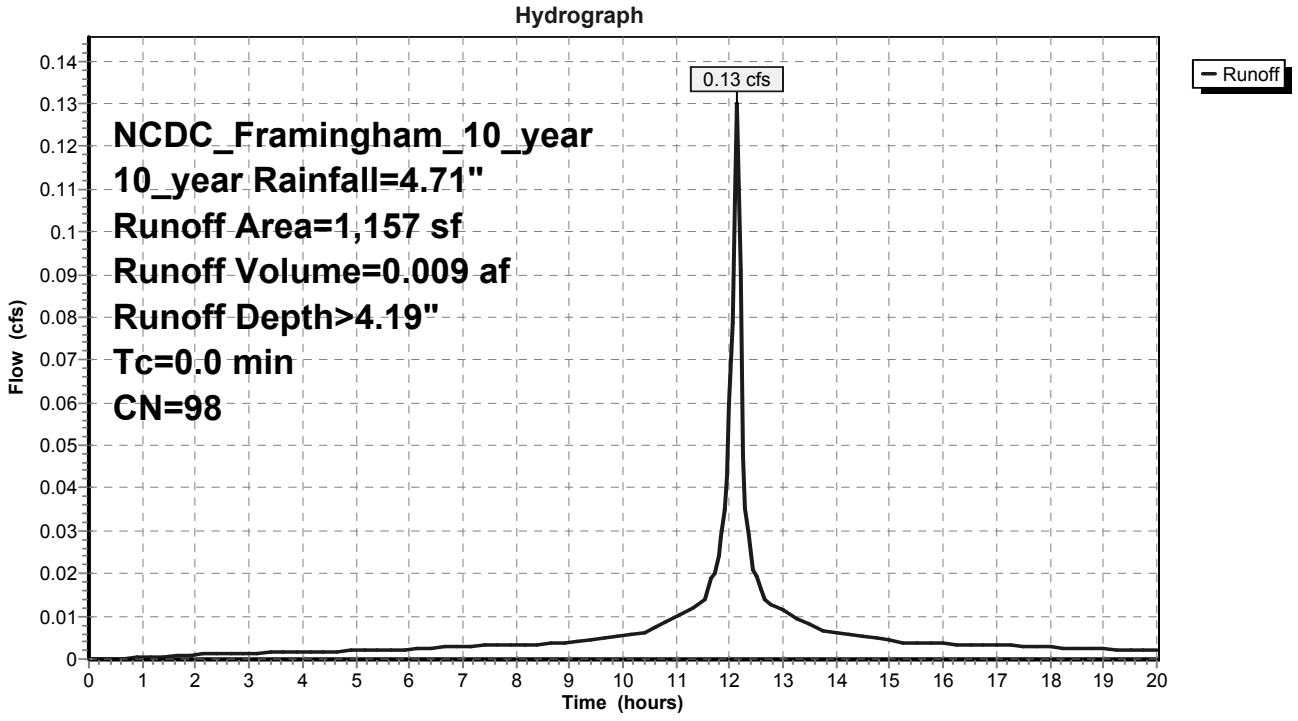
## Summary for Subcatchment ROOF-74: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 465 | 98 | ROOF, 100% imperv, HSG A |
| * | 693 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-74: (blank)



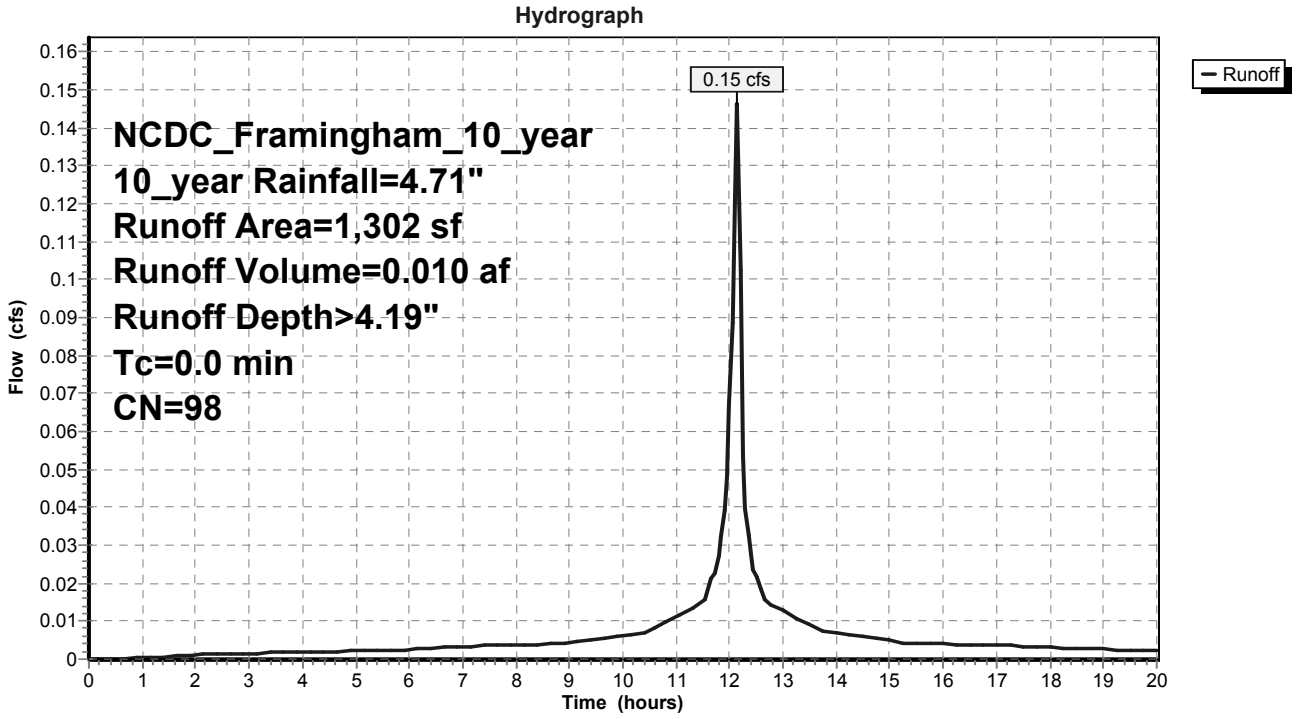
## Summary for Subcatchment ROOF-75: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-75: (blank)



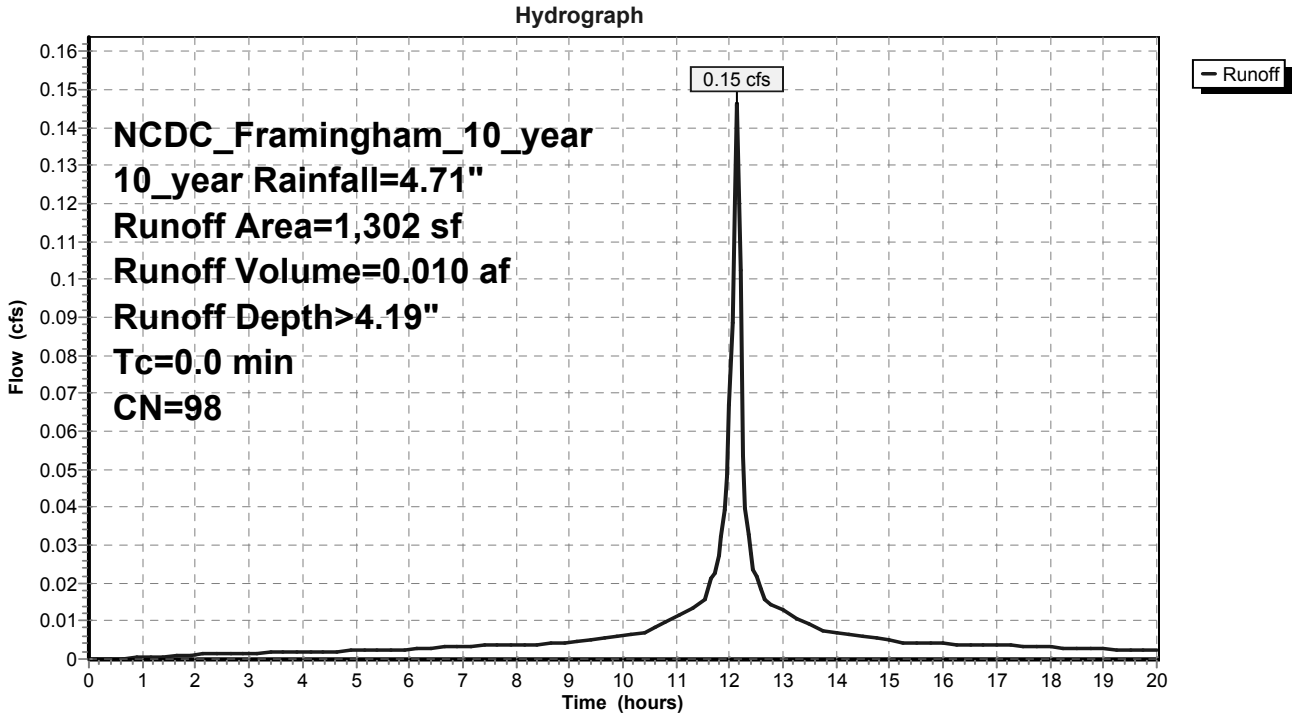
## Summary for Subcatchment ROOF-76: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 643 | 98 | ROOF, 100% imperv, HSG A |
| * | 659 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-76: (blank)



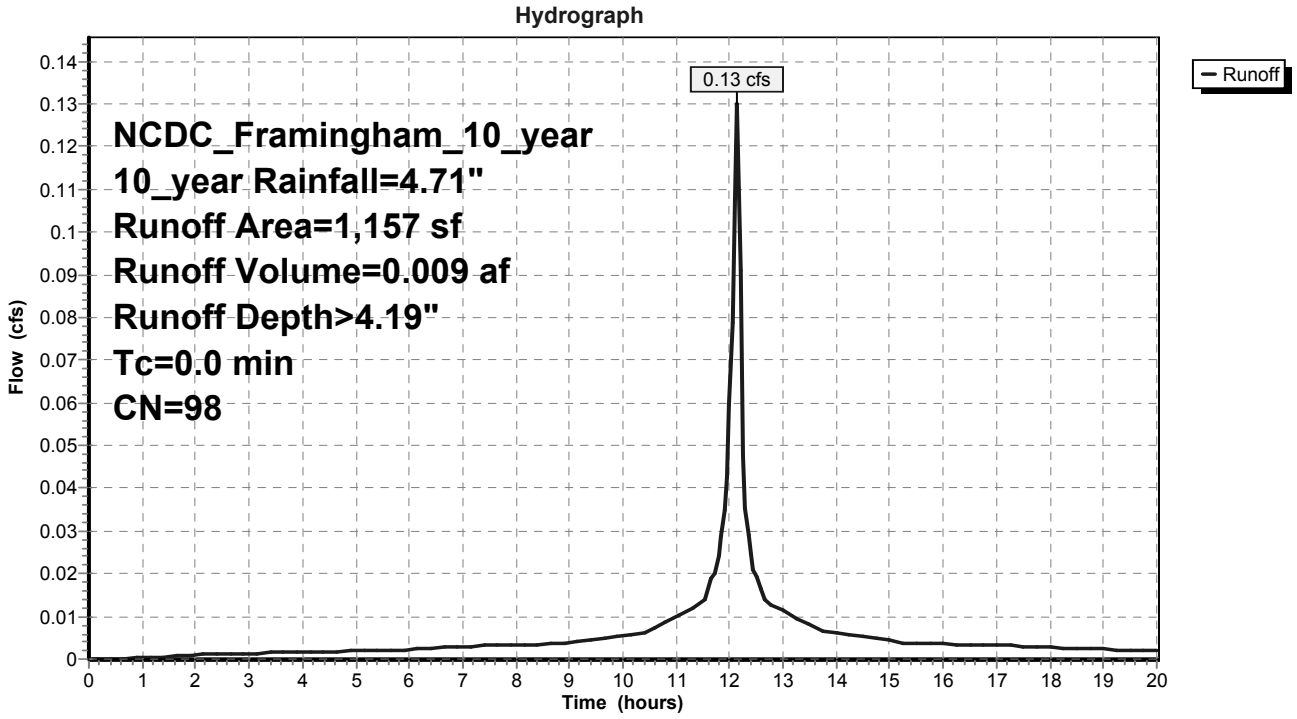
## Summary for Subcatchment ROOF-77: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-77: (blank)



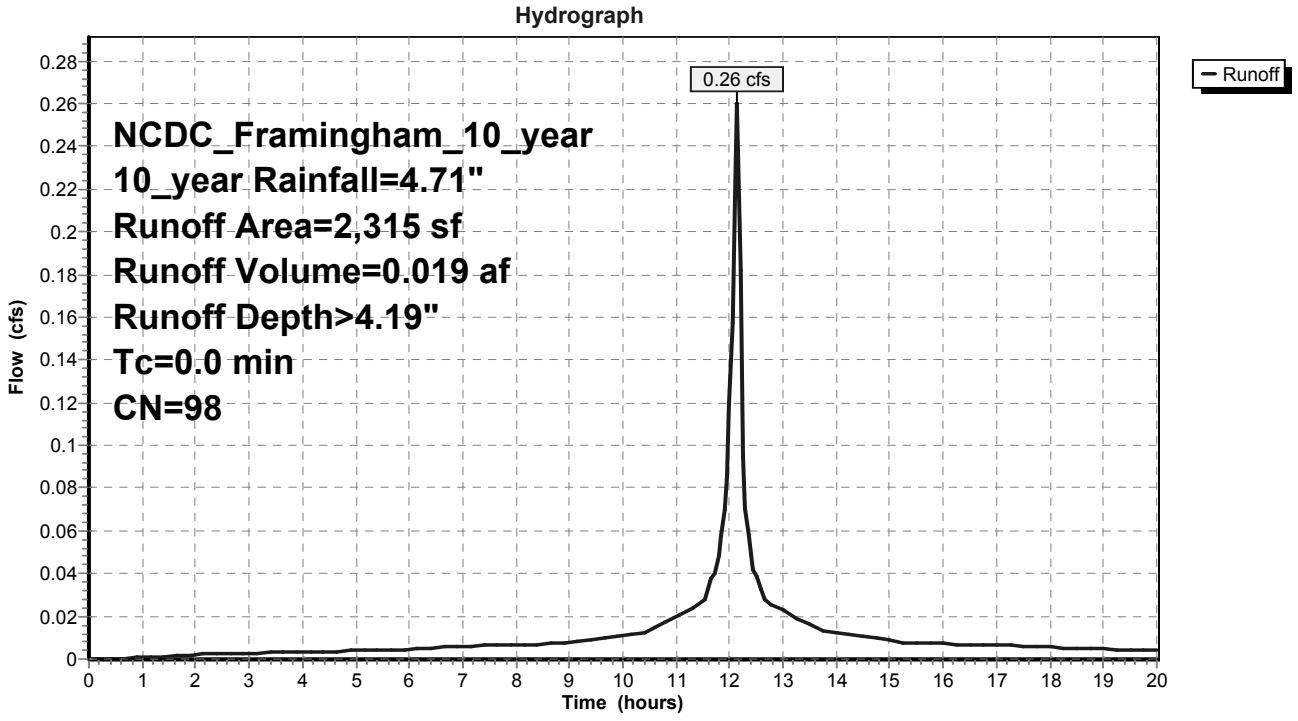
## Summary for Subcatchment ROOF-78: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,443 | 98 | ROOF, 100% imperv, HSG A |
| * | 872 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | 98 | Weighted Average |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-78: (blank)



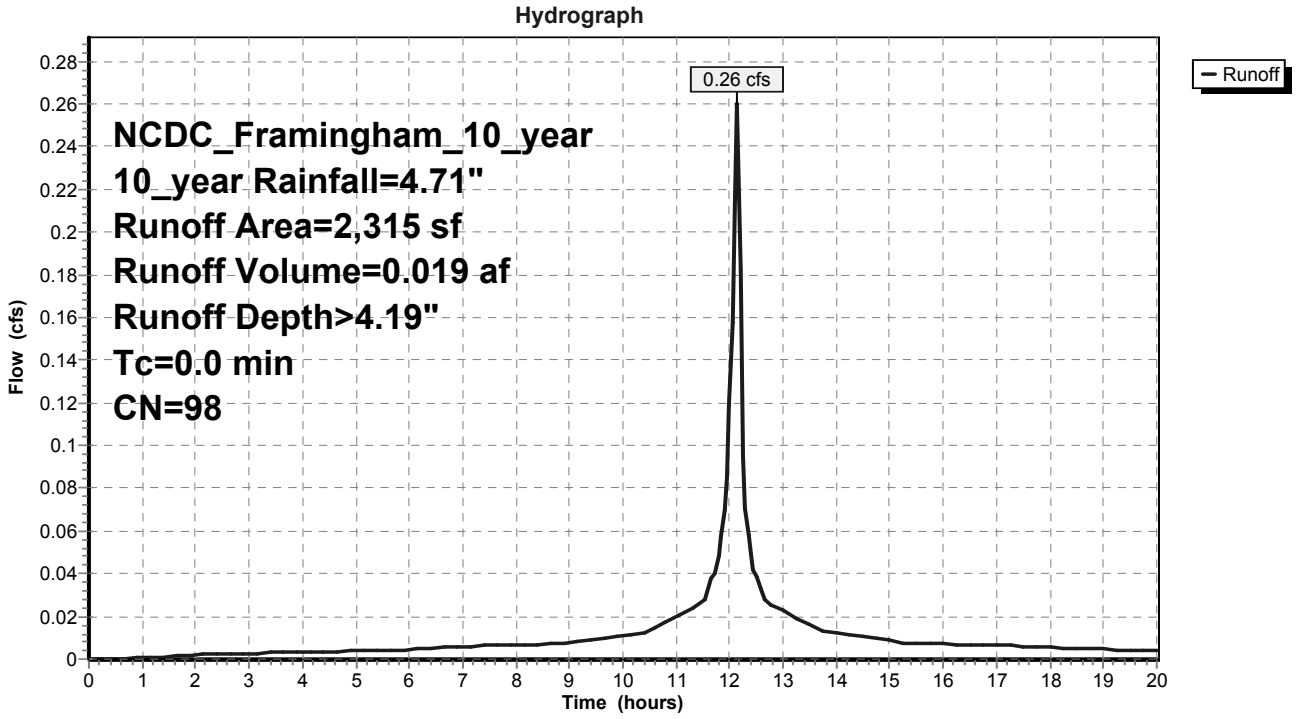
## Summary for Subcatchment ROOF-79: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG A |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-79: (blank)



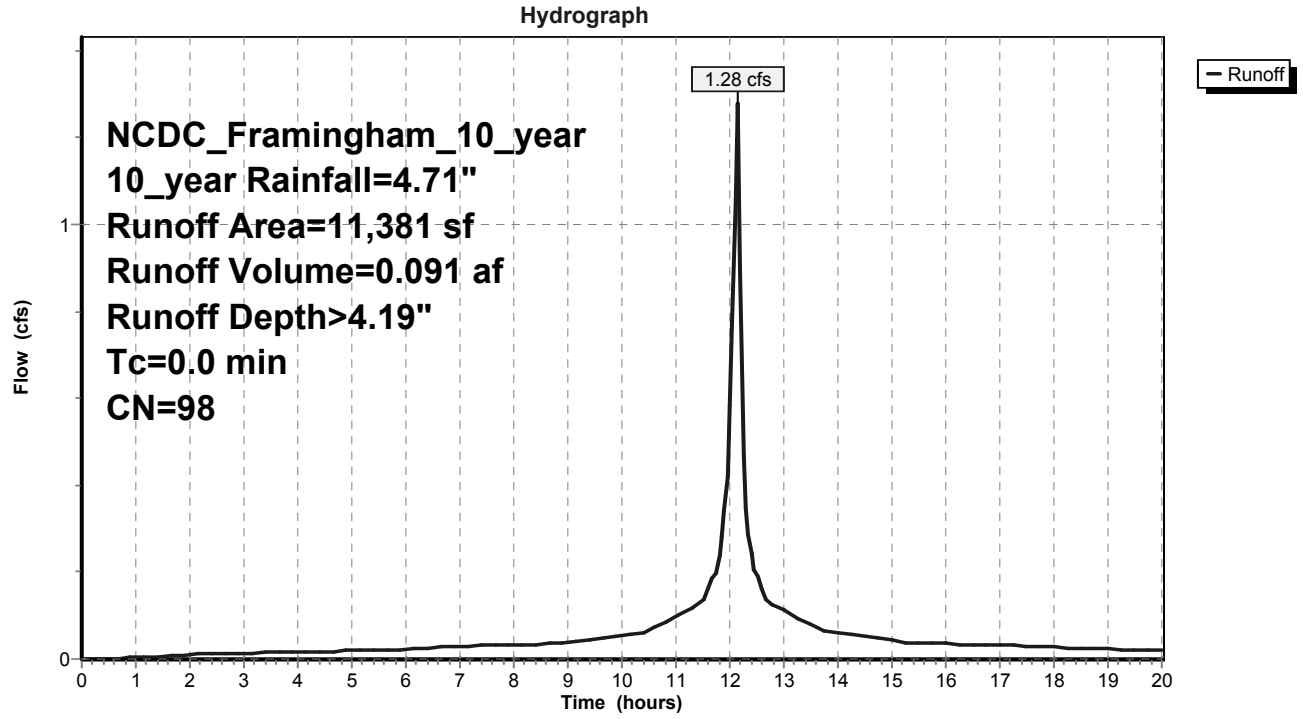
## Summary for Subcatchment ROOF-8: (blank)

Runoff = 1.28 cfs @ 12.14 hrs, Volume= 0.091 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 376 | 98 | DECK, 100% imperv, HSG B |
| * | 11,005 | 98 | ROOF, 100% imperv, HSG B |
| | 11,381 | 98 | Weighted Average |
| | 11,381 | | 100.00% Pervious Area |

## Subcatchment ROOF-8: (blank)



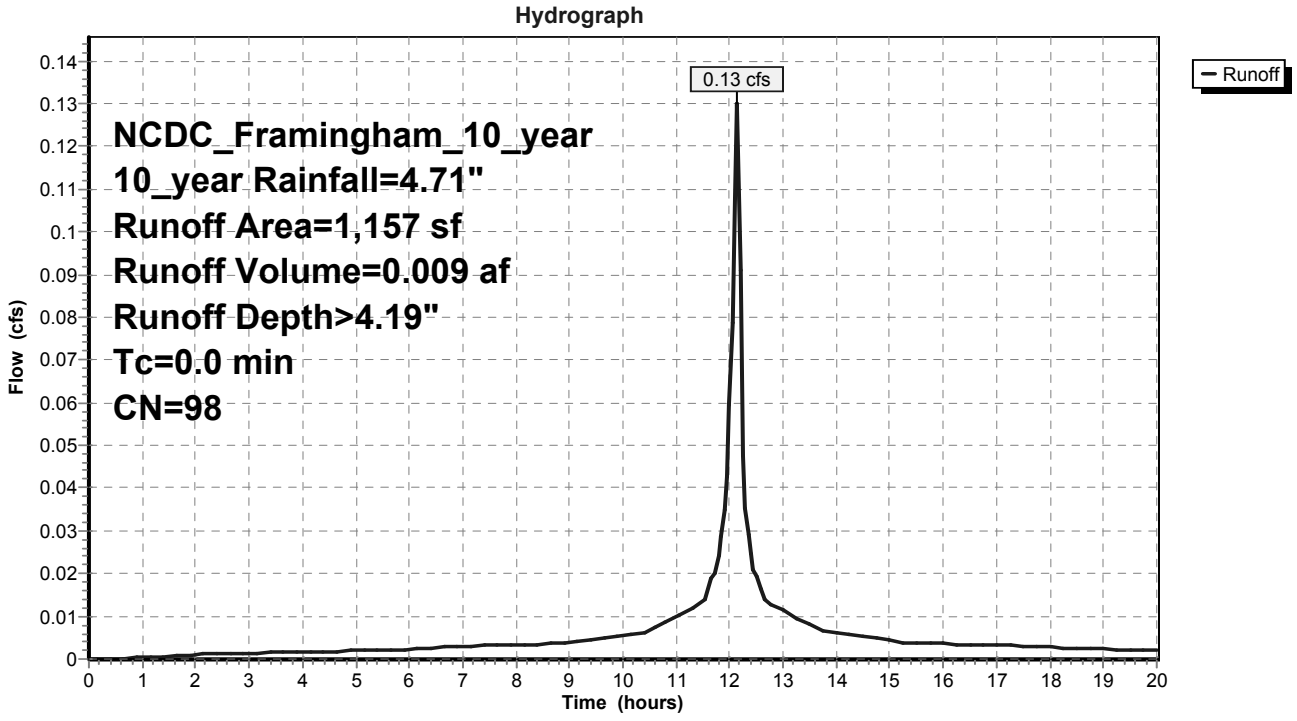
## Summary for Subcatchment ROOF-80: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 548 | 98 | ROOF, 100% imperv, HSG A |
| * | 609 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-80: (blank)



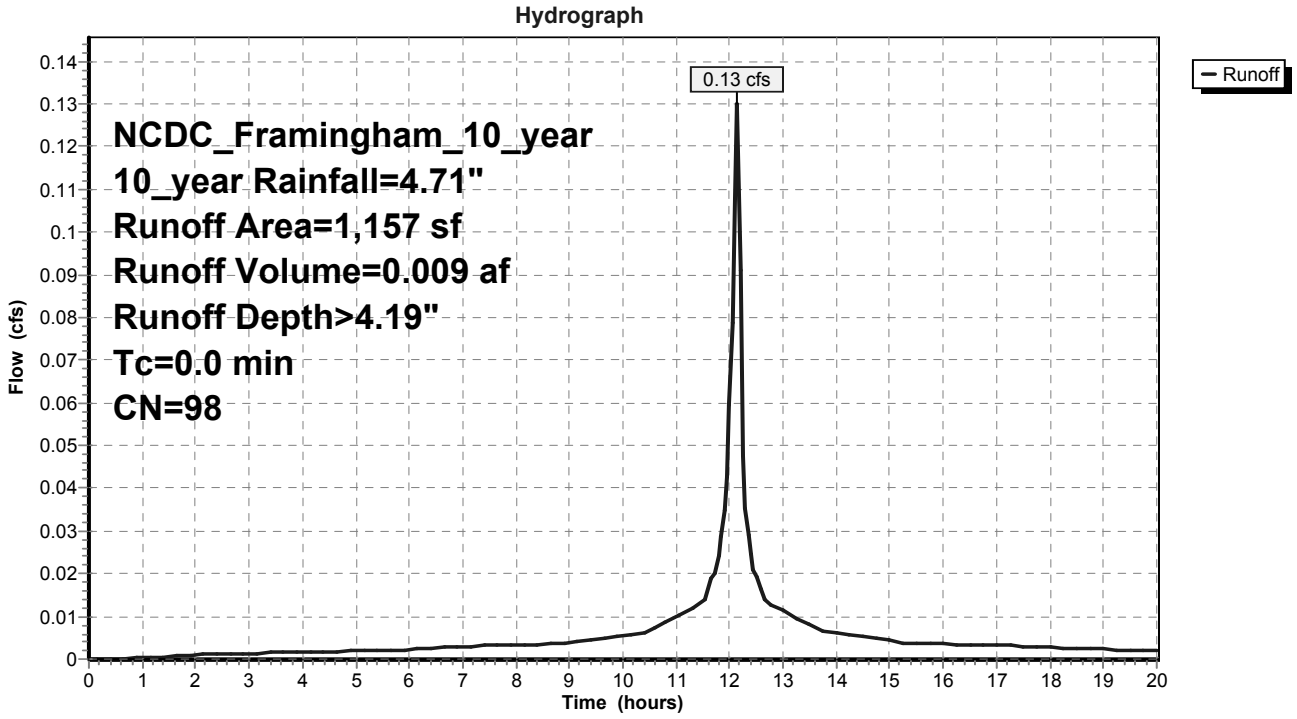
## Summary for Subcatchment ROOF-81: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-81: (blank)



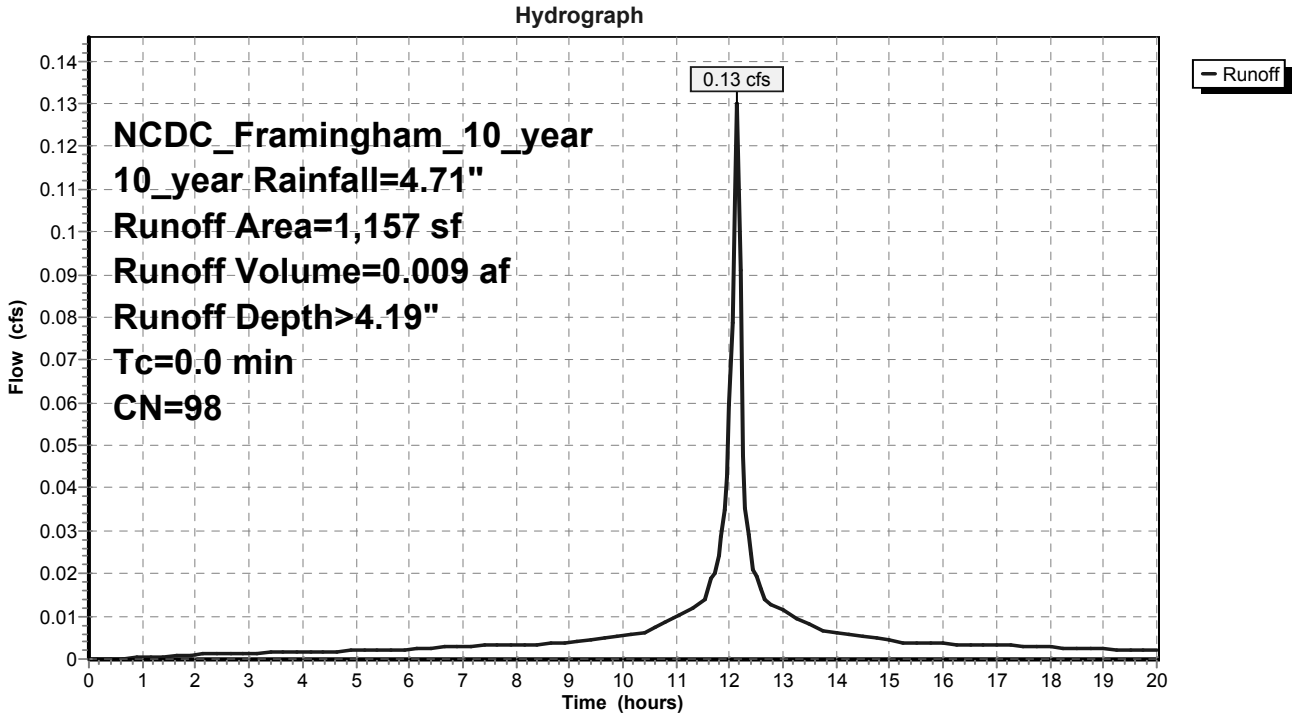
## Summary for Subcatchment ROOF-82: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 234 | 98 | ROOF, 100% imperv, HSG A |
| * | 924 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-82: (blank)



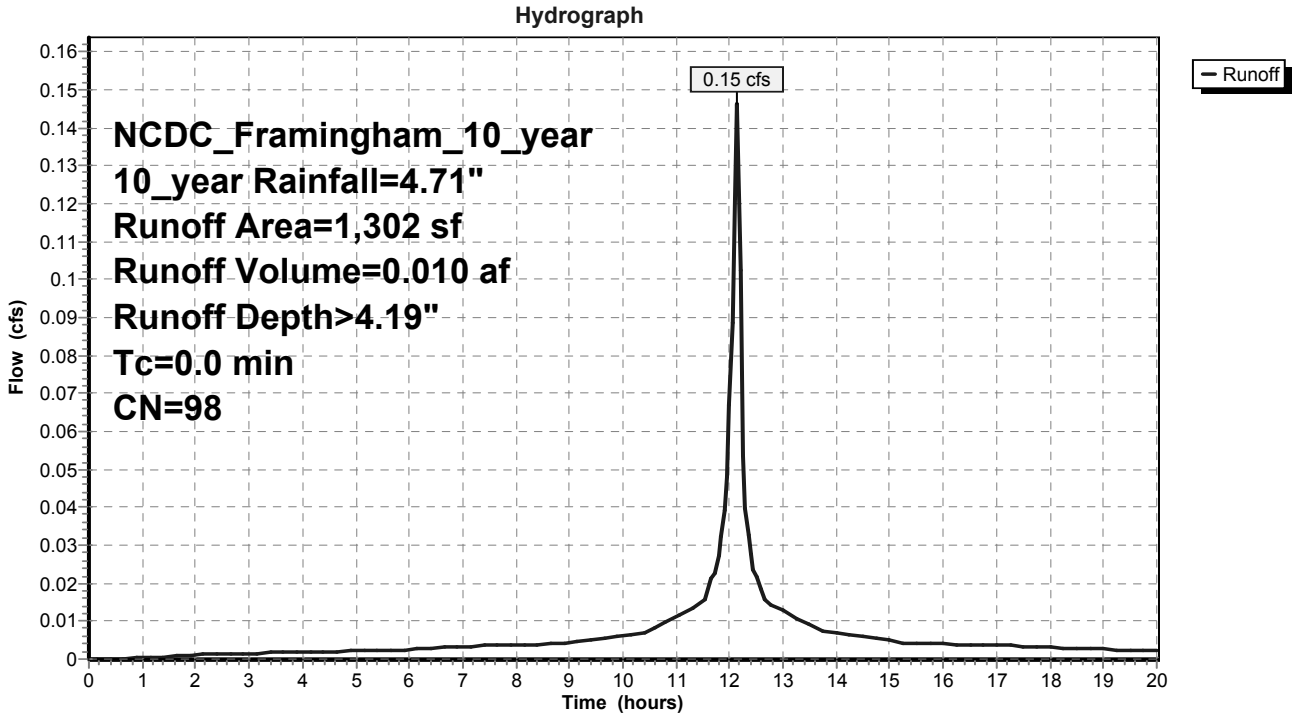
## Summary for Subcatchment ROOF-83: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-83: (blank)



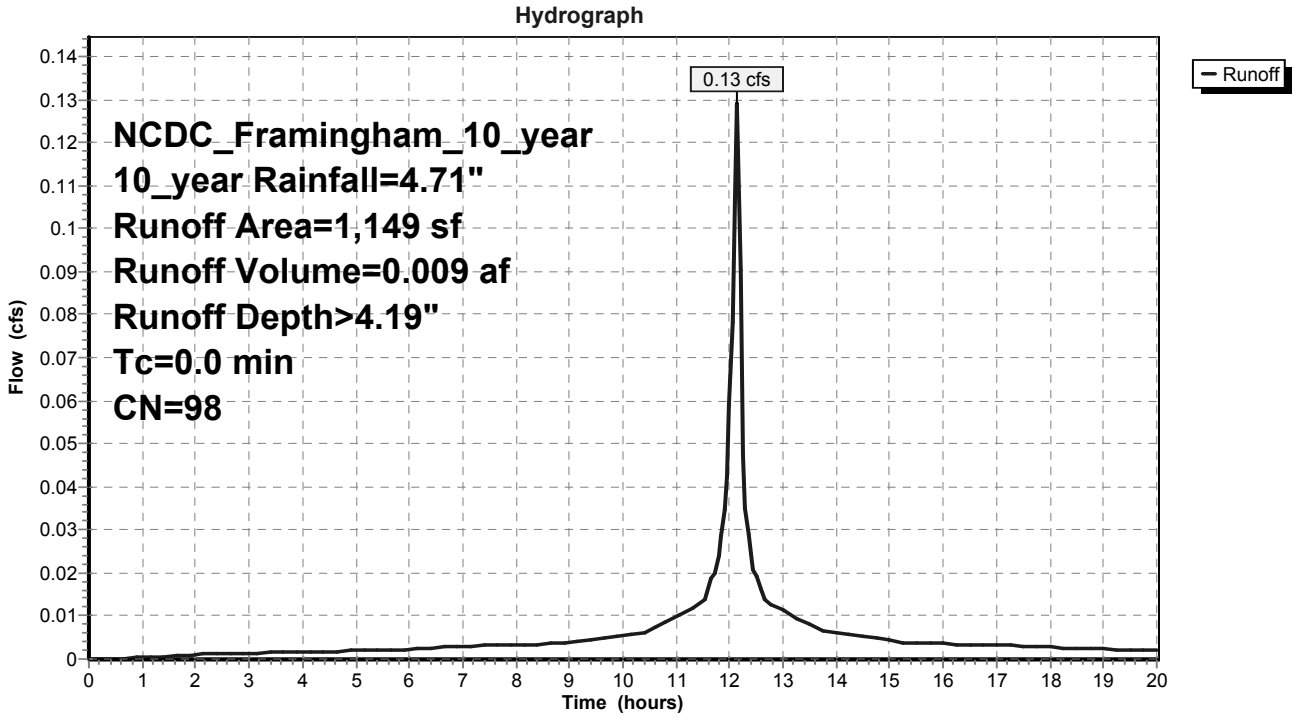
## Summary for Subcatchment ROOF-84: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,143 | 98 | ROOF, 100% imperv, HSG B |
| | 1,149 | 98 | Weighted Average |
| | 1,149 | | 100.00% Pervious Area |

## Subcatchment ROOF-84: (blank)



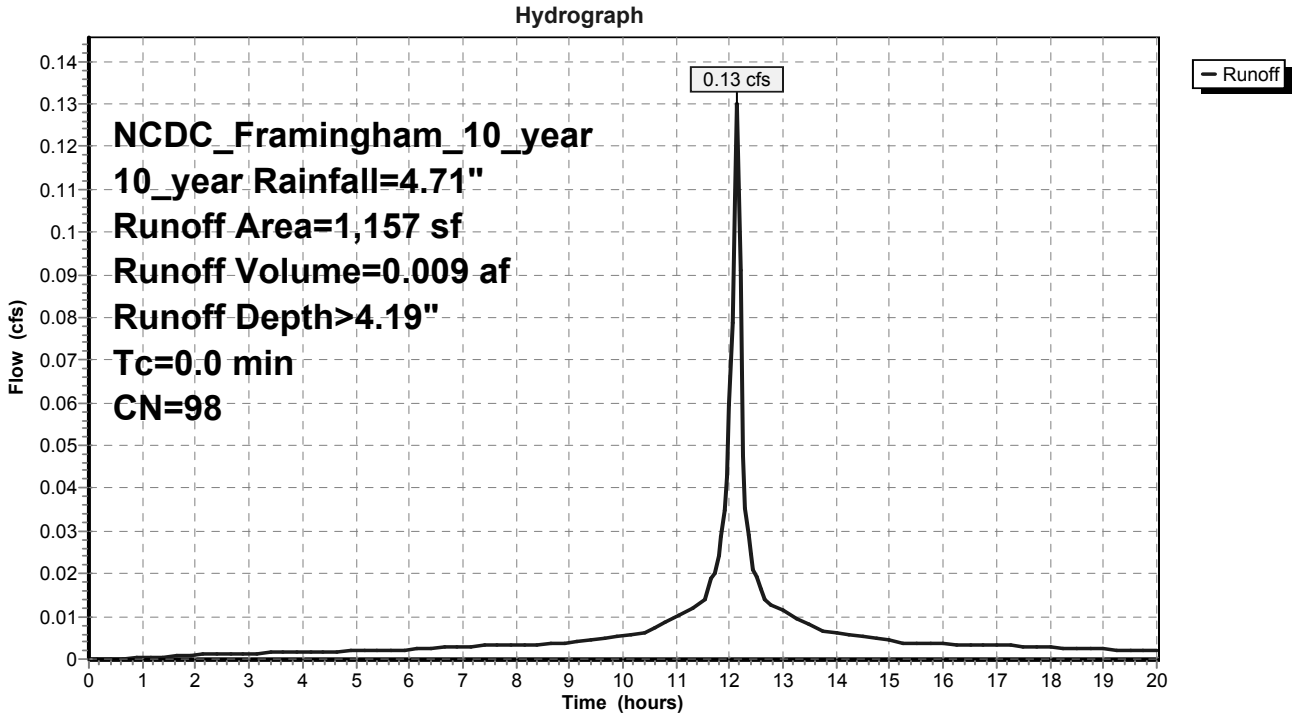
## Summary for Subcatchment ROOF-85: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-85: (blank)



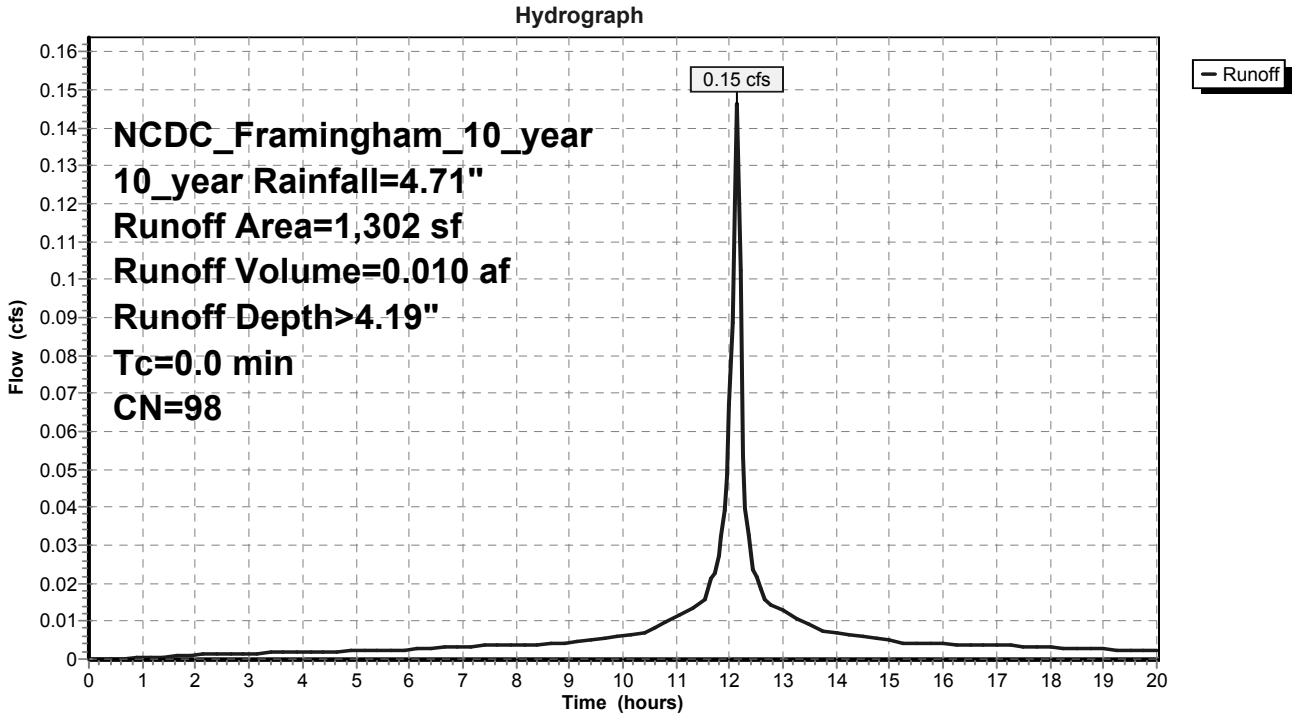
## Summary for Subcatchment ROOF-86: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-86: (blank)



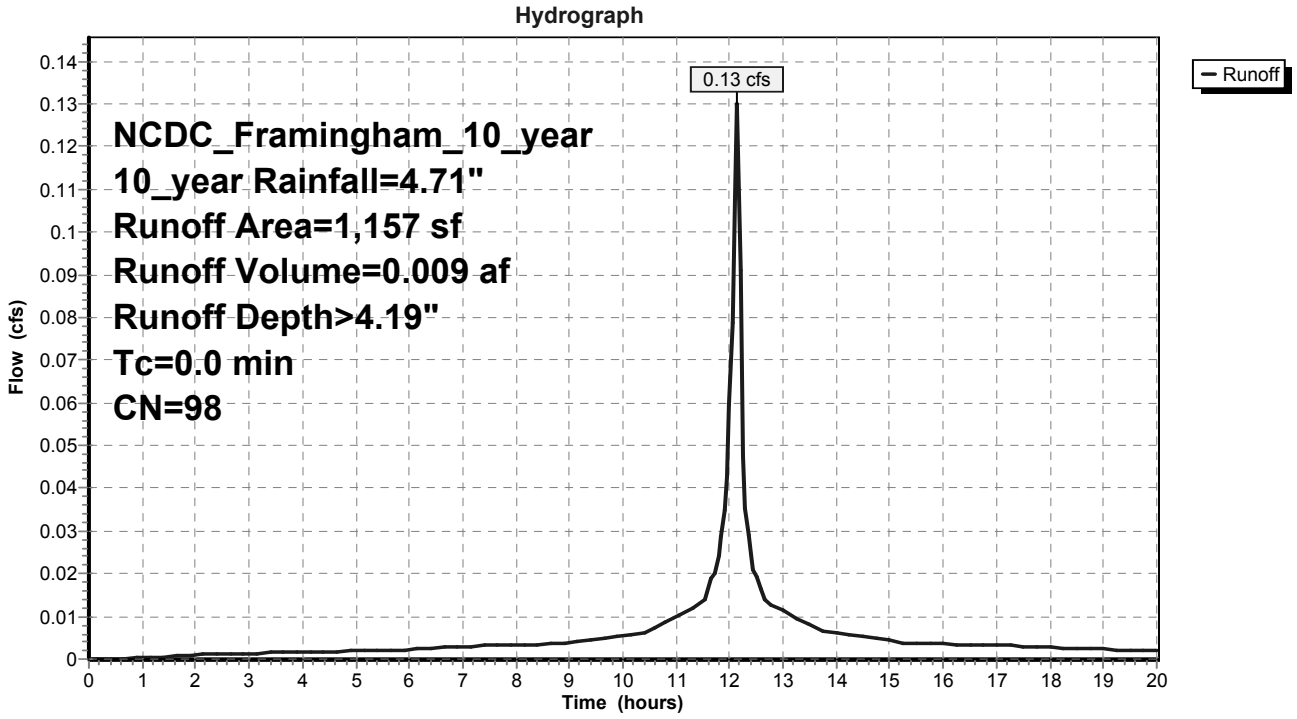
## Summary for Subcatchment ROOF-87: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-87: (blank)



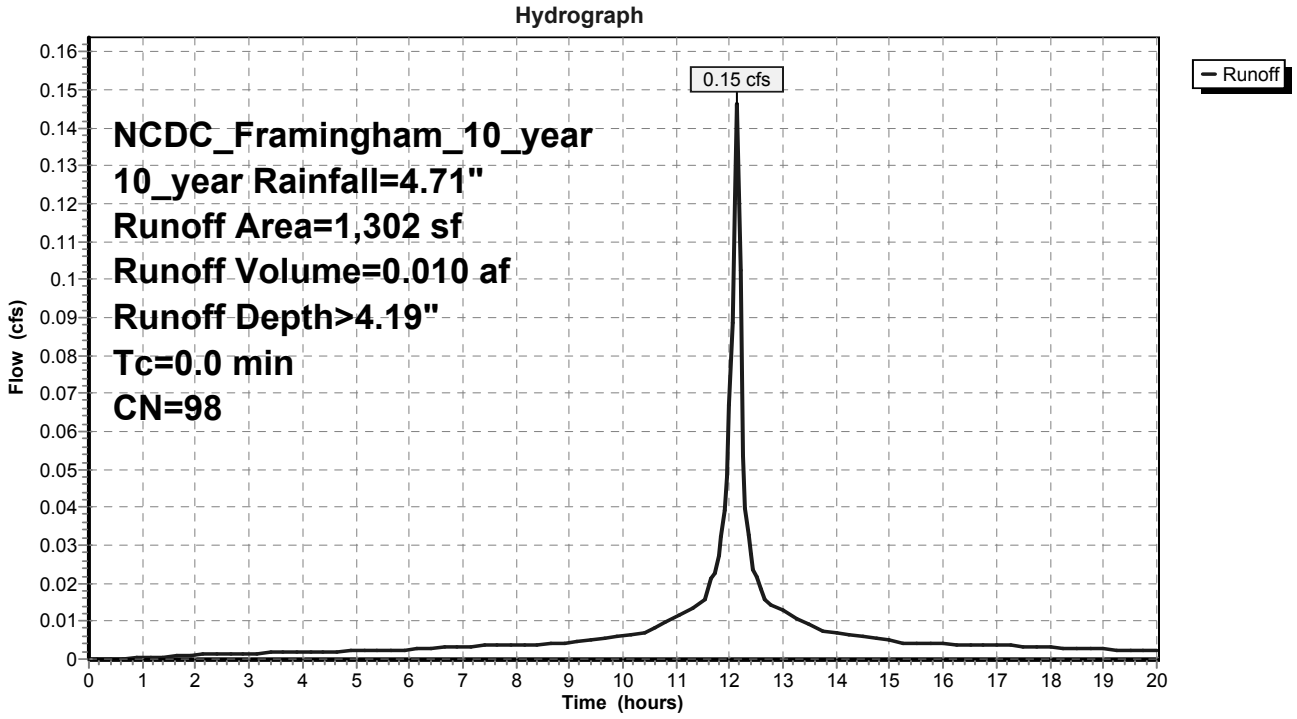
## Summary for Subcatchment ROOF-88: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-88: (blank)



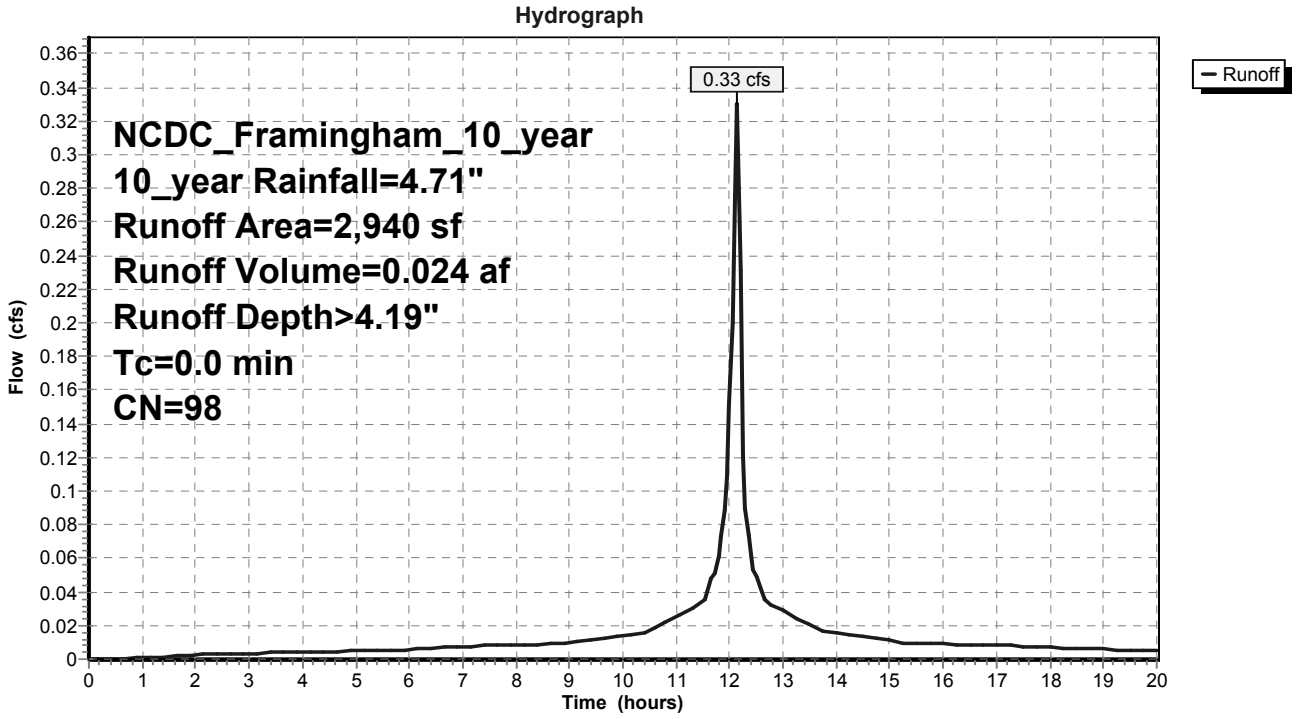
## Summary for Subcatchment ROOF-89: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-89: (blank)



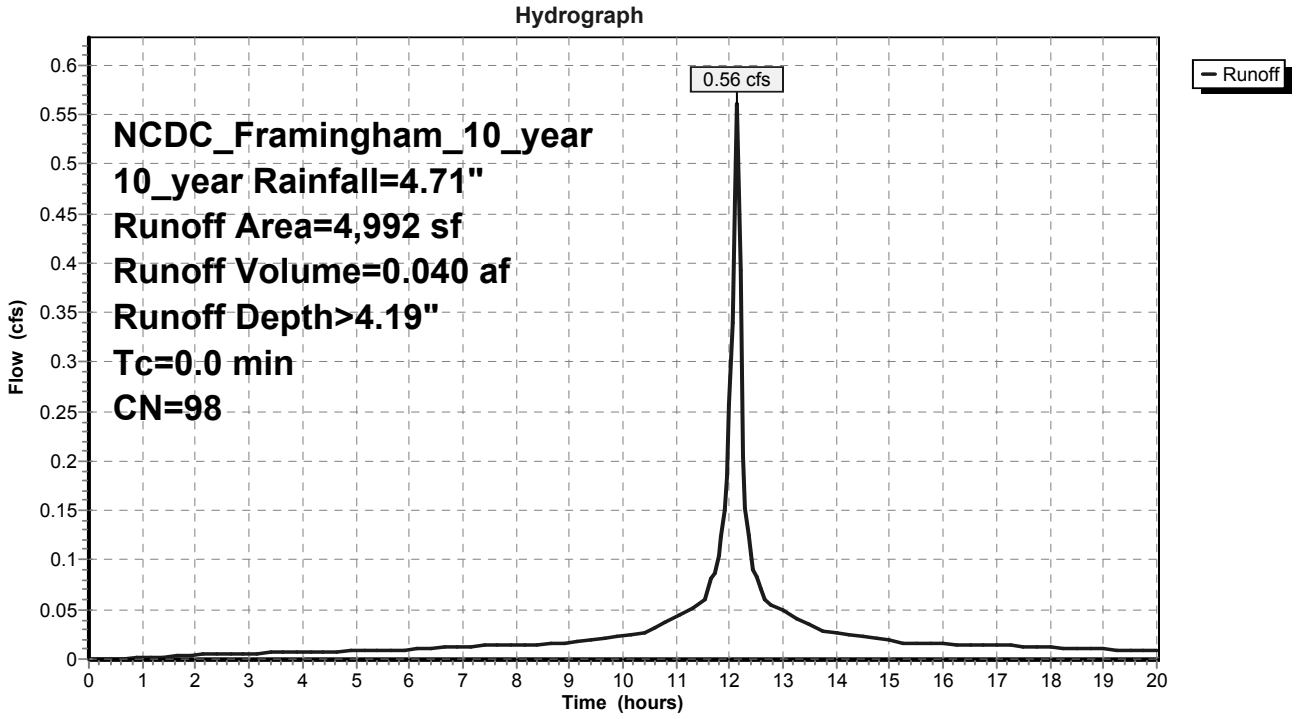
## Summary for Subcatchment ROOF-9: (blank)

Runoff = 0.56 cfs @ 12.14 hrs, Volume= 0.040 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,992 | 98 | ROOF, 100% imperv, HSG B |
| | 4,992 | | 100.00% Pervious Area |

## Subcatchment ROOF-9: (blank)



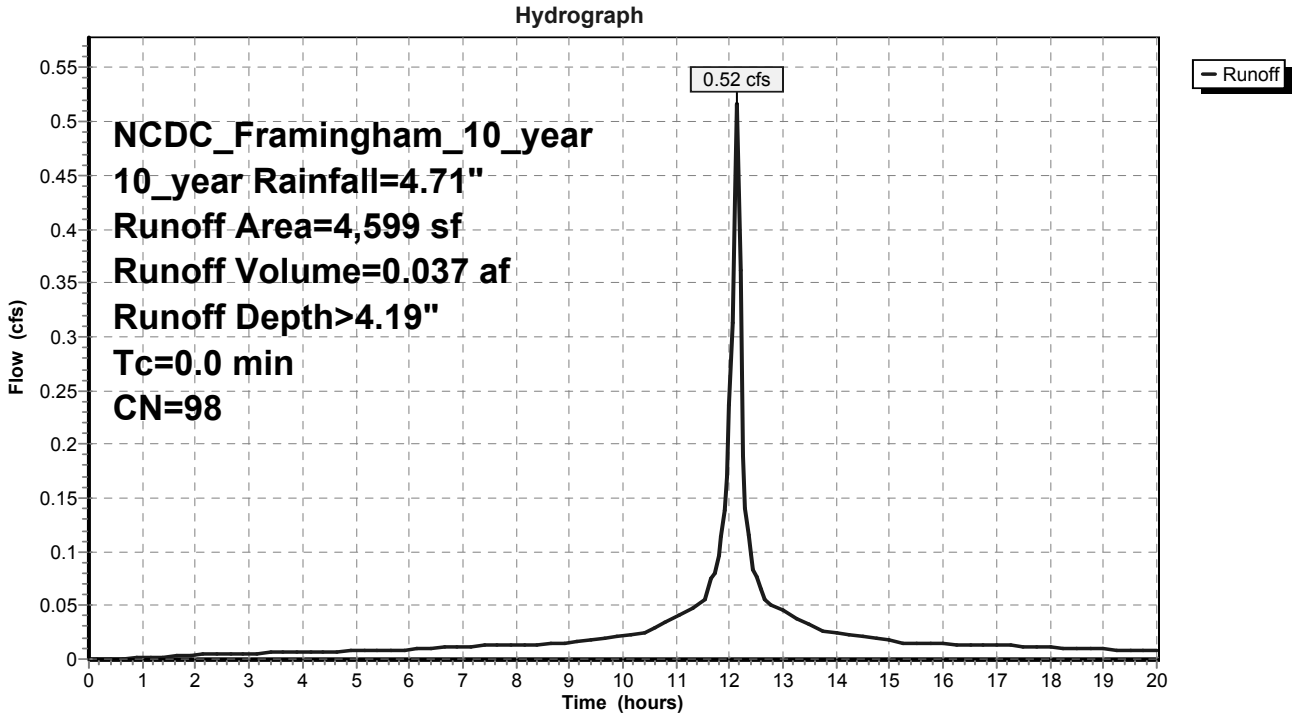
## Summary for Subcatchment ROOF-90: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-90: (blank)



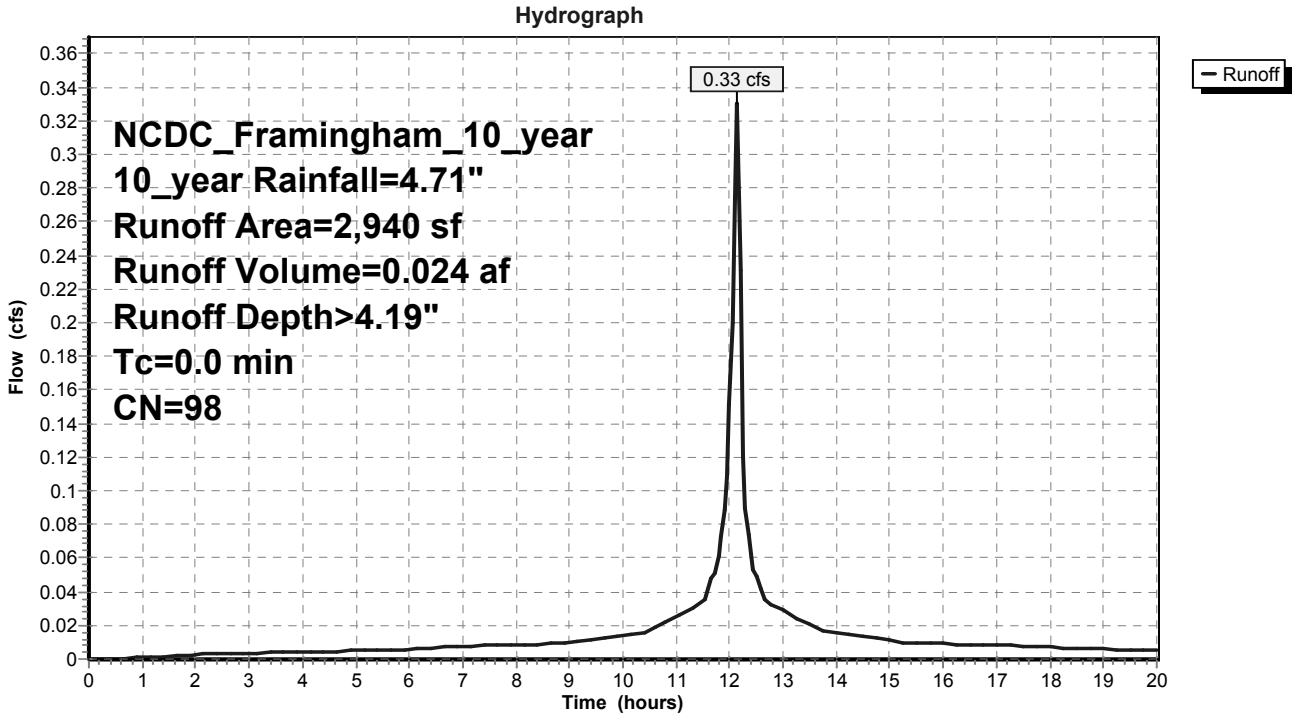
## Summary for Subcatchment ROOF-91: (blank)

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,215 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,725 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-91: (blank)



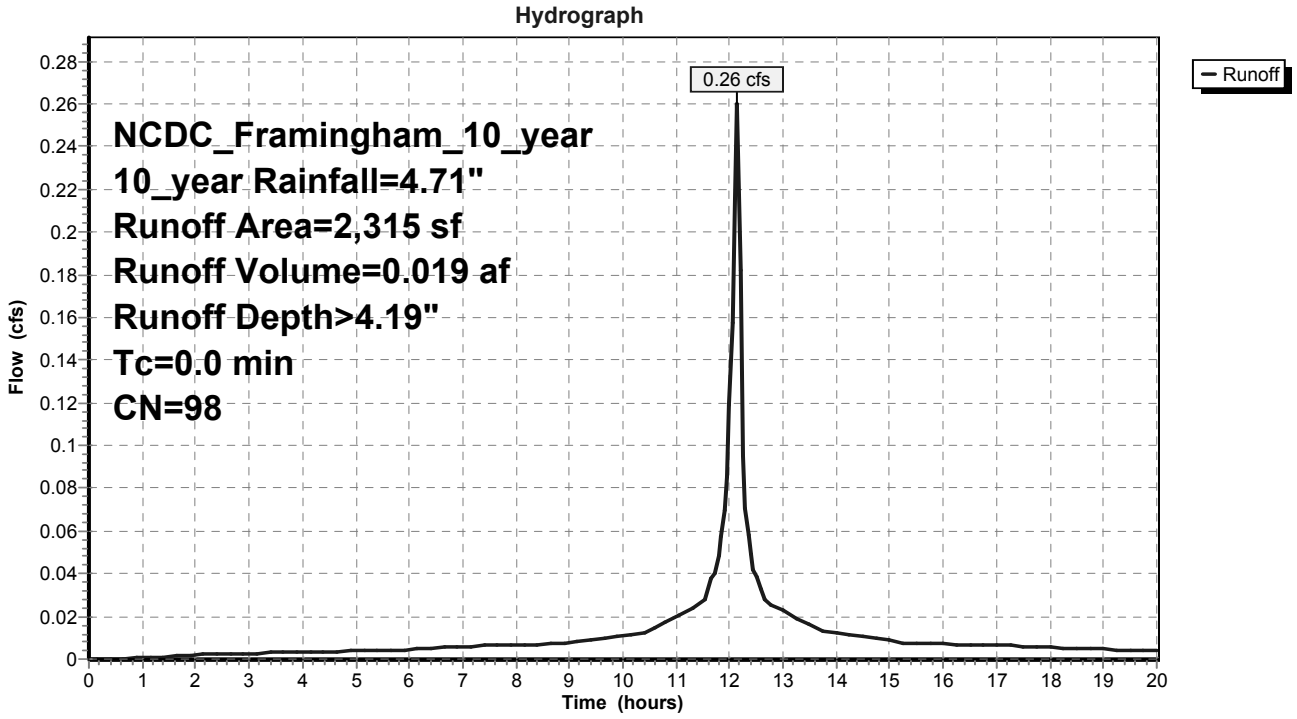
## Summary for Subcatchment ROOF-92: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-92: (blank)



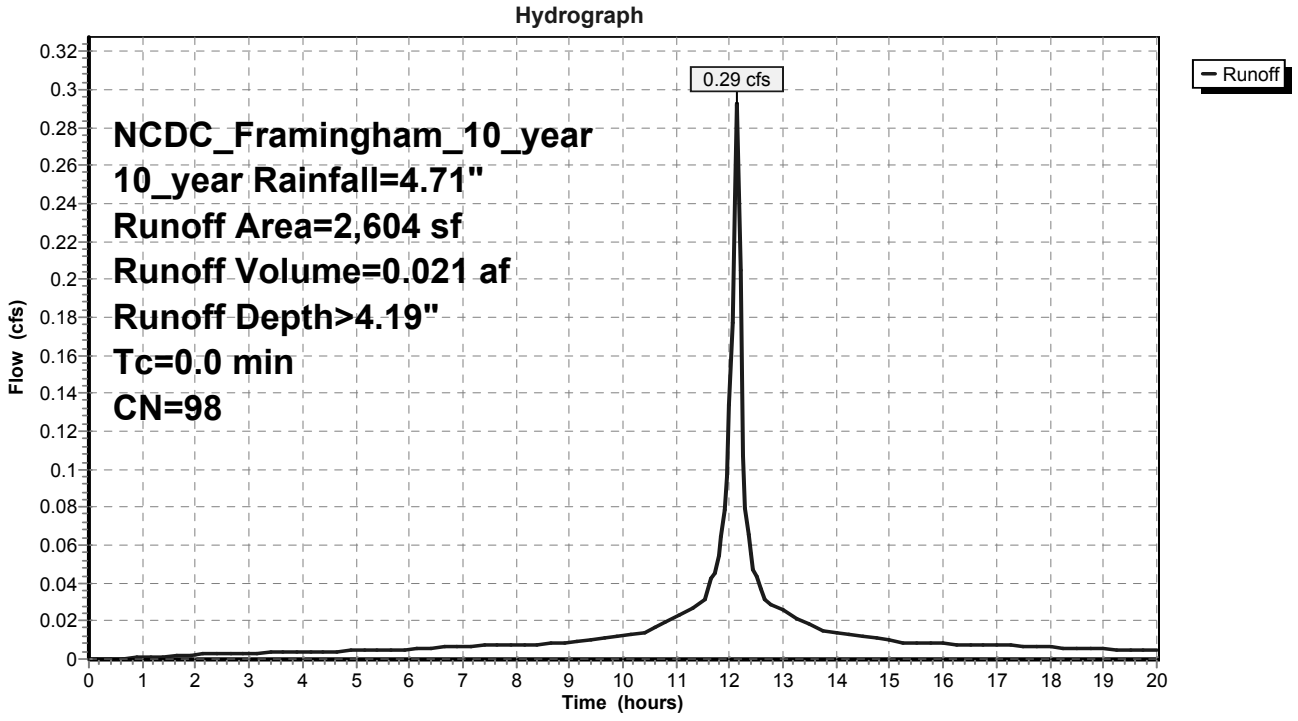
## Summary for Subcatchment ROOF-93: (blank)

Runoff = 0.29 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,102 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,502 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-93: (blank)



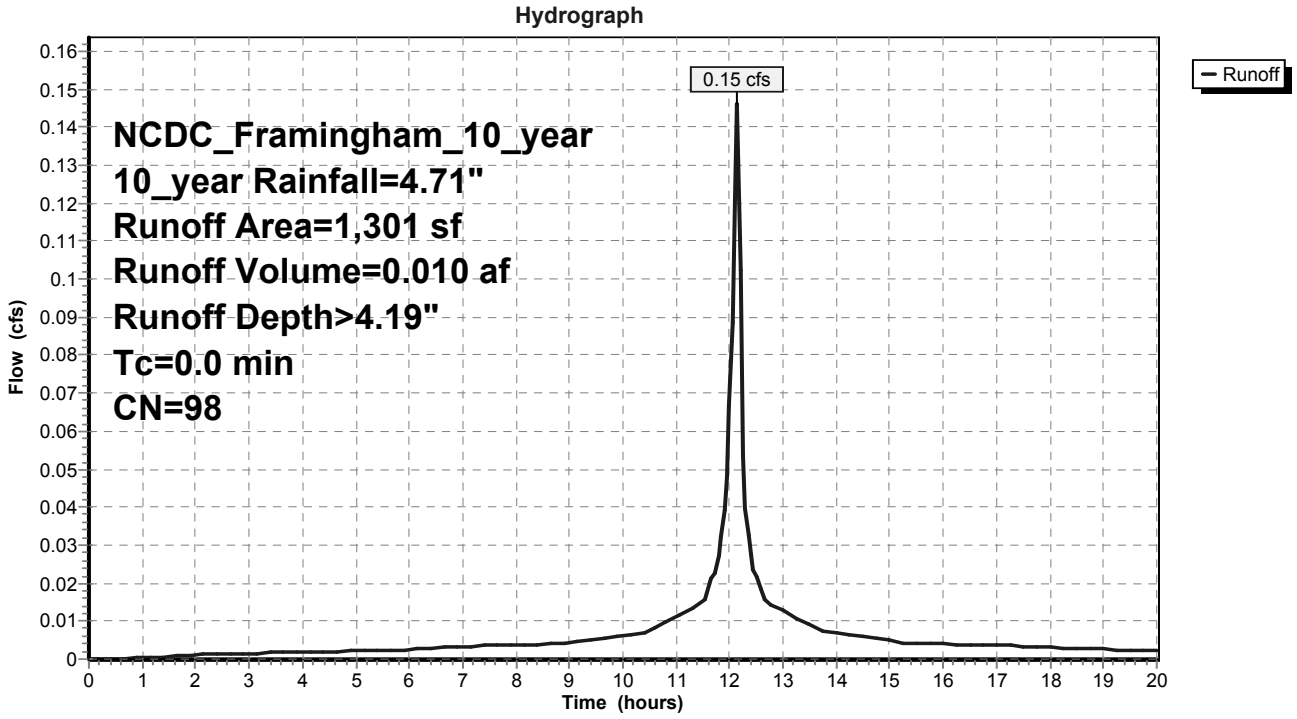
## Summary for Subcatchment ROOF-94: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.010 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,301 | 98 | ROOF, 100% imperv, HSG B |
| | 1,301 | | 100.00% Pervious Area |

## Subcatchment ROOF-94: (blank)



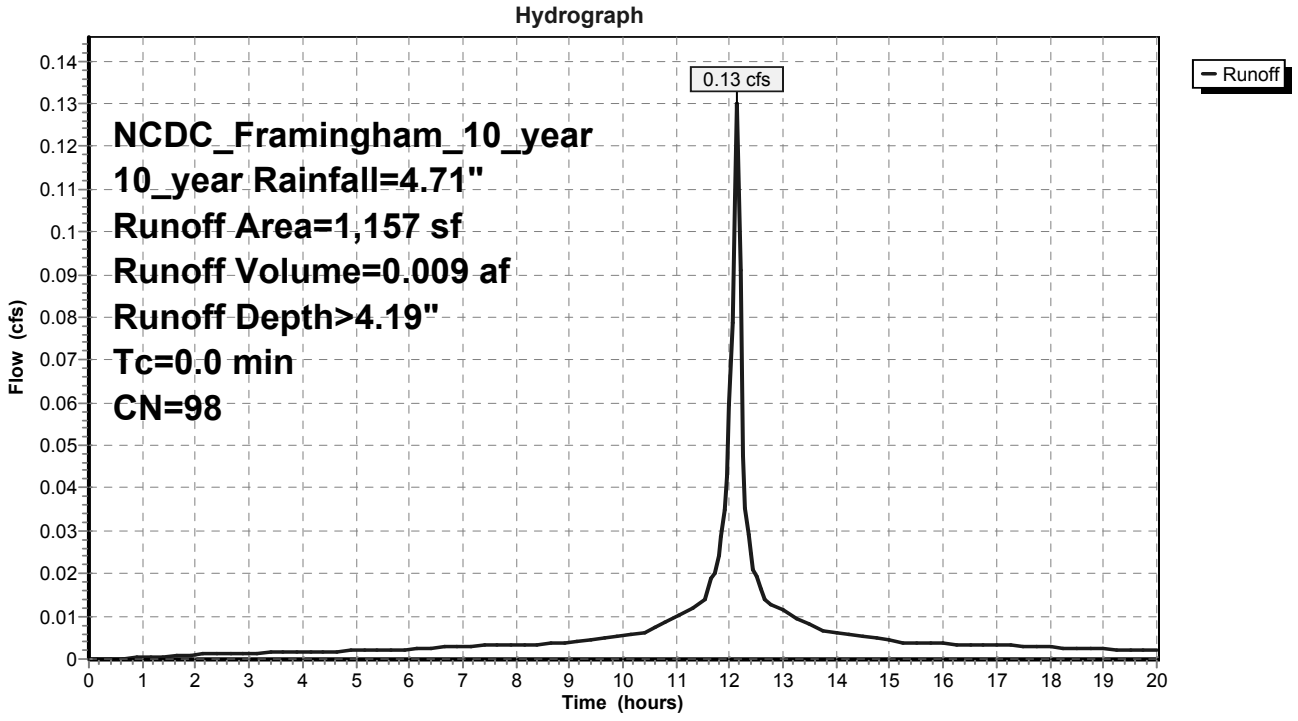
## Summary for Subcatchment ROOF-95: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 986 | 98 | ROOF, 100% imperv, HSG A |
| * | 171 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-95: (blank)



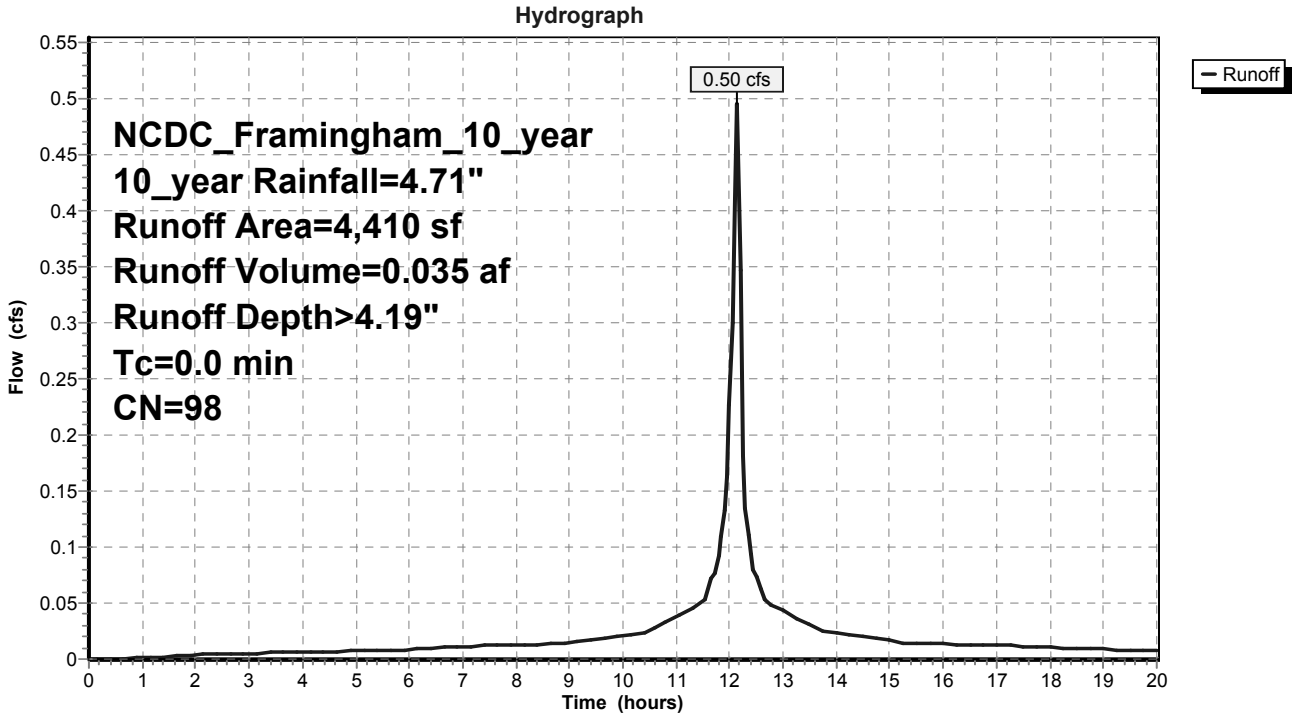
## Summary for Subcatchment ROOF-96: (blank)

Runoff = 0.50 cfs @ 12.14 hrs, Volume= 0.035 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-96: (blank)



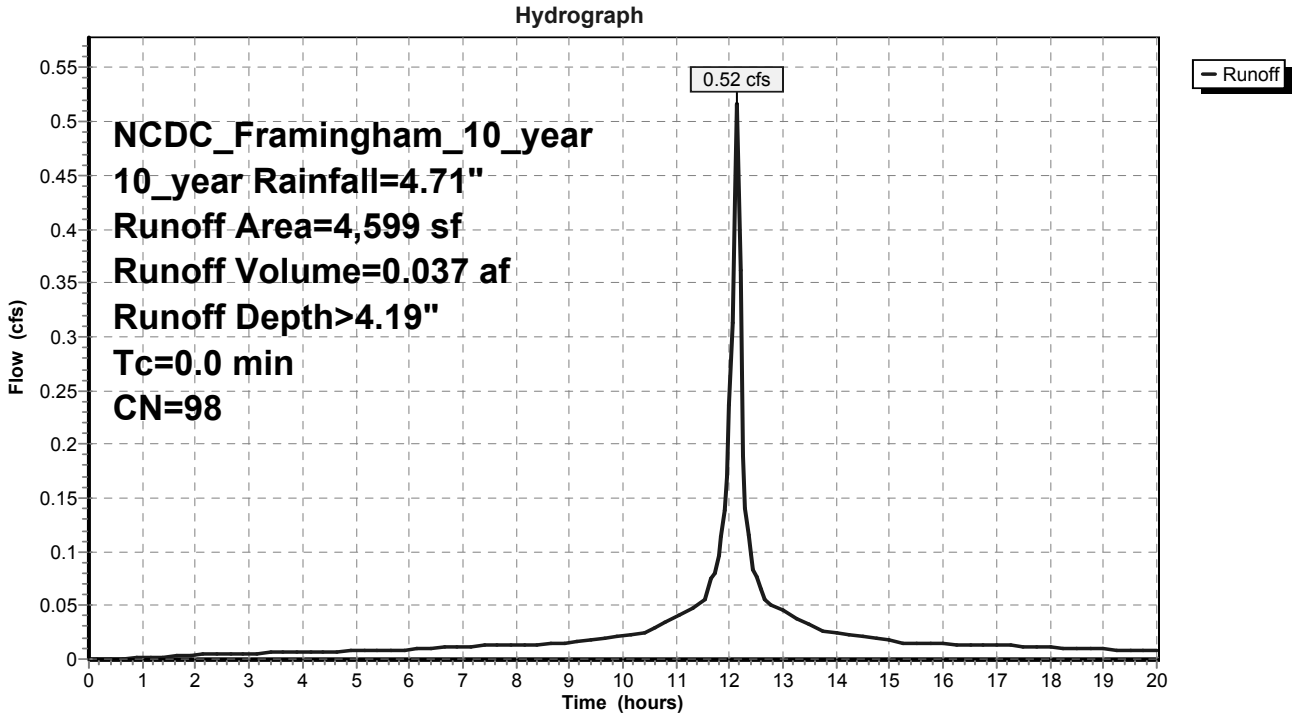
## Summary for Subcatchment ROOF-97: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-97: (blank)



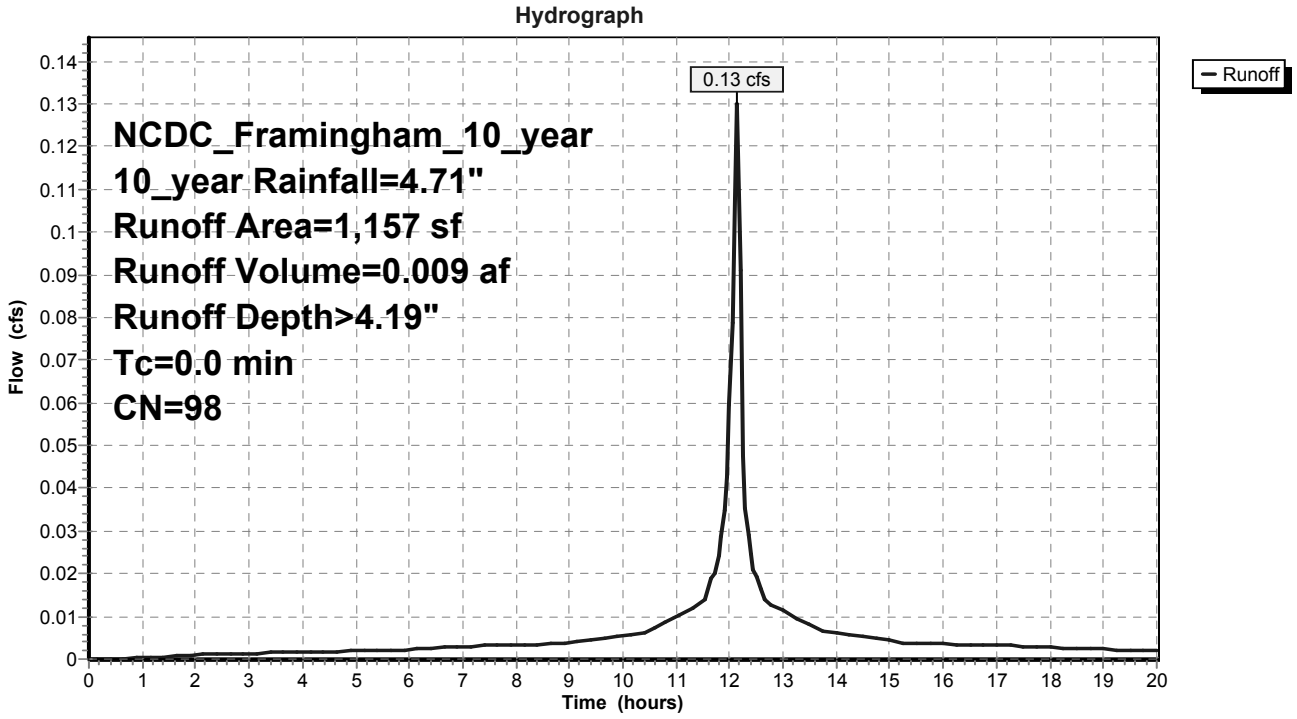
## Summary for Subcatchment ROOF-98: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-98: (blank)



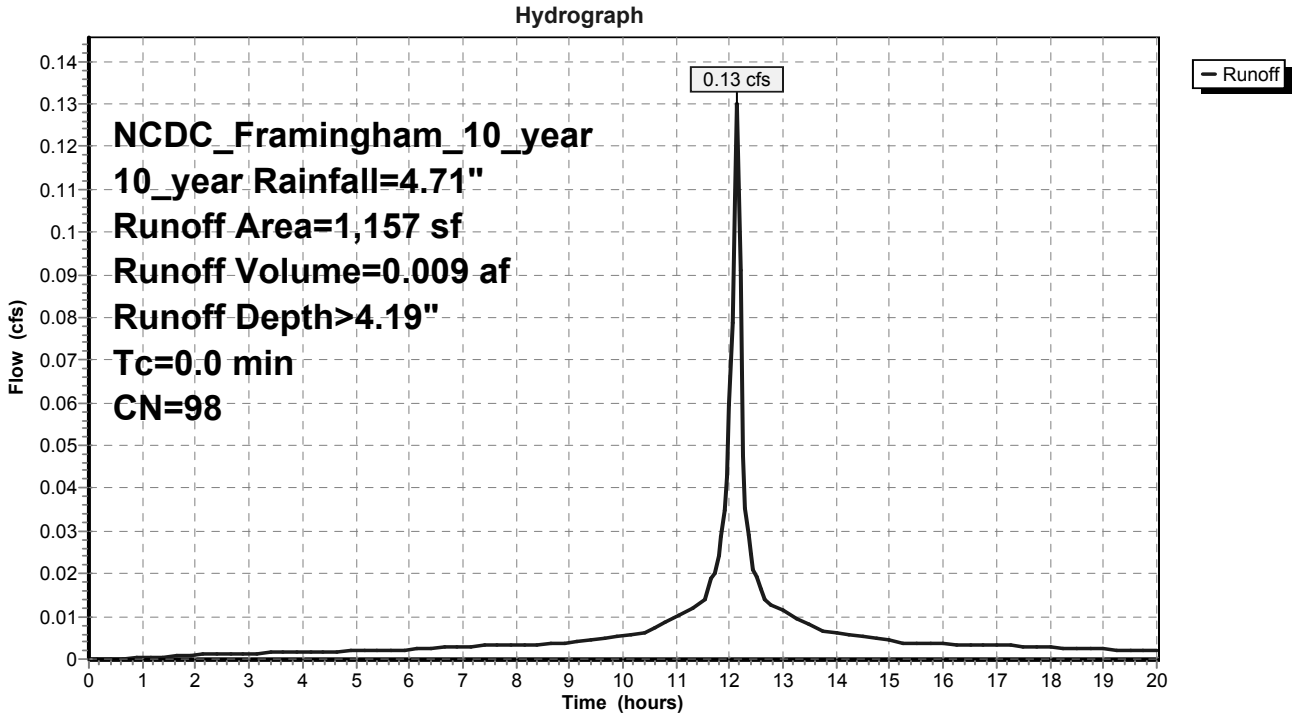
## Summary for Subcatchment ROOF-99: (blank)

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-99: (blank)



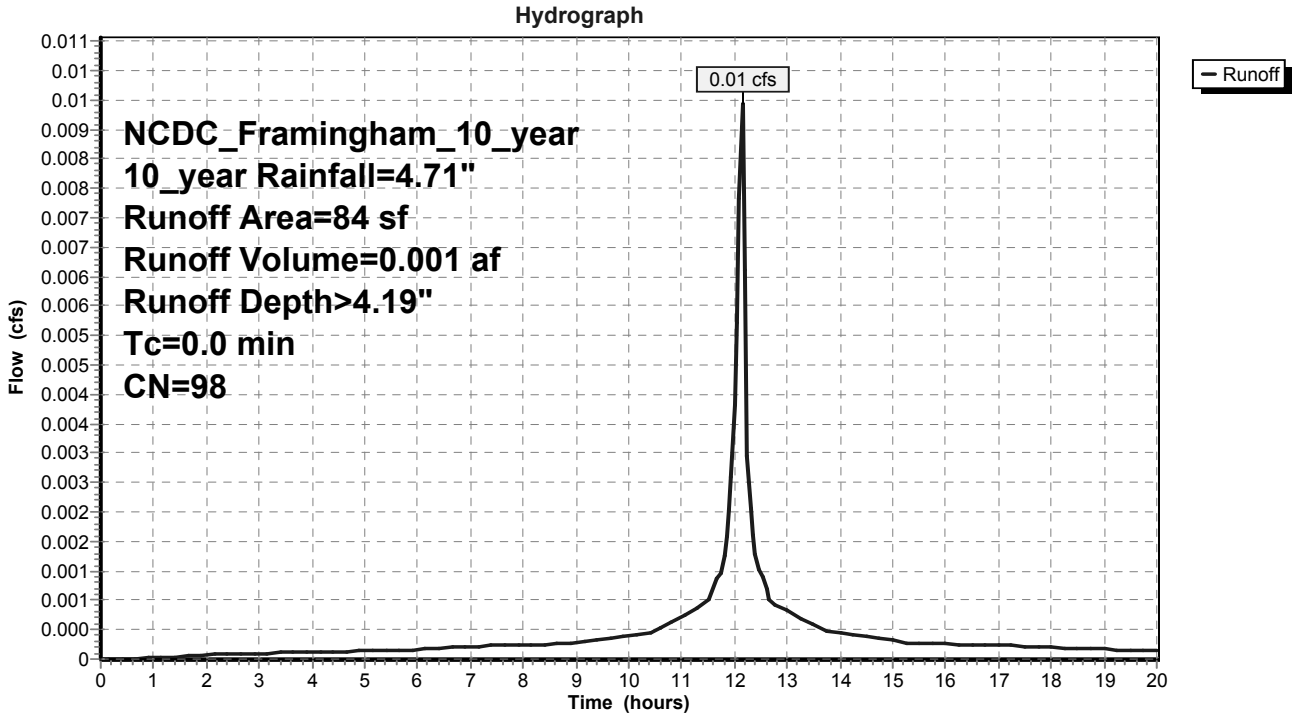
## Summary for Subcatchment ROOF-BS1: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 84 | 98 | ROOF, 100% imperv, HSG B |
| | 84 | | 100.00% Pervious Area |

## Subcatchment ROOF-BS1: (blank)



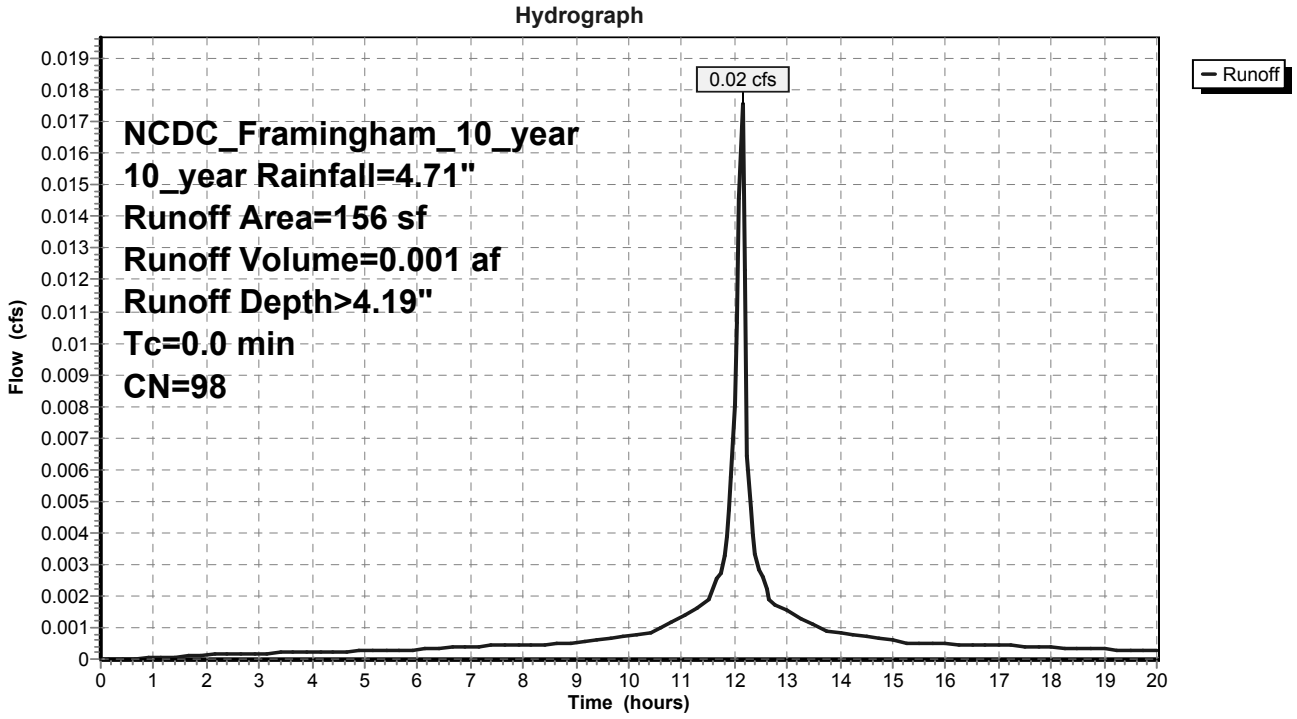
## Summary for Subcatchment ROOF-MAIL20: (blank)

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL20: (blank)



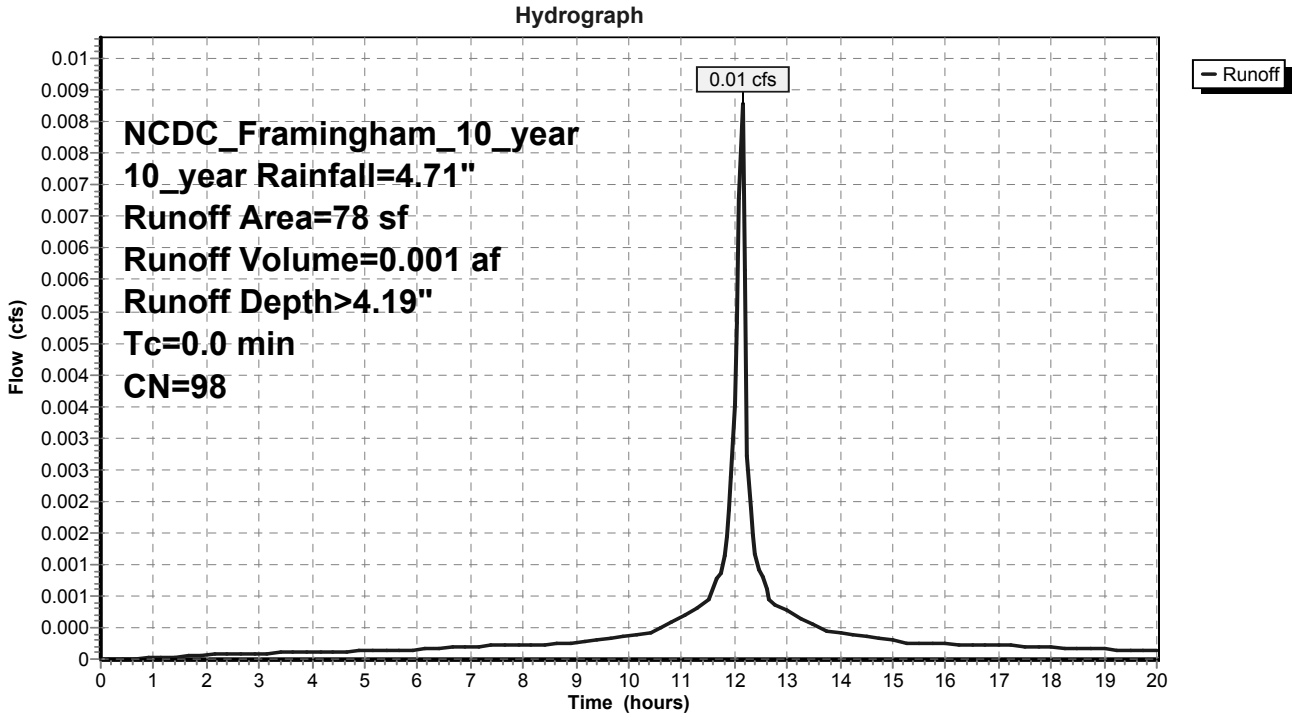
## Summary for Subcatchment ROOF-MAIL29: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL29: (blank)



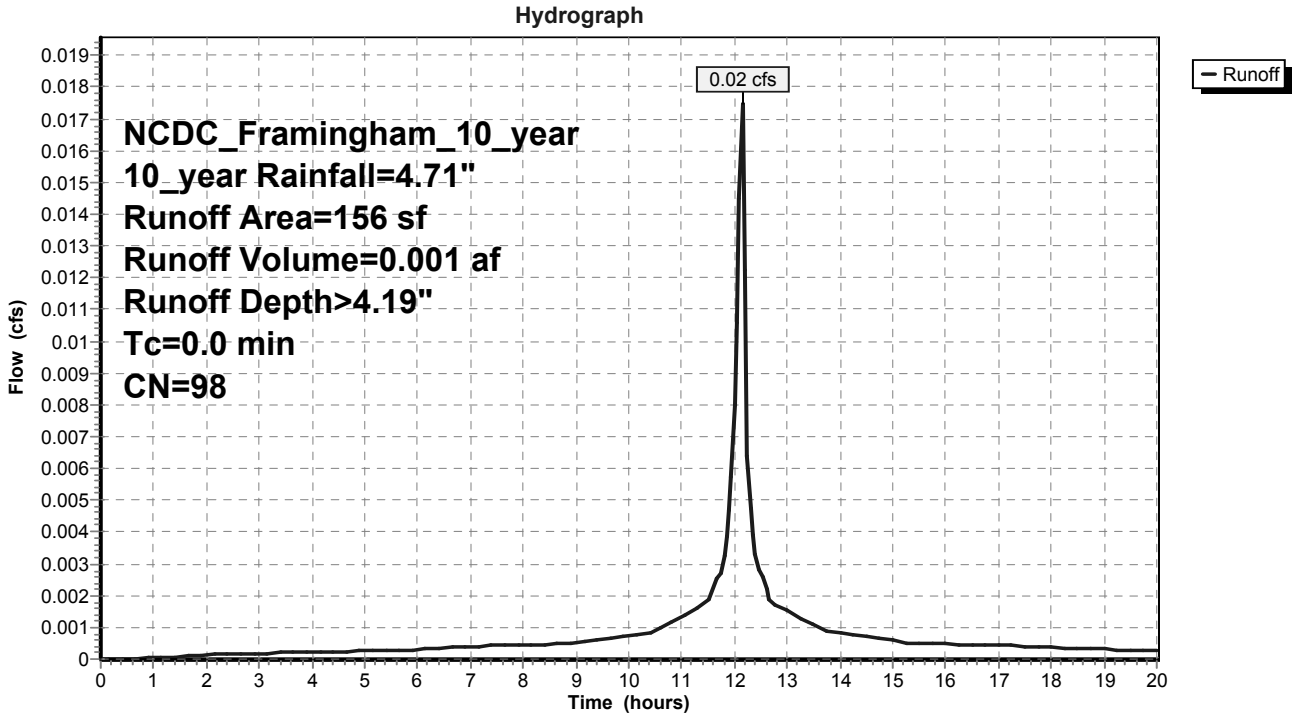
## Summary for Subcatchment ROOF-MAIL5: (blank)

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL5: (blank)



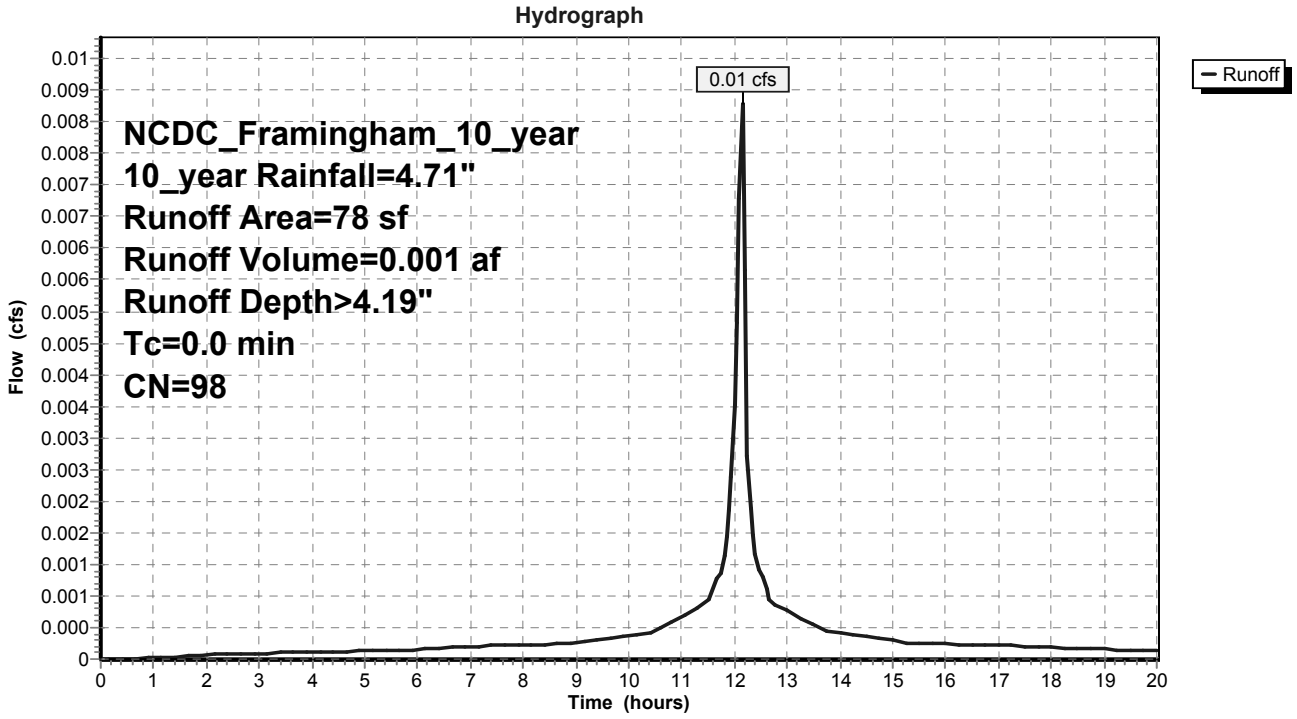
## Summary for Subcatchment ROOF-MAIL64: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL64: (blank)



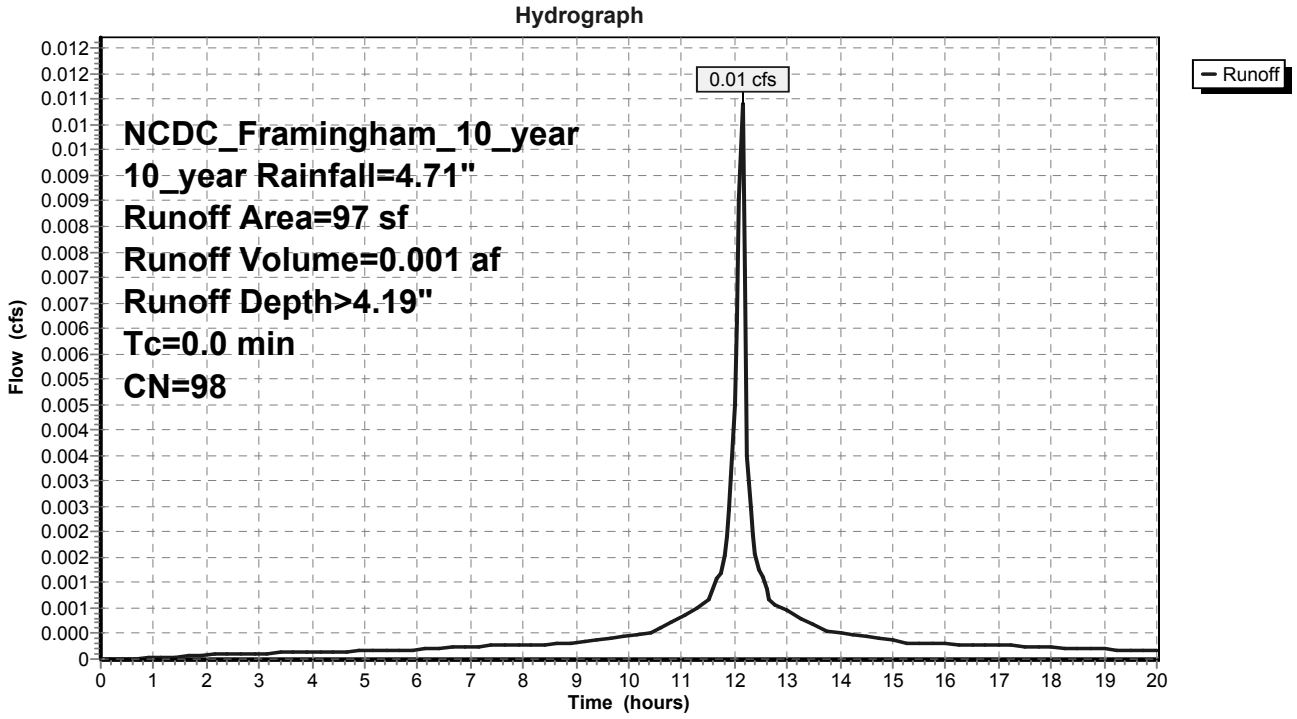
## Summary for Subcatchment ROOF-MAIL8: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 97 | 98 | ROOF, 100% imperv, HSG B |
| | 97 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL8: (blank)



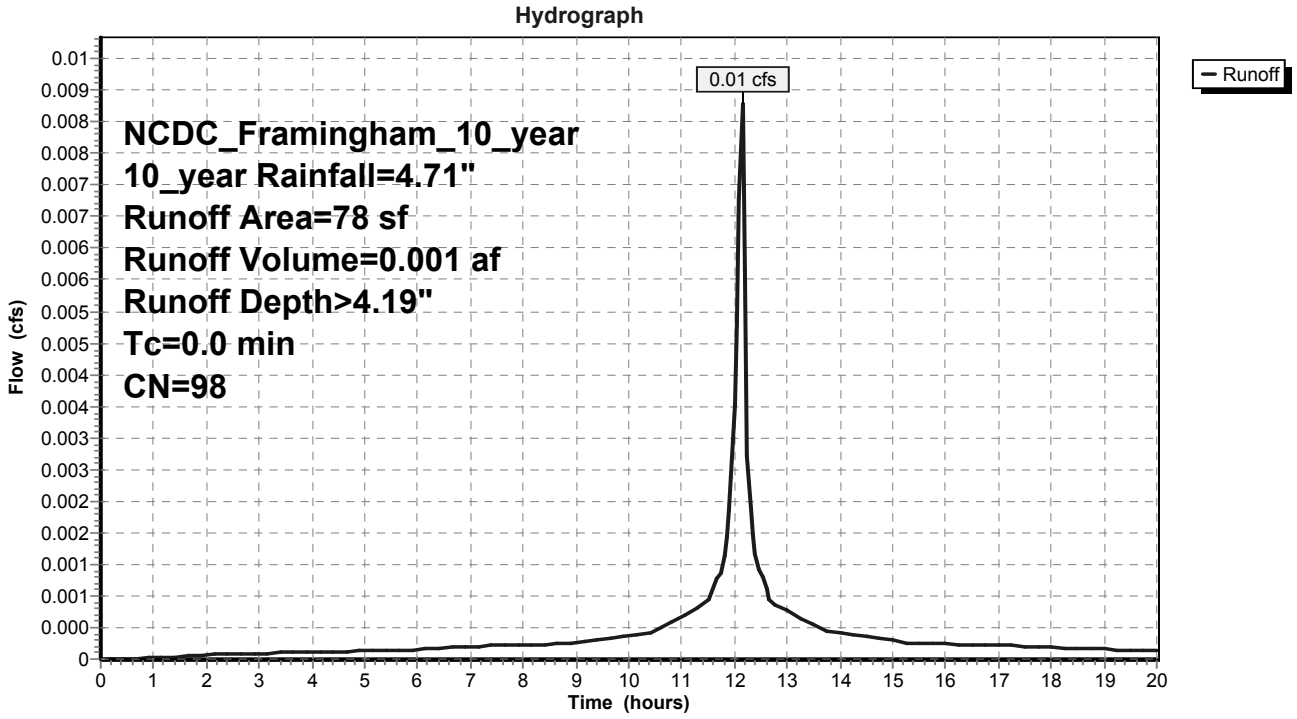
## Summary for Subcatchment ROOF-MAIL91: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL91: (blank)



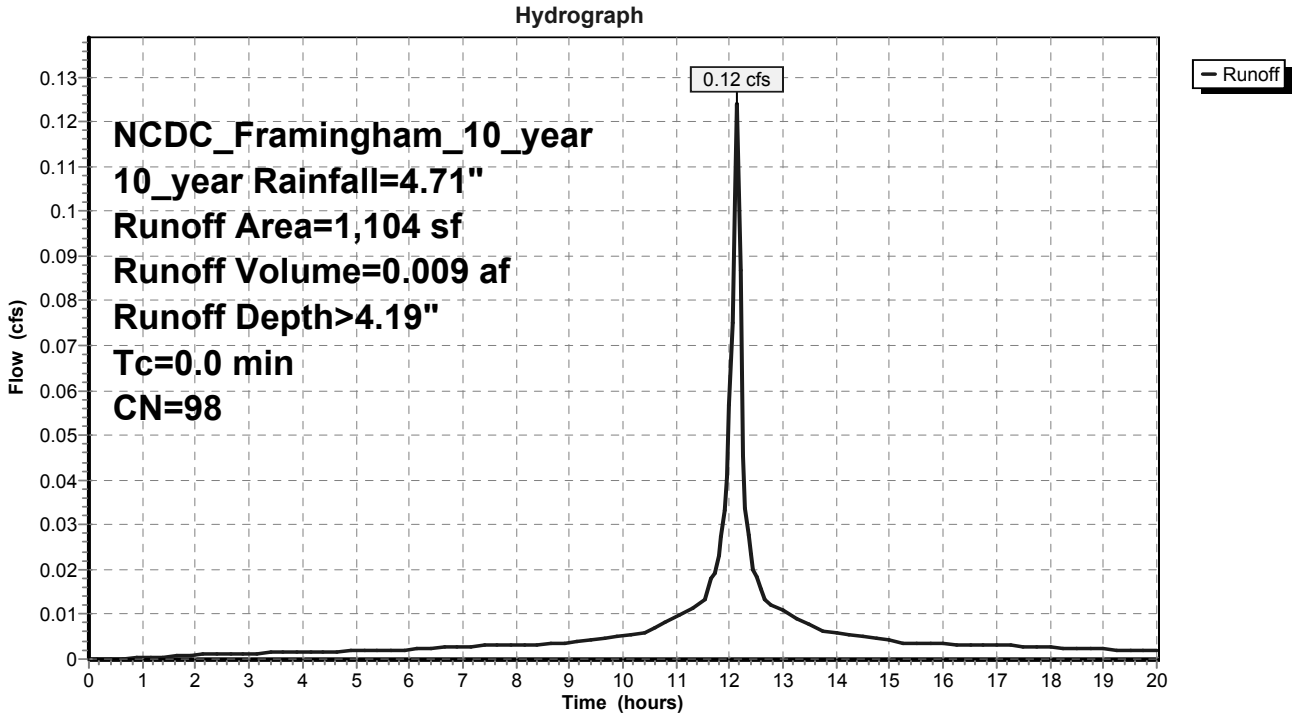
## Summary for Subcatchment ROOF-MAINT11: (blank)

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,104 | 98 | ROOF, 100% imperv, HSG B |
| | 1,104 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAINT11: (blank)



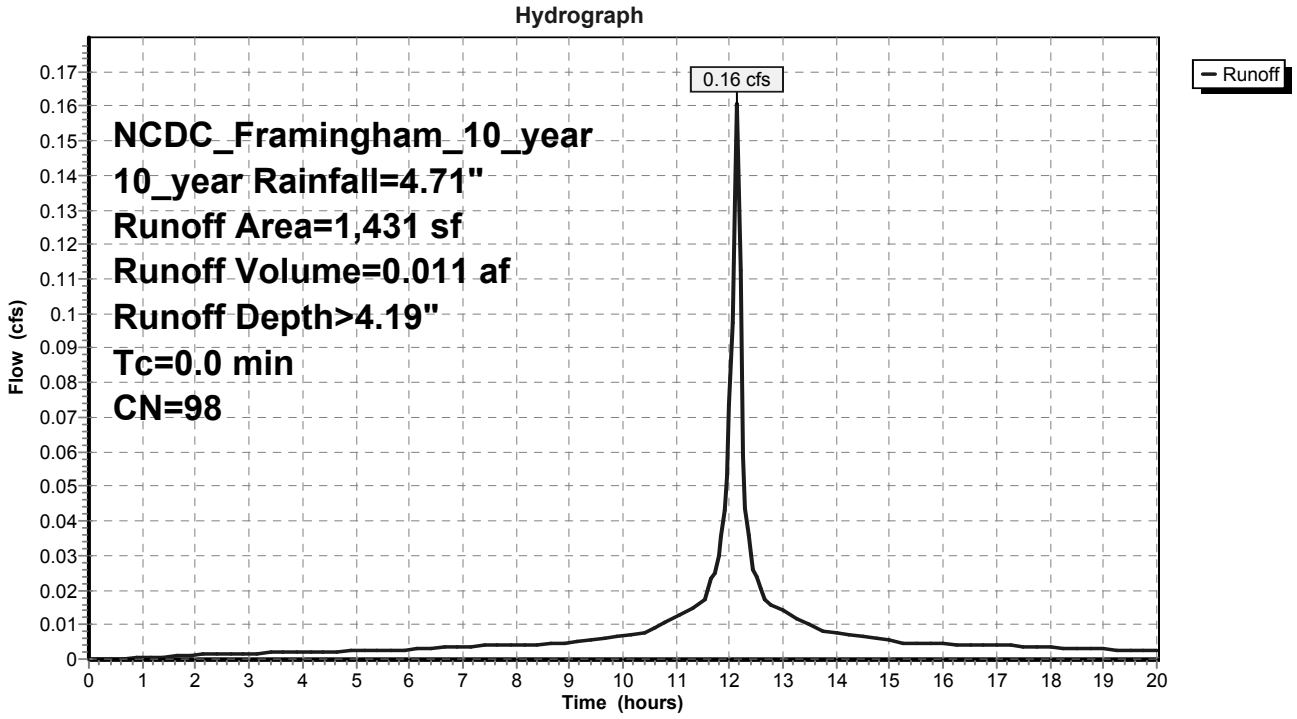
## Summary for Subcatchment ROOF-PL11: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.011 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,431 | 98 | ROOF, 100% imperv, HSG B |
| | 1,431 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL11: (blank)



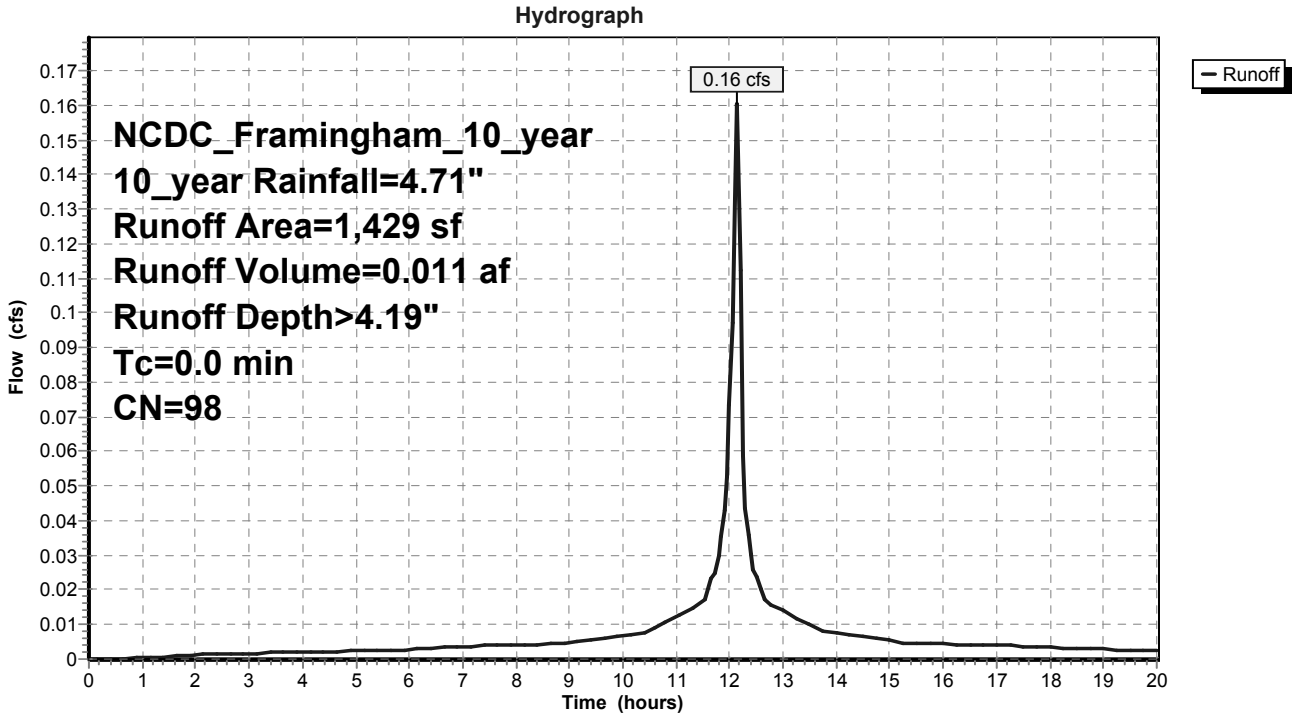
## Summary for Subcatchment ROOF-PL6: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.011 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,429 | 98 | ROOF, 100% imperv, HSG B |
| | 1,429 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL6: (blank)



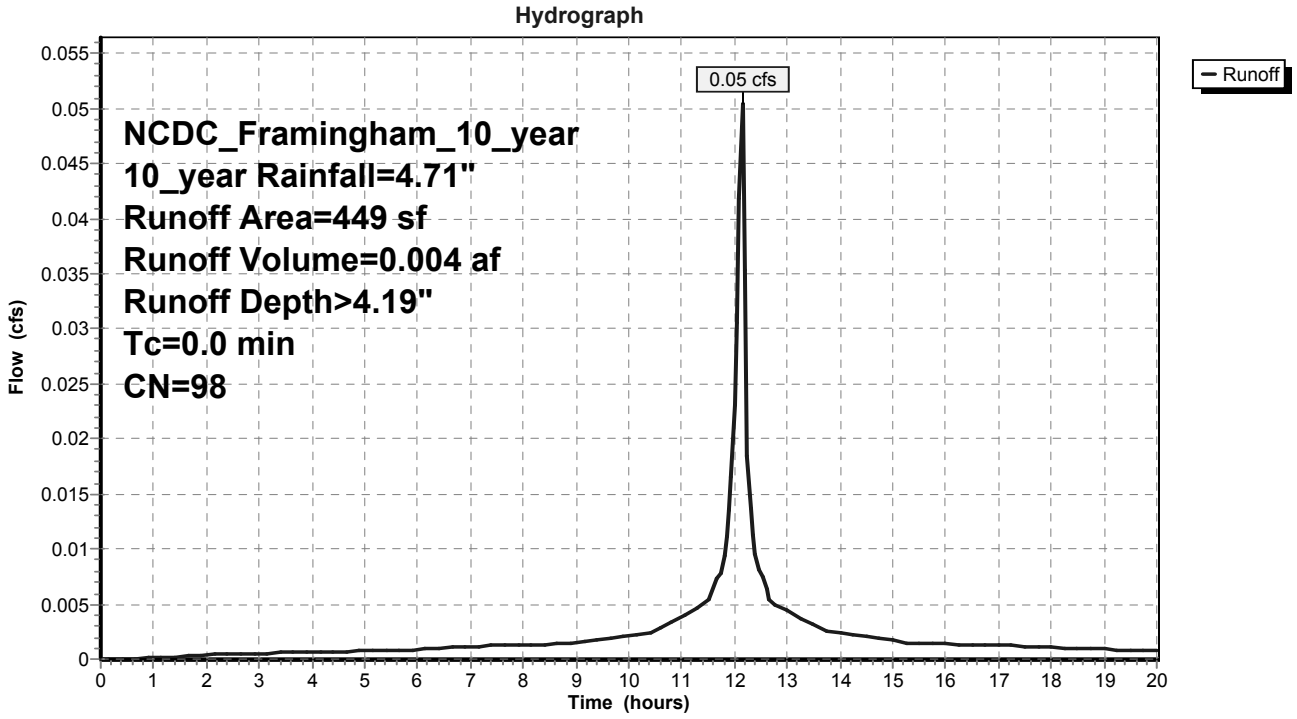
## Summary for Subcatchment ROOF-POOL: (blank)

Runoff = 0.05 cfs @ 12.14 hrs, Volume= 0.004 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 449 | 98 | ROOF, 100% imperv, HSG B |
| | 449 | | 100.00% Pervious Area |

## Subcatchment ROOF-POOL: (blank)



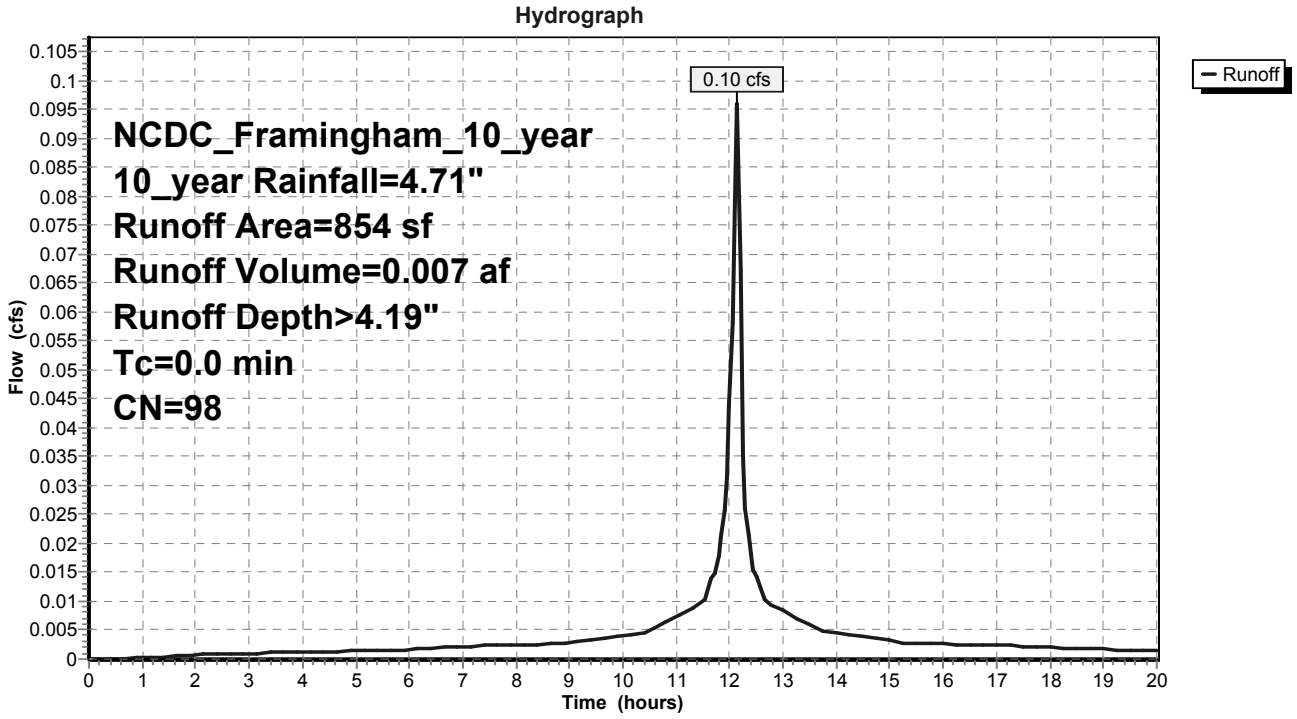
## Summary for Subcatchment ROOF-RECY: (blank)

Runoff = 0.10 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 4.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 854 | 98 | ROOF, 100% imperv, HSG B |
| | 854 | | 100.00% Pervious Area |

## Subcatchment ROOF-RECY: (blank)



## Summary for Subcatchment S-CB-E-1: (blank)

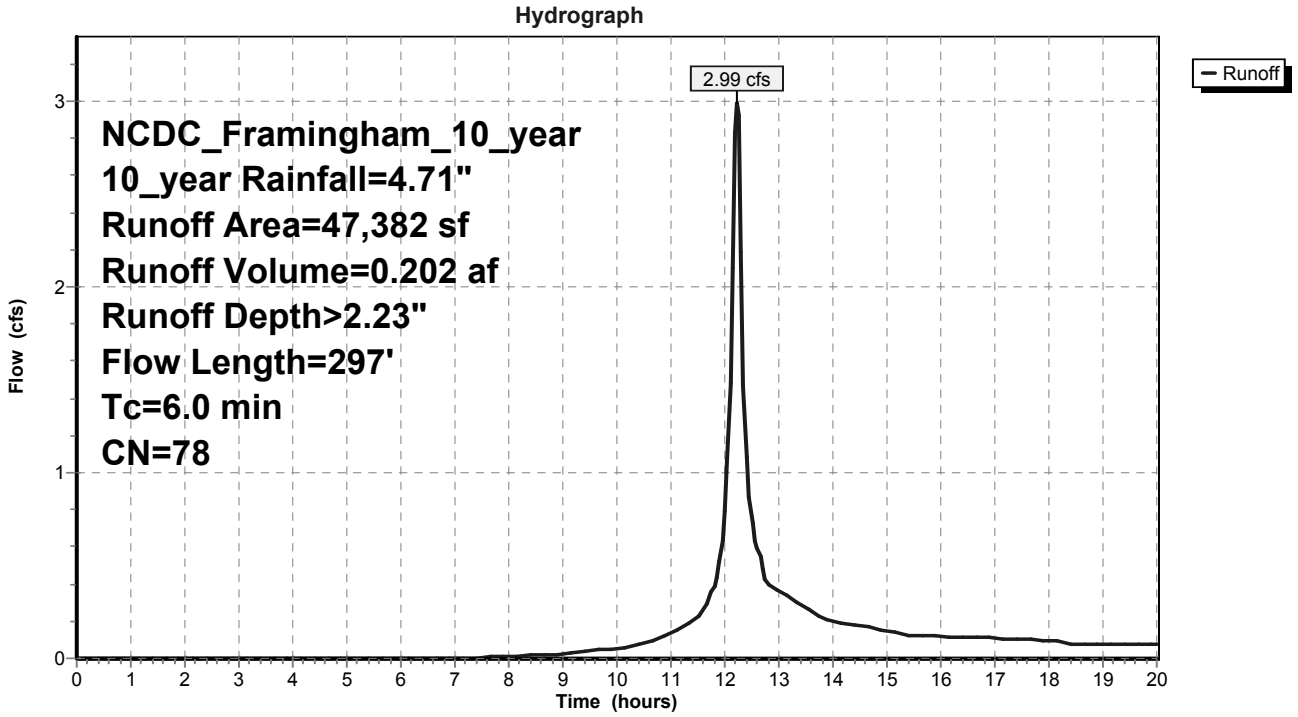
Runoff = 2.99 cfs @ 12.23 hrs, Volume= 0.202 af, Depth> 2.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 25,031 | 61 | GRASS, 0% imperv, HSG B |
| * | 416 | 98 | DECK, 100% imperv, HSG B |
| * | 19,714 | 98 | IMP, 100% imperv, HSG B |
| * | 5 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,215 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 47,382 | 78 | Weighted Average |
| | 47,382 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0437 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.7 | 91 | 0.0903 | 2.10 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 68 | 0.0186 | 2.77 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0363 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0791 | 5.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 7 | 0.0208 | 1.01 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 4 | 0.0200 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 29 | 0.0291 | 3.46 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0216 | 1.03 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.0 | 297 | Total | | | |

## Subcatchment S-CB-E-1: (blank)



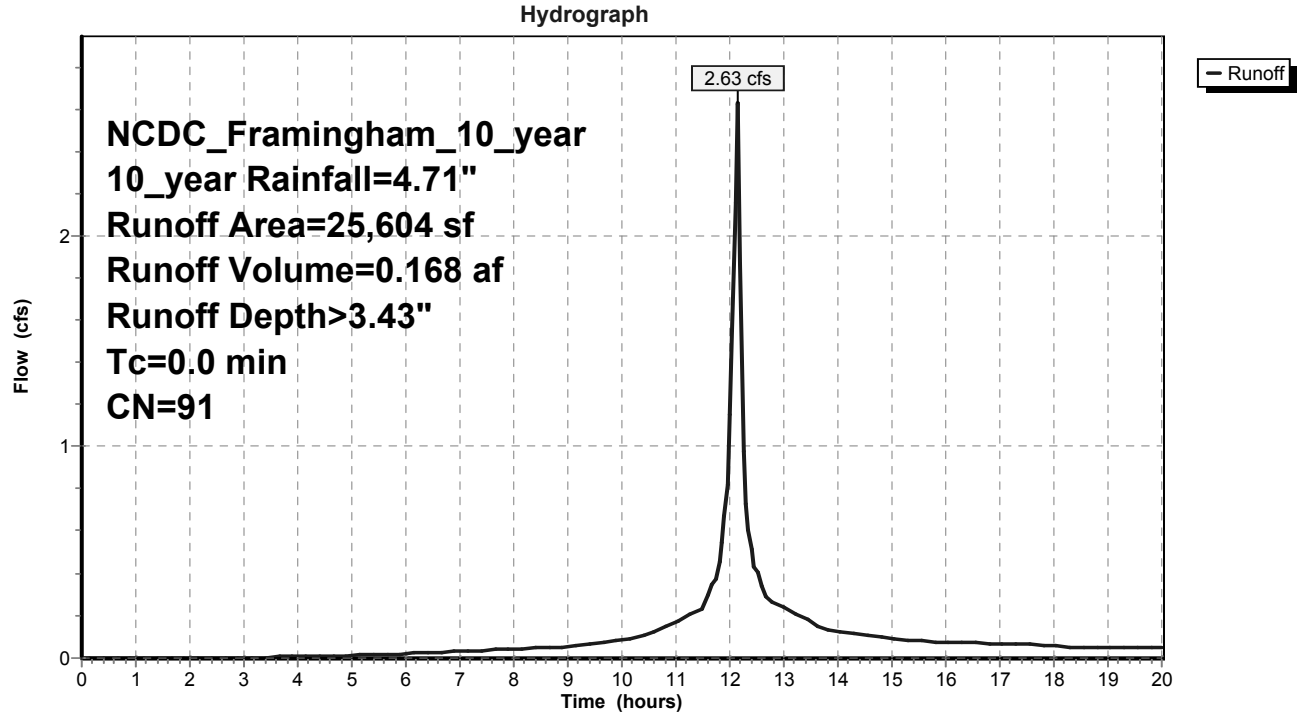
## Summary for Subcatchment S-CB-INF-E-3: (blank)

Runoff = 2.63 cfs @ 12.14 hrs, Volume= 0.168 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,743 | 61 | GRASS, 0% imperv, HSG B |
| * | 437 | 98 | DECK, 100% imperv, HSG B |
| * | 18,687 | 98 | IMP, 100% imperv, HSG B |
| * | 1,737 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,604 | 91 | Weighted Average |
| | 25,604 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-3: (blank)



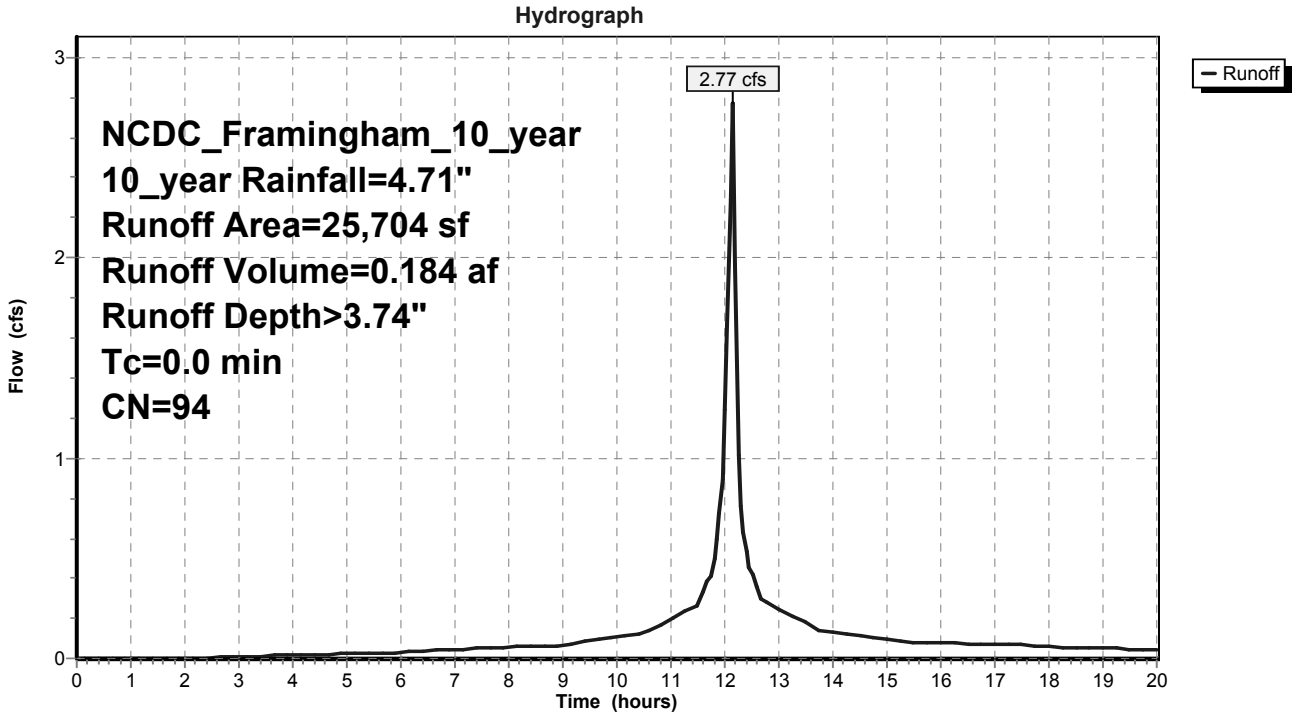
## Summary for Subcatchment S-CB-INF-E-4A: (blank)

Runoff = 2.77 cfs @ 12.14 hrs, Volume= 0.184 af, Depth> 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,473 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,055 | 98 | IMP, 100% imperv, HSG B |
| * | 175 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,704 | 94 | Weighted Average |
| | 25,704 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-4A: (blank)



## Summary for Subcatchment S-DET-1: (blank)

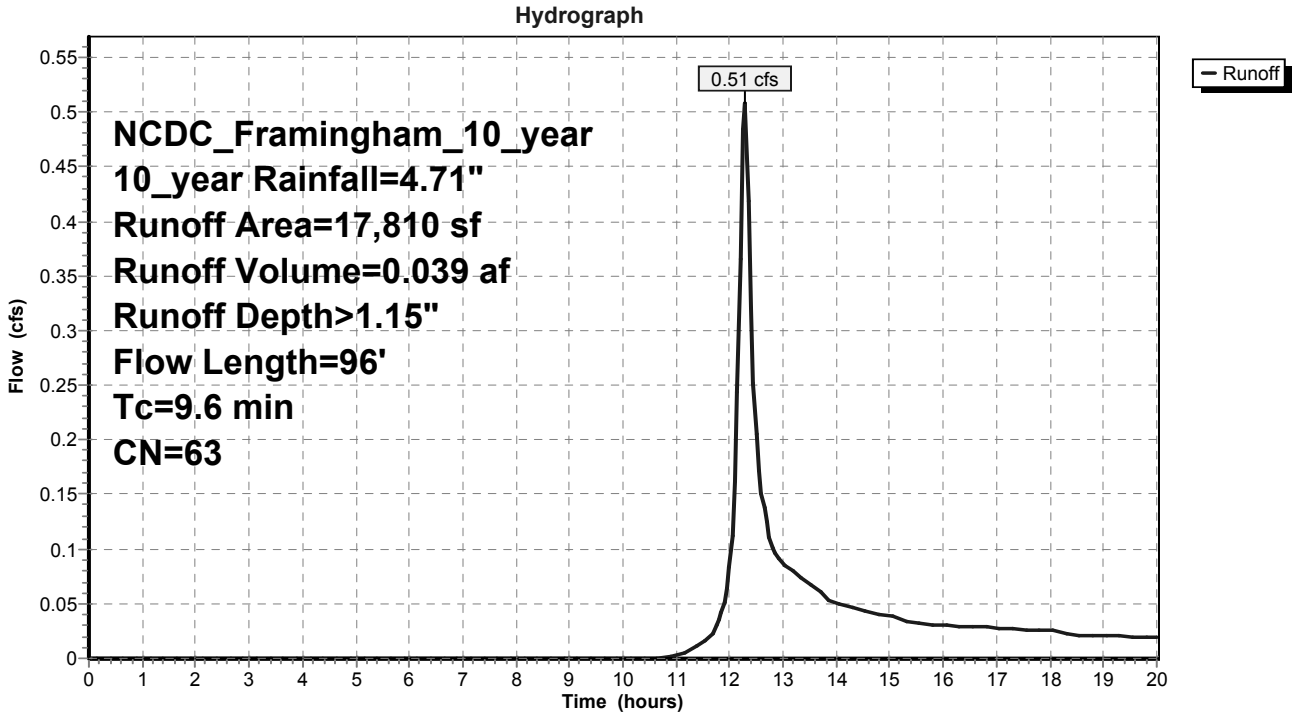
Runoff = 0.51 cfs @ 12.28 hrs, Volume= 0.039 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,881 | 61 | GRASS, 0% imperv, HSG B |
| * | 49 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 111 | 98 | DECK, 100% imperv, HSG B |
| * | 769 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,810 | 63 | Weighted Average |
| | 17,778 | | 99.82% Pervious Area |
| | 32 | | 0.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.4 | 11 | 0.0021 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 9 | 0.0010 | 0.25 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 4.1 | 29 | 0.0169 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 46 | 0.0536 | 1.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 9.6 | 96 | Total | | | |

## Subcatchment S-DET-1: (blank)



## Summary for Subcatchment S-DET-3: (blank)

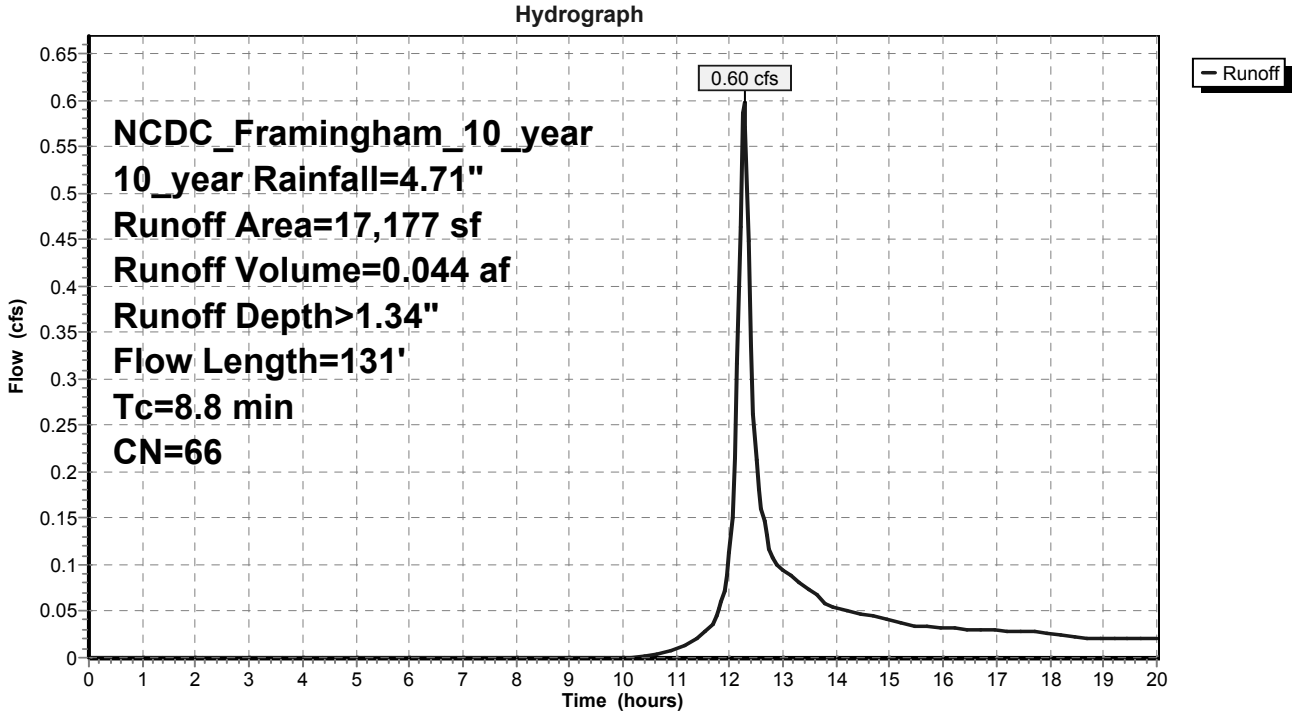
Runoff = 0.60 cfs @ 12.27 hrs, Volume= 0.044 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,639 | 61 | GRASS, 0% imperv, HSG B |
| * | 579 | 98 | DECK, 100% imperv, HSG B |
| * | 56 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,177 | 66 | Weighted Average |
| | 17,177 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.1 | 81 | 0.0332 | 1.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 8.8 | 131 | Total | | | |

## Subcatchment S-DET-3: (blank)



## Summary for Subcatchment S-INF-E-1: (blank)

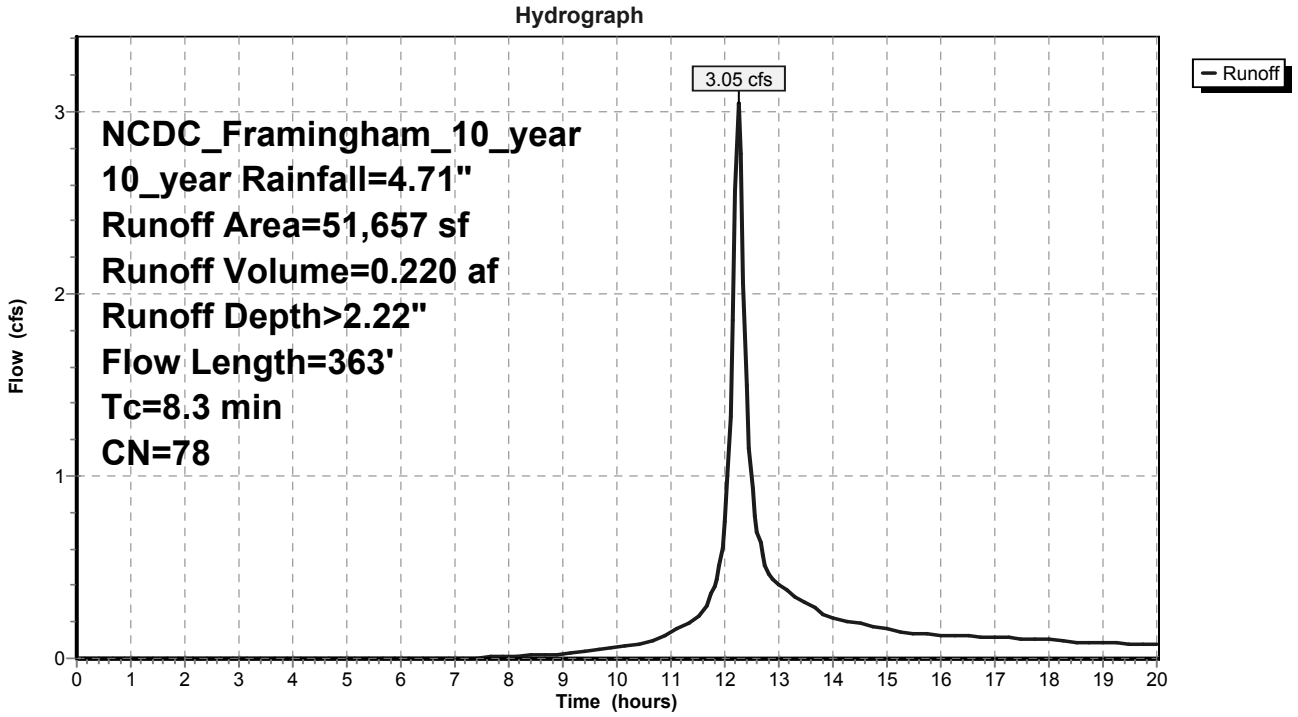
Runoff = 3.05 cfs @ 12.26 hrs, Volume= 0.220 af, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,205 | 61 | GRASS, 0% imperv, HSG B |
| * | 40 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,150 | 98 | DECK, 100% imperv, HSG B |
| * | 21,115 | 98 | IMP, 100% imperv, HSG B |
| * | 2,147 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 51,657 | 78 | Weighted Average |
| | 51,657 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 29 | 0.0280 | 0.15 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 21 | 0.0091 | 0.71 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 107 | 0.0148 | 2.47 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0347 | 1.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 15 | 0.0087 | 1.90 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 25 | 0.0062 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0234 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 30 | 0.0213 | 2.96 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.4 | 86 | 0.0074 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 8 | 0.0161 | 2.58 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 29 | 0.0113 | 2.16 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.3 | 363 | Total | | | |

## Subcatchment S-INF-E-1: (blank)



## Summary for Subcatchment S-INF-E-2: (blank)

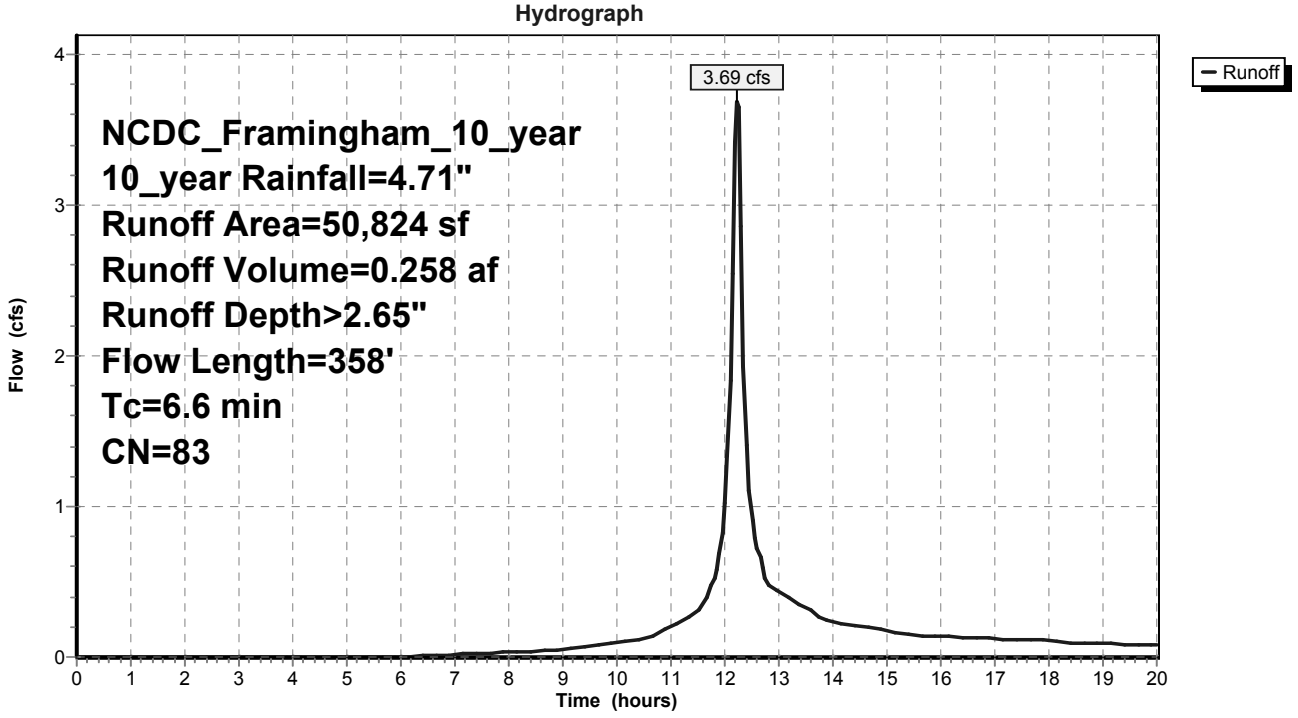
Runoff = 3.69 cfs @ 12.24 hrs, Volume= 0.258 af, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,826 | 61 | GRASS, 0% imperv, HSG B |
| * | 902 | 98 | DECK, 100% imperv, HSG B |
| * | 23,637 | 98 | IMP, 100% imperv, HSG B |
| * | 5,459 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 50,824 | 83 | Weighted Average |
| | 50,824 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 33 | 0.0259 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.3 | 17 | 0.0222 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 114 | 0.0156 | 0.87 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 194 | 0.0103 | 2.06 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.6 | 358 | Total | | | |

## Subcatchment S-INF-E-2: (blank)



## Summary for Subcatchment S-INF-E-3: (blank)

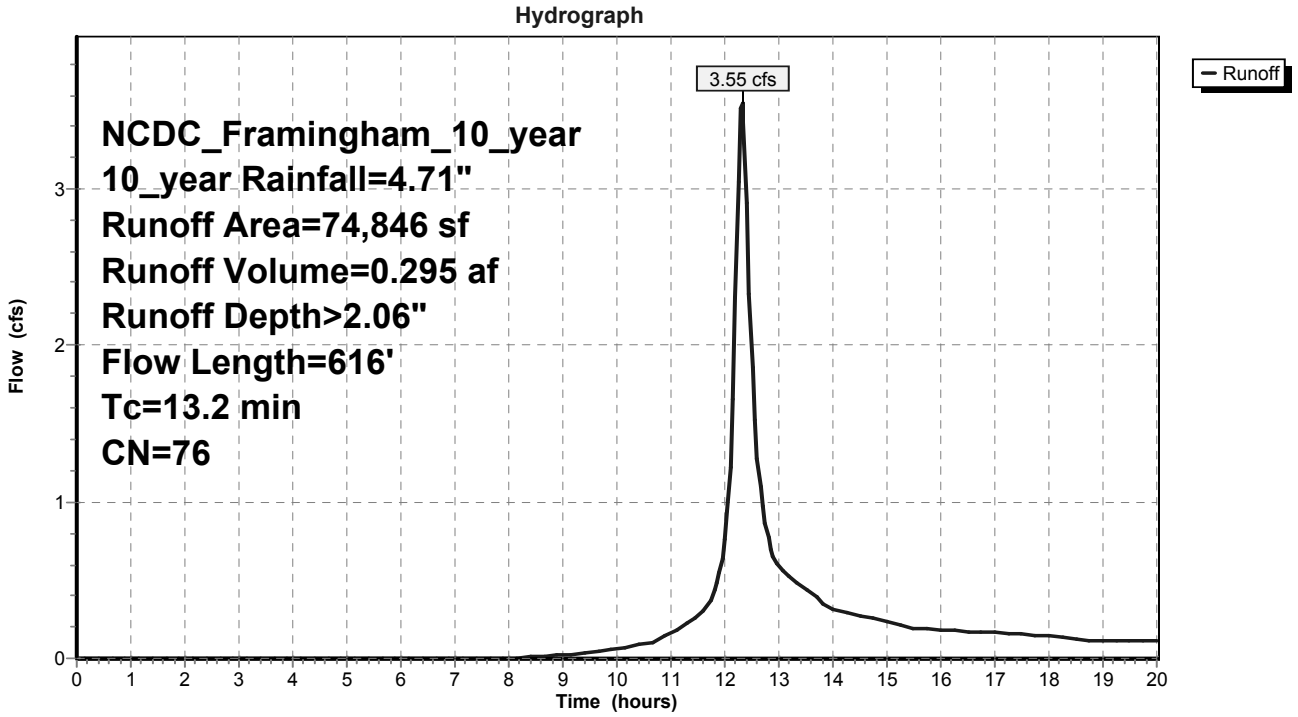
Runoff = 3.55 cfs @ 12.32 hrs, Volume= 0.295 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 43,506 | 61 | GRASS, 0% imperv, HSG B |
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 28,089 | 98 | IMP, 100% imperv, HSG B |
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,680 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,846 | 76 | Weighted Average |
| | 74,846 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 50 | 0.0660 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 91 | 0.0499 | 1.56 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0303 | 3.53 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0301 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 12 | 0.0280 | 3.40 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 57 | 0.0360 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 42 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0100 | 2.03 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 12 | 0.0013 | 0.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 48 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 32 | 0.0235 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 18 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 5 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 34 | 0.0100 | 0.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 162 | 0.0071 | 0.59 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 13.2 | 616 | Total | | | |

## Subcatchment S-INF-E-3: (blank)



## Summary for Subcatchment S-LD-1: (blank)

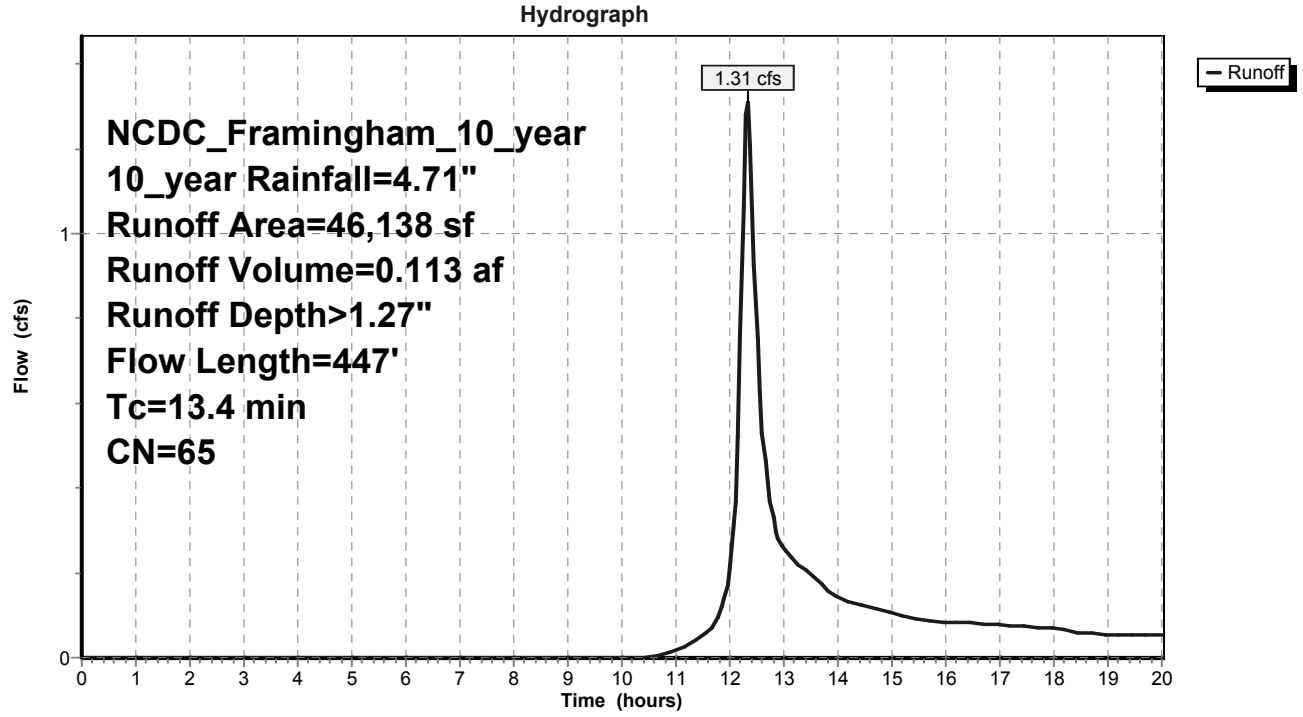
Runoff = 1.31 cfs @ 12.33 hrs, Volume= 0.113 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 38,137 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,396 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,015 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,228 | 98 | DECK, 100% imperv, HSG B |
| * | 1,712 | 98 | IMP, 100% imperv, HSG B |
| * | 650 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 46,138 | 65 | Weighted Average |
| | 44,178 | | 95.75% Pervious Area |
| | 1,960 | | 4.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 50 | 0.0135 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 6.6 | 397 | 0.0205 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 13.4 | 447 | Total | | | |

## Subcatchment S-LD-1: (blank)



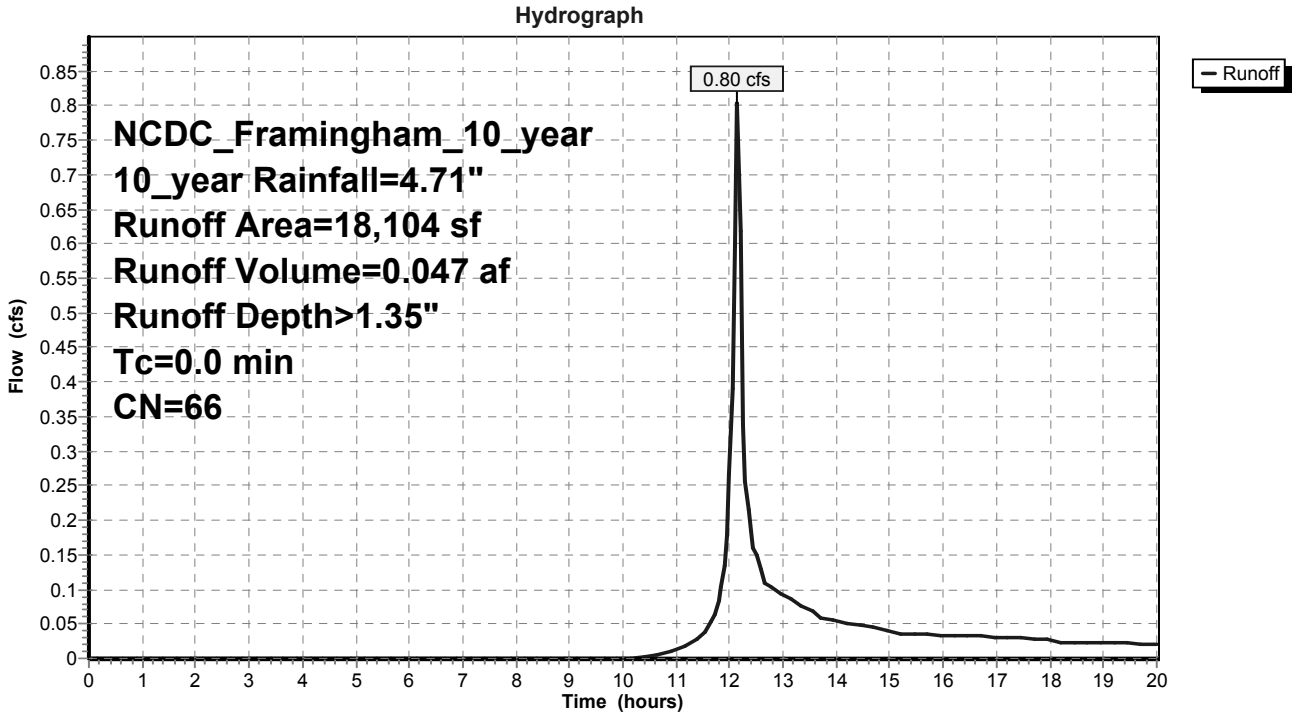
## Summary for Subcatchment S-LD-11: (blank)

Runoff = 0.80 cfs @ 12.15 hrs, Volume= 0.047 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,426 | 61 | GRASS, 0% imperv, HSG B |
| * | 439 | 98 | DECK, 100% imperv, HSG B |
| * | 2,239 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 18,104 | 66 | Weighted Average |
| | 18,104 | | 100.00% Pervious Area |

## Subcatchment S-LD-11: (blank)



## Summary for Subcatchment S-LD-2: (blank)

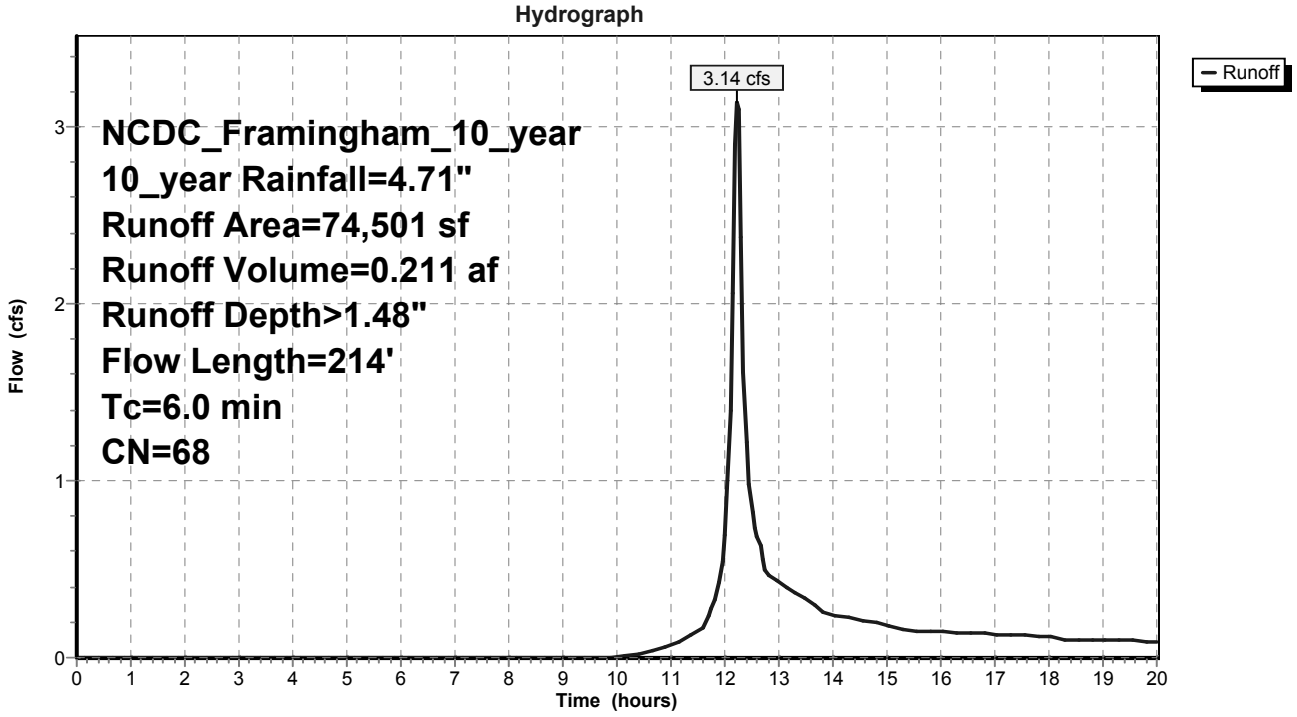
Runoff = 3.14 cfs @ 12.24 hrs, Volume= 0.211 af, Depth> 1.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 57,181 | 61 | GRASS, 0% imperv, HSG B |
| * | 396 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,542 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 803 | 98 | DECK, 100% imperv, HSG B |
| * | 4,508 | 98 | IMP, 100% imperv, HSG B |
| * | 1,071 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,501 | 68 | Weighted Average |
| | 67,649 | | 90.80% Pervious Area |
| | 6,852 | | 9.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2134 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 164 | 0.0313 | 1.24 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.5 | 214 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment S-LD-2: (blank)



## Summary for Subcatchment S-LD-4: (blank)

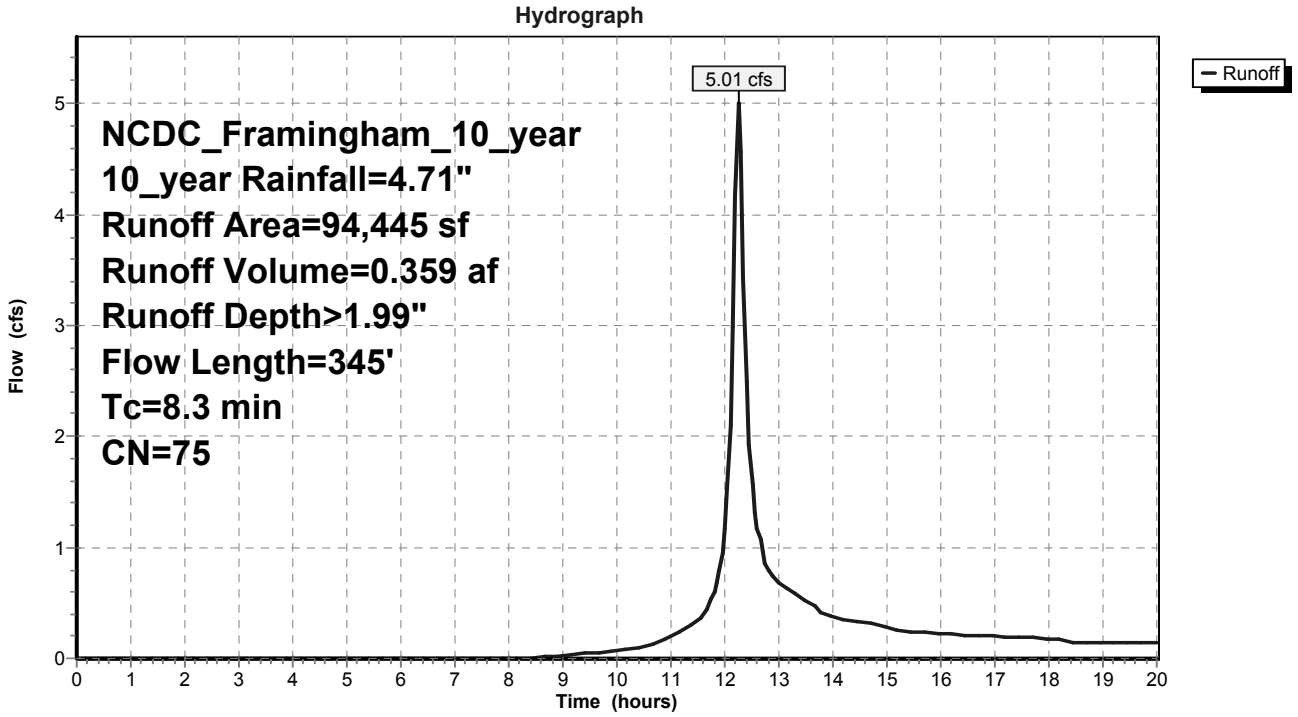
Runoff = 5.01 cfs @ 12.26 hrs, Volume= 0.359 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 53,813 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,316 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 486 | 98 | DECK, 100% imperv, HSG B |
| * | 25,119 | 98 | IMP, 100% imperv, HSG B |
| * | 710 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 94,445 | 75 | Weighted Average |
| | 85,139 | | 90.15% Pervious Area |
| | 9,306 | | 9.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.9 | 50 | 0.0309 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.4 | 288 | 0.0398 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0194 | 2.83 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0182 | 0.94 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 345 | Total | | | |

## Subcatchment S-LD-4: (blank)



## Summary for Subcatchment W 10.0: (blank)

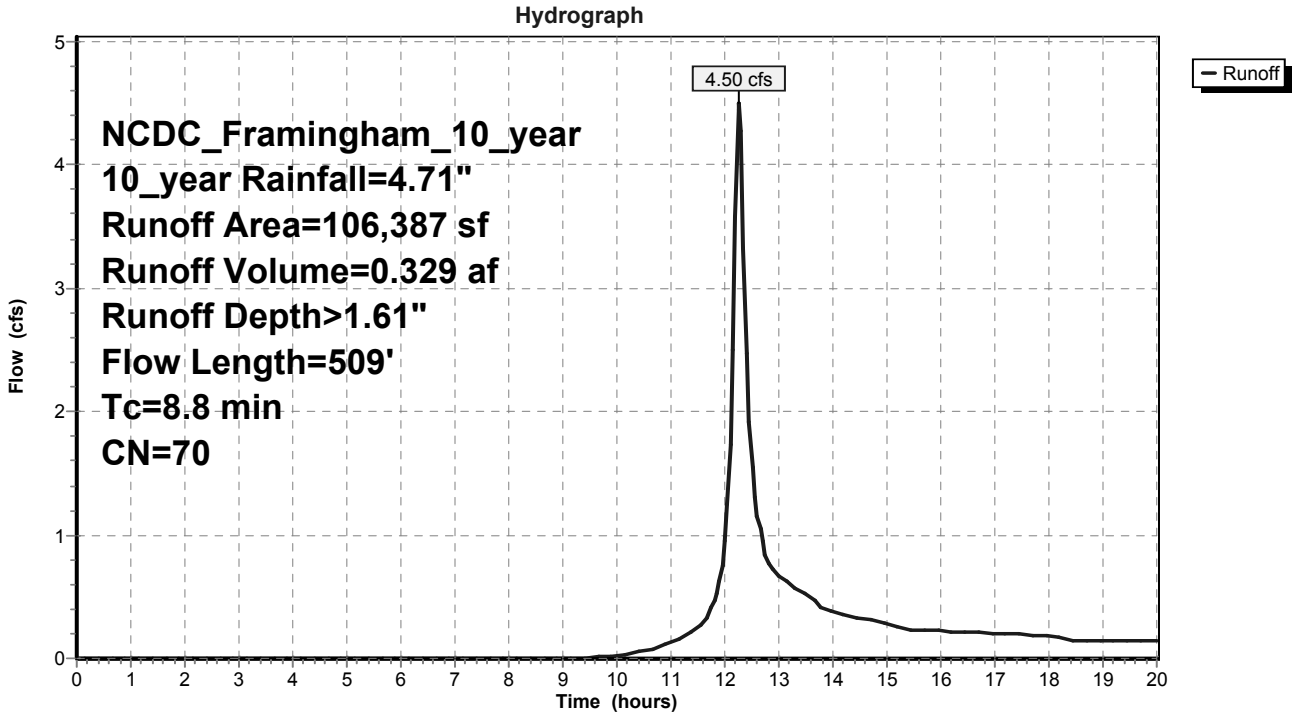
Runoff = 4.50 cfs @ 12.27 hrs, Volume= 0.329 af, Depth> 1.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 100% imperv, HSG C |
| * | 6,541 | 98 | Water, 100% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.8 | 41 | 0.0223 | 0.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 11 | 0.2240 | 1.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.8 | 509 | Total | | | |

## Subcatchment W 10.0: (blank)



## Summary for Subcatchment W 2.0: (blank)

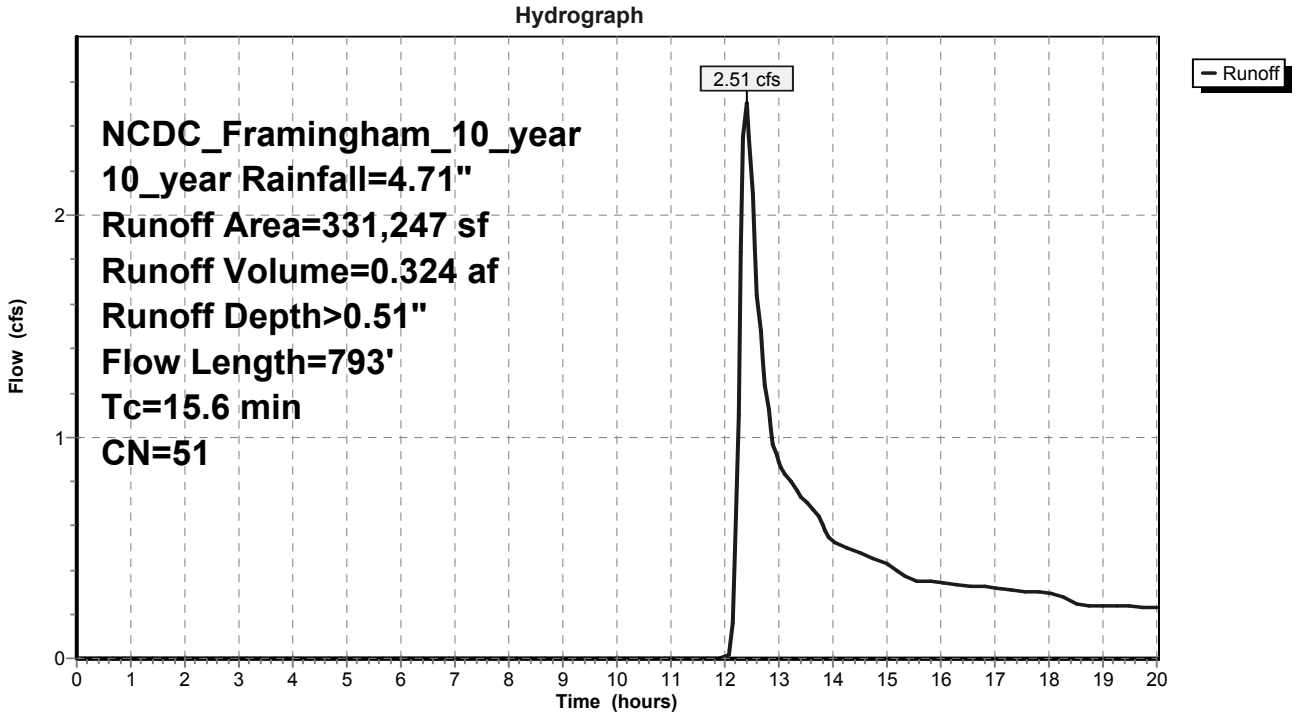
Runoff = 2.51 cfs @ 12.40 hrs, Volume= 0.324 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 40,834 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,020 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 158,571 | 30 | WOODS, 0% imperv, HSG A |
| * | 15 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 17,208 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 2,472 | 98 | DECK, 100% imperv, HSG A |
| * | 54 | 98 | DECK, 100% imperv, HSG B |
| * | 19,292 | 98 | Water, 100% imperv, HSG D |
| * | 1,268 | 98 | Water, 100% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 331,247 | 51 | Weighted Average |
| | 320,062 | | 96.62% Pervious Area |
| | 11,185 | | 3.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: (blank)



## Summary for Subcatchment W 3.1: (blank)

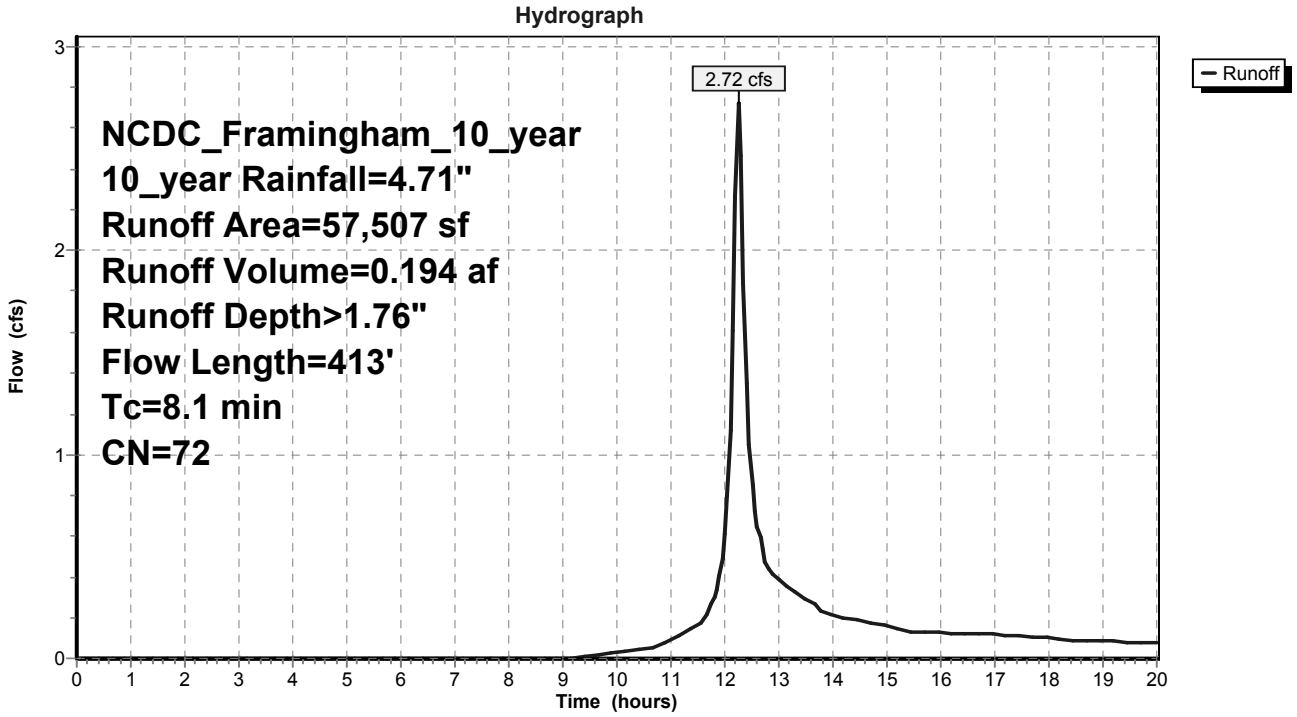
Runoff = 2.72 cfs @ 12.26 hrs, Volume= 0.194 af, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,850 | 39 | GRASS, 0% imperv, HSG A |
| * | 26,567 | 61 | GRASS, 0% imperv, HSG B |
| * | 112 | 30 | WOODS, 0% imperv, HSG A |
| * | 408 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,113 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 15,113 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12 | 98 | DECK, 100% imperv, HSG A |
| * | 1,574 | 98 | DECK, 100% imperv, HSG B |
| * | 3,090 | 98 | IMP, 100% imperv, HSG A |
| * | 4,669 | 98 | IMP, 100% imperv, HSG B |
| | 57,507 | 72 | Weighted Average |
| | 46,310 | | 80.53% Pervious Area |
| | 11,197 | | 19.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2132 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.8 | 363 | 0.0223 | 1.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.1 | 413 | Total | | | |

## Subcatchment W 3.1: (blank)



## Summary for Subcatchment W 3.2: (blank)

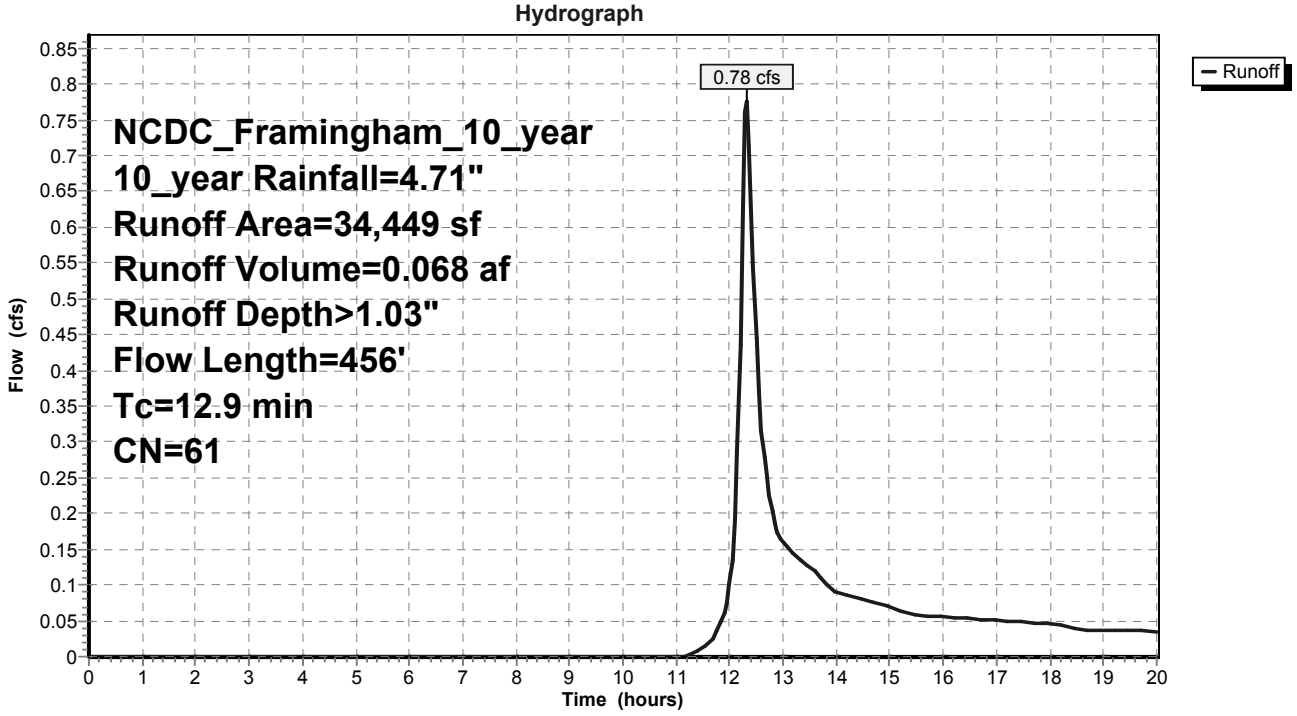
Runoff = 0.78 cfs @ 12.33 hrs, Volume= 0.068 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,379 | 39 | GRASS, 0% imperv, HSG A |
| * | 30,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 8 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 459 | 98 | DECK, 100% imperv, HSG B |
| * | 15 | 98 | IMP, 100% imperv, HSG A |
| * | 621 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 34,449 | 61 | Weighted Average |
| | 34,444 | | 99.99% Pervious Area |
| | 5 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 406 | 0.0128 | 0.79 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 12.9 | 456 | Total | | | |

## Subcatchment W 3.2: (blank)



## Summary for Subcatchment W 3.3: (blank)

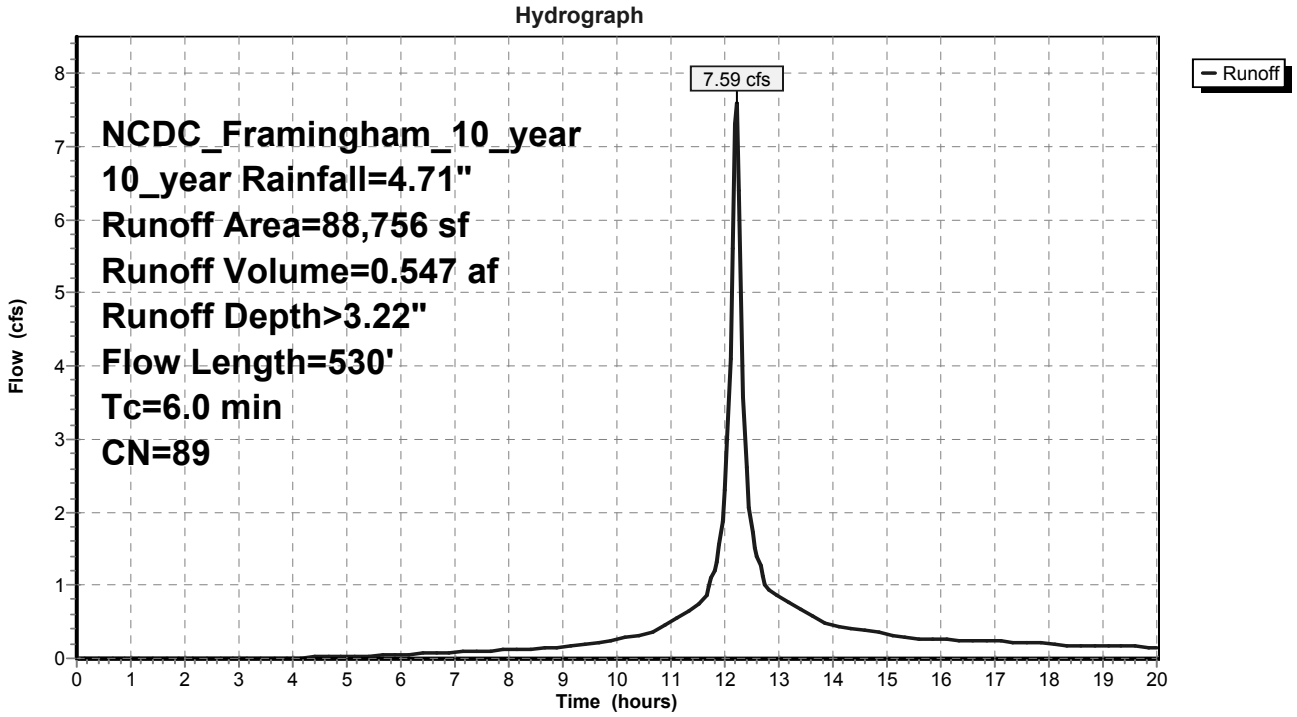
Runoff = 7.59 cfs @ 12.23 hrs, Volume= 0.547 af, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 285 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,658 | 30 | WOODS, 0% imperv, HSG A |
| * | 3,726 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,454 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,698 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,852 | 98 | IMP, 100% imperv, HSG A |
| * | 45,884 | 98 | IMP, 100% imperv, HSG B |
| | 88,756 | 89 | Weighted Average |
| | 79,557 | | 89.64% Pervious Area |
| | 9,199 | | 10.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 530 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.3: (blank)



## Summary for Subcatchment W 3.4: (blank)

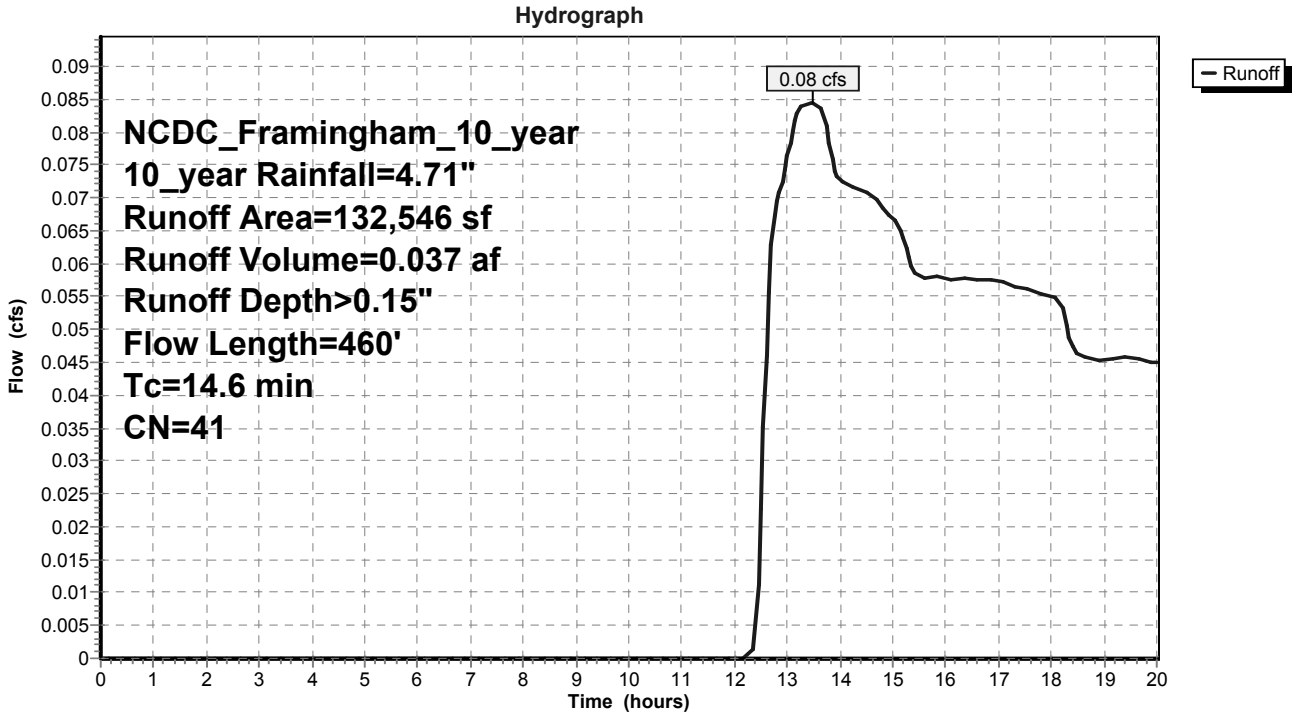
Runoff = 0.08 cfs @ 13.50 hrs, Volume= 0.037 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 34,402 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,152 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,242 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 132,546 | 41 | Weighted Average |
| | 125,888 | | 94.98% Pervious Area |
| | 6,658 | | 5.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: (blank)



## Summary for Subcatchment W 9.1A: (blank)

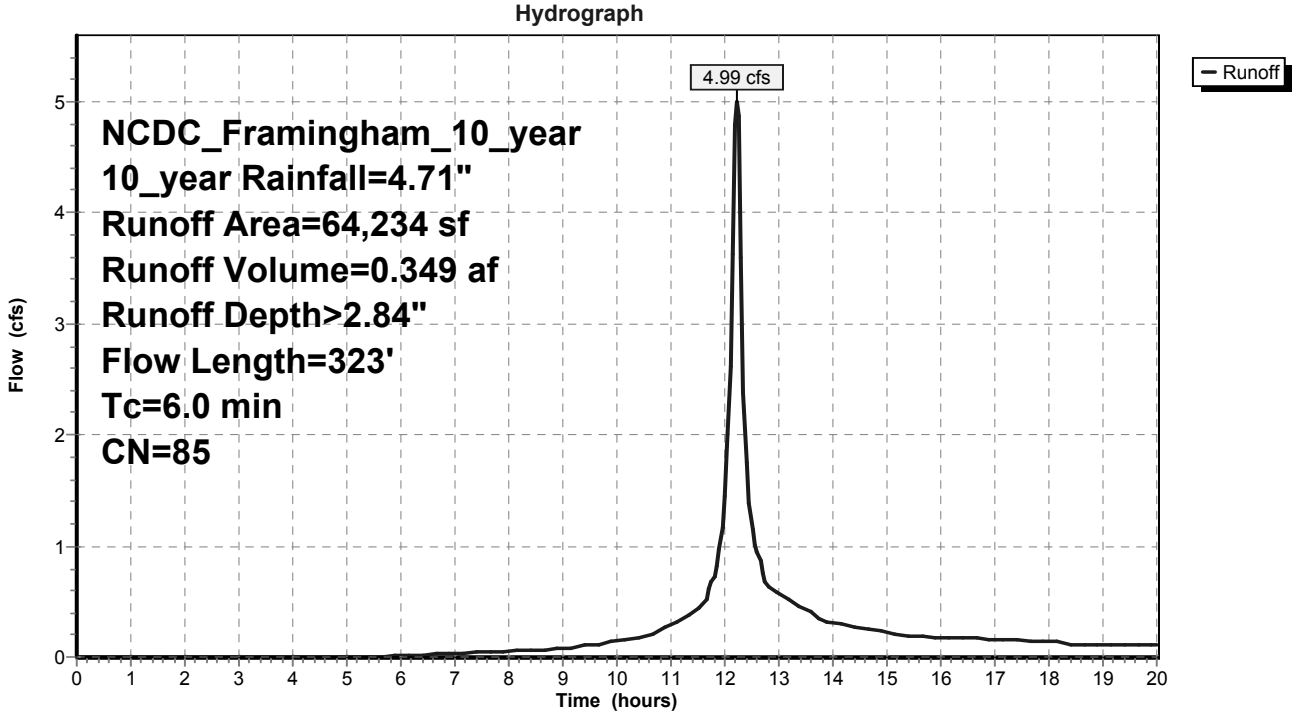
Runoff = 4.99 cfs @ 12.23 hrs, Volume= 0.349 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,121 | 55 | WOODS, 0% imperv, HSG B |
| * | 60,291 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 2,821 | 98 | IMP, 100% imperv, HSG B |
| | 64,234 | 85 | Weighted Average |
| | 25,044 | | 38.99% Pervious Area |
| | 39,189 | | 61.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.5 | 323 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1A: (blank)



## Summary for Subcatchment W 9.1B: (blank)

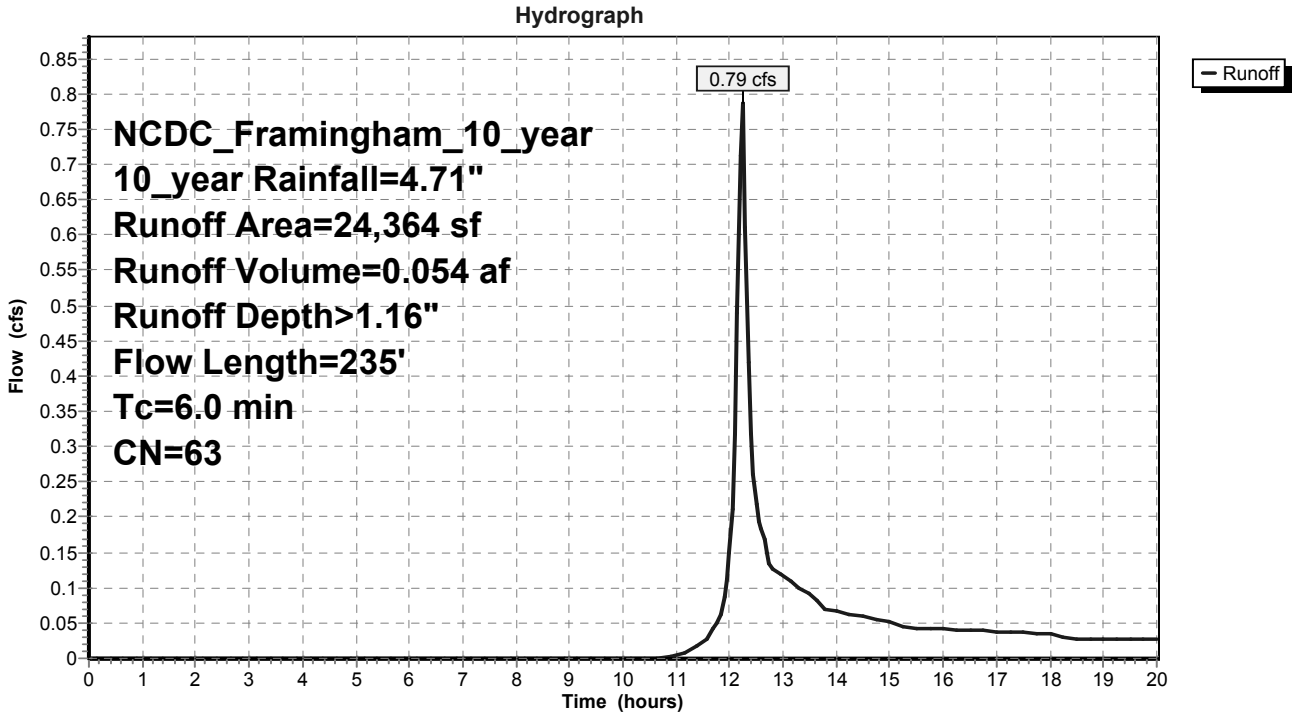
Runoff = 0.79 cfs @ 12.24 hrs, Volume= 0.054 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 12 | 61 | GRASS, 0% imperv, HSG B |
| * | 116 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 676 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,461 | | 83.98% Pervious Area |
| | 3,902 | | 16.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: (blank)



## Summary for Subcatchment W-CULV-N: (blank)

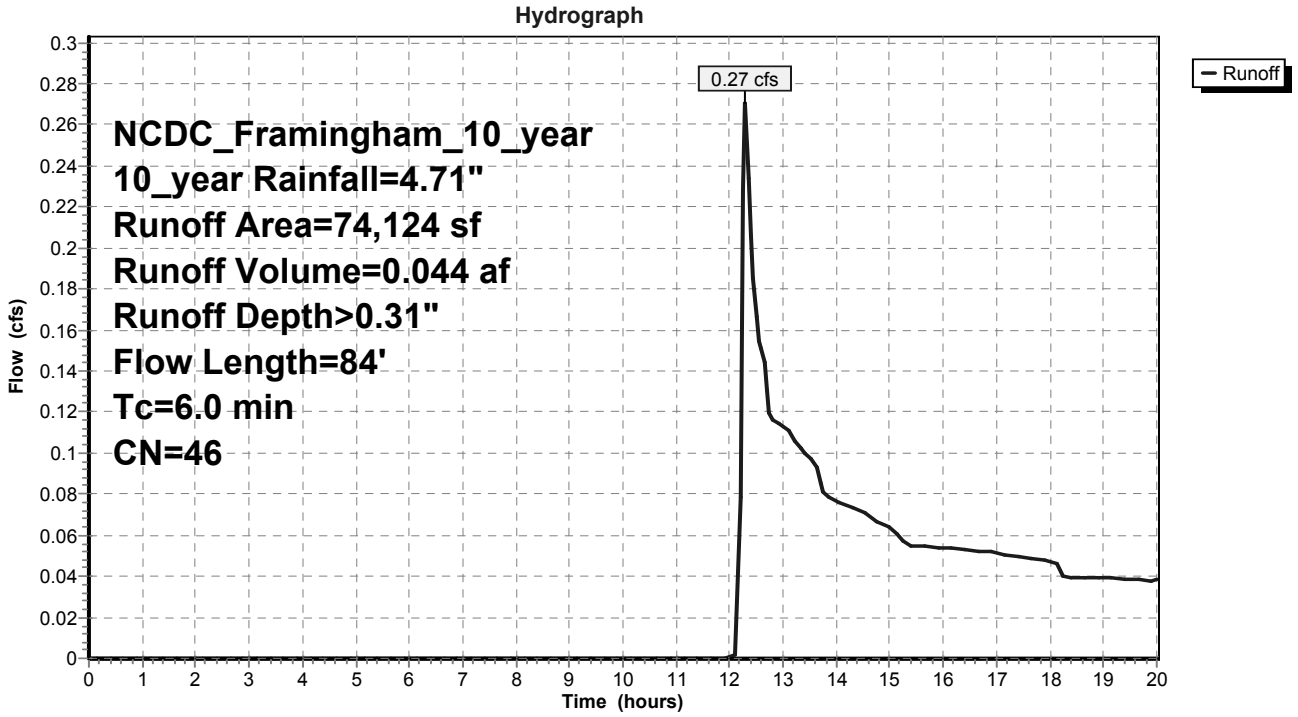
Runoff = 0.27 cfs @ 12.30 hrs, Volume= 0.044 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 49,219 | 39 | GRASS, 0% imperv, HSG A |
| * | 878 | 61 | GRASS, 0% imperv, HSG B |
| * | 11,450 | 30 | WOODS, 0% imperv, HSG A |
| * | 6,537 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 3 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 458 | 98 | DECK, 100% imperv, HSG A |
| * | 70 | 98 | DECK, 100% imperv, HSG B |
| * | 4,994 | 98 | IMP, 100% imperv, HSG A |
| * | 515 | 98 | IMP, 100% imperv, HSG B |
| | 74,124 | 46 | Weighted Average |
| | 69,873 | | 94.27% Pervious Area |
| | 4,251 | | 5.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2138 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 34 | 0.2186 | 3.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 84 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-CULV-N: (blank)



## Summary for Subcatchment W-D-1: (blank)

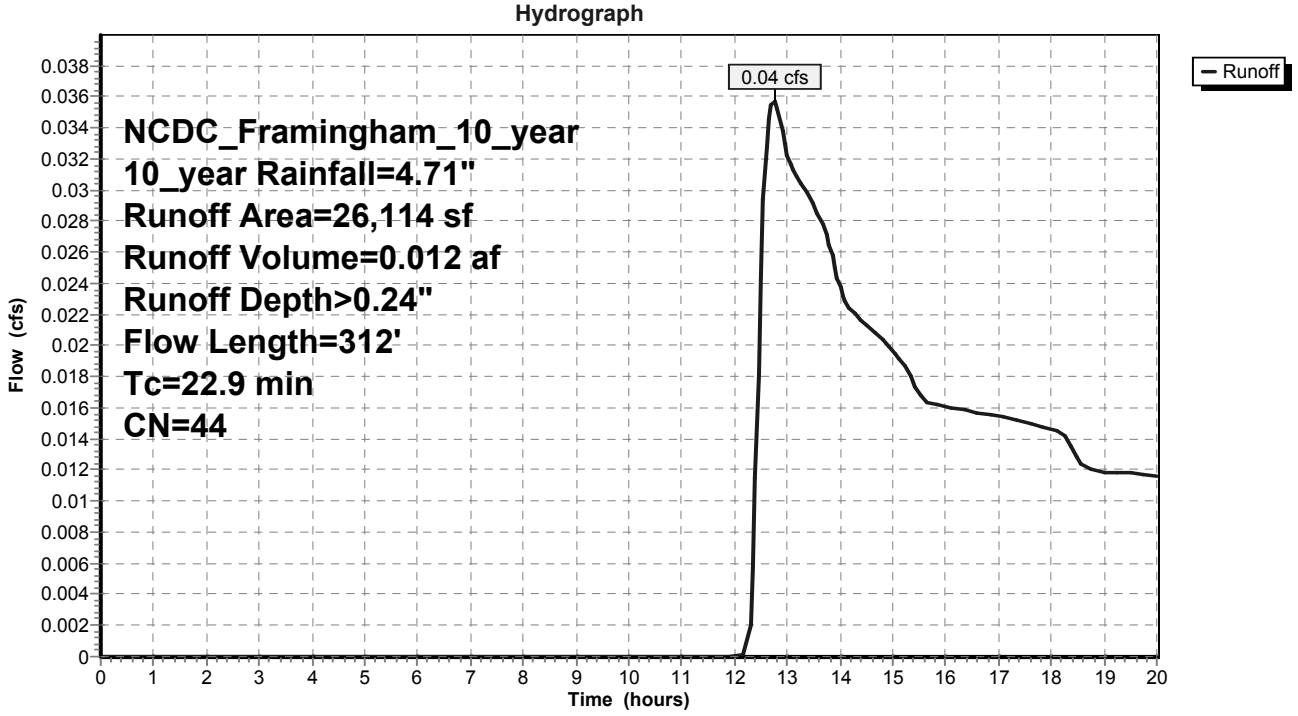
Runoff = 0.04 cfs @ 12.75 hrs, Volume= 0.012 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,996 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,258 | 61 | GRASS, 0% imperv, HSG B |
| * | 535 | 98 | DECK, 100% imperv, HSG A |
| * | 1 | 98 | IMP, 100% imperv, HSG A |
| * | 47 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,136 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 141 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 26,114 | 44 | Weighted Average |
| | 26,114 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 50 | 0.0010 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.6 | 262 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 22.9 | 312 | Total | | | |

## Subcatchment W-D-1: (blank)



## Summary for Subcatchment W-D-3: (blank)

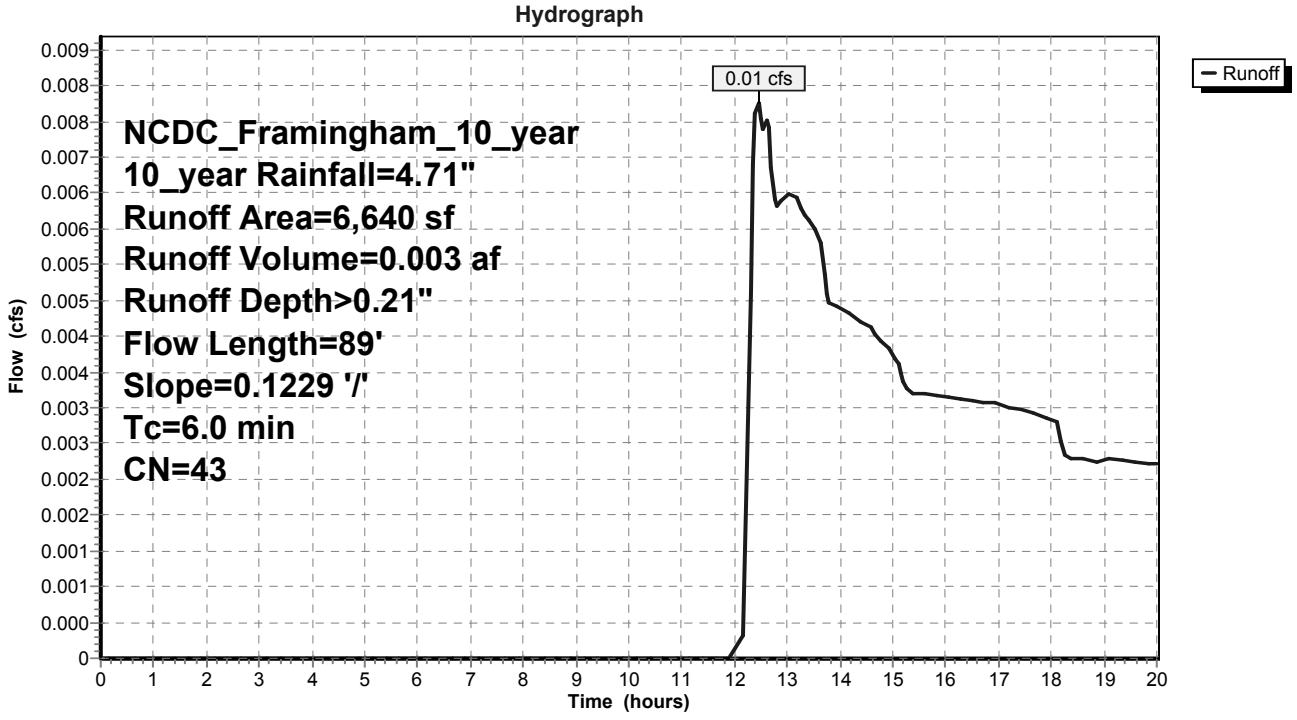
Runoff = 0.01 cfs @ 12.44 hrs, Volume= 0.003 af, Depth> 0.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_10_year 10_year Rainfall=4.71"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,198 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,421 | 30 | WOODS, 0% imperv, HSG A |
| * | 1,021 | 77 | GRAVEL, 65% imperv, HSG A |
| | 6,640 | 43 | Weighted Average |
| | 5,977 | | 90.01% Pervious Area |
| | 664 | | 9.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 89 | 0.1229 | 0.33 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 4.5 | 89 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-D-3: (blank)



## Summary for Reach R-SWALE1: (new Reach)

Inflow Area = 0.663 ac, 2.32% Impervious, Inflow Depth > 1.09" for 10_year event
Inflow = 0.82 cfs @ 12.26 hrs, Volume= 0.060 af
Outflow = 0.60 cfs @ 12.35 hrs, Volume= 0.059 af, Atten= 27%, Lag= 5.5 min

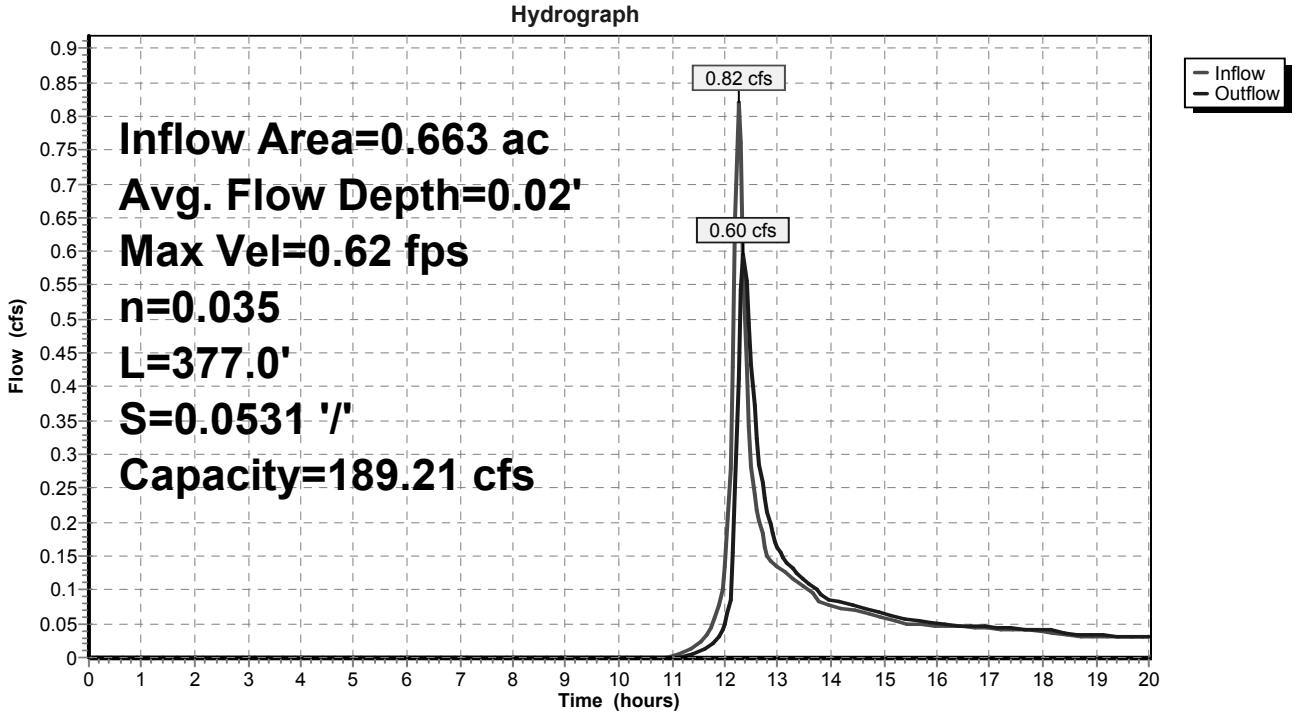
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.62 fps, Min. Travel Time= 10.1 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 20.3 min

Peak Storage= 361 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 189.21 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 377.0' Slope= 0.0531 '/'
Inlet Invert= 165.00', Outlet Invert= 145.00'

‡

## Reach R-SWALE1: (new Reach)



## Summary for Reach R-SWALE2: (new Reach)

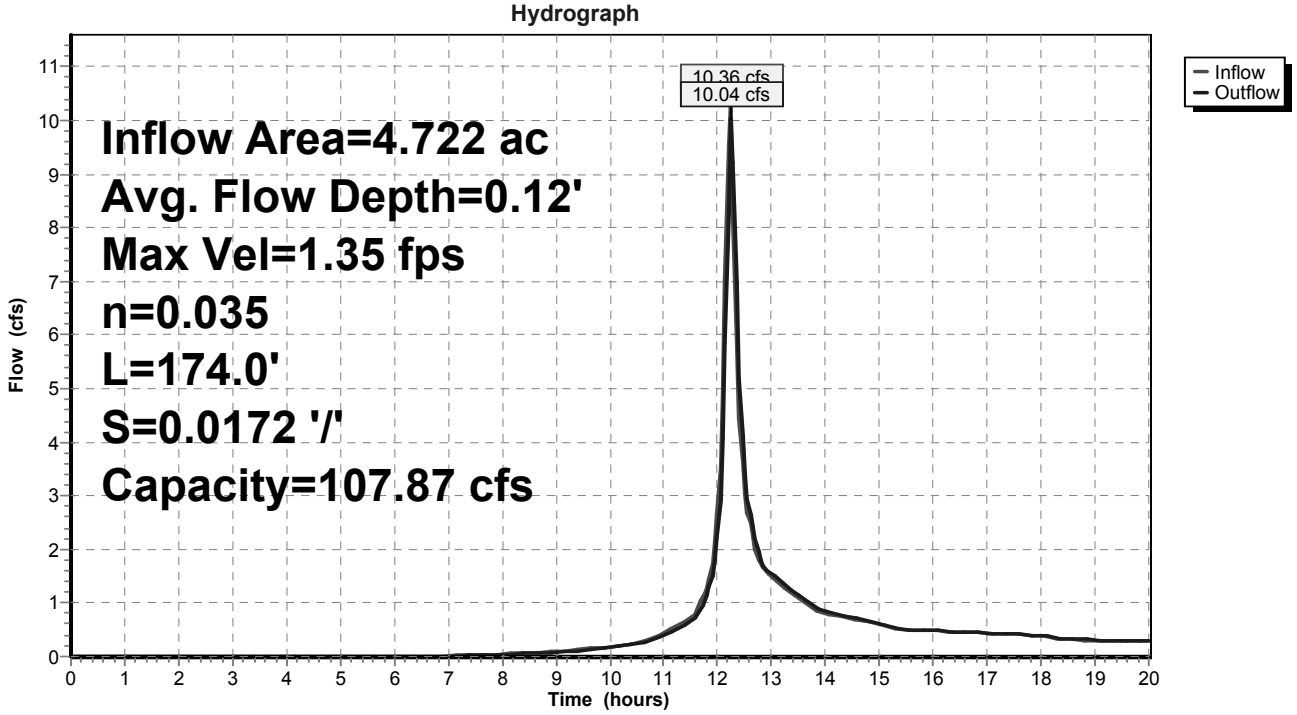
Inflow Area = 4.722 ac, 23.76% Impervious, Inflow Depth > 1.95" for 10_year event
Inflow = 10.36 cfs @ 12.24 hrs, Volume= 0.769 af
Outflow = 10.04 cfs @ 12.26 hrs, Volume= 0.765 af, Atten= 3%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 1.35 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 7.5 min

Peak Storage= 1,290 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 107.87 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 174.0' Slope= 0.0172 '/'
Inlet Invert= 145.00', Outlet Invert= 142.00'

## Reach R-SWALE2: (new Reach)



## Summary for Reach R-SWALE3: (new Reach)

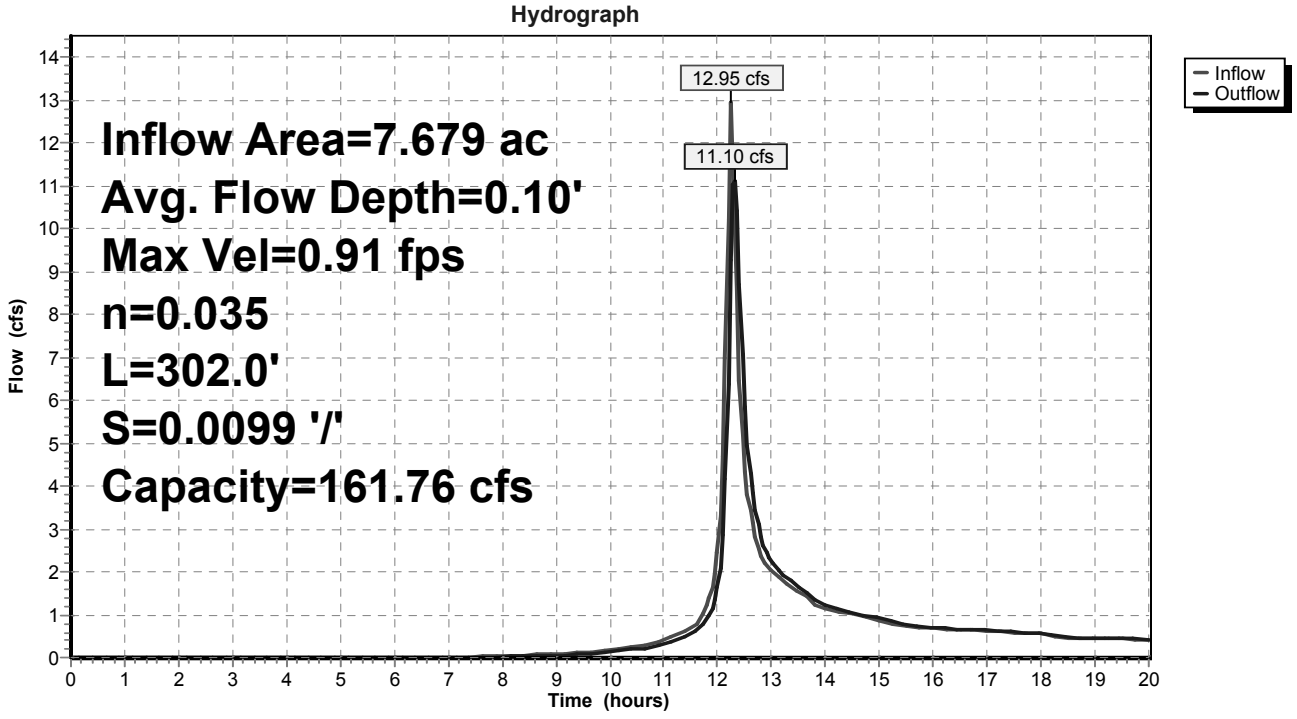
Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 1.53" for 10_year event
Inflow = 12.95 cfs @ 12.26 hrs, Volume= 0.978 af
Outflow = 11.10 cfs @ 12.31 hrs, Volume= 0.967 af, Atten= 14%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.91 fps, Min. Travel Time= 5.5 min
Avg. Velocity = 0.28 fps, Avg. Travel Time= 18.3 min

Peak Storage= 3,676 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 0.50' Flow Area= 62.0 sf, Capacity= 161.76 cfs

120.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 128.00'
Length= 302.0' Slope= 0.0099 '/'
Inlet Invert= 142.00', Outlet Invert= 139.00'

## Reach R-SWALE3: (new Reach)



## Summary for Pond DET-1: 387

Inflow Area = 0.908 ac, 0.08% Impervious, Inflow Depth > 2.82" for 10_year event
Inflow = 2.68 cfs @ 12.15 hrs, Volume= 0.214 af
Outflow = 0.43 cfs @ 12.63 hrs, Volume= 0.087 af, Atten= 84%, Lag= 29.0 min
Primary = 0.43 cfs @ 12.63 hrs, Volume= 0.087 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.38' @ 12.63 hrs Surf.Area= 4,791 sf Storage= 5,780 cf
Flood Elev= 170.00' Surf.Area= 5,344 sf Storage= 8,945 cf

Plug-Flow detention time= 312.5 min calculated for 0.087 af (41% of inflow)
Center-of-Mass det. time= 161.7 min ( 897.9 - 736.2 )

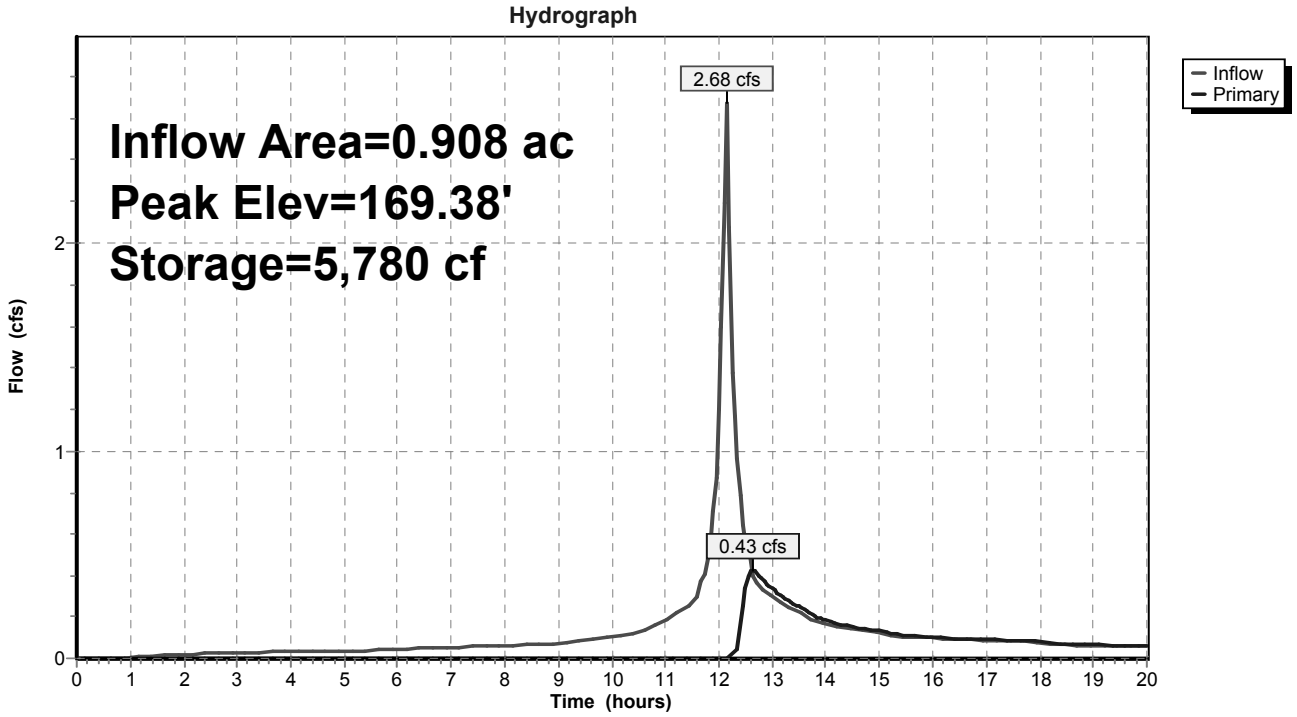
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 8,945 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 3,630 | 0 | 0 |
| 169.00 | 4,458 | 4,044 | 4,044 |
| 170.00 | 5,344 | 4,901 | 8,945 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 15.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.80' S= 0.0133 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.30' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.42 cfs @ 12.63 hrs HW=169.38' TW=150.60' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 0.42 cfs of 22.87 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 0.42 cfs @ 0.90 fps)

## Pond DET-1: 387



## Summary for Pond DET-2: 391

Inflow Area = 0.988 ac, 0.00% Impervious, Inflow Depth > 3.00" for 10_year event
Inflow = 3.60 cfs @ 12.14 hrs, Volume= 0.247 af
Outflow = 1.56 cfs @ 12.25 hrs, Volume= 0.207 af, Atten= 57%, Lag= 6.4 min
Primary = 1.56 cfs @ 12.25 hrs, Volume= 0.207 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 165.06' @ 12.25 hrs Surf.Area= 2,110 sf Storage= 3,254 cf
Flood Elev= 166.00' Surf.Area= 2,656 sf Storage= 5,490 cf

Plug-Flow detention time= 123.5 min calculated for 0.207 af (84% of inflow)
Center-of-Mass det. time= 68.8 min ( 803.1 - 734.3 )

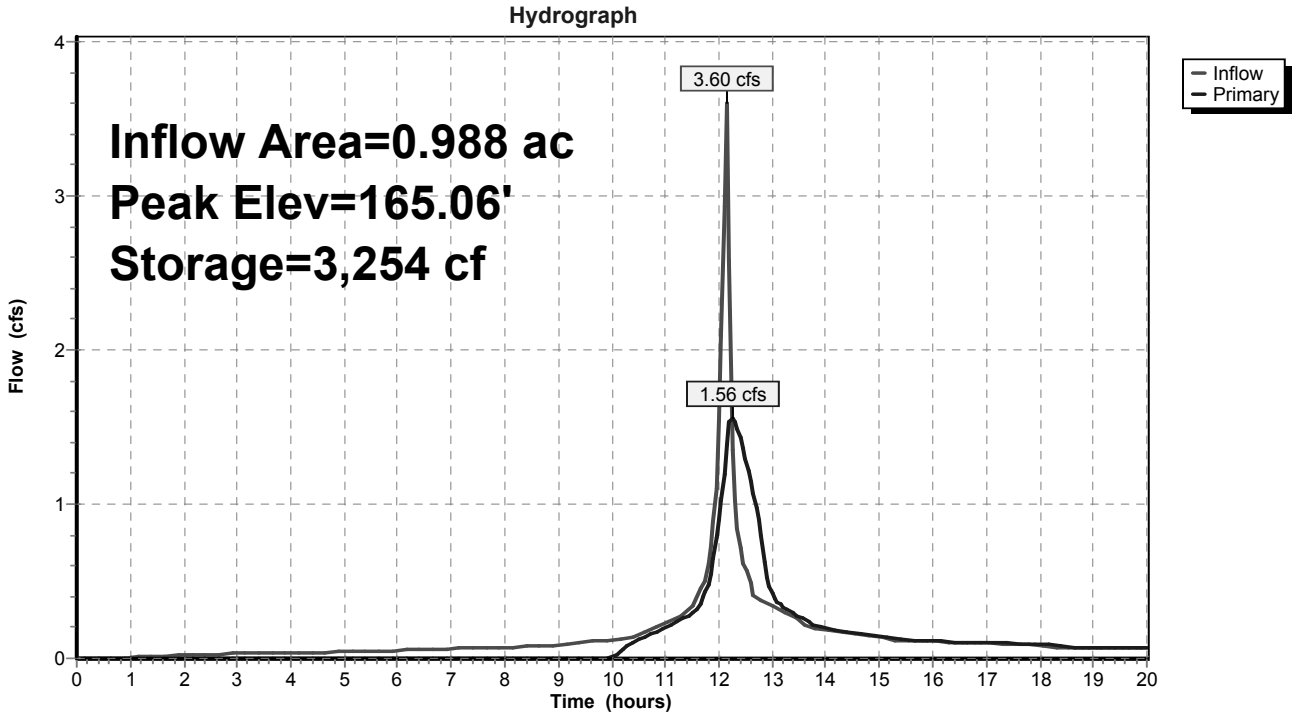
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 5,490 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 1,079 | 0 | 0 |
| 164.00 | 1,548 | 1,314 | 1,314 |
| 165.00 | 2,074 | 1,811 | 3,125 |
| 166.00 | 2,656 | 2,365 | 5,490 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 25.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.80' S= 0.0080 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 164.20' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.56 cfs @ 12.25 hrs HW=165.06' TW=158.73' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.56 cfs of 14.62 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.56 cfs @ 4.47 fps)

## Pond DET-2: 391



## Summary for Pond DET-3: 395

Inflow Area = 0.995 ac, 0.00% Impervious, Inflow Depth > 3.06" for 10_year event
Inflow = 3.24 cfs @ 12.15 hrs, Volume= 0.254 af
Outflow = 1.44 cfs @ 12.29 hrs, Volume= 0.199 af, Atten= 56%, Lag= 8.5 min
Primary = 1.44 cfs @ 12.29 hrs, Volume= 0.199 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 175.03' @ 12.29 hrs Surf.Area= 2,478 sf Storage= 3,968 cf
Flood Elev= 176.00' Surf.Area= 3,044 sf Storage= 6,640 cf

Plug-Flow detention time= 151.0 min calculated for 0.199 af (78% of inflow)
Center-of-Mass det. time= 82.6 min ( 816.1 - 733.6 )

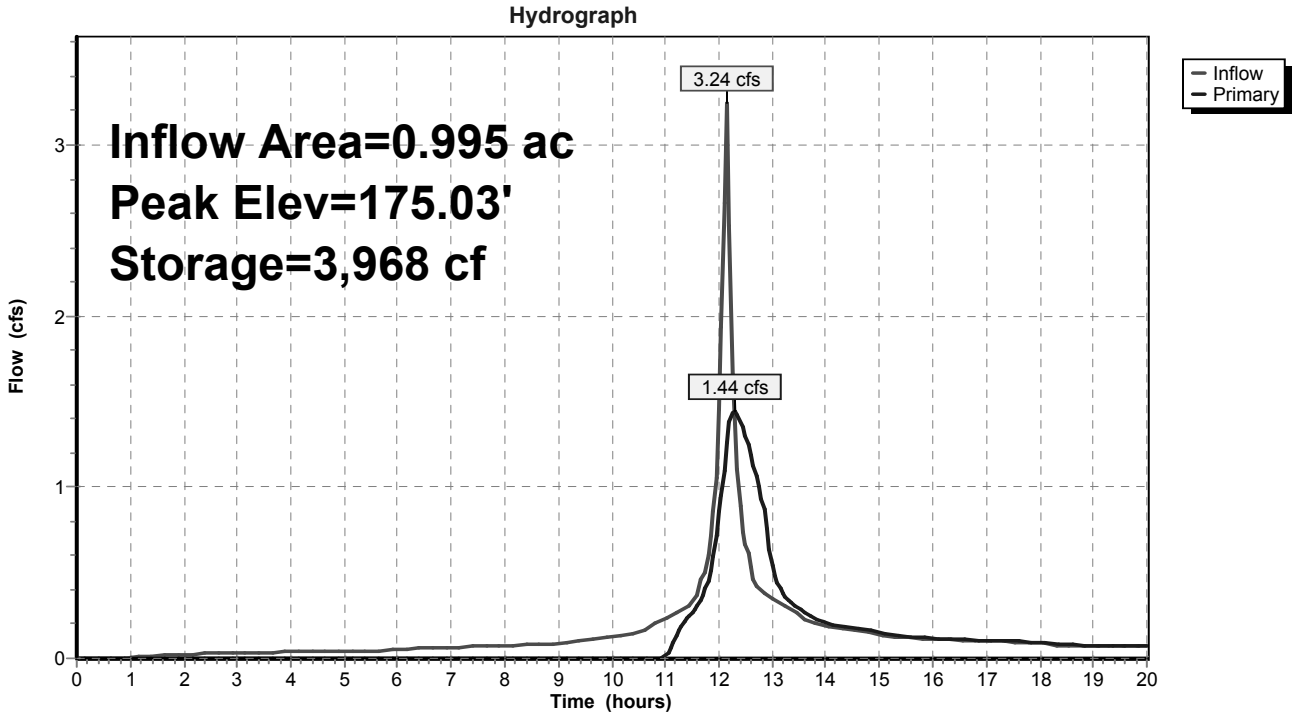
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 6,640 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 1,458 | 0 | 0 |
| 174.00 | 1,930 | 1,694 | 1,694 |
| 175.00 | 2,459 | 2,195 | 3,889 |
| 176.00 | 3,044 | 2,752 | 6,640 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 169.00' | **18.0" Round RCP_Round 18"**<br>L= 48.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.00' / 168.40' S= 0.0125 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 174.30' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.44 cfs @ 12.29 hrs HW=175.03' TW=162.58' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.44 cfs of 22.28 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.44 cfs @ 4.12 fps)

## Pond DET-3: 395



## Summary for Pond INF-ROOF-100: 368

Inflow Area = 0.166 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.81 cfs @ 12.14 hrs, Volume= 0.058 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 173.33' @ 20.00 hrs Surf.Area= 471 sf Storage= 2,526 cf

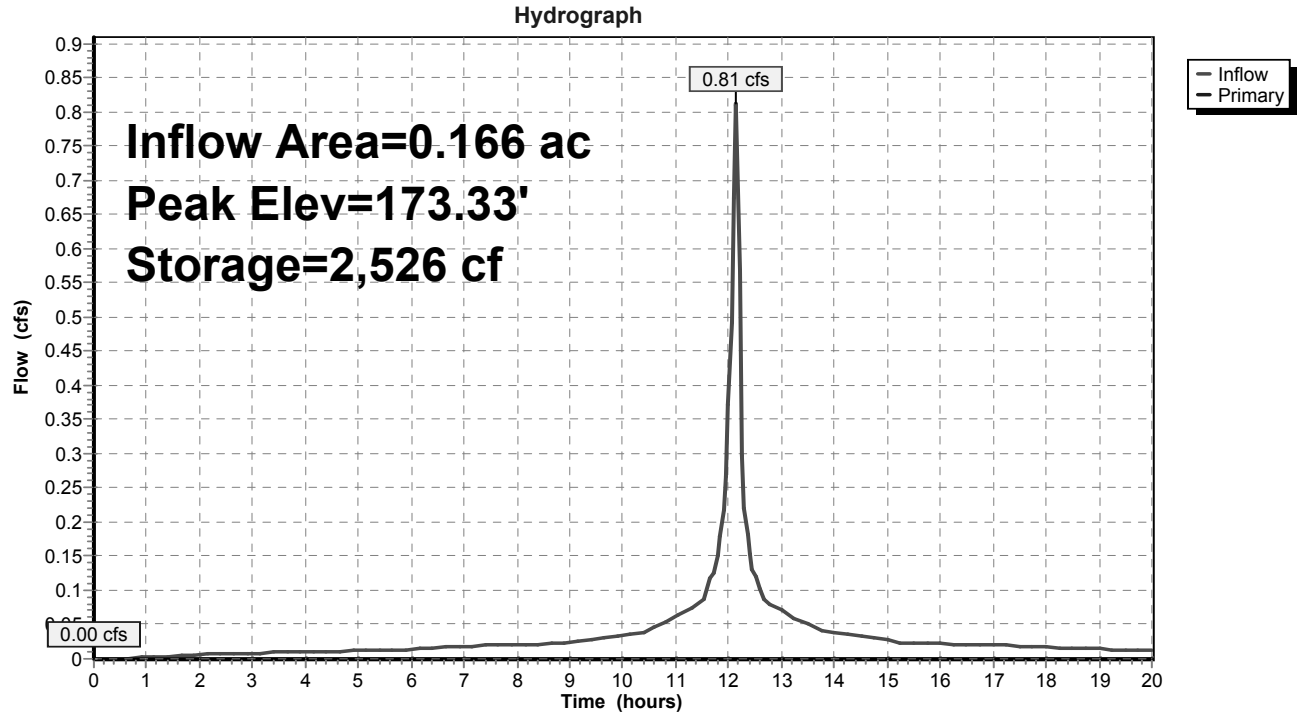
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=166.00' TW=162.50' (Dynamic Tailwater)
↑└**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-100: 368



## Summary for Pond INF-ROOF-110: 299

Inflow Area = 0.159 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.78 cfs @ 12.14 hrs, Volume= 0.056 af
Outflow = 0.76 cfs @ 12.15 hrs, Volume= 0.054 af, Atten= 3%, Lag= 0.5 min
Primary = 0.76 cfs @ 12.15 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.74' @ 12.15 hrs Surf.Area= 393 sf Storage= 116 cf
Flood Elev= 176.00' Surf.Area= 393 sf Storage= 2,620 cf

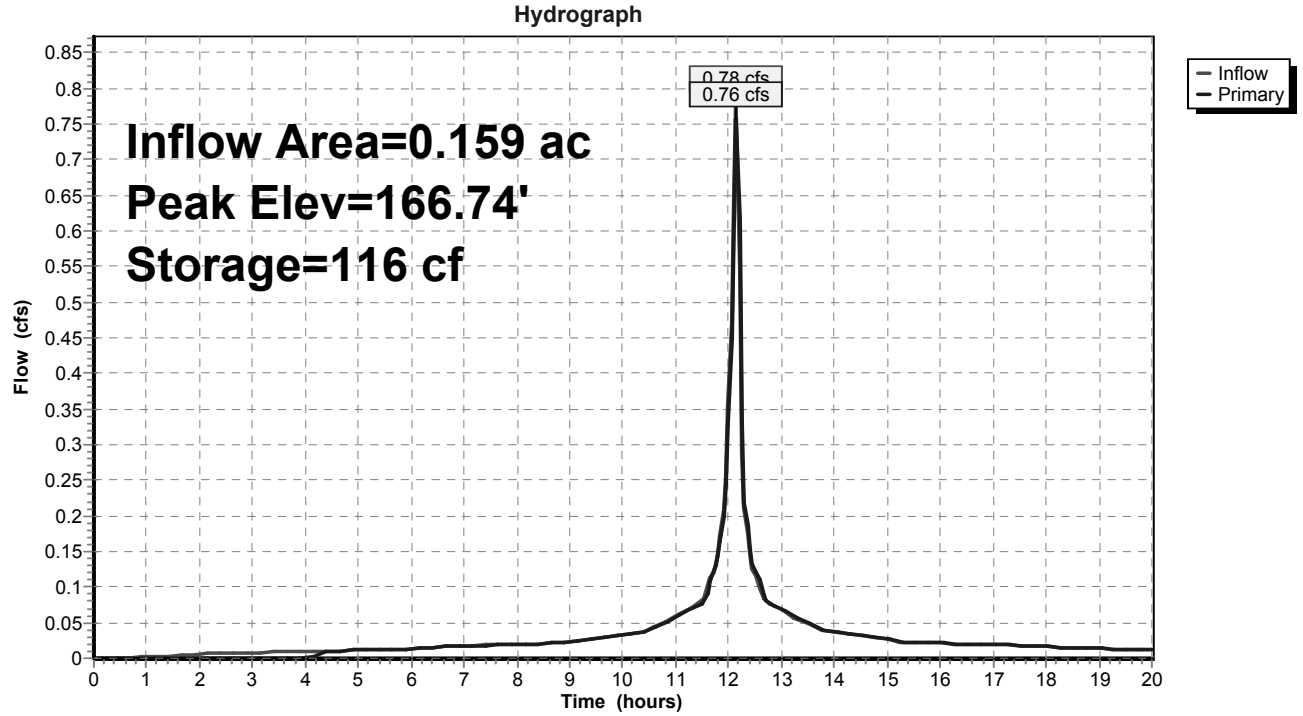
Plug-Flow detention time= 34.5 min calculated for 0.054 af (97% of inflow)
Center-of-Mass det. time= 19.6 min ( 731.9 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.76 cfs @ 12.15 hrs HW=166.74' TW=141.53' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.76 cfs @ 1.57 fps)

## Pond INF-ROOF-110: 299



## Summary for Pond INF-ROOF-114: 297

Inflow Area = 0.250 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.22 cfs @ 12.14 hrs, Volume= 0.087 af
Outflow = 0.39 cfs @ 12.31 hrs, Volume= 0.034 af, Atten= 68%, Lag= 9.9 min
Primary = 0.39 cfs @ 12.31 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.16' @ 12.31 hrs Surf.Area= 393 sf Storage= 2,360 cf
Flood Elev= 164.00' Surf.Area= 393 sf Storage= 2,312 cf

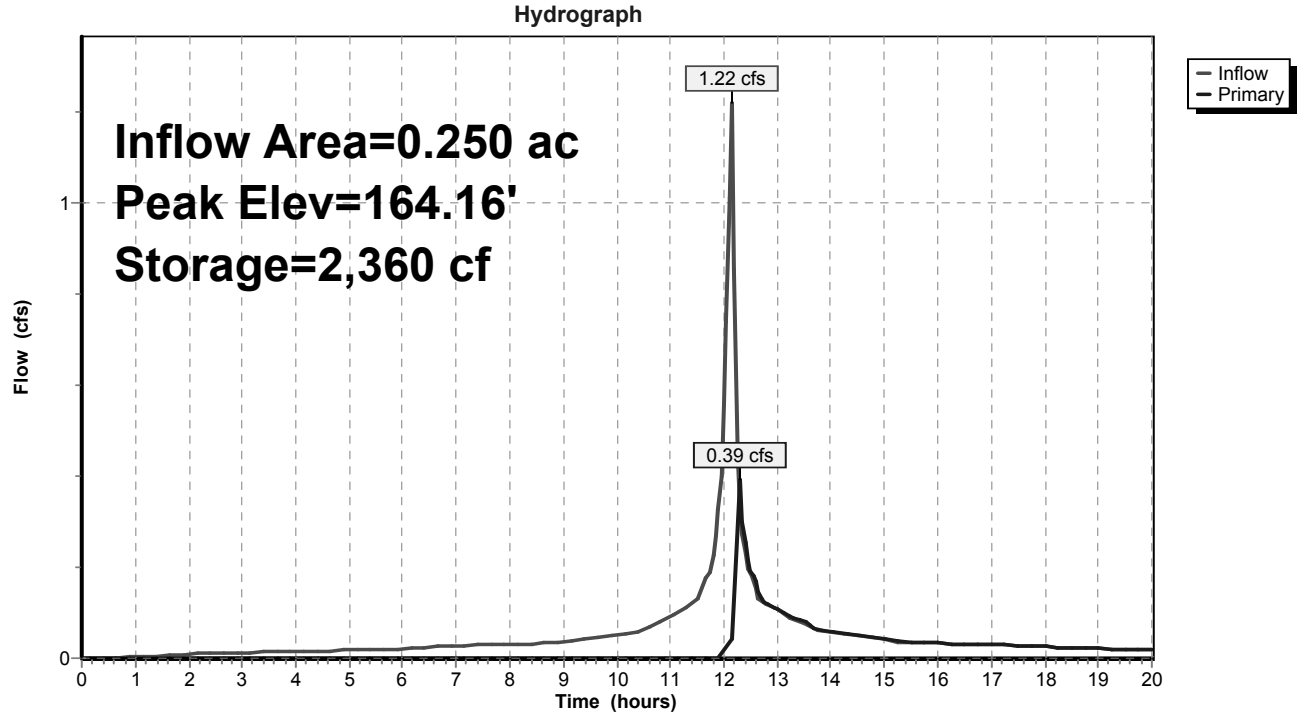
Plug-Flow detention time= 325.5 min calculated for 0.034 af (39% of inflow)
Center-of-Mass det. time= 160.1 min ( 872.4 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.37 cfs @ 12.31 hrs HW=164.15' TW=145.11' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.37 cfs @ 1.24 fps)

## Pond INF-ROOF-114: 297



## Summary for Pond INF-ROOF-117: 295

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.55 cfs @ 12.14 hrs, Volume= 0.039 af
Outflow = 0.03 cfs @ 13.92 hrs, Volume= 0.008 af, Atten= 95%, Lag= 106.4 min
Primary = 0.03 cfs @ 13.92 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.03' @ 13.92 hrs Surf.Area= 236 sf Storage= 1,392 cf
Flood Elev= 168.00' Surf.Area= 236 sf Storage= 1,572 cf

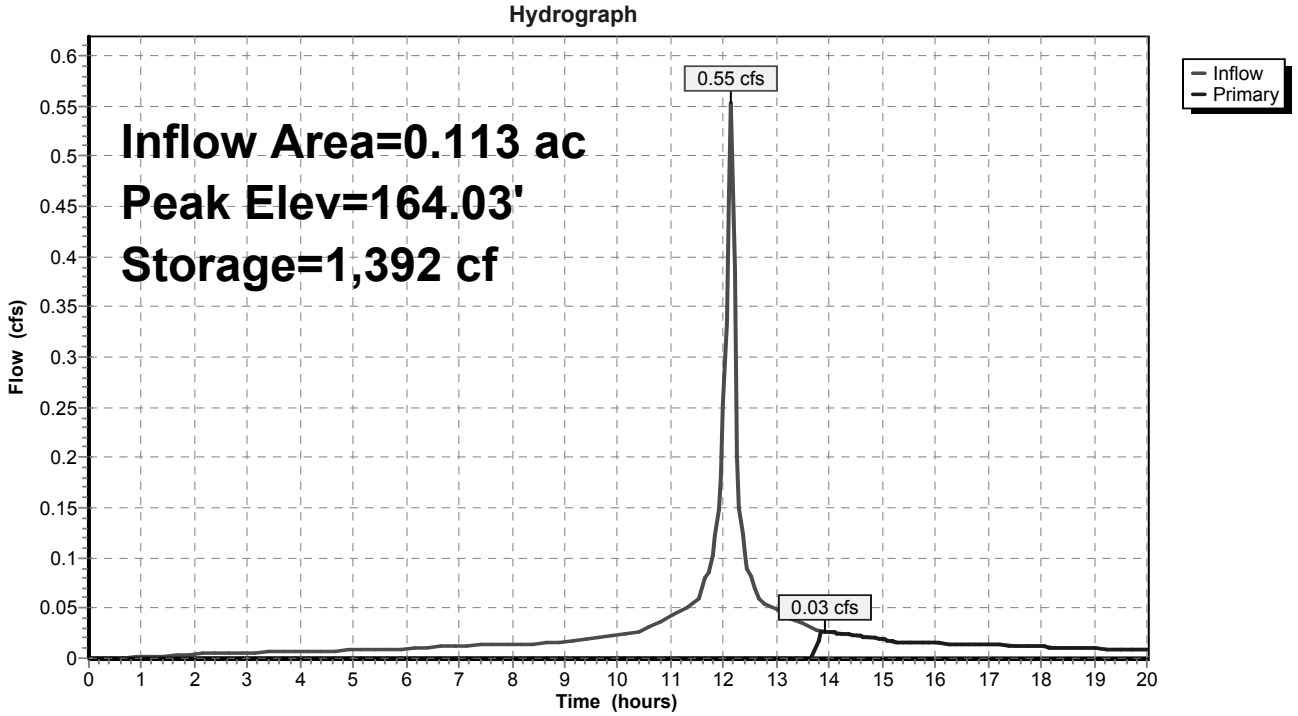
Plug-Flow detention time= 567.5 min calculated for 0.008 af (19% of inflow)
Center-of-Mass det. time= 267.6 min ( 979.9 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.03 cfs @ 13.92 hrs HW=164.03' TW=142.03' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.52 fps)

## Pond INF-ROOF-117: 295



## Summary for Pond INF-ROOF-123: 119

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.53 cfs @ 12.14 hrs, Volume= 0.109 af
Outflow = 0.80 cfs @ 12.26 hrs, Volume= 0.045 af, Atten= 48%, Lag= 7.0 min
Primary = 0.80 cfs @ 12.26 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 148.75' @ 12.26 hrs Surf.Area= 471 sf Storage= 2,868 cf
Flood Elev= 150.00' Surf.Area= 471 sf Storage= 3,144 cf

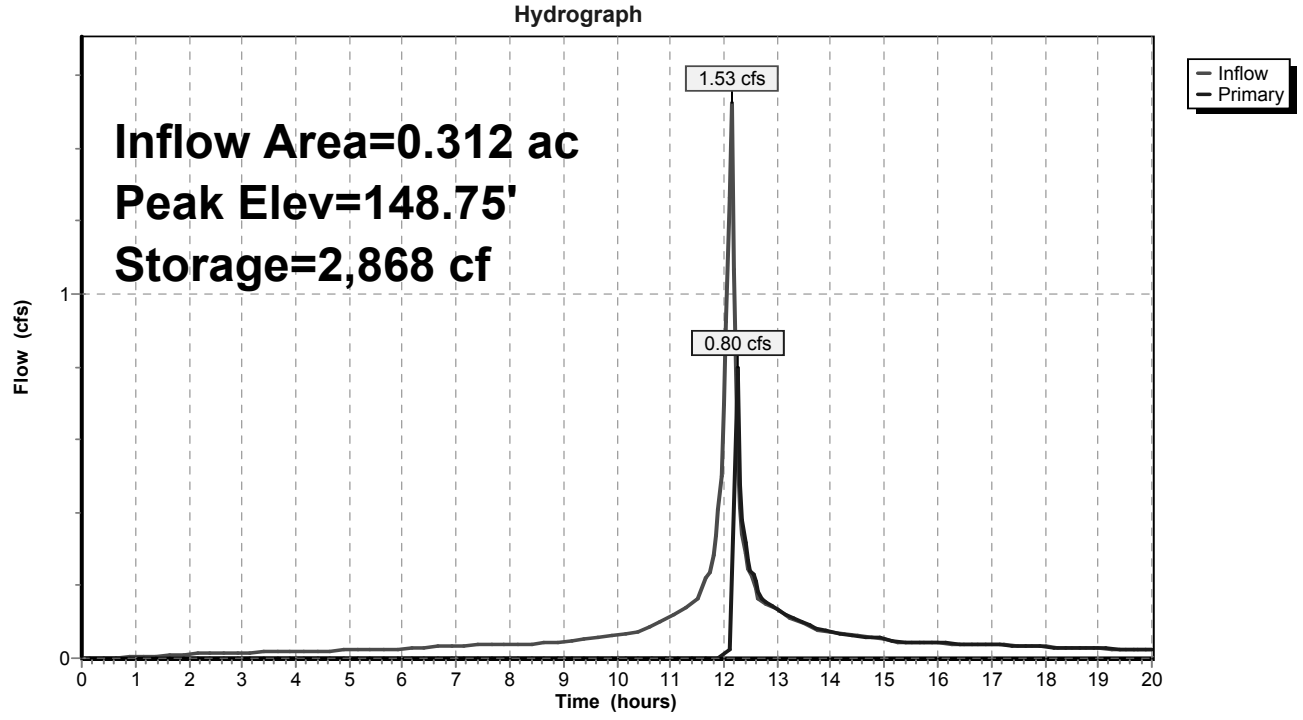
Plug-Flow detention time= 307.0 min calculated for 0.045 af (41% of inflow)
Center-of-Mass det. time= 152.1 min ( 864.4 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.50' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 141.50' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.72 cfs @ 12.26 hrs HW=148.73' TW=142.09' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.72 cfs @ 1.55 fps)

## Pond INF-ROOF-123: 119



## Summary for Pond INF-ROOF-13: 384

Inflow Area = 0.083 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.41 cfs @ 12.14 hrs, Volume= 0.029 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 181.61' @ 20.00 hrs Surf.Area= 314 sf Storage= 1,261 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

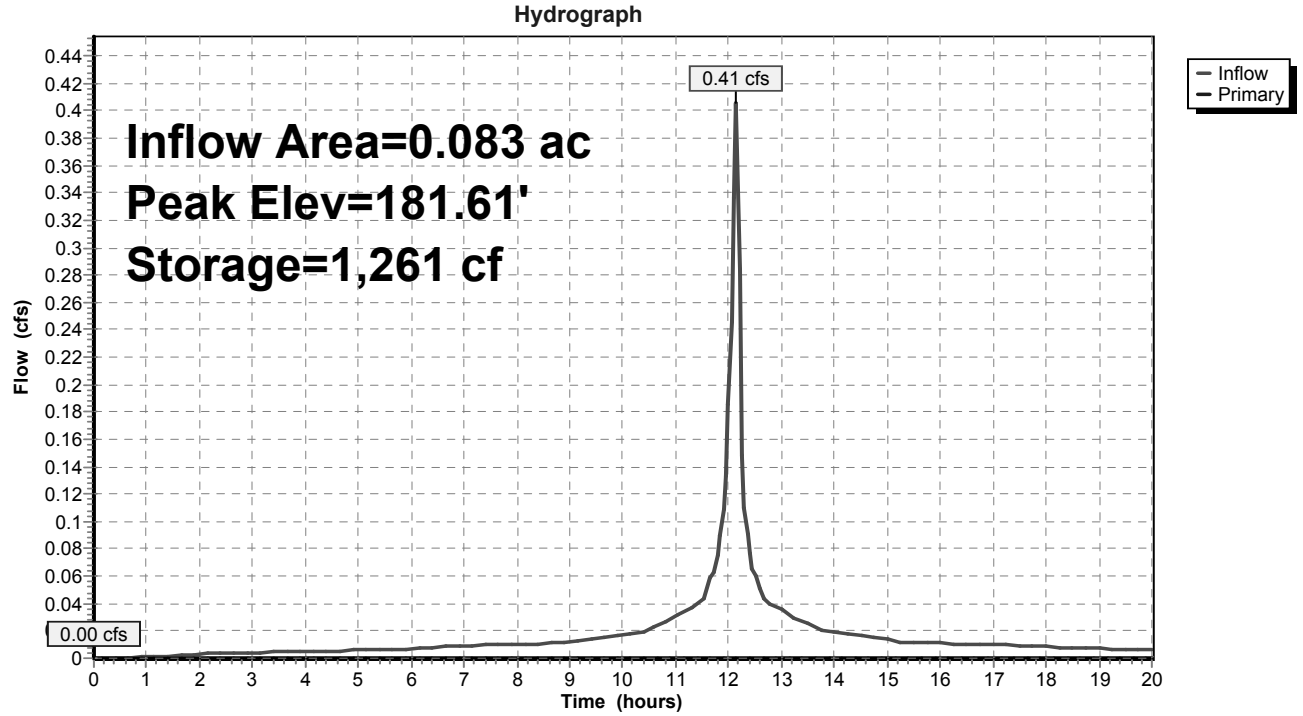
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=176.00' TW=171.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-13: 384



## Summary for Pond INF-ROOF-16: 375

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.55 cfs @ 12.14 hrs, Volume= 0.039 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 183.46' @ 20.00 hrs Surf.Area= 314 sf Storage= 1,717 cf
Flood Elev= 188.00' Surf.Area= 314 sf Storage= 2,096 cf

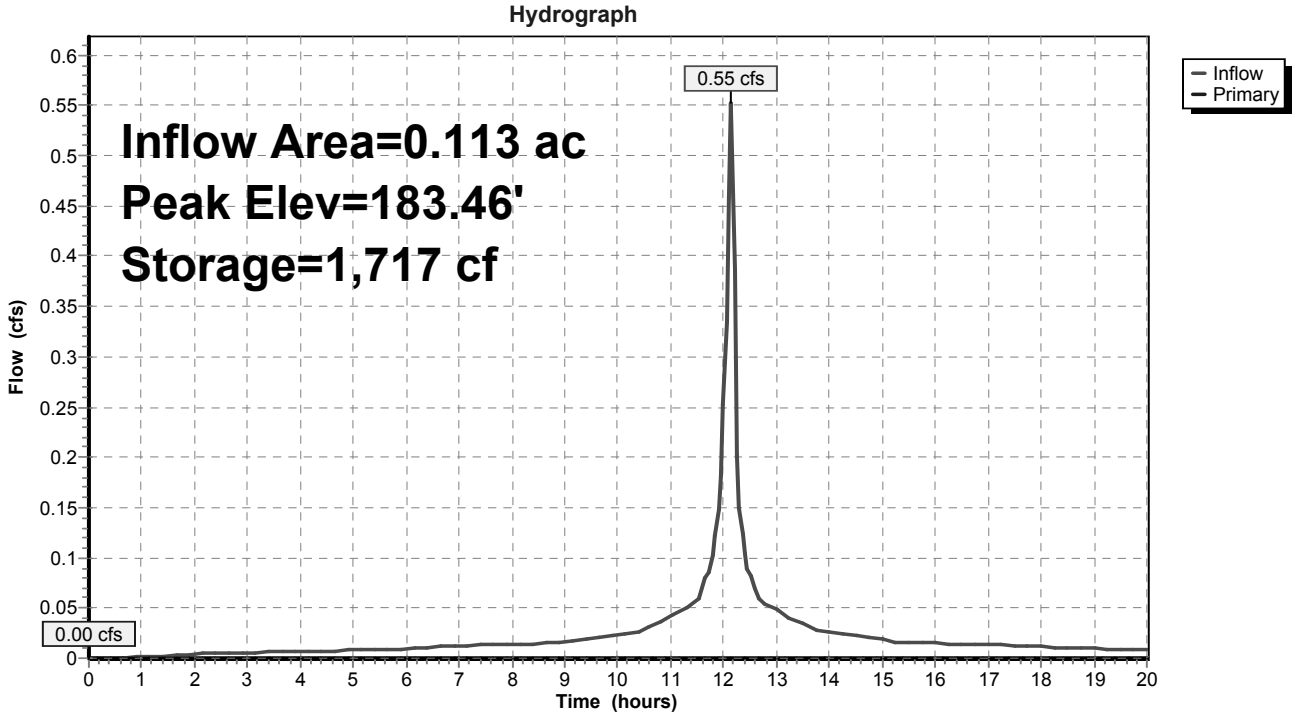
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=176.00' TW=167.25' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-16: 375



## Summary for Pond INF-ROOF-19: 377

Inflow Area = 0.138 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.68 cfs @ 12.14 hrs, Volume= 0.048 af
Outflow = 0.07 cfs @ 12.71 hrs, Volume= 0.014 af, Atten= 89%, Lag= 34.3 min
Primary = 0.07 cfs @ 12.71 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 178.54' @ 12.70 hrs Surf.Area= 236 sf Storage= 1,487 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

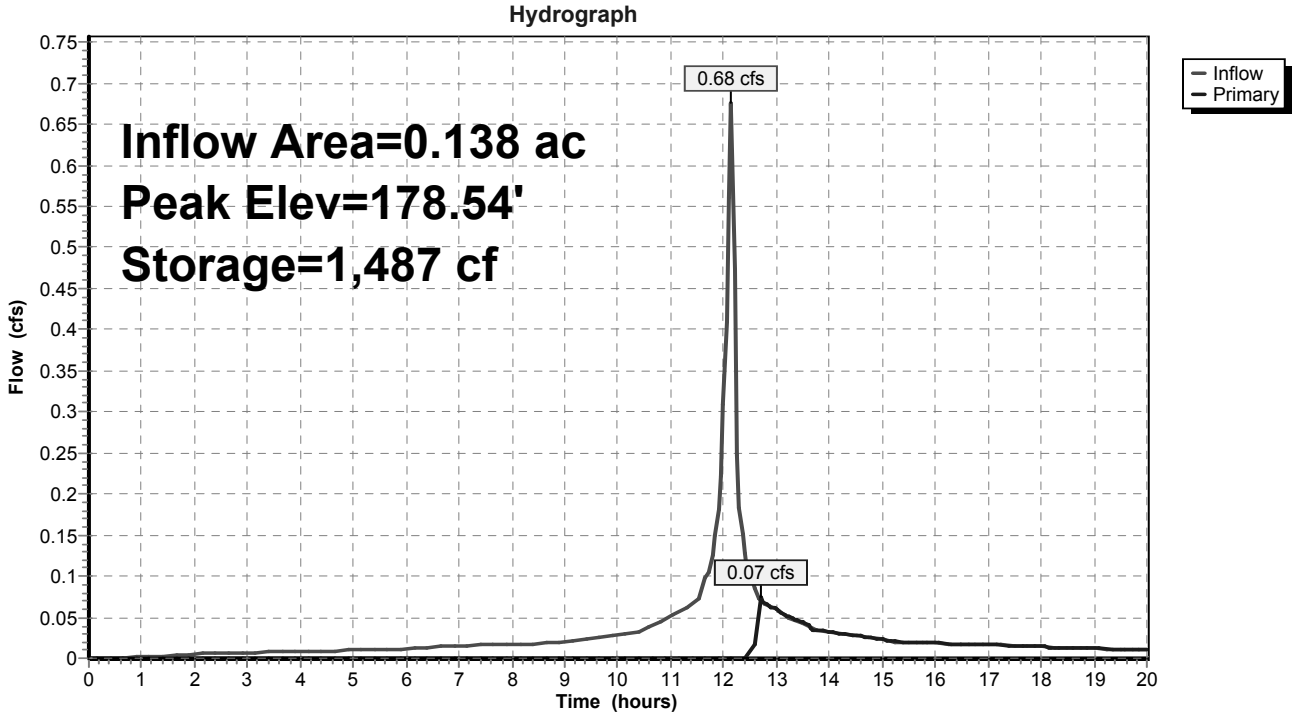
Plug-Flow detention time= 416.4 min calculated for 0.014 af (29% of inflow)
Center-of-Mass det. time= 200.3 min ( 912.7 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 171.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 178.50' | **36.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.07 cfs @ 12.71 hrs HW=178.54' TW=171.84' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 0.62 fps)

## Pond INF-ROOF-19: 377



## Summary for Pond INF-ROOF-23: 372

Inflow Area = 0.134 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.65 cfs @ 12.14 hrs, Volume= 0.047 af
Outflow = 0.01 cfs @ 19.25 hrs, Volume= 0.001 af, Atten= 98%, Lag= 426.4 min
Primary = 0.01 cfs @ 19.25 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 184.51' @ 19.25 hrs Surf.Area= 314 sf Storage= 1,977 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

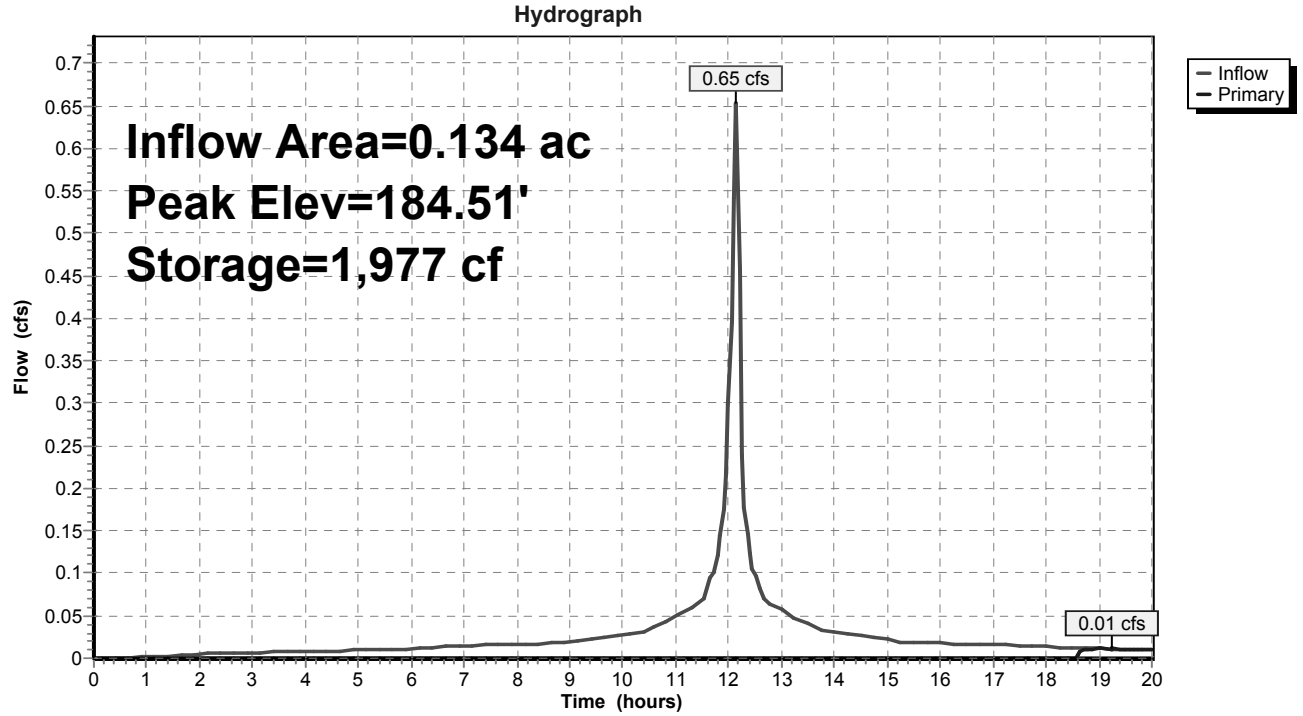
Plug-Flow detention time= 998.3 min calculated for 0.001 af (3% of inflow)
Center-of-Mass det. time= 446.5 min ( 1,158.8 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.01 cfs @ 19.25 hrs HW=184.51' TW=171.35' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.39 fps)

## Pond INF-ROOF-23: 372



## Summary for Pond INF-ROOF-25: 382

Inflow Area = 0.107 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af
Outflow = 0.02 cfs @ 14.83 hrs, Volume= 0.005 af, Atten= 96%, Lag= 161.3 min
Primary = 0.02 cfs @ 14.83 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 176.02' @ 14.83 hrs Surf.Area= 236 sf Storage= 1,391 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

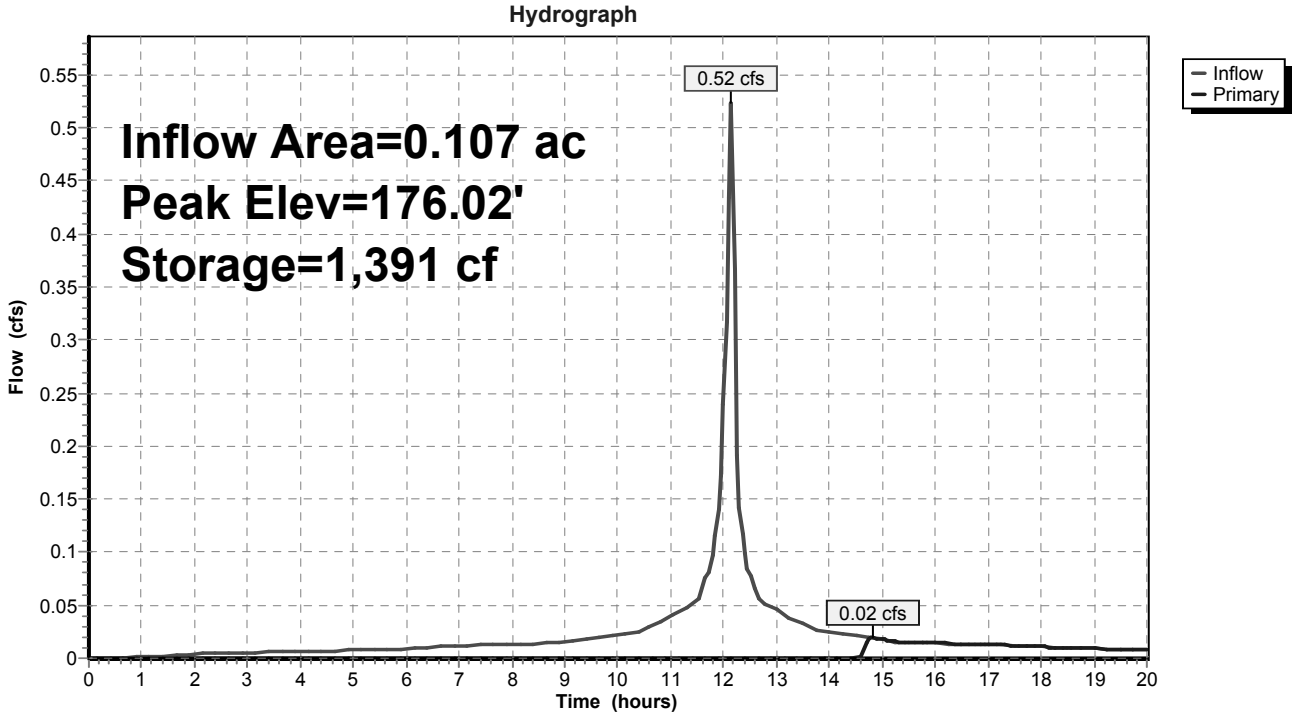
Plug-Flow detention time= 657.0 min calculated for 0.005 af (15% of inflow)
Center-of-Mass det. time= 306.7 min ( 1,019.1 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 176.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.02 cfs @ 14.83 hrs HW=176.02' TW=171.55' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.46 fps)

## Pond INF-ROOF-25: 382



## Summary for Pond INF-ROOF-28:

Inflow Area = 0.274 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.34 cfs @ 12.14 hrs, Volume= 0.096 af
Outflow = 1.31 cfs @ 12.15 hrs, Volume= 0.070 af, Atten= 3%, Lag= 0.5 min
Primary = 1.31 cfs @ 12.15 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.85' @ 12.15 hrs Surf.Area= 236 sf Storage= 1,174 cf
Flood Elev= 177.00' Surf.Area= 236 sf Storage= 1,572 cf

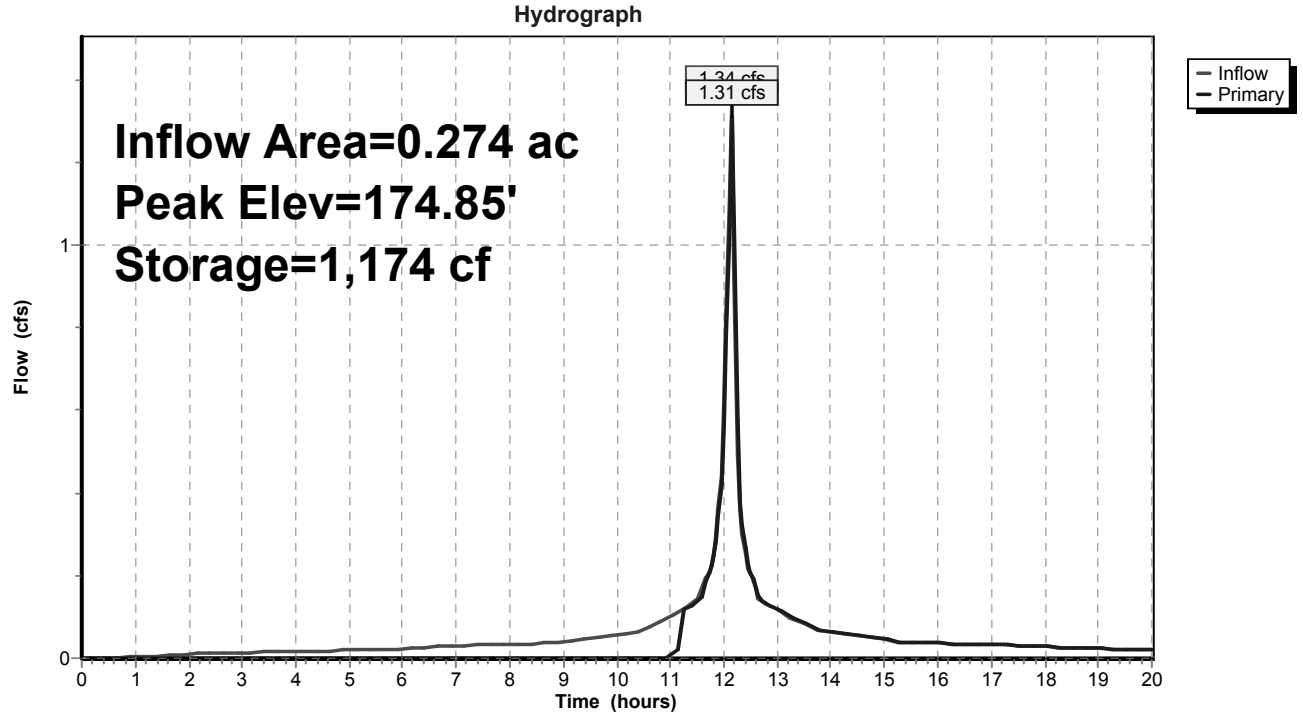
Plug-Flow detention time= 164.5 min calculated for 0.070 af (73% of inflow)
Center-of-Mass det. time= 86.9 min ( 799.3 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.30 cfs @ 12.15 hrs HW=174.85' TW=155.98' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 1.30 cfs @ 1.89 fps)

## Pond INF-ROOF-28:



## Summary for Pond INF-ROOF-3: 370

Inflow Area = 0.361 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.77 cfs @ 12.14 hrs, Volume= 0.126 af
Outflow = 0.12 cfs @ 14.80 hrs, Volume= 0.018 af, Atten= 93%, Lag= 159.4 min
Primary = 0.12 cfs @ 14.80 hrs, Volume= 0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 190.07' @ 14.80 hrs Surf.Area= 707 sf Storage= 4,716 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

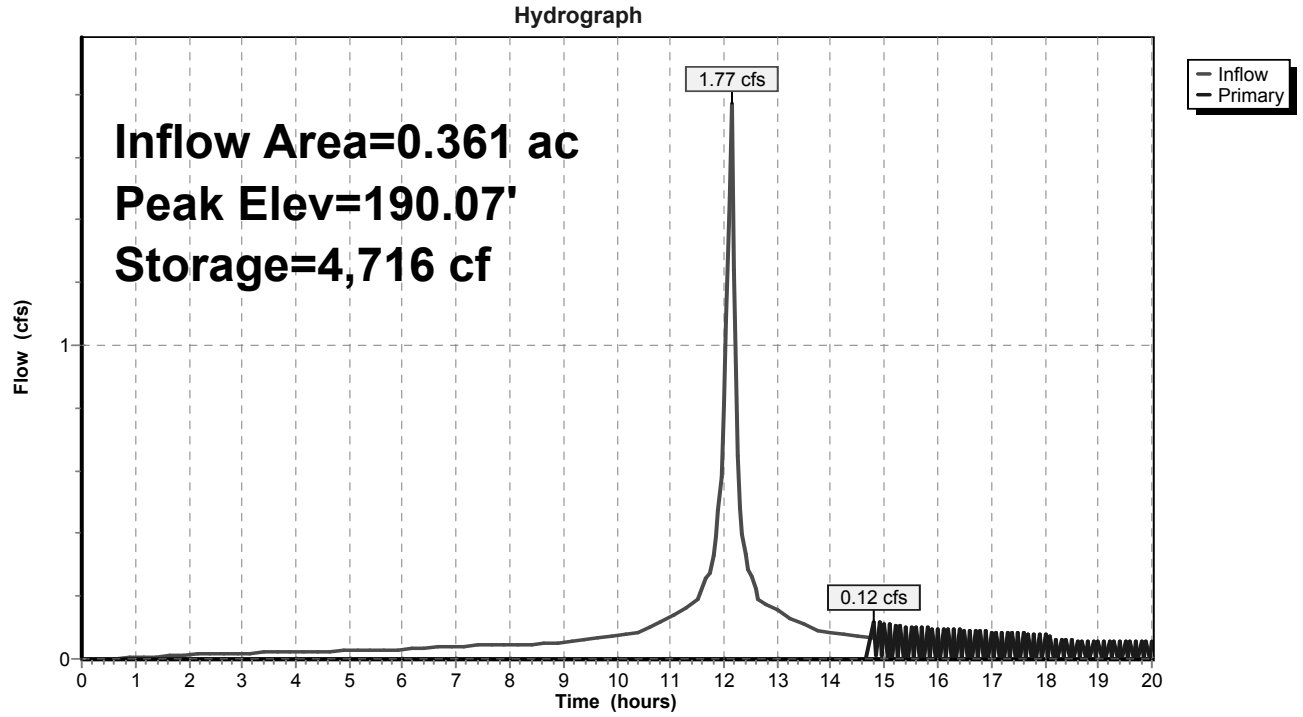
Plug-Flow detention time= 666.0 min calculated for 0.018 af (14% of inflow)
Center-of-Mass det. time= 310.8 min ( 1,023.1 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.12 cfs @ 14.80 hrs HW=190.07' TW=169.58' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 0.85 fps)

### Pond INF-ROOF-3: 370



## Summary for Pond INF-ROOF-36: 366

Inflow Area = 0.213 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.04 cfs @ 12.14 hrs, Volume= 0.074 af
Outflow = 0.25 cfs @ 12.37 hrs, Volume= 0.026 af, Atten= 76%, Lag= 13.5 min
Primary = 0.25 cfs @ 12.37 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 314 sf Storage= 0 cf
Peak Elev= 190.11' @ 12.35 hrs Surf.Area= 314 sf Storage= 2,096 cf
Flood Elev= 157.00' Surf.Area= 314 sf Storage= 126 cf

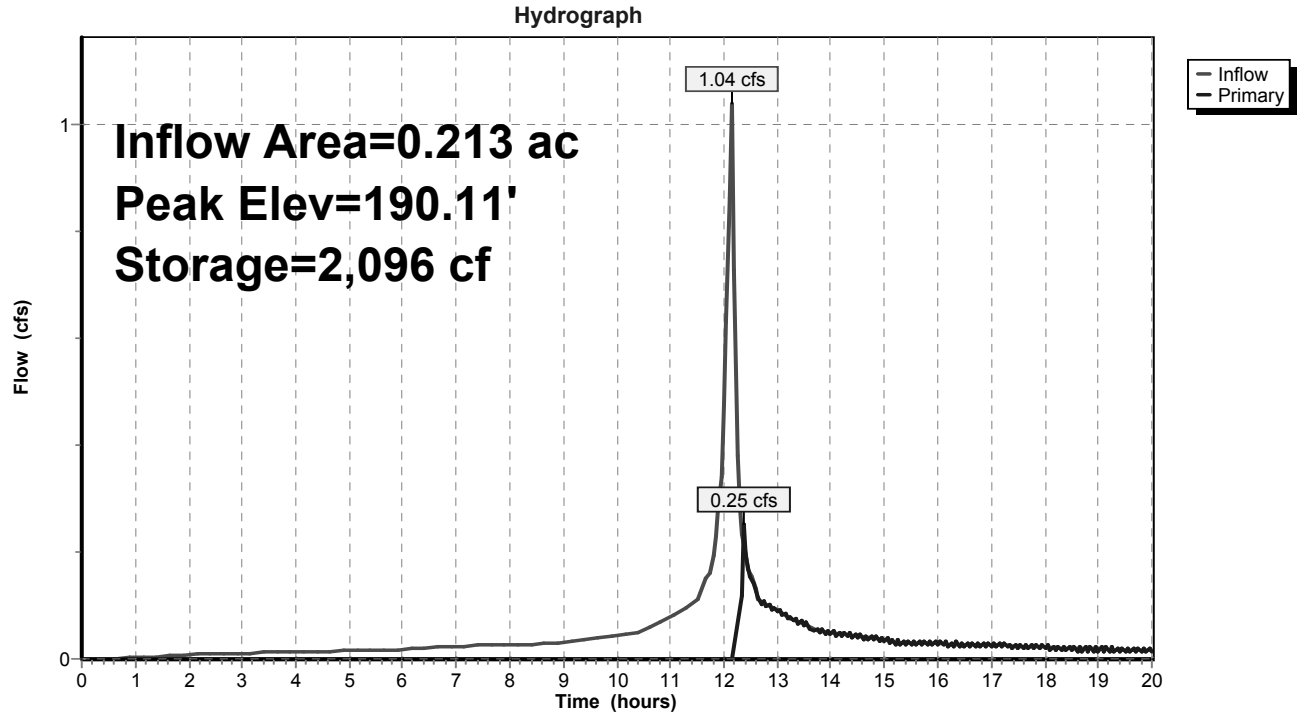
Plug-Flow detention time= 356.1 min calculated for 0.026 af (35% of inflow)
Center-of-Mass det. time= 172.8 min ( 885.1 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.22 cfs @ 12.37 hrs HW=190.11' TW=168.78' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 1.04 fps)

## Pond INF-ROOF-36: 366



## Summary for Pond INF-ROOF-43: 364

Inflow Area = 0.106 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.52 cfs @ 12.14 hrs, Volume= 0.037 af
Outflow = 0.02 cfs @ 18.85 hrs, Volume= 0.001 af, Atten= 97%, Lag= 402.4 min
Primary = 0.02 cfs @ 18.85 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.02' @ 18.85 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

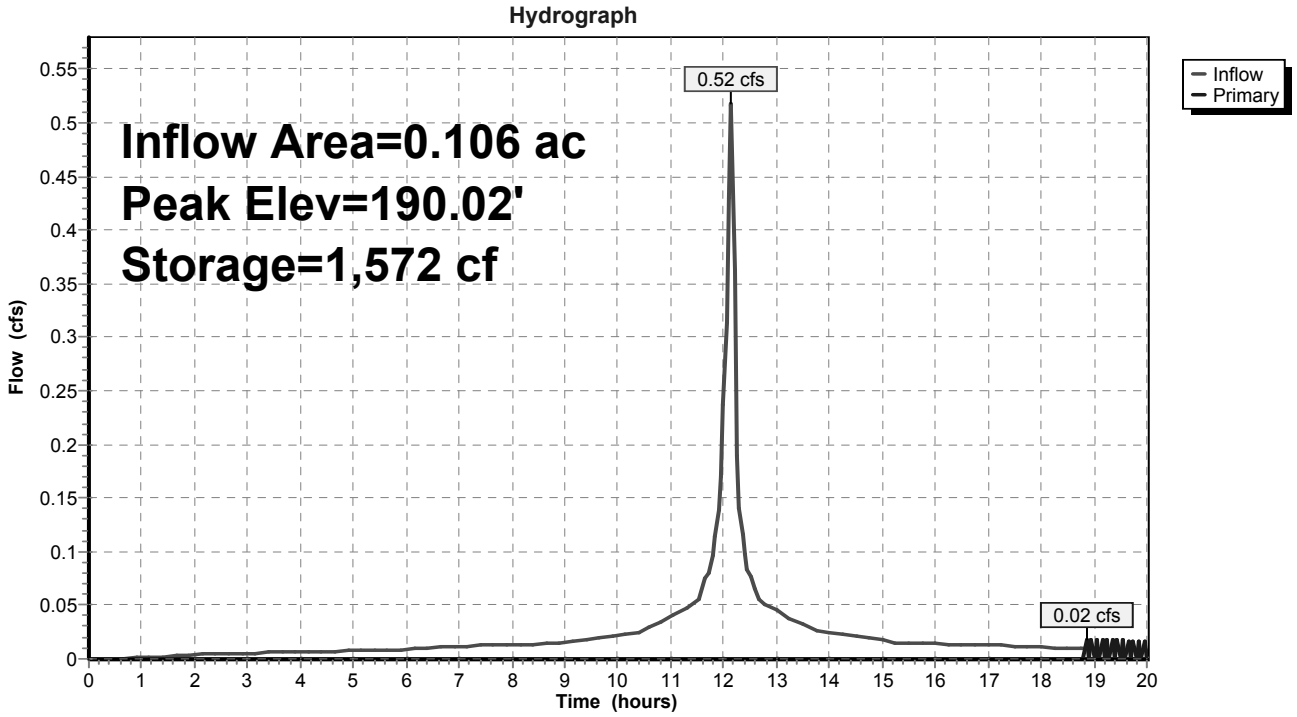
Plug-Flow detention time= 1,013.7 min calculated for 0.001 af (2% of inflow)
Center-of-Mass det. time= 451.2 min ( 1,163.5 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.02 cfs @ 18.85 hrs HW=190.02' TW=170.03' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.45 fps)

## Pond INF-ROOF-43: 364



## Summary for Pond INF-ROOF-53: 362

Inflow Area = 0.174 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.85 cfs @ 12.14 hrs, Volume= 0.061 af
Outflow = 0.03 cfs @ 19.60 hrs, Volume= 0.001 af, Atten= 97%, Lag= 447.4 min
Primary = 0.03 cfs @ 19.60 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.03' @ 19.60 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

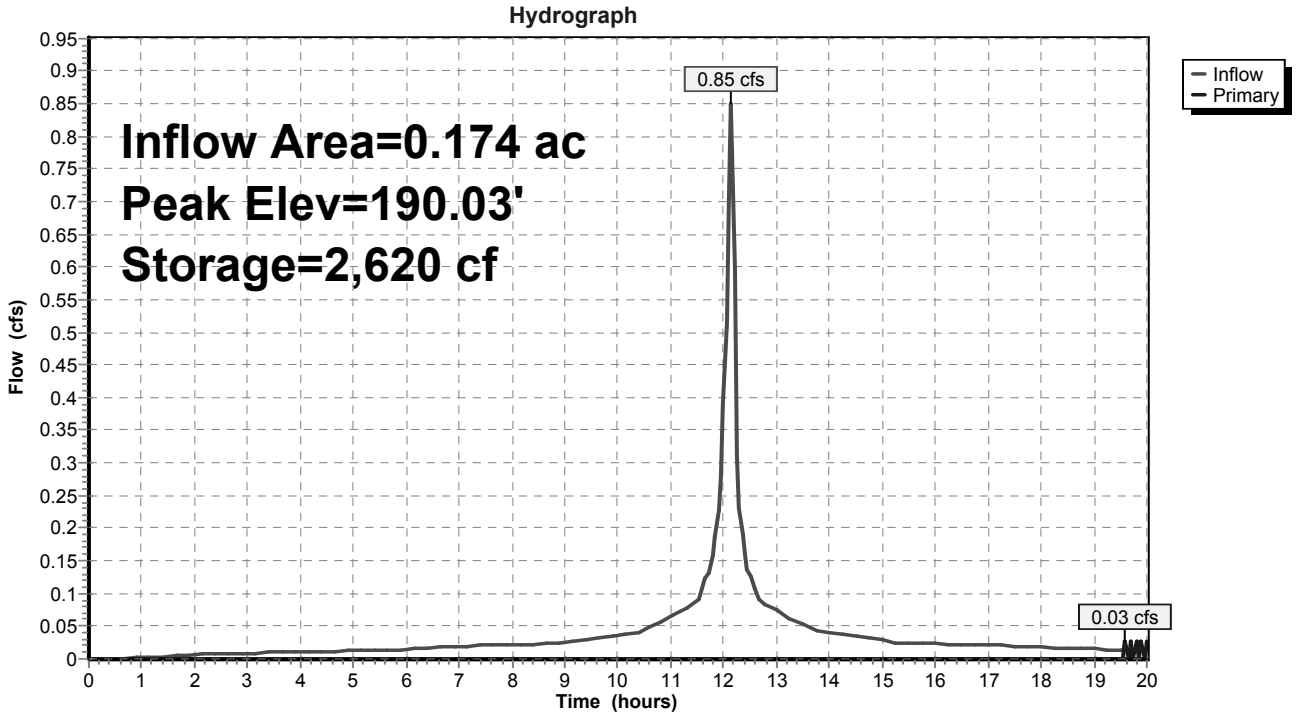
Plug-Flow detention time= 1,081.1 min calculated for 0.001 af (1% of inflow)
Center-of-Mass det. time= 475.6 min ( 1,187.9 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.03 cfs @ 19.60 hrs HW=190.03' TW=170.03' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.52 fps)

## Pond INF-ROOF-53: 362



## Summary for Pond INF-ROOF-55: 314

Inflow Area = 0.248 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.21 cfs @ 12.14 hrs, Volume= 0.087 af
Outflow = 0.08 cfs @ 14.30 hrs, Volume= 0.014 af, Atten= 93%, Lag= 129.4 min
Primary = 0.08 cfs @ 14.30 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.06' @ 14.30 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

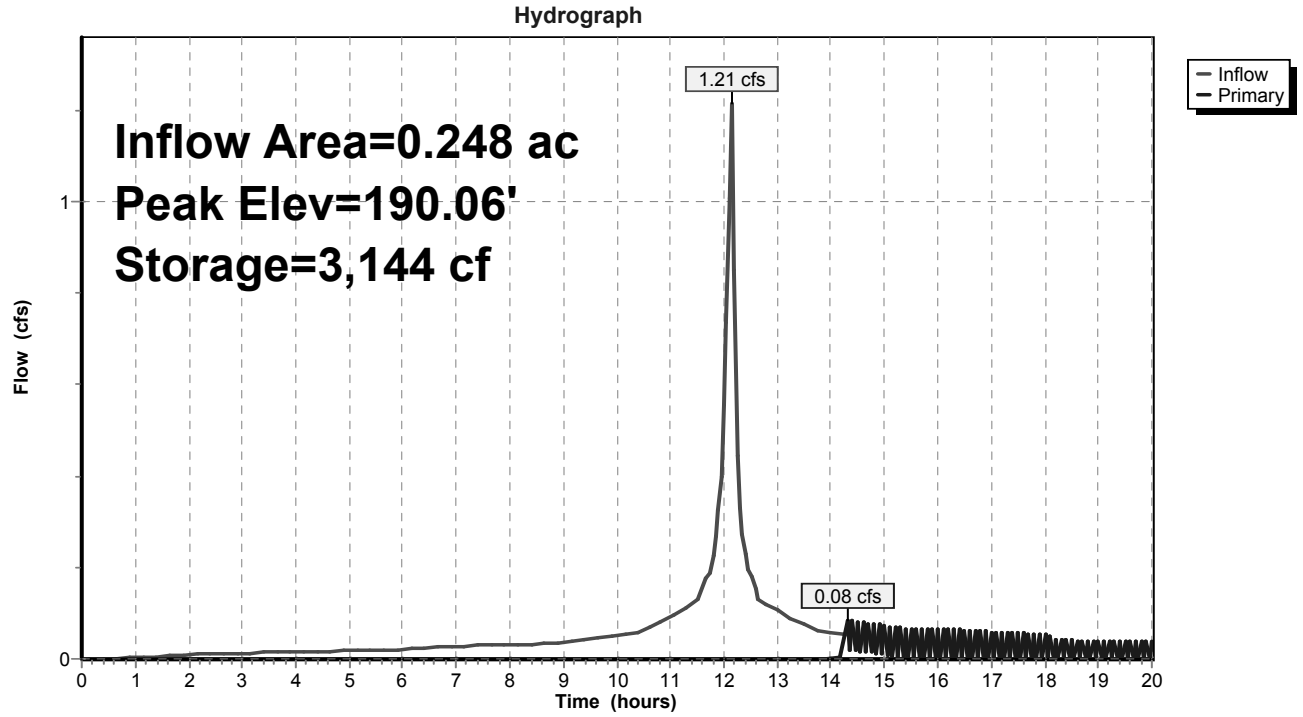
Plug-Flow detention time= 614.9 min calculated for 0.014 af (17% of inflow)
Center-of-Mass det. time= 288.4 min ( 1,000.8 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.08 cfs @ 14.30 hrs HW=190.06' TW=171.23' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 0.75 fps)

## Pond INF-ROOF-55: 314



## Summary for Pond INF-ROOF-62: 310

Inflow Area = 0.135 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.66 cfs @ 12.14 hrs, Volume= 0.047 af
Outflow = 0.74 cfs @ 12.16 hrs, Volume= 0.023 af, Atten= 0%, Lag= 1.0 min
Primary = 0.74 cfs @ 12.16 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.23' @ 12.15 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

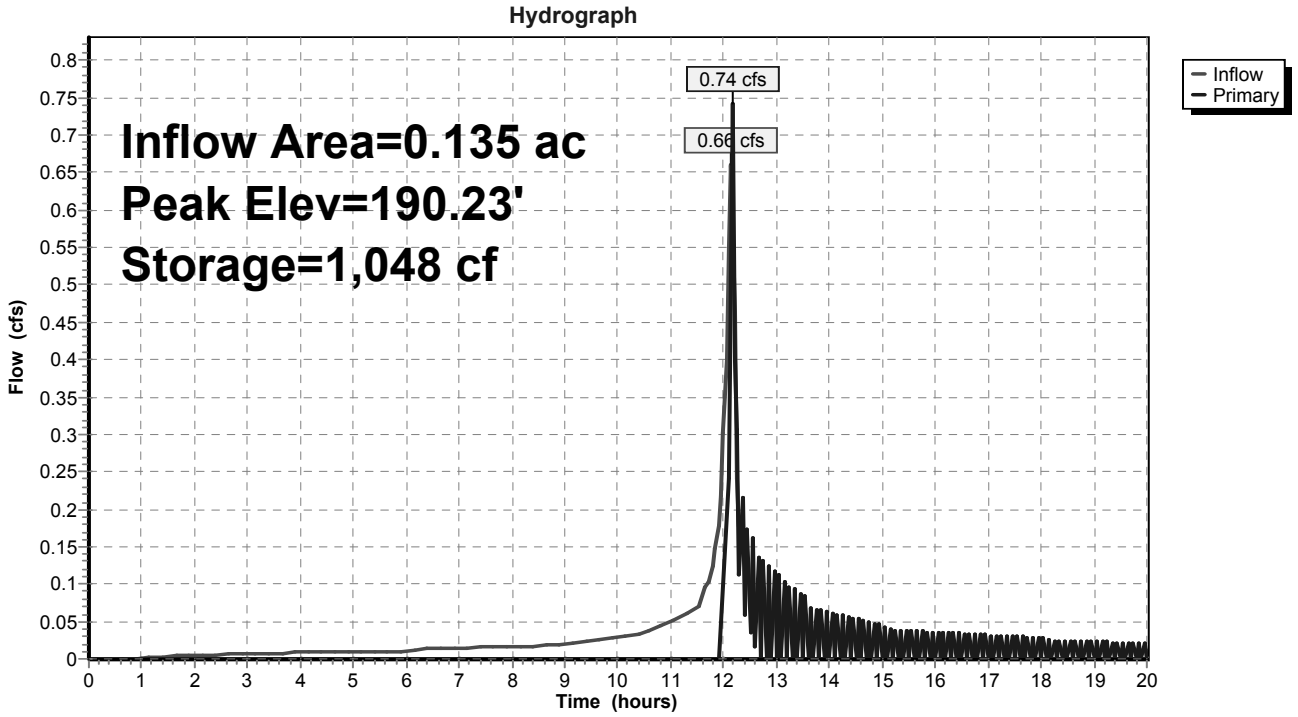
Plug-Flow detention time= 258.4 min calculated for 0.023 af (49% of inflow)
Center-of-Mass det. time= 129.3 min ( 841.7 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.66 cfs @ 12.16 hrs HW=190.22' TW=171.12' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.66 cfs @ 1.50 fps)

## Pond INF-ROOF-62: 310



## Summary for Pond INF-ROOF-63: 308

Inflow Area = 0.511 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 2.50 cfs @ 12.14 hrs, Volume= 0.178 af
Outflow = 2.60 cfs @ 12.14 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.1 min
Primary = 2.60 cfs @ 12.14 hrs, Volume= 0.106 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.56' @ 12.15 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

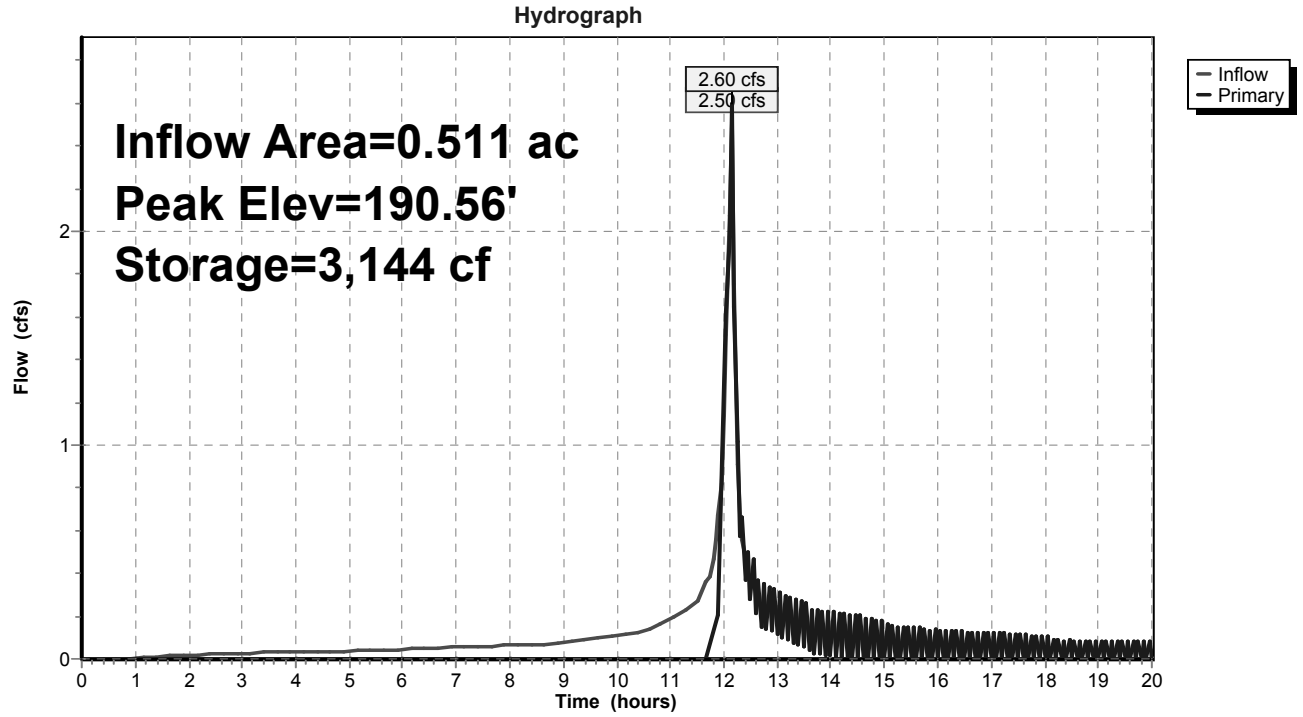
Plug-Flow detention time= 211.3 min calculated for 0.106 af (59% of inflow)
Center-of-Mass det. time= 108.4 min ( 820.7 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.54 cfs @ 12.14 hrs HW=190.55' TW=0.00' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 2.54 cfs @ 2.54 fps)

### Pond INF-ROOF-63: 308



## Summary for Pond INF-ROOF-67: 316

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.01 cfs @ 12.14 hrs, Volume= 0.072 af
Outflow = 1.11 cfs @ 12.15 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.2 min
Primary = 1.11 cfs @ 12.15 hrs, Volume= 0.048 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.31' @ 12.15 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

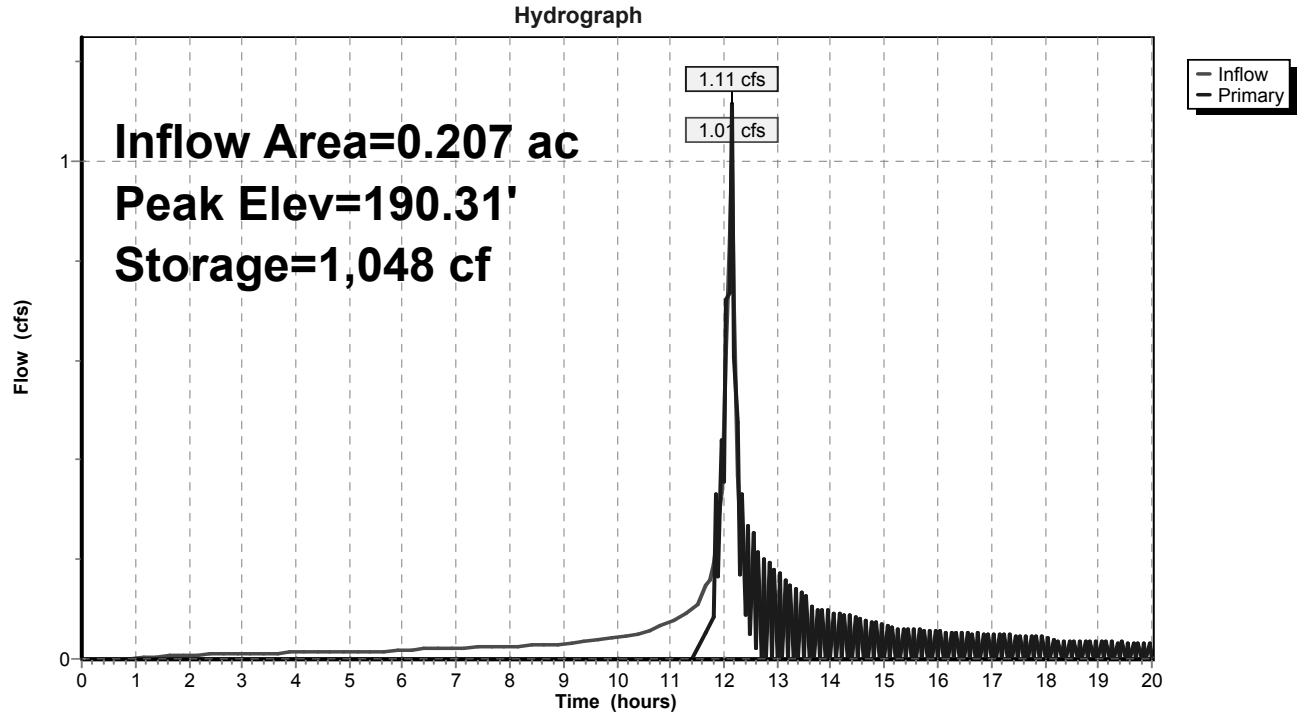
Plug-Flow detention time= 185.6 min calculated for 0.048 af (66% of inflow)
Center-of-Mass det. time= 96.7 min ( 809.0 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.08 cfs @ 12.15 hrs HW=190.31' TW=171.07' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.08 cfs @ 1.77 fps)

### Pond INF-ROOF-67: 316



## Summary for Pond INF-ROOF-71: 312

Inflow Area = 0.364 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.78 cfs @ 12.14 hrs, Volume= 0.127 af
Outflow = 2.26 cfs @ 12.15 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.3 min
Primary = 2.26 cfs @ 12.15 hrs, Volume= 0.067 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.50' @ 12.15 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

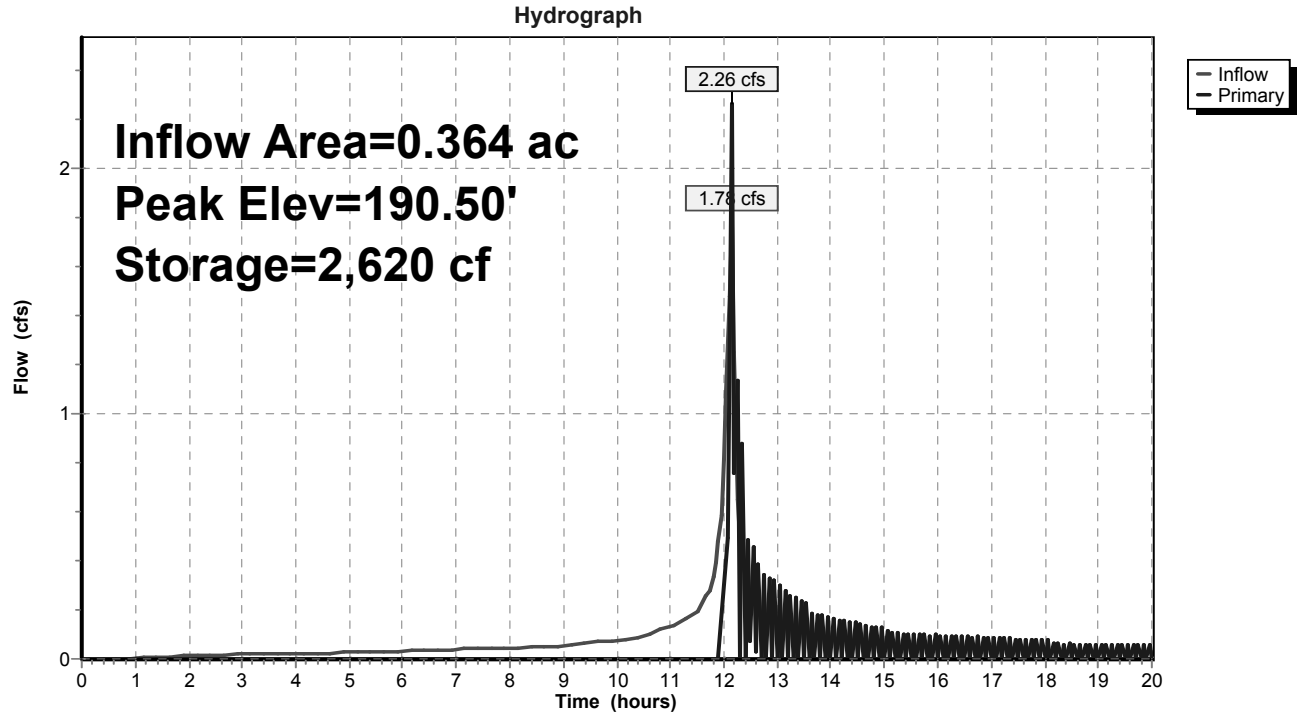
Plug-Flow detention time= 240.5 min calculated for 0.067 af (53% of inflow)
Center-of-Mass det. time= 121.2 min ( 833.5 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.20 cfs @ 12.15 hrs HW=190.49' TW=154.42' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 2.20 cfs @ 2.25 fps)

### Pond INF-ROOF-71: 312



## Summary for Pond INF-ROOF-76: 318

Inflow Area = 0.204 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.00 cfs @ 12.14 hrs, Volume= 0.071 af
Outflow = 0.05 cfs @ 14.55 hrs, Volume= 0.011 af, Atten= 95%, Lag= 144.4 min
Primary = 0.05 cfs @ 14.55 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.04' @ 14.55 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

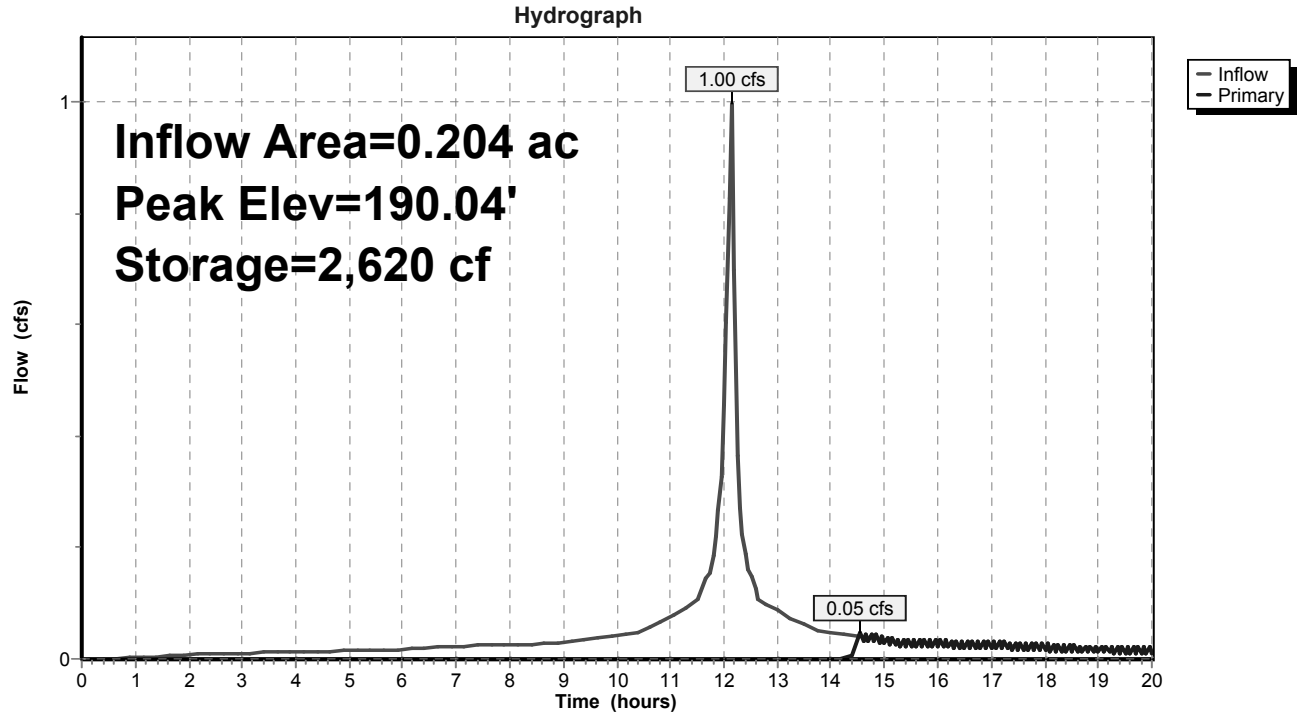
Plug-Flow detention time= 639.0 min calculated for 0.011 af (15% of inflow)
Center-of-Mass det. time= 298.3 min ( 1,010.6 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.05 cfs @ 14.55 hrs HW=190.04' TW=171.23' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.62 fps)

### Pond INF-ROOF-76: 318



## Summary for Pond INF-ROOF-89: 338

Inflow Area = 0.317 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.55 cfs @ 12.14 hrs, Volume= 0.111 af
Outflow = 0.05 cfs @ 19.20 hrs, Volume= 0.002 af, Atten= 97%, Lag= 423.4 min
Primary = 0.05 cfs @ 19.20 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 190.04' @ 19.20 hrs Surf.Area= 707 sf Storage= 4,716 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

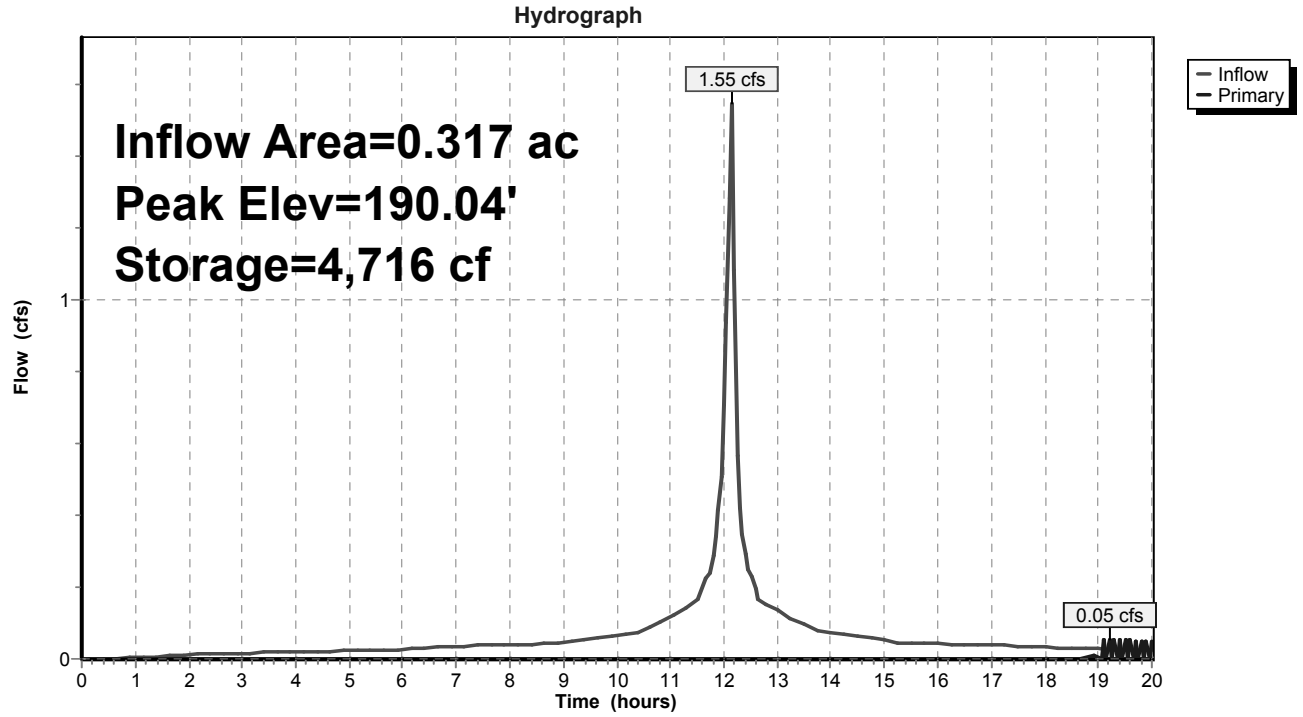
Plug-Flow detention time= 1,025.5 min calculated for 0.002 af (2% of inflow)
Center-of-Mass det. time= 457.3 min ( 1,169.6 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.05 cfs @ 19.20 hrs HW=190.04' TW=153.00' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.65 fps)

## Pond INF-ROOF-89: 338



## Summary for Pond INF-ROOF-90: 336

Inflow Area = 0.245 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.20 cfs @ 12.14 hrs, Volume= 0.086 af
Outflow = 0.08 cfs @ 14.50 hrs, Volume= 0.013 af, Atten= 93%, Lag= 141.4 min
Primary = 0.08 cfs @ 14.50 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.05' @ 14.50 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

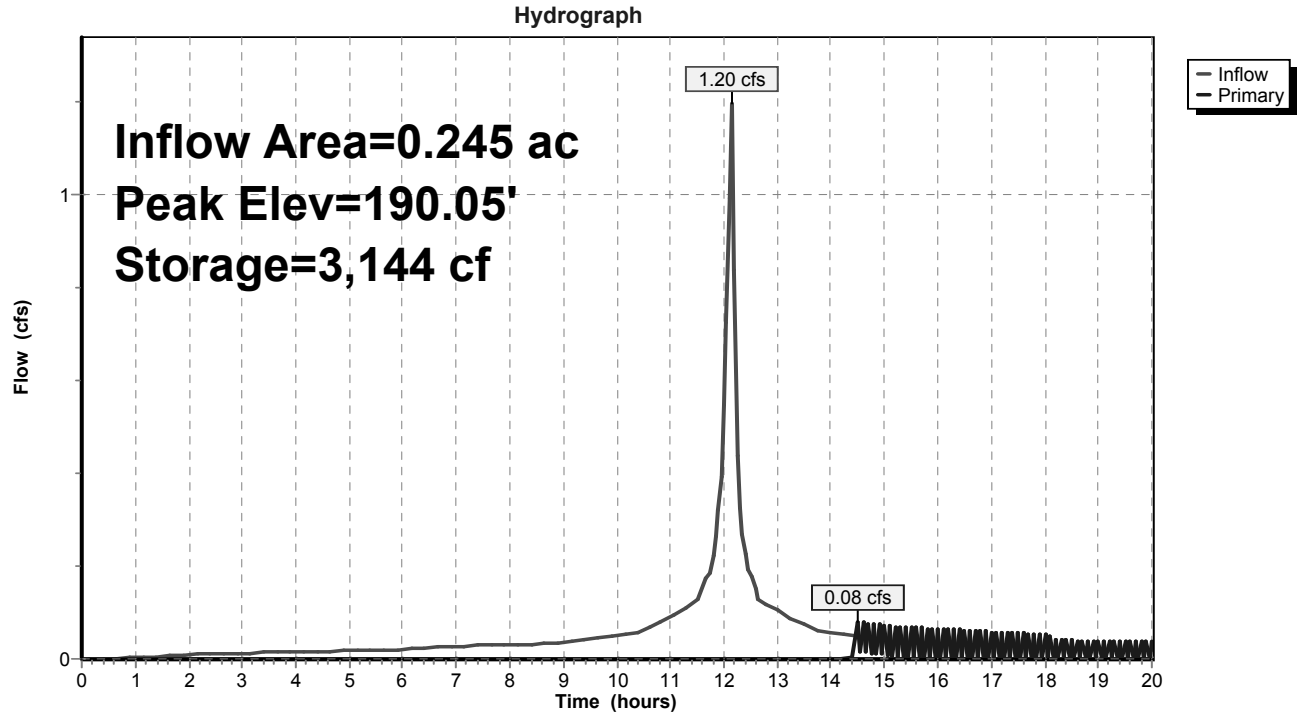
Plug-Flow detention time= 635.2 min calculated for 0.013 af (16% of inflow)
Center-of-Mass det. time= 297.4 min ( 1,009.7 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.08 cfs @ 14.50 hrs HW=190.05' TW=169.52' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 0.75 fps)

## Pond INF-ROOF-90: 336



## Summary for Pond INF-ROOF-94: 342

Inflow Area = 0.136 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.67 cfs @ 12.14 hrs, Volume= 0.048 af
Outflow = 0.08 cfs @ 13.15 hrs, Volume= 0.011 af, Atten= 88%, Lag= 60.4 min
Primary = 0.08 cfs @ 13.15 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.05' @ 13.15 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

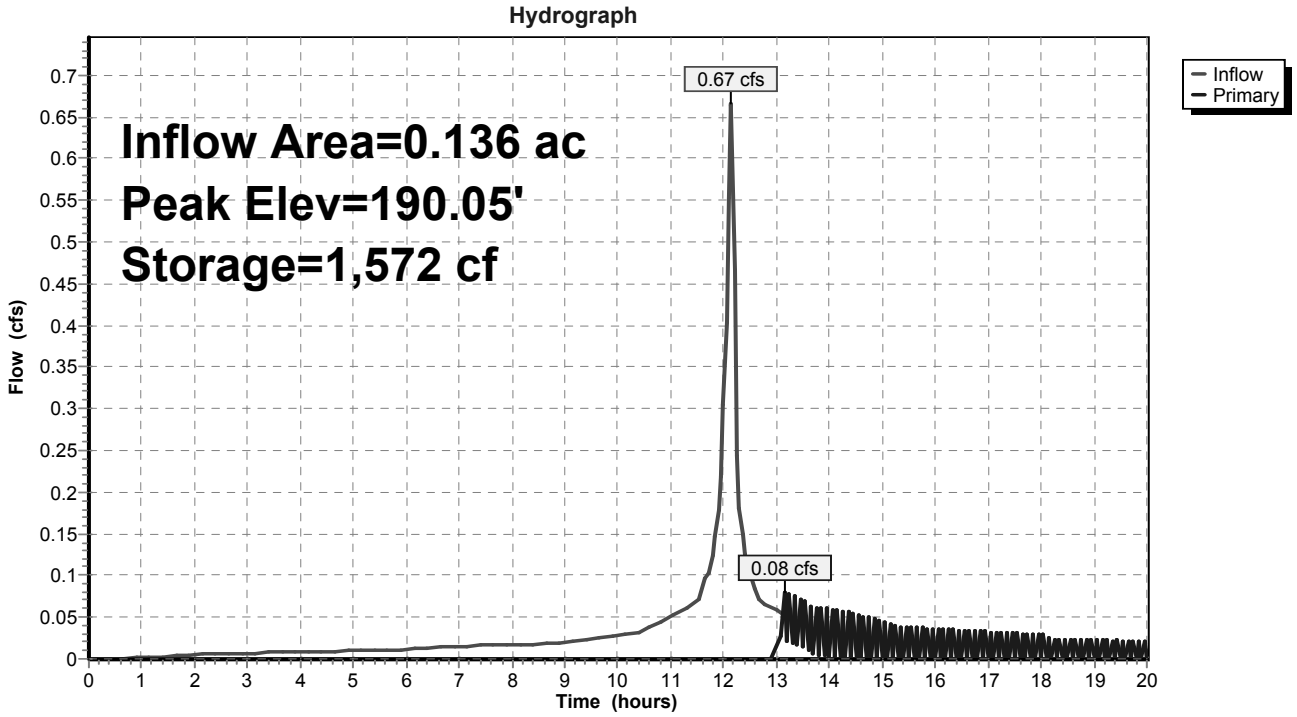
Plug-Flow detention time= 485.5 min calculated for 0.011 af (24% of inflow)
Center-of-Mass det. time= 230.3 min ( 942.6 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.08 cfs @ 13.15 hrs HW=190.05' TW=163.54' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 0.75 fps)

## Pond INF-ROOF-94: 342



## Summary for Pond INF-ROOF-95: 340

Inflow Area = 0.154 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 0.75 cfs @ 12.14 hrs, Volume= 0.054 af
Outflow = 0.14 cfs @ 12.46 hrs, Volume= 0.018 af, Atten= 81%, Lag= 19.3 min
Primary = 0.14 cfs @ 12.46 hrs, Volume= 0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.08' @ 12.45 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

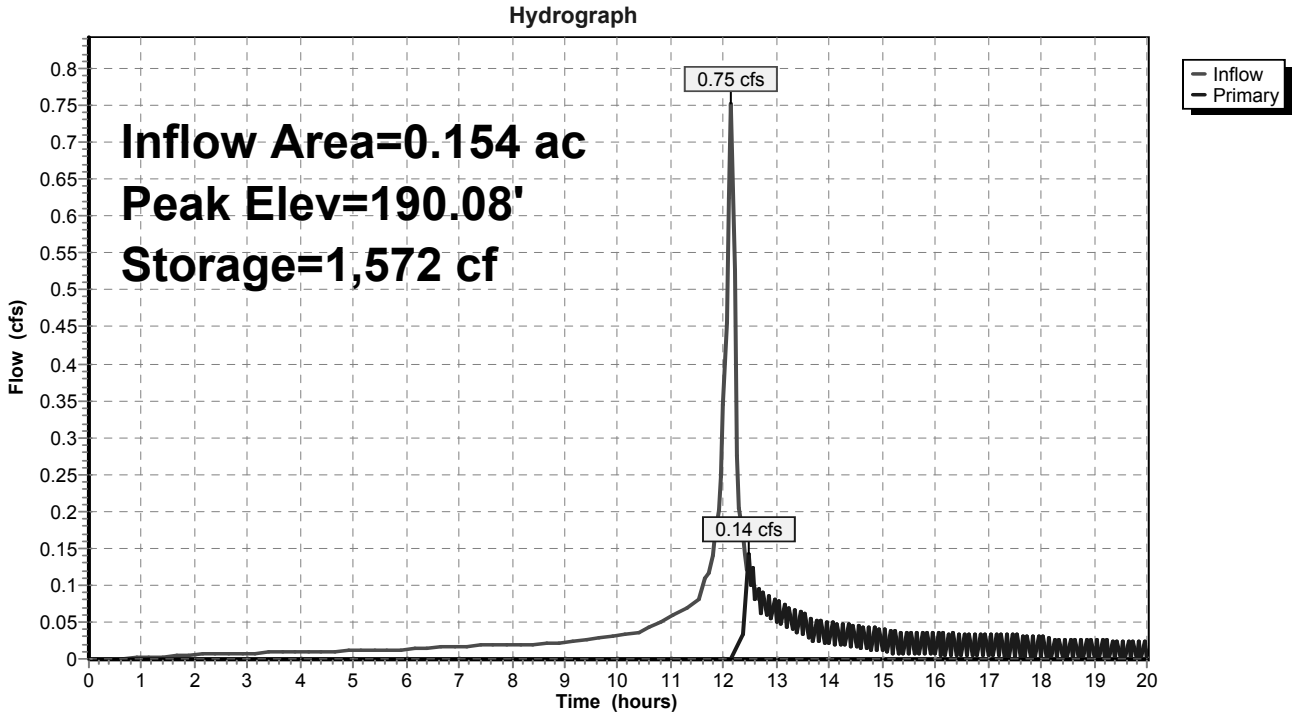
Plug-Flow detention time= 378.5 min calculated for 0.018 af (33% of inflow)
Center-of-Mass det. time= 182.6 min ( 895.0 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.12 cfs @ 12.46 hrs HW=190.07' TW=153.00' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 0.86 fps)

## Pond INF-ROOF-95: 340



## Summary for Pond INF-ROOF-96: 344

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 4.19" for 10_year event
Inflow = 1.01 cfs @ 12.14 hrs, Volume= 0.072 af
Outflow = 1.11 cfs @ 12.15 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.2 min
Primary = 1.11 cfs @ 12.15 hrs, Volume= 0.048 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.31' @ 12.15 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

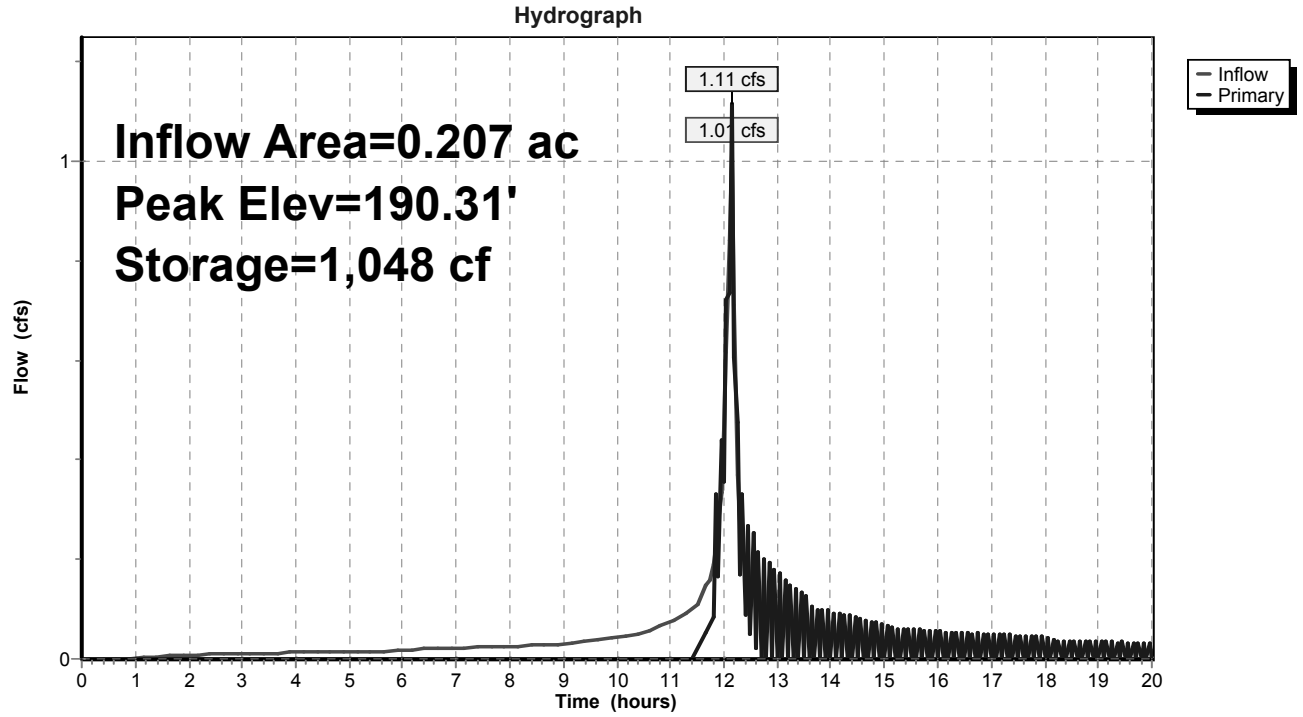
Plug-Flow detention time= 185.6 min calculated for 0.048 af (66% of inflow)
Center-of-Mass det. time= 96.7 min ( 809.0 - 712.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.08 cfs @ 12.15 hrs HW=190.31' TW=163.63' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.08 cfs @ 1.77 fps)

### Pond INF-ROOF-96: 344



## Summary for Pond P E 1.1A: 284

Inflow Area = 21.860 ac, 1.84% Impervious, Inflow Depth > 0.32" for 10_year event
Inflow = 8.42 cfs @ 12.23 hrs, Volume= 0.578 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 133.60' @ 20.00 hrs Surf.Area= 42,403 sf Storage= 25,164 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

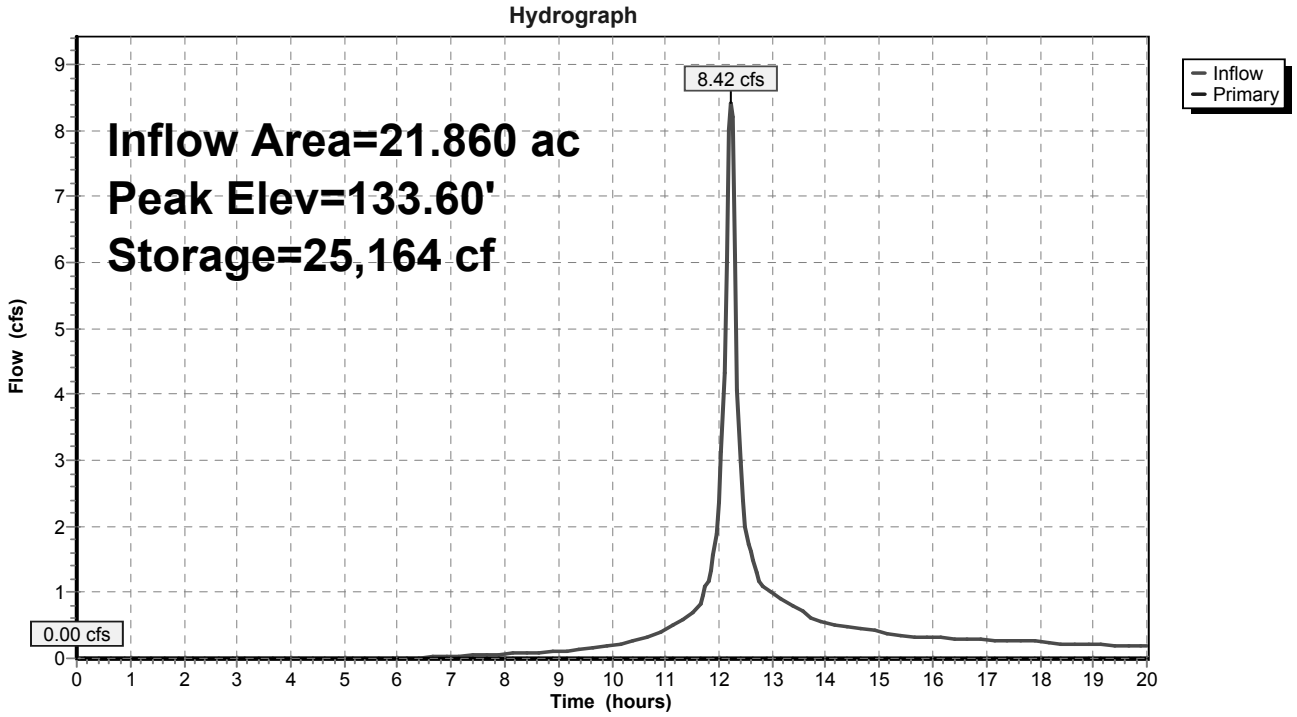
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 19.156 ac, 1.06% Impervious, Inflow Depth > 0.92" for 10_year event
Inflow = 16.75 cfs @ 12.28 hrs, Volume= 1.470 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 145.90' @ 20.00 hrs Surf.Area= 46,227 sf Storage= 63,965 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

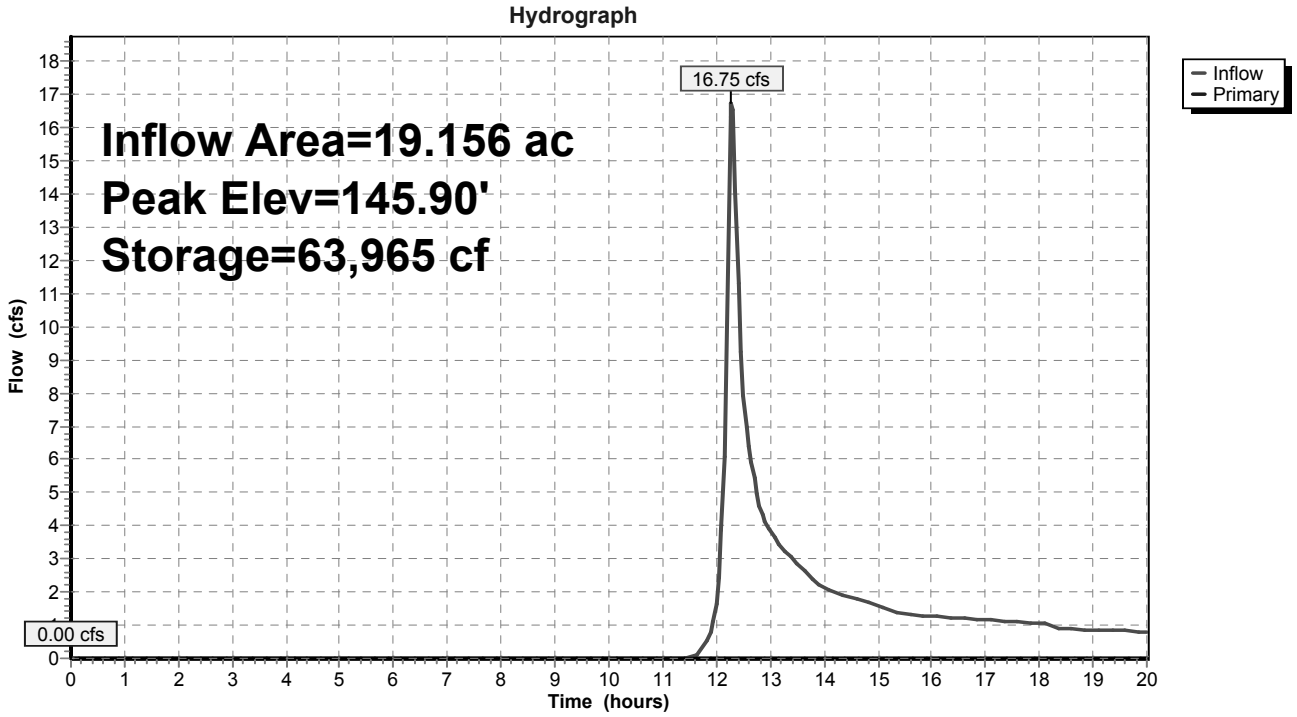
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=142.00' TW=133.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.2A: 282

Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 1.51" for 10_year event
Inflow = 11.10 cfs @ 12.31 hrs, Volume= 0.967 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 134.85' @ 20.00 hrs Surf.Area= 51,844 sf Storage= 42,069 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

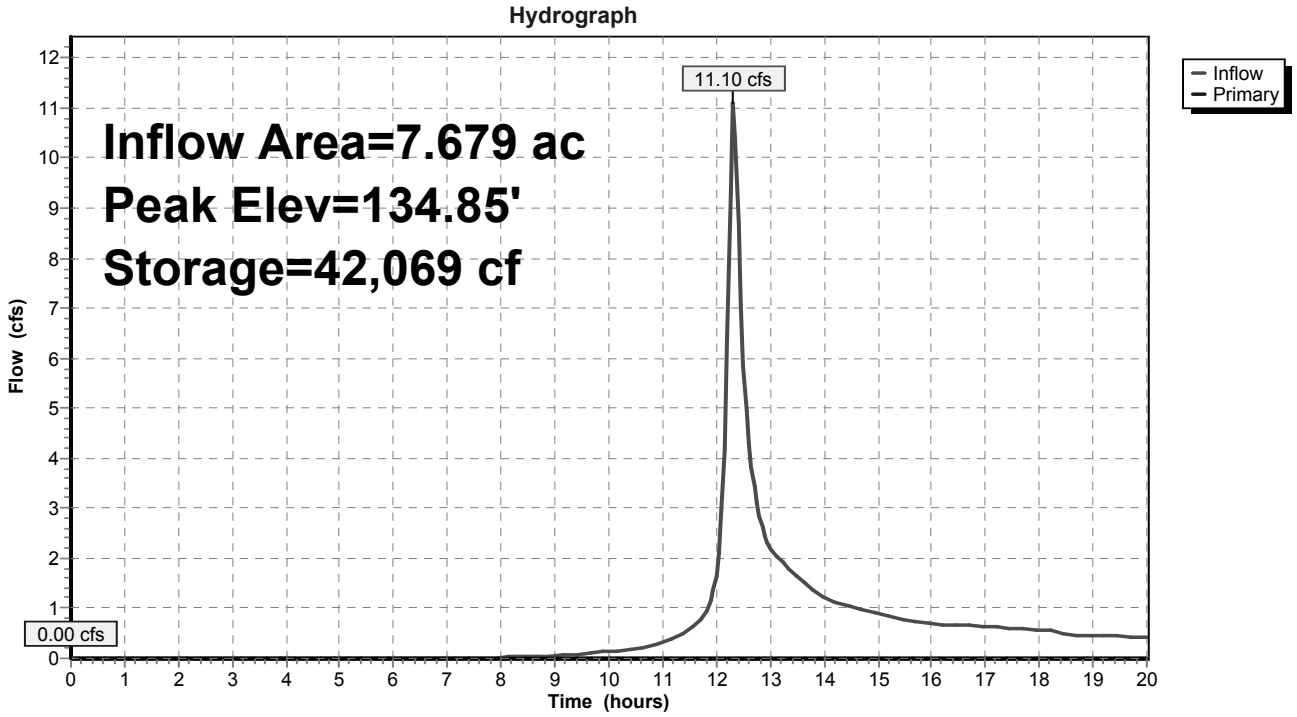
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.2A: 282



## Summary for Pond P E-CULV-S: 231

Inflow Area = 4.510 ac, 0.93% Impervious, Inflow Depth > 1.21" for 10_year event
Inflow = 5.96 cfs @ 12.28 hrs, Volume= 0.456 af
Outflow = 5.69 cfs @ 12.31 hrs, Volume= 0.446 af, Atten= 5%, Lag= 2.0 min
Primary = 5.69 cfs @ 12.31 hrs, Volume= 0.446 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 168.68' @ 12.31 hrs Surf.Area= 2,434 sf Storage= 1,241 cf
Flood Elev= 171.00' Surf.Area= 9,105 sf Storage= 14,267 cf

Plug-Flow detention time= 13.5 min calculated for 0.445 af (97% of inflow)
Center-of-Mass det. time= 5.6 min ( 845.5 - 839.9 )

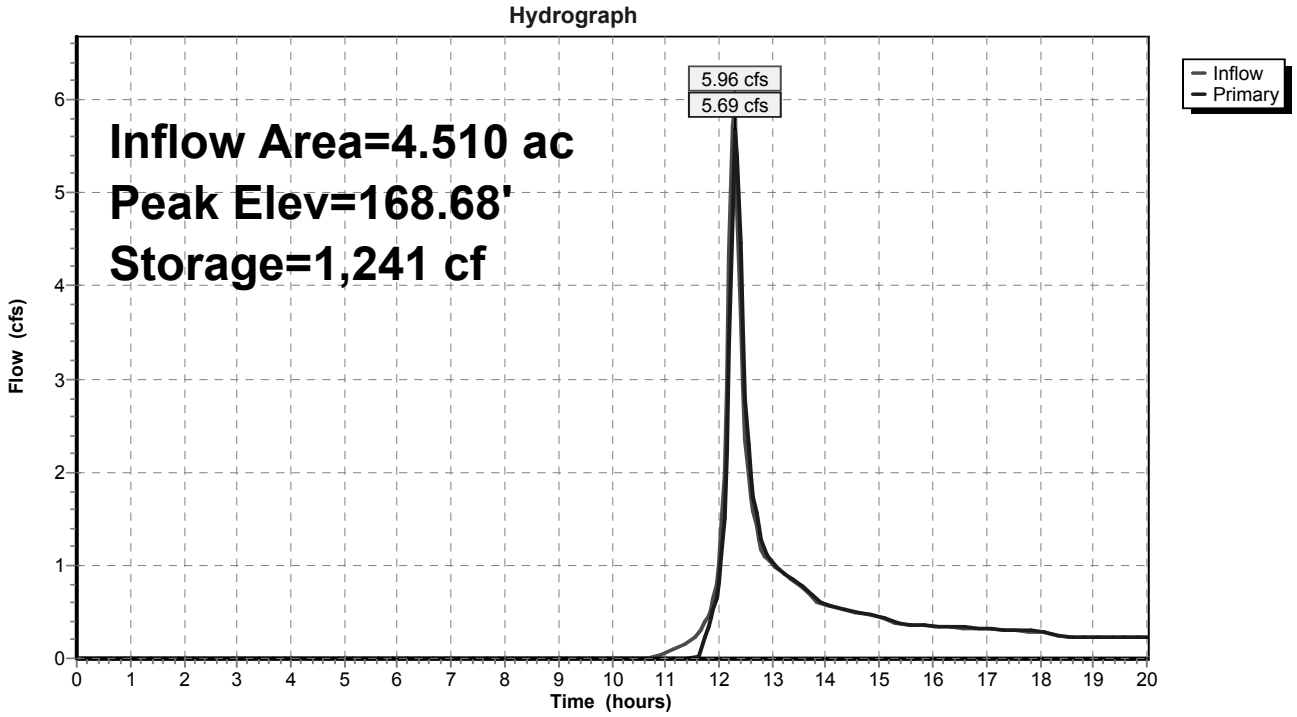
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 14,267 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 1,243 | 0 | 0 |
| 169.00 | 3,008 | 2,125 | 2,125 |
| 170.00 | 6,086 | 4,547 | 6,672 |
| 171.00 | 9,105 | 7,595 | 14,267 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 236.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 158.00' S= 0.0254 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 168.25' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=5.58 cfs @ 12.31 hrs HW=168.67' TW=143.74' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 5.58 cfs of 18.28 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 5.58 cfs @ 2.12 fps)

## Pond P E-CULV-S: 231



## Summary for Pond P INF-E-1:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.385 ac, 0.00% Impervious, Inflow Depth > 2.00" for 10_year event
Inflow = 3.11 cfs @ 12.25 hrs, Volume= 0.231 af
Outflow = 0.27 cfs @ 13.71 hrs, Volume= 0.095 af, Atten= 91%, Lag= 87.4 min
Discarded = 0.02 cfs @ 11.50 hrs, Volume= 0.023 af
Primary = 0.25 cfs @ 13.71 hrs, Volume= 0.072 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 165.22' @ 13.71 hrs Surf.Area= 3,441 sf Storage= 6,195 cf
Flood Elev= 168.50' Surf.Area= 3,441 sf Storage= 7,308 cf

Plug-Flow detention time= 217.9 min calculated for 0.095 af (41% of inflow)
Center-of-Mass det. time= 114.4 min ( 915.0 - 800.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 162.50' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 163.00' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | x 2.00 = 7,308 cf Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 364.90' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #2 | Device 3 | 165.00' | **9.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Primary | 160.50' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 160.50' / 159.50' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #4 | Discarded | 162.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 11.50 hrs HW=163.00' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.25 cfs @ 13.71 hrs HW=165.22' TW=150.78' (Dynamic Tailwater)
└**3=RCP_Round 18"** (Passes 0.25 cfs of 13.22 cfs potential flow)
  ├**1=Bleeder at WQT Vol** ( Controls 0.00 cfs)
  └**2=Orifice/Grate Overflow** (Orifice Controls 0.25 cfs @ 1.50 fps)

## Pond P INF-E-1: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

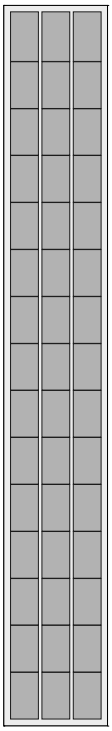
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

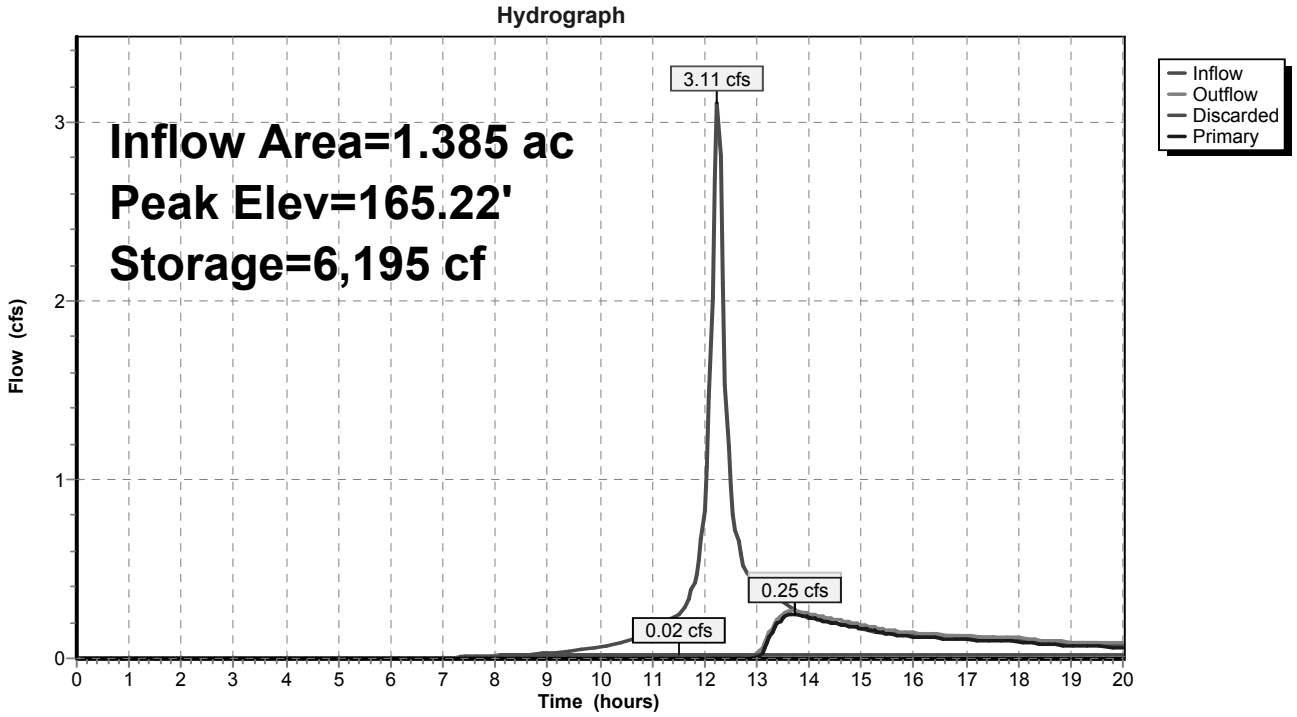
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-1:


Hydrograph
Inflow Area=1.385 ac
Peak Elev=165.22'
Storage=6,195 cf
3.11 cfs
0.25 cfs
0.02 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P INF-E-2: 142

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 2.66" for 10_year event
Inflow = 3.69 cfs @ 12.24 hrs, Volume= 0.259 af
Outflow = 3.70 cfs @ 12.26 hrs, Volume= 0.191 af, Atten= 0%, Lag= 1.7 min
Discarded = 0.01 cfs @ 9.90 hrs, Volume= 0.012 af
Primary = 3.69 cfs @ 12.26 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 167.25' @ 12.26 hrs Surf.Area= 1,721 sf Storage= 3,480 cf
Flood Elev= 169.60' Surf.Area= 1,721 sf Storage= 3,654 cf

Plug-Flow detention time= 112.8 min calculated for 0.191 af (74% of inflow)
Center-of-Mass det. time= 44.2 min ( 834.1 - 790.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 164.00' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 164.50' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 166.50' | **18.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 4 | 167.00' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary overflow** C= 0.600 |
| #3 | Device 4 | 366.40' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #4 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #5 | Discarded | 164.00' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 9.90 hrs HW=164.50' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=3.50 cfs @ 12.26 hrs HW=167.23' TW=156.38' (Dynamic Tailwater)
└**4=RCP_Round 18"** (Passes 3.50 cfs of 13.99 cfs potential flow)
  ├**1=Orifice/Grate Overflow** (Orifice Controls 2.46 cfs @ 3.28 fps)
  ├**2=Orifice/Grate Overflow - auxiliary overflow**(Orifice Controls 1.04 cfs @ 1.53 fps)
  └**3=Bleeder at WQT Vol** ( Controls 0.00 cfs)

## Pond P INF-E-2: 142 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

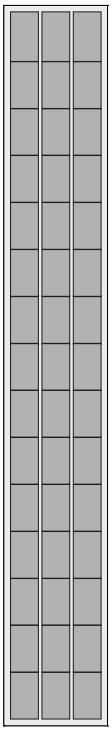
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

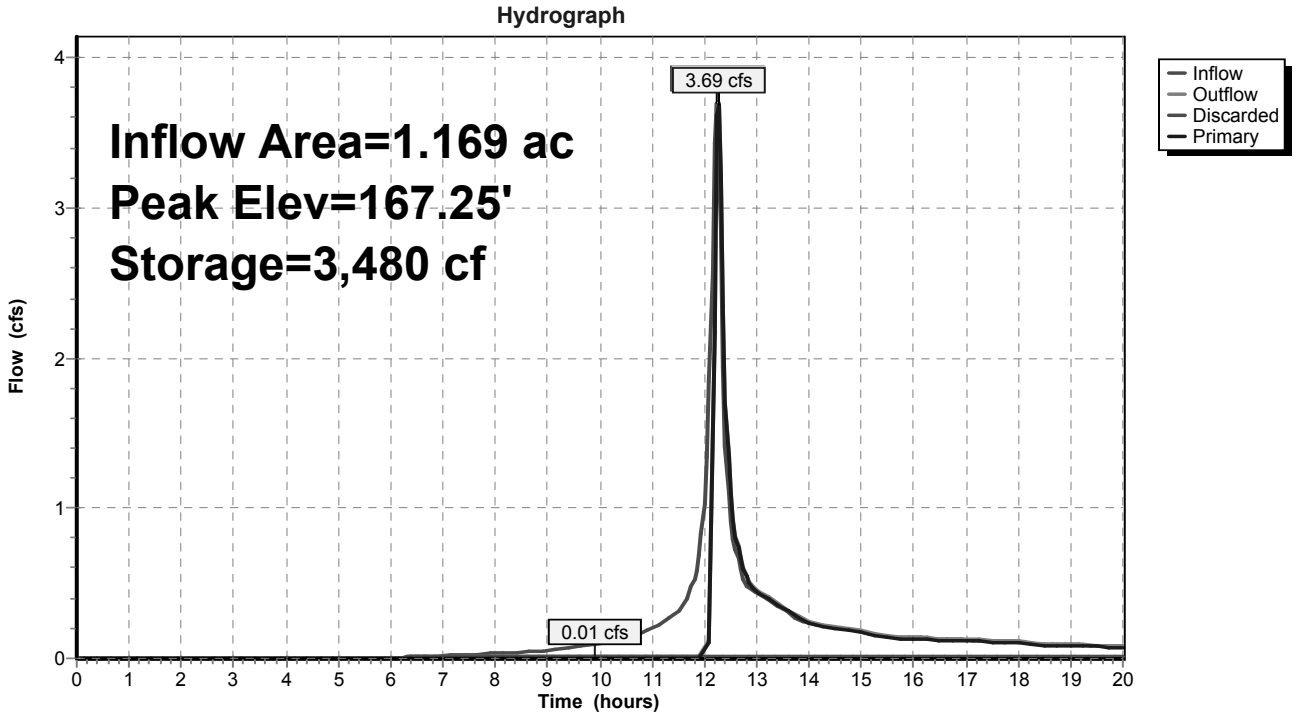
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-2: 142



## Summary for Pond P INF-E-3:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 6.824 ac, 5.44% Impervious, Inflow Depth > 1.94" for 10_year event
Inflow = 12.39 cfs @ 12.24 hrs, Volume= 1.105 af
Outflow = 6.66 cfs @ 12.43 hrs, Volume= 0.697 af, Atten= 46%, Lag= 11.0 min
Discarded = 0.02 cfs @ 8.15 hrs, Volume= 0.034 af
Primary = 6.64 cfs @ 12.43 hrs, Volume= 0.662 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.98' @ 12.43 hrs Surf.Area= 6,283 sf Storage= 19,530 cf
Flood Elev= 174.75' Surf.Area= 6,283 sf Storage= 21,456 cf

Plug-Flow detention time= 154.2 min calculated for 0.697 af (63% of inflow)
Center-of-Mass det. time= 67.4 min ( 872.8 - 805.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.25' | 8,735 cf | **44.25'W x 142.00'L x 5.50'H Field A**<br>34,558 cf Overall - 12,722 cf Embedded = 21,837 cf x 40.0% Voids |
| #2A | 168.00' | 12,722 cf | **ADS_StormTech MC-3500 c +Cap**x 114 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf |
| | | 21,456 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.75' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.75' / 161.75' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 171.25' | **14.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Device 1 | 171.75' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary X 4.00**<br>C= 0.600 |
| #4 | Device 1 | 169.35' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #5 | Discarded | 167.25' | **0.170 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 8.15 hrs HW=167.33' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=6.48 cfs @ 12.43 hrs HW=171.98' TW=159.07' (Dynamic Tailwater)
└**1=Culvert** (Passes 6.48 cfs of 37.63 cfs potential flow)
  ├**2=Orifice/Grate Overflow** (Orifice Controls 1.92 cfs @ 3.29 fps)
  ├**3=Orifice/Grate Overflow - auxiliary** (Orifice Controls 4.18 cfs @ 1.53 fps)
  └**4=Bleeder at WQT Vol** (Orifice Controls 0.37 cfs @ 7.62 fps)

## Pond P INF-E-3: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

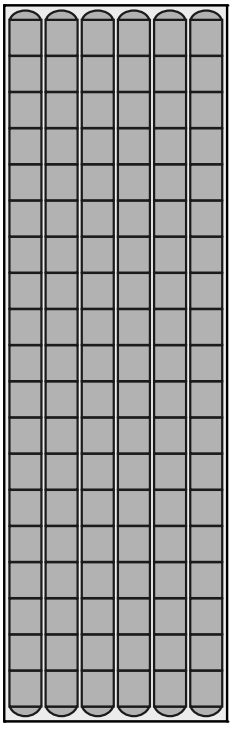
19 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 140.00' Row Length +12.0" End Stone x 2 = 142.00' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

114 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 6 Rows = 12,721.7 cf Chamber Storage

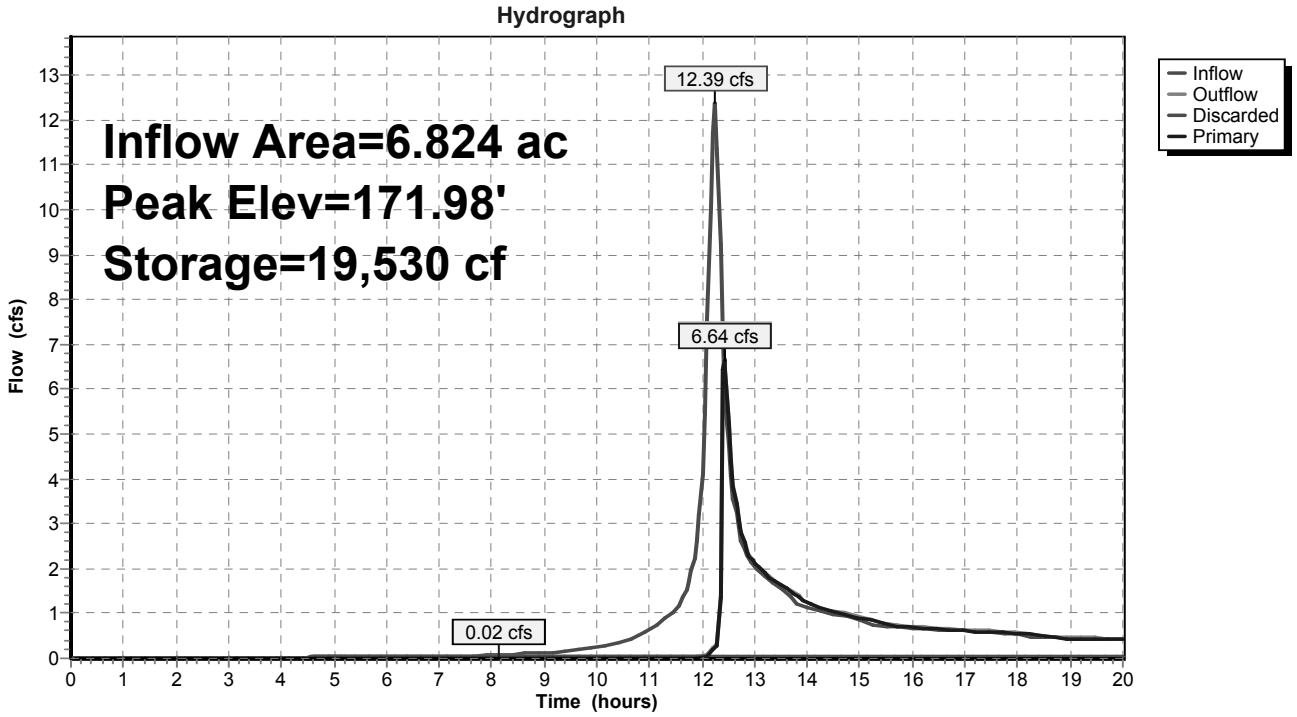
34,558.4 cf Field - 12,721.7 cf Chambers = 21,836.7 cf Stone x 40.0% Voids = 8,734.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,456.4 cf = 0.493 af
Overall Storage Efficiency = 62.1%

114 Chambers
1,279.9 cy Field
808.8 cy Stone



## Pond P INF-E-3:


Hydrograph
Inflow Area=6.824 ac
Peak Elev=171.98'
Storage=19,530 cf
12.39 cfs
6.64 cfs
0.02 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P INF-E-4A: 145

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.603 ac, 0.00% Impervious, Inflow Depth > 1.77" for 10_year event
Inflow = 3.37 cfs @ 12.26 hrs, Volume= 0.237 af
Outflow = 0.25 cfs @ 13.76 hrs, Volume= 0.139 af, Atten= 92%, Lag= 90.3 min
Discarded = 0.01 cfs @ 11.75 hrs, Volume= 0.009 af
Primary = 0.24 cfs @ 13.76 hrs, Volume= 0.130 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.07' @ 13.76 hrs Surf.Area= 2,089 sf Storage= 5,174 cf
Flood Elev= 175.00' Surf.Area= 2,089 sf Storage= 7,026 cf

Plug-Flow detention time= 214.7 min calculated for 0.139 af (59% of inflow)
Center-of-Mass det. time= 118.6 min ( 959.4 - 840.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 2,974 cf | **22.75'W x 91.81'L x 5.50'H Field A**<br>11,487 cf Overall - 4,052 cf Embedded = 7,435 cf x 40.0% Voids |
| #2A | 168.25' | 4,052 cf | **ADS_StormTech MC-3500 c +Cap**x 36 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 7,026 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 171.50' | **3.0" Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 3 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #3 | Primary | 168.00' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #4 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 11.75 hrs HW=167.61' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.24 cfs @ 13.76 hrs HW=171.07' TW=162.31' (Dynamic Tailwater)
└**3=Culvert** (Passes 0.24 cfs of 18.87 cfs potential flow)
  ├**1=Orifice/Grate Overflow** ( Controls 0.00 cfs)
  └**2=Bleeder** (Orifice Controls 0.24 cfs @ 4.92 fps)

## Pond P INF-E-4A: 145 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

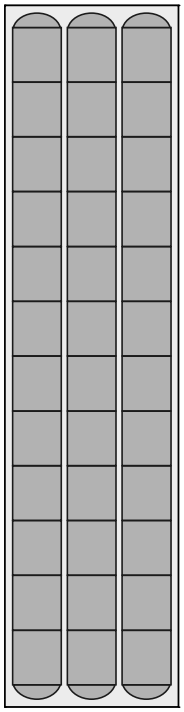
12 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 89.81' Row Length +12.0" End Stone x 2 = 91.81' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

36 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 4,051.9 cf Chamber Storage

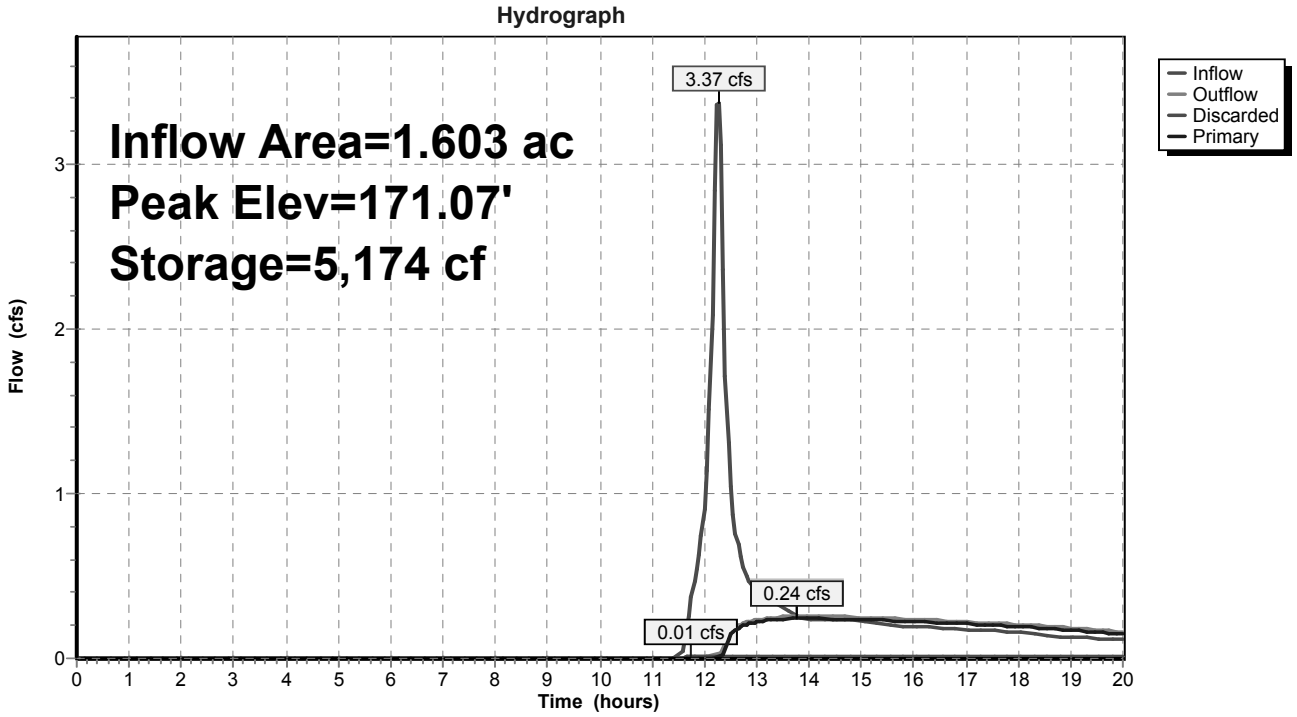
11,487.3 cf Field - 4,051.9 cf Chambers = 7,435.4 cf Stone x 40.0% Voids = 2,974.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,026.0 cf = 0.161 af
Overall Storage Efficiency = 61.2%

36 Chambers
425.5 cy Field
275.4 cy Stone



## Pond P INF-E-4A: 145



## Summary for Pond P INF-E-4B: 140

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth > 3.74" for 10_year event
Inflow = 2.77 cfs @ 12.14 hrs, Volume= 0.184 af
Outflow = 1.53 cfs @ 12.24 hrs, Volume= 0.133 af, Atten= 45%, Lag= 5.7 min
Discarded = 0.01 cfs @ 4.60 hrs, Volume= 0.012 af
Primary = 1.52 cfs @ 12.24 hrs, Volume= 0.122 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.22' @ 12.24 hrs Surf.Area= 1,273 sf Storage= 3,845 cf
Flood Elev= 175.00' Surf.Area= 1,273 sf Storage= 4,242 cf

Plug-Flow detention time= 171.0 min calculated for 0.133 af (72% of inflow)
Center-of-Mass det. time= 96.5 min ( 838.0 - 741.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 1,840 cf | **22.75'W x 55.96'L x 5.50'H Field A**<br>7,002 cf Overall - 2,403 cf Embedded = 4,599 cf x 40.0% Voids |
| #2A | 168.25' | 2,403 cf | **ADS_StormTech MC-3500 c +Cap**x 21 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 4,242 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.90' | **18.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.90' / 166.80' S= 0.0005 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.50' | **3.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 172.00' | **36.0" W x 3.0" H Vert. Orifice/Grate-auxiliary** C= 0.600 |
| #4 | Device 1 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #5 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 4.60 hrs HW=167.58' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=1.44 cfs @ 12.24 hrs HW=172.21' TW=162.63' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.44 cfs of 12.72 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 3.68 fps)
  ├**3=Orifice/Grate-auxiliary** (Orifice Controls 0.91 cfs @ 1.46 fps)
  └**4=Bleeder** (Orifice Controls 0.35 cfs @ 7.11 fps)

## Pond P INF-E-4B: 140 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

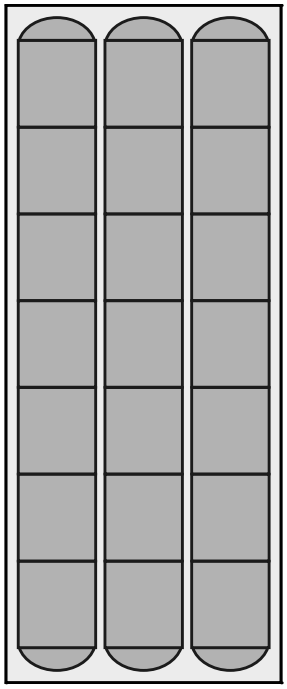
7 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 53.96' Row Length +12.0" End Stone x 2 = 55.96' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

21 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 2,402.6 cf Chamber Storage

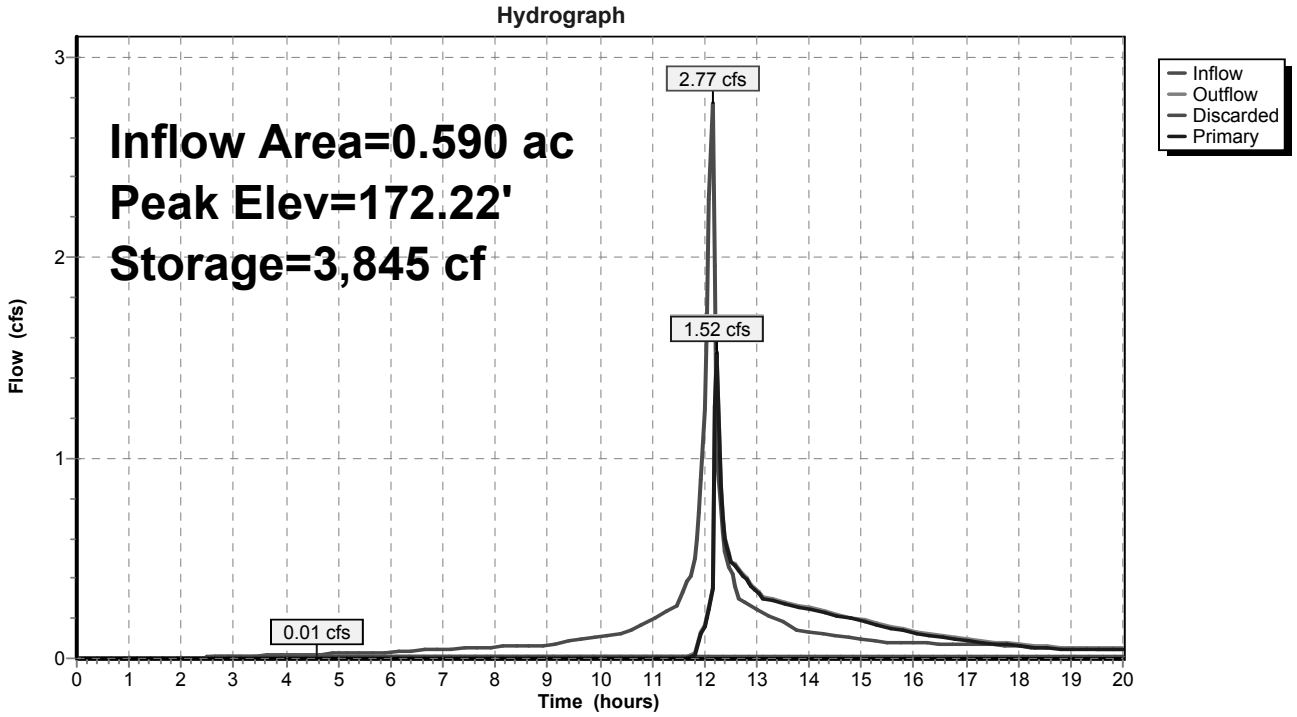
7,001.6 cf Field - 2,402.6 cf Chambers = 4,599.0 cf Stone x 40.0% Voids = 1,839.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,242.2 cf = 0.097 af
Overall Storage Efficiency = 60.6%

21 Chambers
259.3 cy Field
170.3 cy Stone



## Pond P INF-E-4B: 140



## Summary for Pond P MH-CULV-NA: 114

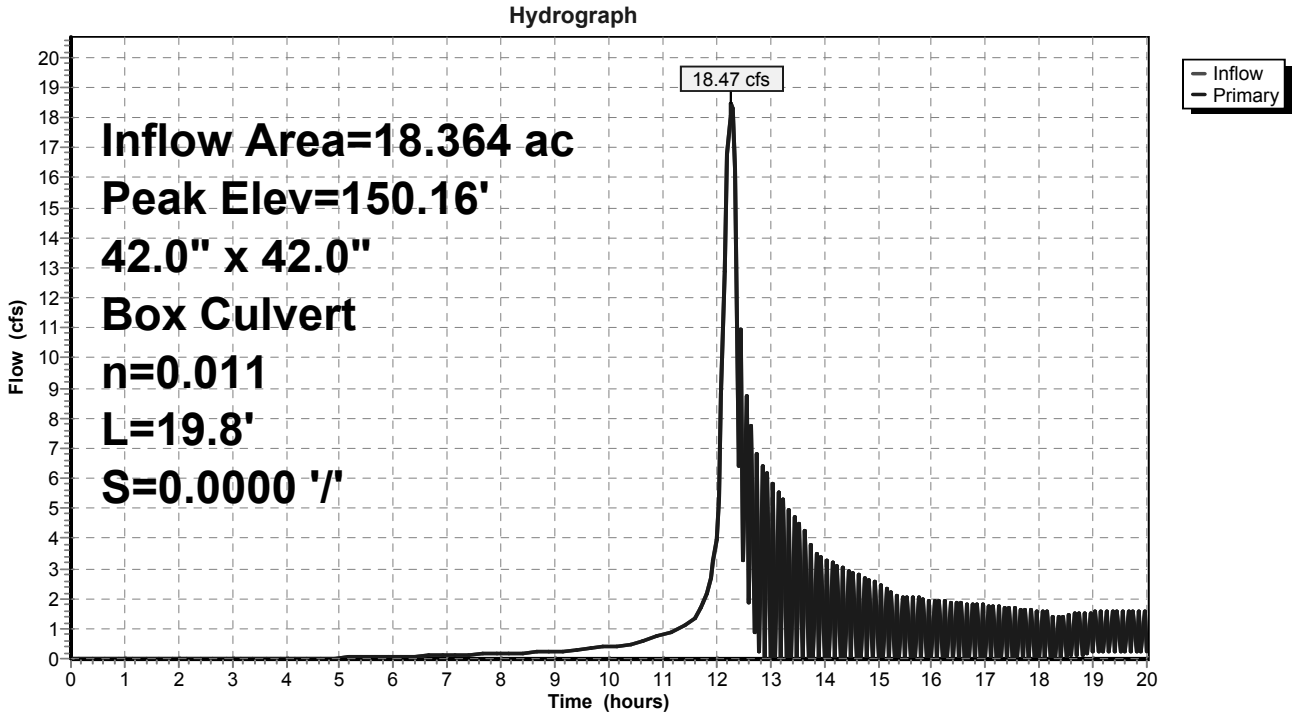
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.03" for 10_year event
Inflow = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af
Outflow = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af, Atten= 0%, Lag= 0.0 min
Primary = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.16' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=18.20 cfs @ 12.28 hrs HW=150.15' TW=149.96' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 18.20 cfs @ 2.03 fps)

## Pond P MH-CULV-NA: 114



## Summary for Pond P MH-CULV-NB: 115

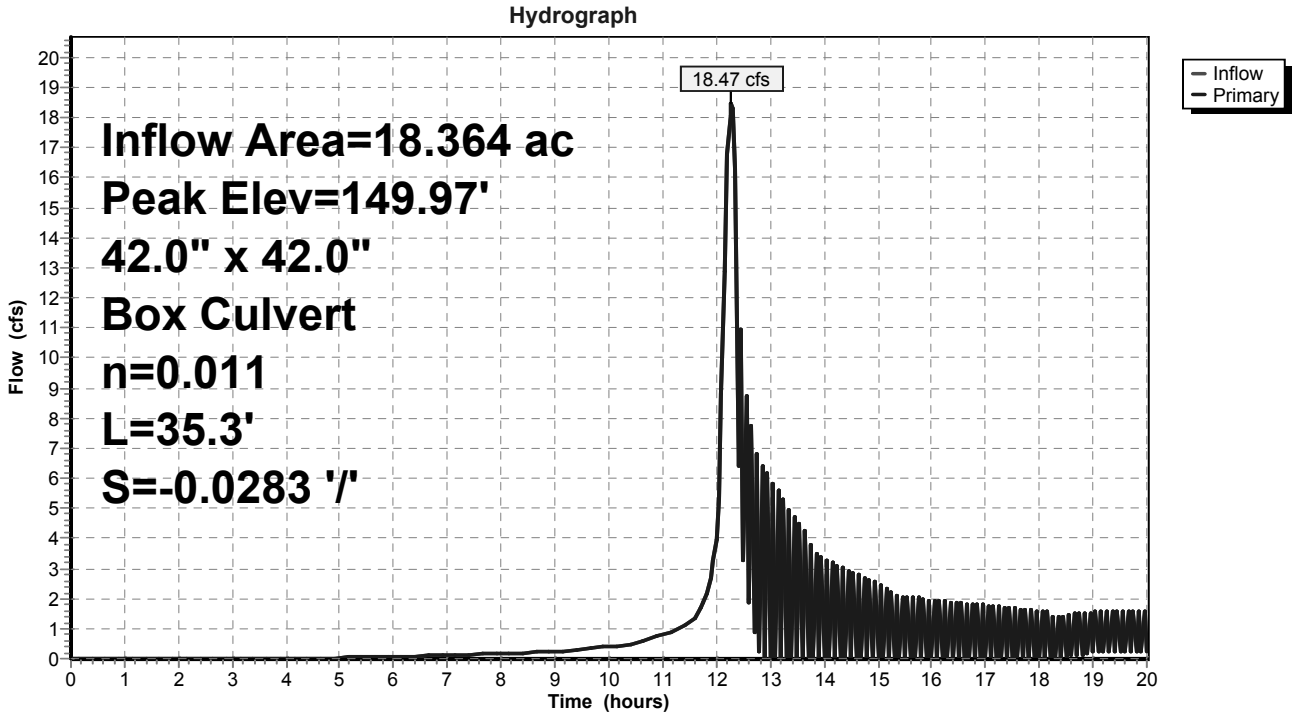
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.03" for 10_year event
Inflow = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af
Outflow = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af, Atten= 0%, Lag= 0.0 min
Primary = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 149.97' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=18.20 cfs @ 12.28 hrs HW=149.96' TW=0.00' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 18.20 cfs @ 3.77 fps)

## Pond P MH-CULV-NB: 115



## Summary for Pond P RG-E-7:

Inflow Area = 0.951 ac, 0.00% Impervious, Inflow Depth > 3.32" for 10_year event
Inflow = 3.62 cfs @ 12.23 hrs, Volume= 0.263 af
Outflow = 3.37 cfs @ 12.26 hrs, Volume= 0.208 af, Atten= 7%, Lag= 2.0 min
Primary = 3.37 cfs @ 12.26 hrs, Volume= 0.208 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 173.99' @ 12.26 hrs Surf.Area= 3,664 sf Storage= 3,001 cf
Flood Elev= 175.00' Surf.Area= 7,929 sf Storage= 8,847 cf

Plug-Flow detention time= 111.9 min calculated for 0.208 af (79% of inflow)
Center-of-Mass det. time= 51.8 min ( 817.2 - 765.4 )

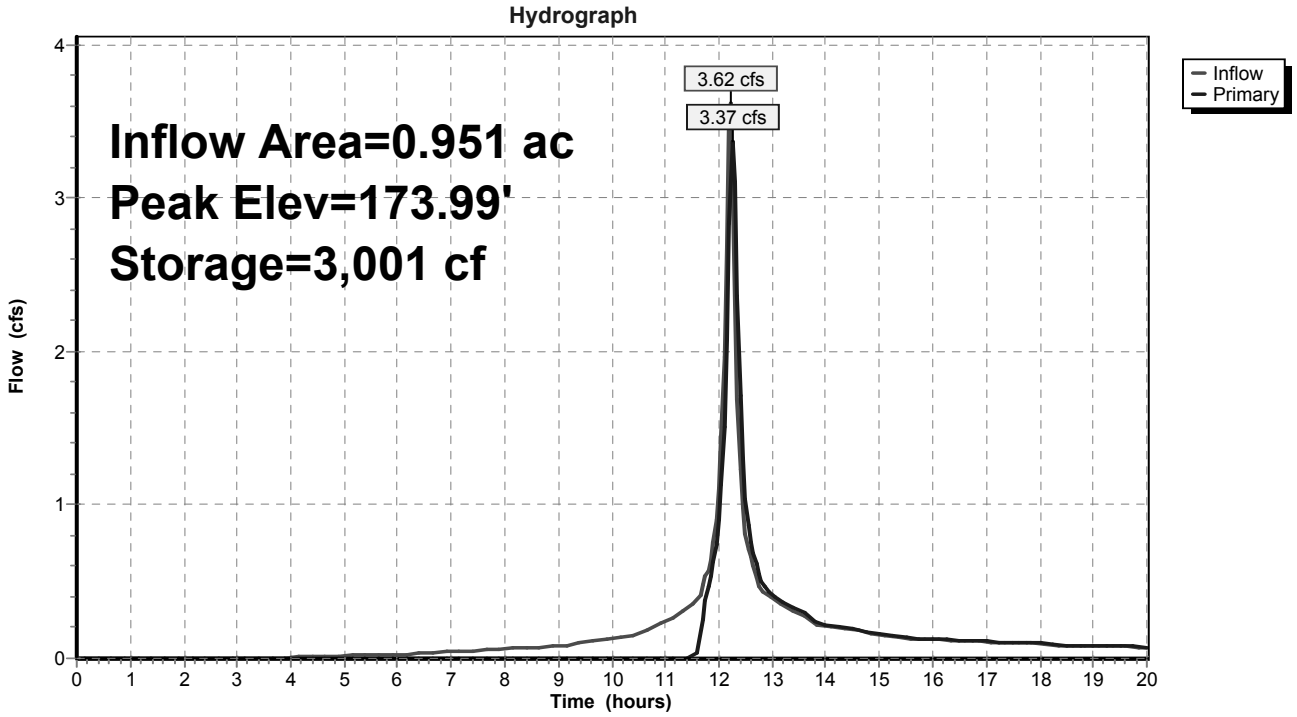
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 8,847 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 2,408 | 0 | 0 |
| 174.00 | 3,678 | 3,043 | 3,043 |
| 175.00 | 7,929 | 5,804 | 8,847 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 173.80' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.40' | **18.0" Round Culvert**<br>L= 35.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.40' / 169.20' S= 0.0057 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.31 cfs @ 12.26 hrs HW=173.99' TW=169.31' (Dynamic Tailwater)
↑**2=Culvert** (Passes 3.31 cfs of 18.95 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 3.31 cfs @ 1.41 fps)

## Pond P RG-E-7:


Hydrograph
Inflow Area=0.951 ac
Peak Elev=173.99'
Storage=3,001 cf
3.62 cfs
3.37 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P RG-E-9A:

Inflow Area = 2.302 ac, 0.00% Impervious, Inflow Depth > 2.13" for 10_year event
Inflow = 5.54 cfs @ 12.24 hrs, Volume= 0.408 af
Outflow = 5.45 cfs @ 12.25 hrs, Volume= 0.403 af, Atten= 2%, Lag= 0.8 min
Primary = 5.45 cfs @ 12.25 hrs, Volume= 0.403 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.00' @ 12.25 hrs Surf.Area= 898 sf Storage= 582 cf
Flood Elev= 167.00' Surf.Area= 1,657 sf Storage= 1,860 cf

Plug-Flow detention time= 11.6 min calculated for 0.402 af (98% of inflow)
Center-of-Mass det. time= 6.9 min ( 807.7 - 800.8 )

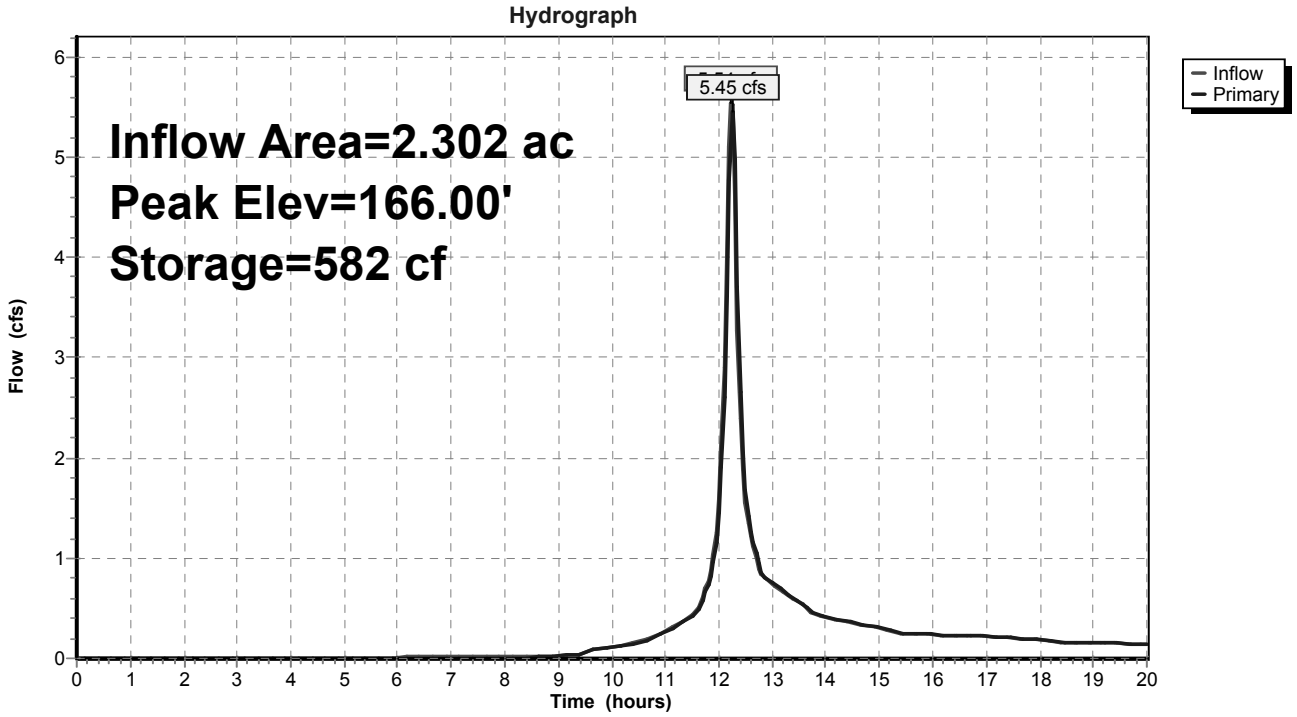
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 1,860 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 266 | 0 | 0 |
| 166.00 | 898 | 582 | 582 |
| 167.00 | 1,657 | 1,278 | 1,860 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 165.50' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 151.00' | **18.0" Round Culvert**<br>L= 46.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 151.00' / 150.20' S= 0.0174 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=5.40 cfs @ 12.25 hrs HW=166.00' TW=150.67' (Dynamic Tailwater)
↑**2=Culvert** (Passes 5.40 cfs of 37.53 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 5.40 cfs @ 2.31 fps)

## Pond P RG-E-9A:


Hydrograph
Inflow Area=2.302 ac
Peak Elev=166.00'
Storage=582 cf
5.45 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

## Summary for Pond P RG-E-9B: 244

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

Inflow Area = 2.836 ac, 0.00% Impervious, Inflow Depth > 1.90" for 10_year event
Inflow = 6.07 cfs @ 12.25 hrs, Volume= 0.449 af
Outflow = 5.87 cfs @ 12.28 hrs, Volume= 0.337 af, Atten= 3%, Lag= 1.7 min
Primary = 5.87 cfs @ 12.28 hrs, Volume= 0.337 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.67' @ 12.28 hrs Surf.Area= 3,910 sf Storage= 5,454 cf
Flood Elev= 151.00' Surf.Area= 4,178 sf Storage= 6,784 cf

Plug-Flow detention time= 106.3 min calculated for 0.337 af (75% of inflow)
Center-of-Mass det. time= 40.6 min ( 851.4 - 810.8 )

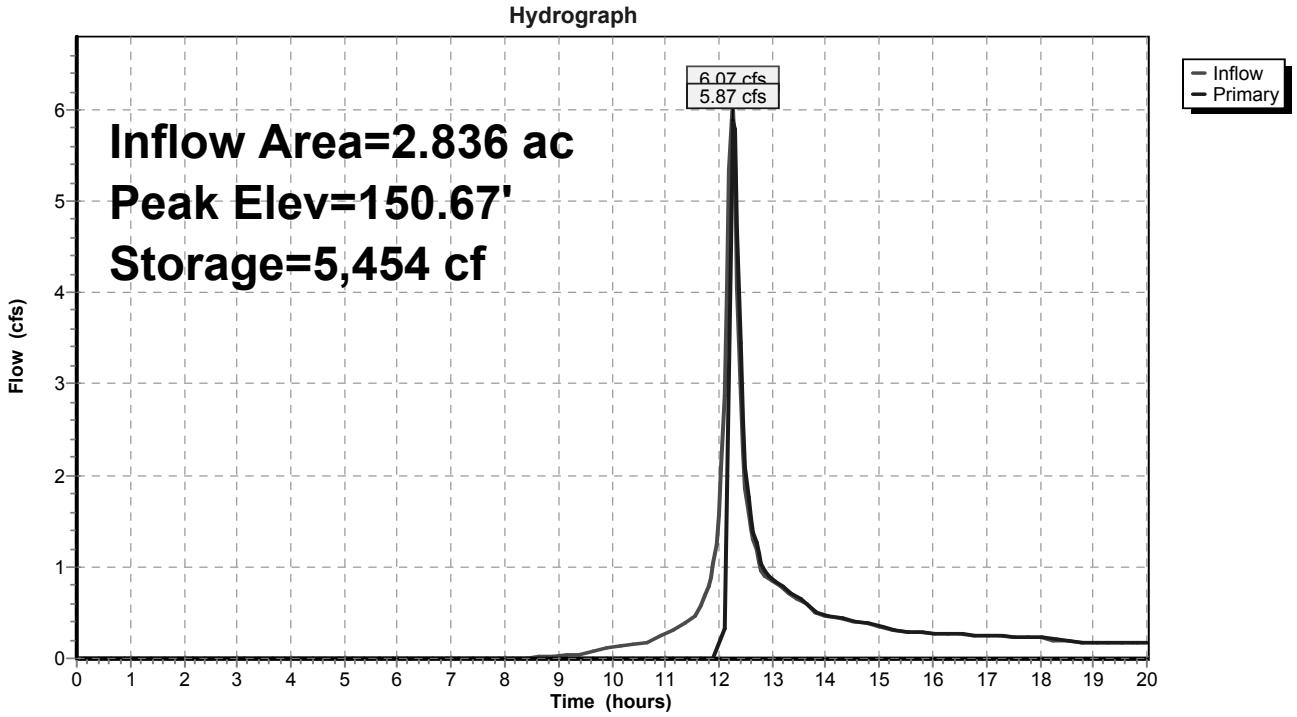
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 149.00' | 6,784 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 149.00 | 2,666 | 0 | 0 |
| 150.00 | 3,362 | 3,014 | 3,014 |
| 151.00 | 4,178 | 3,770 | 6,784 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 28.00 31.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=5.73 cfs @ 12.28 hrs HW=150.67' TW=143.57' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 5.73 cfs @ 1.31 fps)

## Pond P RG-E-9B: 244



## Summary for Pond P RG-W-5A: 250

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 1.64" for 10_year event
Inflow = 2.29 cfs @ 12.15 hrs, Volume= 0.180 af
Outflow = 2.36 cfs @ 12.20 hrs, Volume= 0.178 af, Atten= 0%, Lag= 3.0 min
Primary = 2.36 cfs @ 12.20 hrs, Volume= 0.178 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 163.64' @ 12.20 hrs Surf.Area= 196 sf Storage= 93 cf
Flood Elev= 164.00' Surf.Area= 252 sf Storage= 173 cf

Plug-Flow detention time= 5.0 min calculated for 0.178 af (99% of inflow)
Center-of-Mass det. time= 2.0 min ( 832.0 - 830.0 )

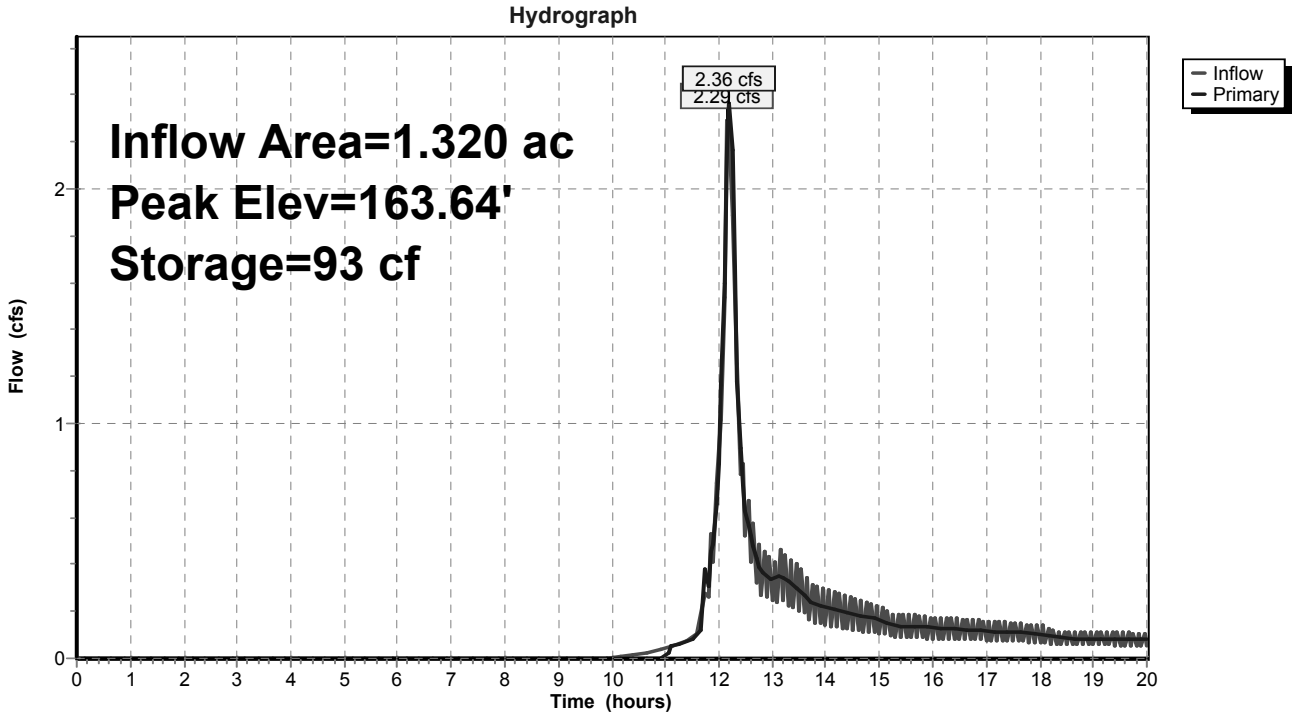
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 173 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 95 | 0 | 0 |
| 164.00 | 252 | 173 | 173 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 163.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=2.36 cfs @ 12.20 hrs HW=163.64' TW=162.64' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 2.36 cfs @ 1.19 fps)

## Pond P RG-W-5A: 250



## Summary for Pond P RG-W-5B: 252

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 1.62" for 10_year event
Inflow = 2.36 cfs @ 12.20 hrs, Volume= 0.178 af
Outflow = 2.39 cfs @ 12.20 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.1 min
Primary = 2.39 cfs @ 12.20 hrs, Volume= 0.177 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.64' @ 12.20 hrs Surf.Area= 160 sf Storage= 72 cf
Flood Elev= 163.00' Surf.Area= 212 sf Storage= 138 cf

Plug-Flow detention time= 3.7 min calculated for 0.177 af (99% of inflow)
Center-of-Mass det. time= 1.2 min ( 833.2 - 832.0 )

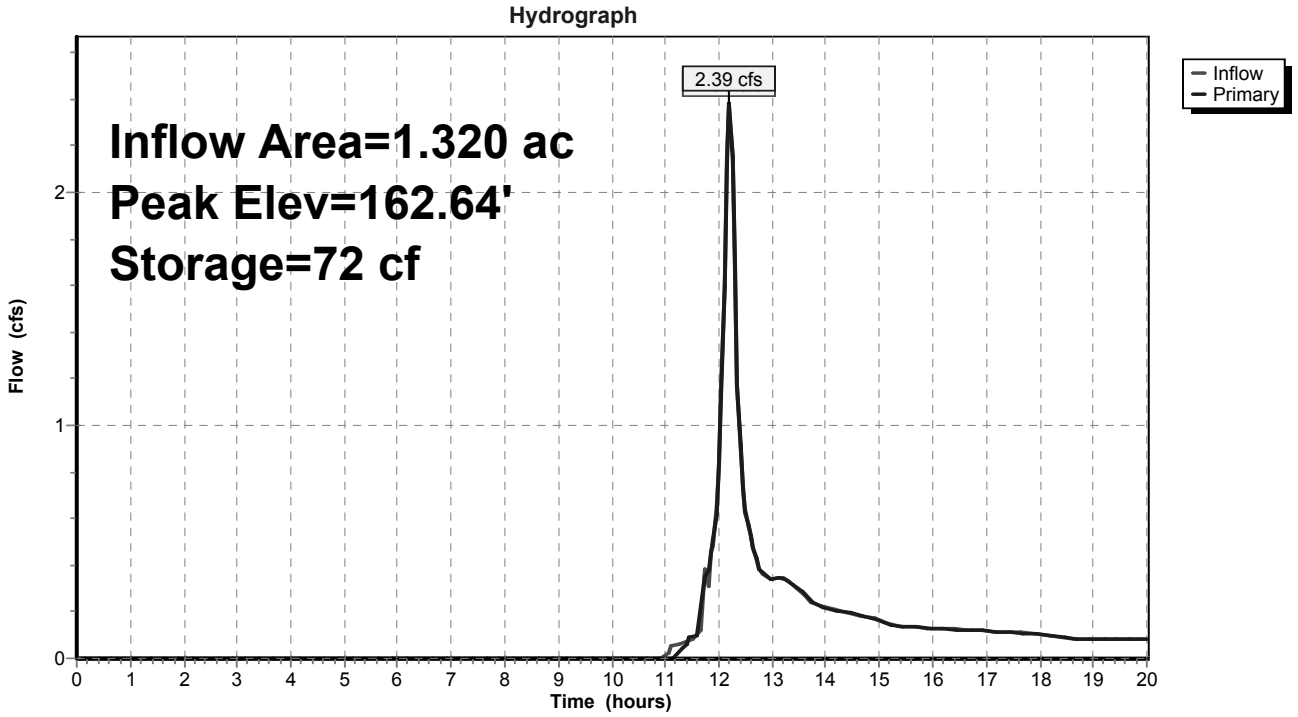
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 138 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 65 | 0 | 0 |
| 163.00 | 212 | 138 | 138 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=2.38 cfs @ 12.20 hrs HW=162.64' TW=161.64' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 2.38 cfs @ 1.19 fps)

## Pond P RG-W-5B: 252



## Summary for Pond P RG-W-5C: 254

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.1 in/hr to drawdown in 72 hours.

---

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 1.61" for 10_year event
Inflow = 2.39 cfs @ 12.20 hrs, Volume= 0.177 af
Outflow = 2.39 cfs @ 12.21 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.7 min
Primary = 2.39 cfs @ 12.21 hrs, Volume= 0.159 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 161.64' @ 12.21 hrs Surf.Area= 975 sf Storage= 920 cf
Flood Elev= 162.00' Surf.Area= 1,046 sf Storage= 1,280 cf

Plug-Flow detention time= 48.1 min calculated for 0.159 af (90% of inflow)
Center-of-Mass det. time= 14.9 min ( 848.1 - 833.2 )

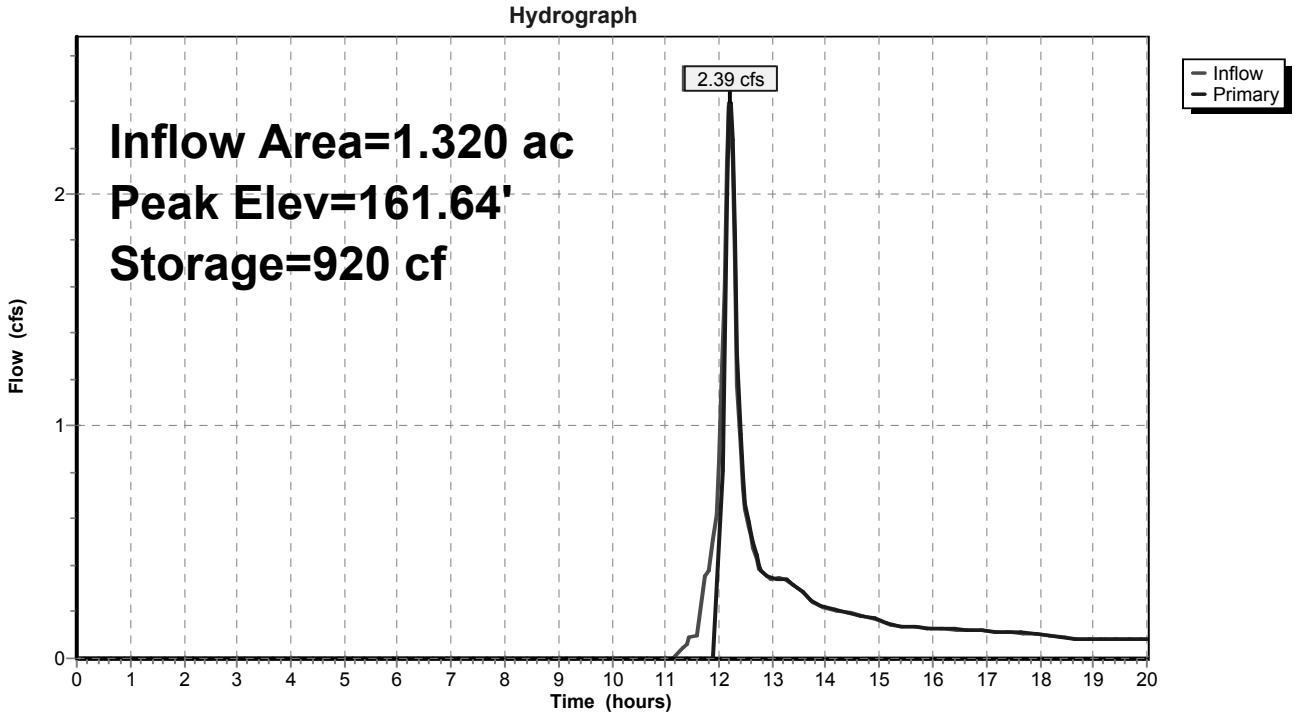
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 160.50' | 1,280 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 160.50 | 624 | 0 | 0 |
| 161.00 | 778 | 351 | 351 |
| 161.50 | 946 | 431 | 782 |
| 162.00 | 1,046 | 498 | 1,280 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 161.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=2.34 cfs @ 12.21 hrs HW=161.64' TW=153.05' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 2.34 cfs @ 1.19 fps)

## Pond P RG-W-5C: 254



## Summary for Pond P S-CB-E-1: 263

Inflow Area = 1.190 ac, 0.00% Impervious, Inflow Depth > 2.10" for 10_year event
Inflow = 3.03 cfs @ 12.23 hrs, Volume= 0.209 af
Outflow = 3.03 cfs @ 12.24 hrs, Volume= 0.205 af, Atten= 0%, Lag= 0.5 min
Primary = 3.03 cfs @ 12.24 hrs, Volume= 0.205 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 155 sf Storage= 0 cf
Peak Elev= 171.68' @ 12.24 hrs Surf.Area= 667 sf Storage= 278 cf
Flood Elev= 172.00' Surf.Area= 913 sf Storage= 534 cf

Plug-Flow detention time= 14.0 min calculated for 0.205 af (98% of inflow)
Center-of-Mass det. time= 6.8 min ( 807.4 - 800.5 )

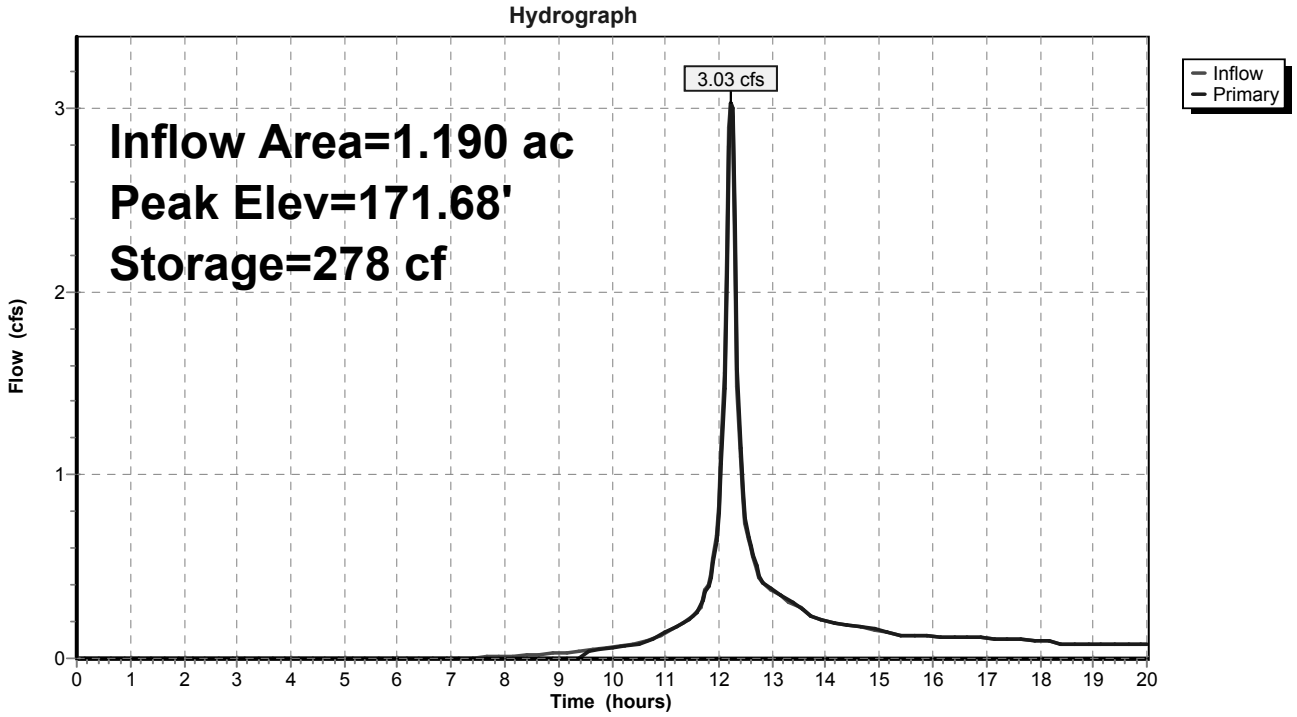
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 534 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 155 | 0 | 0 |
| 172.00 | 913 | 534 | 534 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.50' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.20' | **18.0" Round Culvert**<br>L= 16.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.80' / 169.20' S= -0.0875 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=2.95 cfs @ 12.24 hrs HW=171.67' TW=165.99' (Dynamic Tailwater)
↑**2=Culvert** (Passes 2.95 cfs of 13.96 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 2.95 cfs @ 1.36 fps)

## Pond P S-CB-E-1: 263



## Summary for Pond P W 3.1: 5

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 1.42" for 10_year event
Inflow = 7.82 cfs @ 12.34 hrs, Volume= 0.774 af
Outflow = 7.70 cfs @ 12.46 hrs, Volume= 0.604 af, Atten= 2%, Lag= 7.3 min
Discarded = 0.01 cfs @ 9.90 hrs, Volume= 0.009 af
Primary = 7.69 cfs @ 12.46 hrs, Volume= 0.595 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.09' @ 12.46 hrs Surf.Area= 4,753 sf Storage= 7,741 cf
Flood Elev= 157.00' Surf.Area= 6,397 sf Storage= 12,836 cf

Plug-Flow detention time= 96.6 min calculated for 0.604 af (78% of inflow)
Center-of-Mass det. time= 35.3 min ( 888.4 - 853.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 12,836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

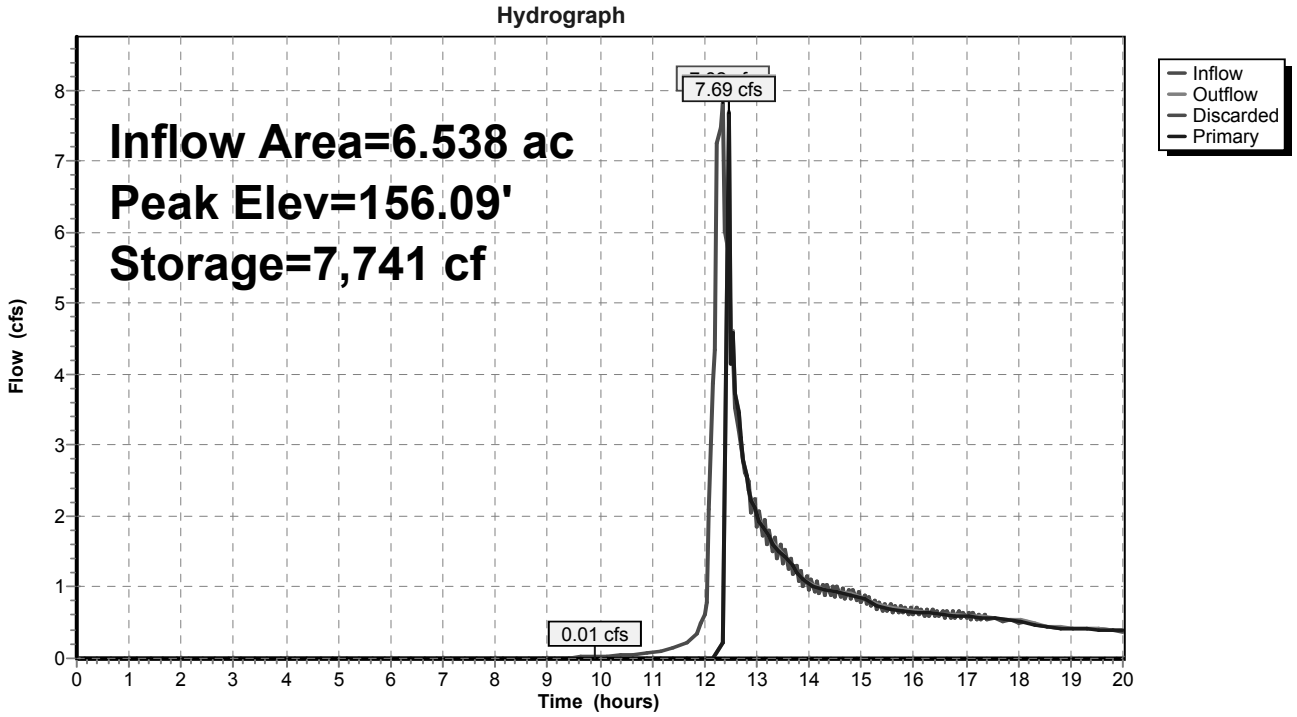
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,598 | 3,930 | 7,338 |
| 157.00 | 6,397 | 5,498 | 12,836 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Discarded | 153.00' | **0.01 cfs Exfiltration at all elevations** |

**Discarded OutFlow** Max=0.01 cfs @ 9.90 hrs HW=153.04' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=6.91 cfs @ 12.46 hrs HW=156.08' TW=0.00' (Dynamic Tailwater)
↑**1=Asymmetrical Weir** (Weir Controls 6.91 cfs @ 0.90 fps)

## Pond P W 3.1: 5


Hydrograph
Inflow Area=6.538 ac
Peak Elev=156.09'
Storage=7,741 cf
7.69 cfs
0.01 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P W 3.4: 13

Inflow Area = 3.043 ac, 5.02% Impervious, Inflow Depth > 0.15" for 10_year event
Inflow = 0.08 cfs @ 13.50 hrs, Volume= 0.037 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 181.14' @ 20.00 hrs Surf.Area= 2,319 sf Storage= 1,623 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

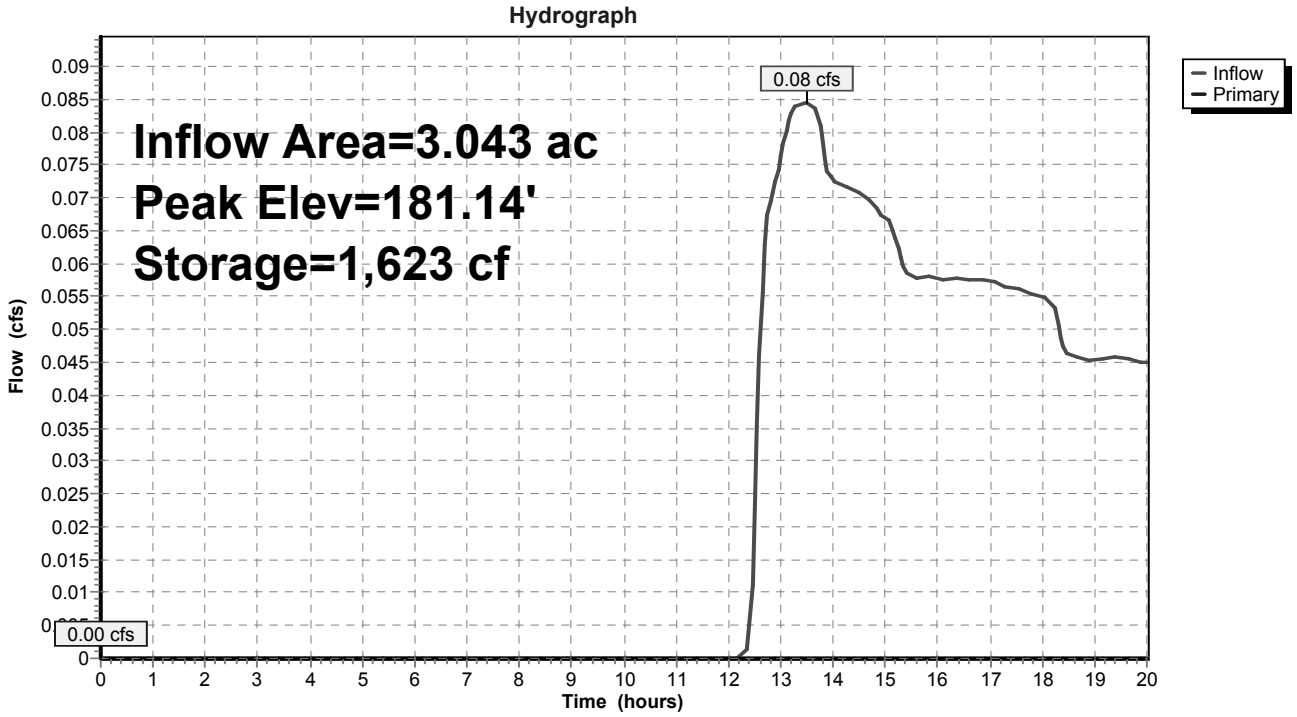
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=180.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 3.4: 13


Hydrograph
Inflow Area=3.043 ac
Peak Elev=181.14'
Storage=1,623 cf
0.08 cfs
0.00 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.005
0.01
0.015
0.02
0.025
0.03
0.035
0.04
0.045
0.05
0.055
0.06
0.065
0.07
0.075
0.08
0.085
0.09
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P W 9.1B: 14

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 732 sf Storage= 0 cf
Flood Elev= 159.00' Surf.Area= 4,550 sf Storage= 5,474 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

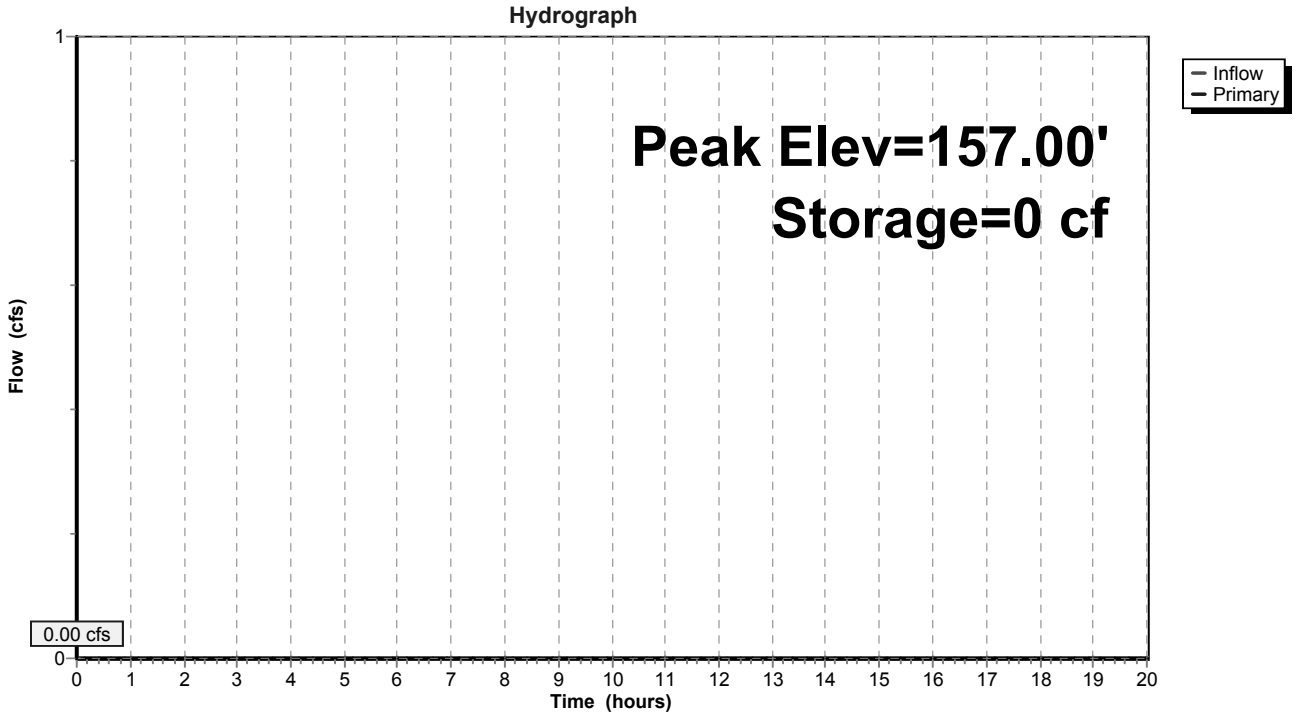
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=157.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 9.1B: 14



## Summary for Pond P W-CULV-N: 227

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.02" for 10_year event
Inflow = 20.18 cfs @ 12.24 hrs, Volume= 1.566 af
Outflow = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af, Atten= 9%, Lag= 2.2 min
Primary = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 4,411 sf Storage= 0 cf
Peak Elev= 153.12' @ 12.28 hrs Surf.Area= 4,711 sf Storage= 558 cf
Flood Elev= 159.00' Surf.Area= 21,416 sf Storage= 72,181 cf

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

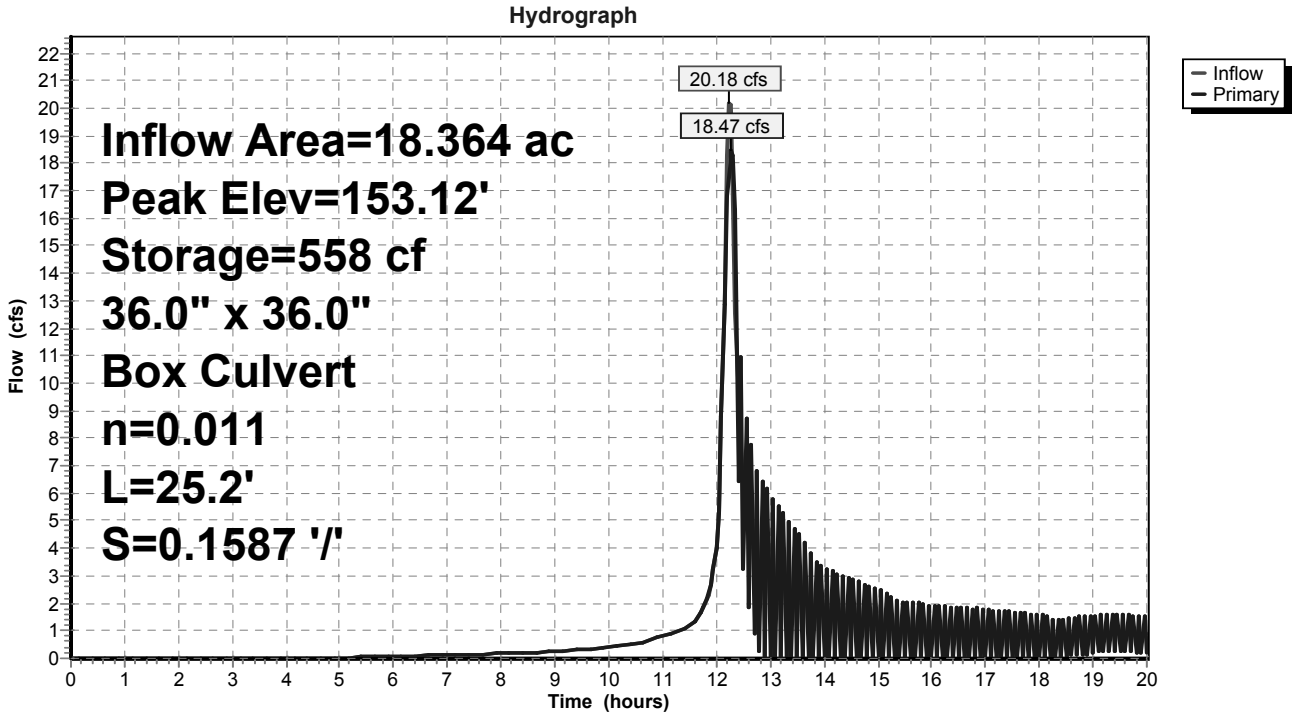
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 72,181 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 4,411 | 0 | 0 |
| 154.00 | 6,861 | 5,636 | 5,636 |
| 155.00 | 8,907 | 7,884 | 13,520 |
| 156.00 | 11,660 | 10,284 | 23,804 |
| 157.00 | 14,425 | 13,042 | 36,846 |
| 158.00 | 17,414 | 15,919 | 52,765 |
| 159.00 | 21,416 | 19,415 | 72,181 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **36.0" W x 36.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 9.00 sf |

**Primary OutFlow** Max=18.20 cfs @ 12.28 hrs HW=153.11' TW=150.15' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 18.20 cfs @ 3.97 fps)

## Pond P W-CULV-N: 227



## Summary for Pond P W-D-3: 111

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 158.00' Surf.Area= 435 sf Storage= 0 cf
Peak Elev= 158.00' @ 0.00 hrs Surf.Area= 435 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,217 sf Storage= 2,517 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

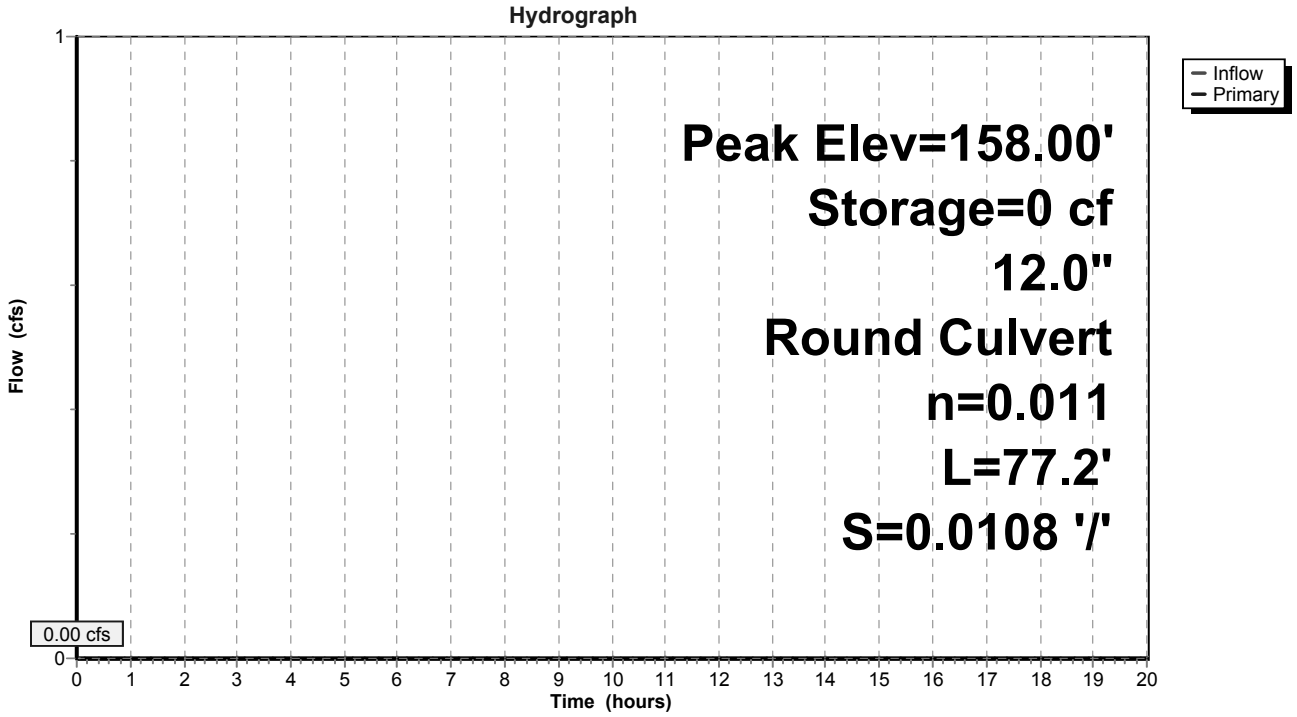
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 158.00' | 2,517 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 158.00 | 435 | 0 | 0 |
| 159.00 | 722 | 578 | 578 |
| 161.00 | 1,217 | 1,939 | 2,517 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Existing Culvert to Remain in Place**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=158.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Existing Culvert to Remain in Place**(Passes 0.00 cfs of 3.51 cfs potential flow)

## Pond P W-D-3: 111



## Summary for Pond P-RG-E-1:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

Inflow Area = 2.568 ac, 0.00% Impervious, Inflow Depth > 1.83" for 10_year event
Inflow = 5.19 cfs @ 12.24 hrs, Volume= 0.392 af
Outflow = 2.77 cfs @ 12.38 hrs, Volume= 0.324 af, Atten= 47%, Lag= 8.2 min
Primary = 2.77 cfs @ 12.38 hrs, Volume= 0.324 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 142.01' @ 12.38 hrs Surf.Area= 3,505 sf Storage= 5,174 cf
Flood Elev= 143.00' Surf.Area= 4,489 sf Storage= 9,132 cf

Plug-Flow detention time= 91.5 min calculated for 0.324 af (83% of inflow)
Center-of-Mass det. time= 39.0 min ( 848.4 - 809.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.00' | 9,132 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

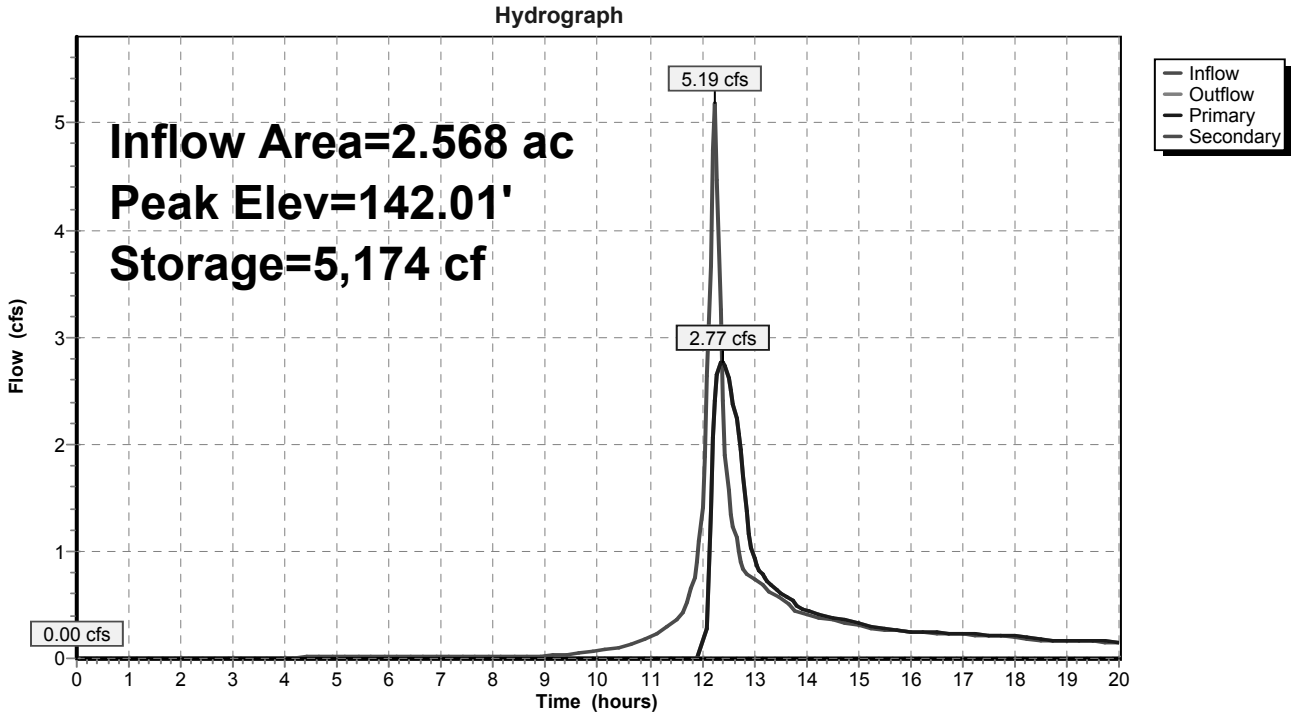
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 140.00 | 1,669 | 0 | 0 |
| 141.00 | 2,558 | 2,114 | 2,114 |
| 142.00 | 3,495 | 3,027 | 5,140 |
| 143.00 | 4,489 | 3,992 | 9,132 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 142.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 6.00 9.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Device 3 | 141.25' | **11.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 140.00' | **18.0" Round Culvert**<br>L= 50.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 140.00' / 139.50' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=2.76 cfs @ 12.38 hrs HW=142.01' TW=138.25' (Dynamic Tailwater)
↑—**3=Culvert** (Passes 2.76 cfs of 9.78 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 2.76 cfs @ 4.19 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=140.00' TW=142.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P-RG-E-1:


Hydrograph
Inflow Area=2.568 ac
Peak Elev=142.01'
Storage=5,174 cf
5.19 cfs
2.77 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-2:

No Infiltration rate assumed in the model. However, an infiltration rate of 0.17 in/hr will be required to meet the 72 hour drawdown requirement.

---

Inflow Area = 0.477 ac, 0.08% Impervious, Inflow Depth > 2.23" for 10_year event
Inflow = 1.31 cfs @ 12.23 hrs, Volume= 0.088 af
Outflow = 1.21 cfs @ 12.26 hrs, Volume= 0.074 af, Atten= 7%, Lag= 1.9 min
Primary = 1.21 cfs @ 12.26 hrs, Volume= 0.074 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.65' @ 12.26 hrs Surf.Area= 1,591 sf Storage= 831 cf
Flood Elev= 163.00' Surf.Area= 1,929 sf Storage= 1,444 cf

Plug-Flow detention time= 79.6 min calculated for 0.074 af (84% of inflow)
Center-of-Mass det. time= 30.4 min ( 833.9 - 803.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 1,444 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

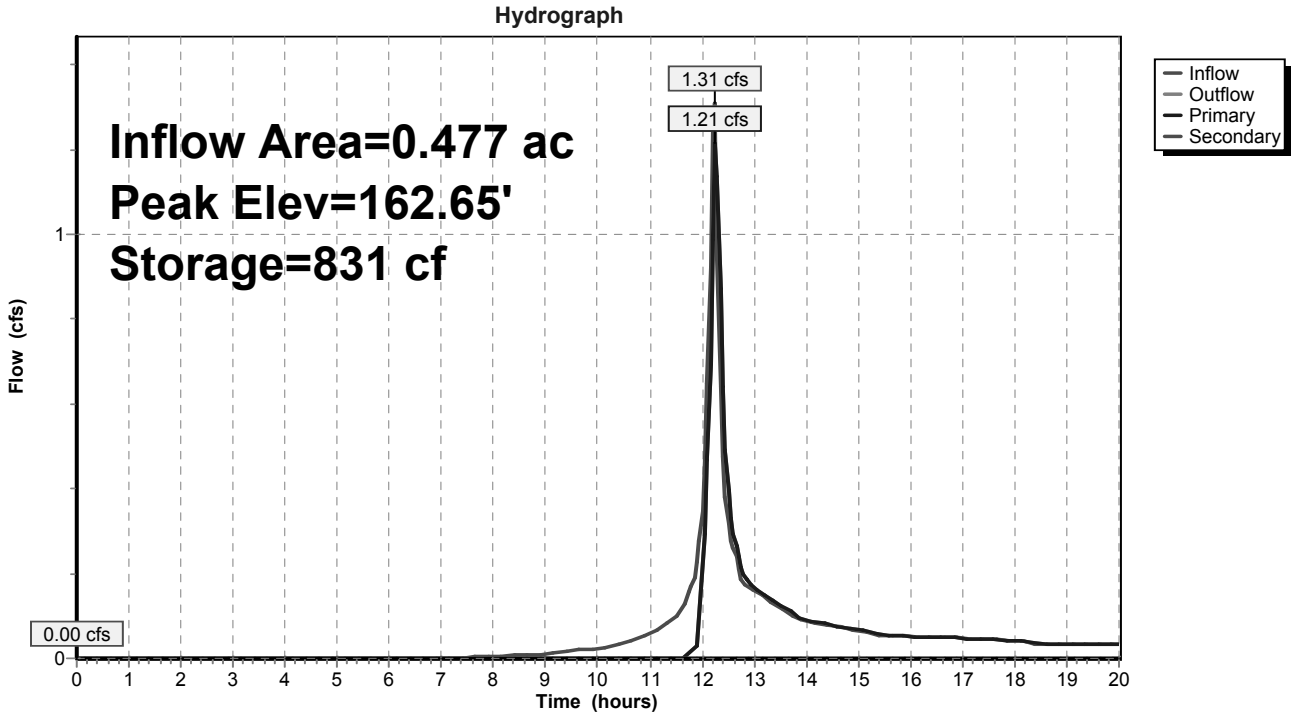
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 959 | 0 | 0 |
| 163.00 | 1,929 | 1,444 | 1,444 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.90' | **18.0" Round RCP_Round 18"**<br>L= 18.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.90' / 155.70' S= 0.0111 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 162.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 162.80' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 1.00 5.00 6.00<br>Height (feet) 0.33 0.00 0.00 0.33 |

**Primary OutFlow** Max=1.19 cfs @ 12.26 hrs HW=162.65' TW=149.22' (Dynamic Tailwater)
↑—**1=RCP_Round 18"** (Passes 1.19 cfs of 26.05 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 1.19 cfs @ 1.26 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
↑—**3=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P-RG-E-2:


Hydrograph
Inflow Area=0.477 ac
Peak Elev=162.65'
Storage=831 cf
1.31 cfs
1.21 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4A:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth > 1.84" for 10_year event
Inflow = 1.10 cfs @ 12.23 hrs, Volume= 0.074 af
Outflow = 0.63 cfs @ 12.34 hrs, Volume= 0.065 af, Atten= 42%, Lag= 6.3 min
Primary = 0.63 cfs @ 12.34 hrs, Volume= 0.065 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.05' @ 12.34 hrs Surf.Area= 1,116 sf Storage= 761 cf
Flood Elev= 173.00' Surf.Area= 2,506 sf Storage= 2,480 cf

Plug-Flow detention time= 60.9 min calculated for 0.065 af (88% of inflow)
Center-of-Mass det. time= 24.1 min ( 840.0 - 815.9 )

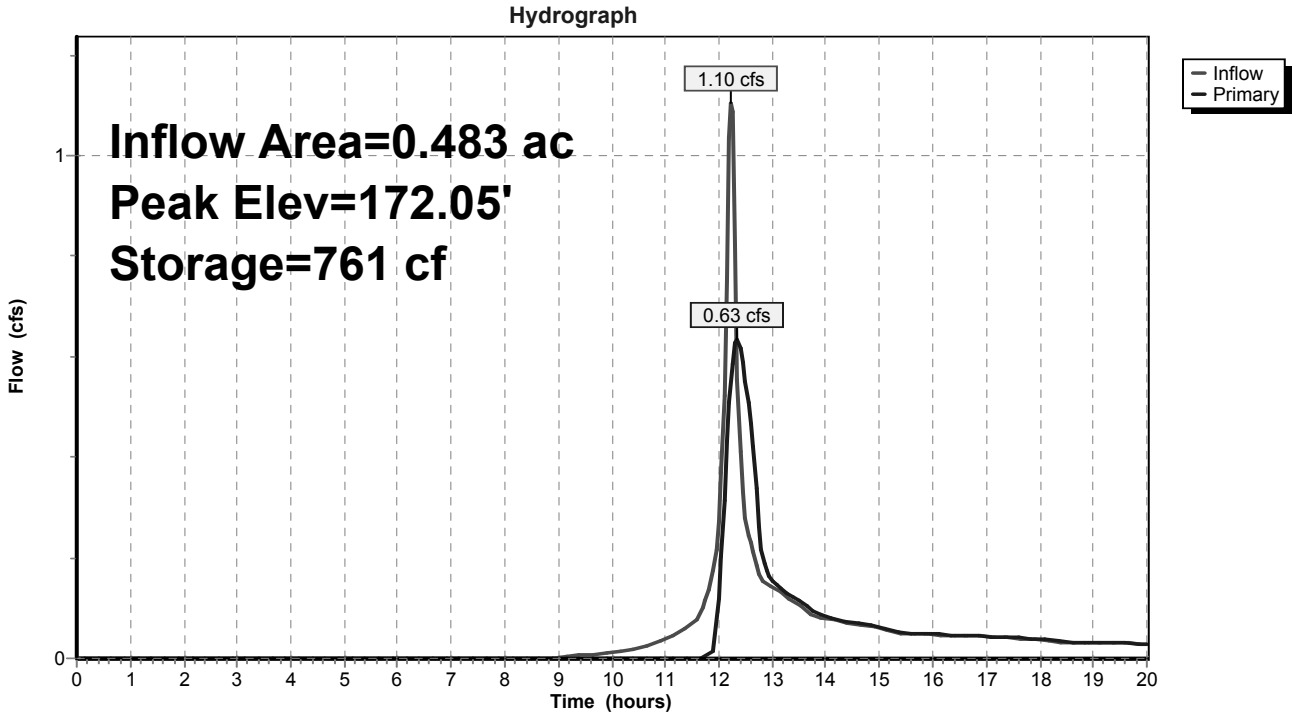
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 2,480 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 371 | 0 | 0 |
| 172.00 | 1,041 | 706 | 706 |
| 173.00 | 2,506 | 1,774 | 2,480 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 168.00' | **18.0" Round Culvert**<br>L= 65.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.30' S= 0.0108 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.60' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.63 cfs @ 12.34 hrs HW=172.05' TW=156.32' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.63 cfs of 16.54 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.63 cfs @ 3.22 fps)

## Pond P-RG-E-4A:


Hydrograph
Inflow Area=0.483 ac
Peak Elev=172.05'
Storage=761 cf
1.10 cfs
0.63 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4B:

Inflow Area = 0.527 ac, 0.00% Impervious, Inflow Depth > 2.66" for 10_year event
Inflow = 1.69 cfs @ 12.23 hrs, Volume= 0.117 af
Outflow = 1.22 cfs @ 12.30 hrs, Volume= 0.093 af, Atten= 28%, Lag= 4.5 min
Primary = 1.22 cfs @ 12.30 hrs, Volume= 0.093 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.03' @ 12.30 hrs Surf.Area= 1,960 sf Storage= 1,567 cf
Flood Elev= 171.00' Surf.Area= 2,920 sf Storage= 3,942 cf

Plug-Flow detention time= 101.9 min calculated for 0.093 af (80% of inflow)
Center-of-Mass det. time= 44.1 min ( 833.2 - 789.2 )

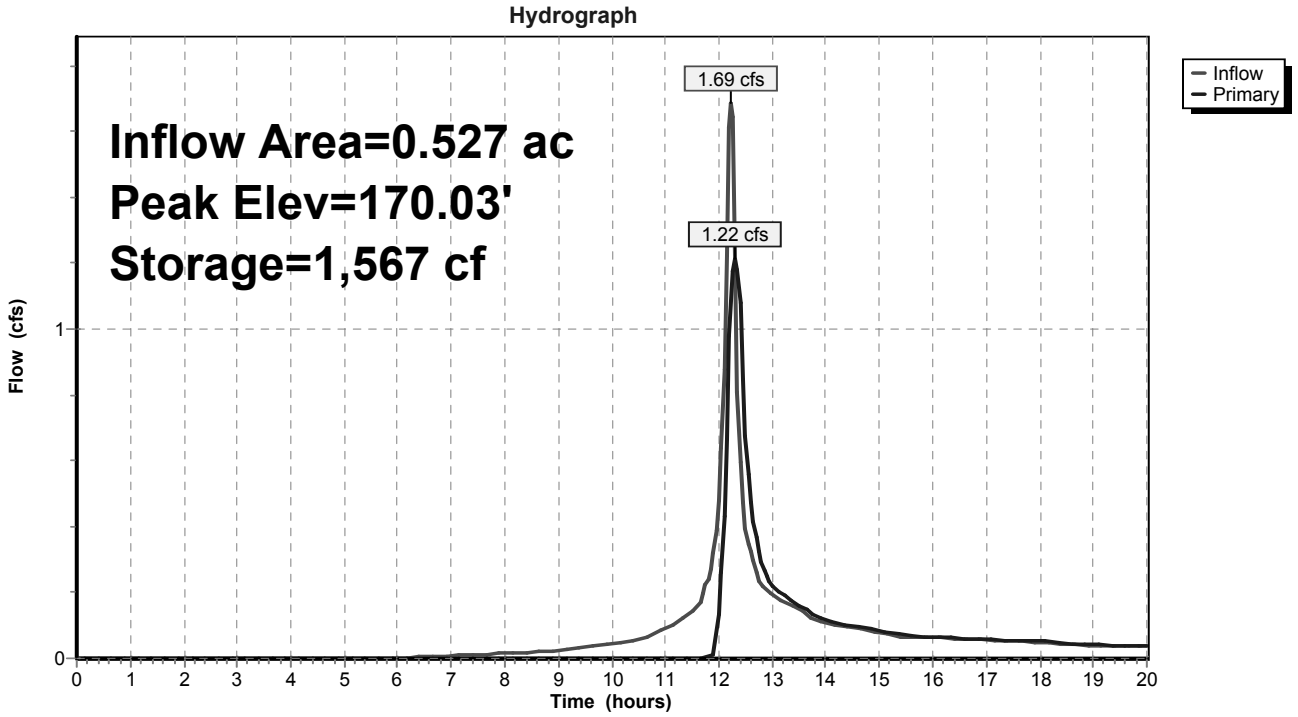
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 3,942 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 1,097 | 0 | 0 |
| 170.00 | 1,933 | 1,515 | 1,515 |
| 171.00 | 2,920 | 2,427 | 3,942 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.90' | **18.0" Round Culvert**<br>L= 72.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.90' / 161.90' S= 0.0139 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.70' | **9.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.21 cfs @ 12.30 hrs HW=170.03' TW=156.33' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.21 cfs of 23.01 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.21 cfs @ 2.75 fps)

## Pond P-RG-E-4B:


Hydrograph
Inflow Area=0.527 ac
Peak Elev=170.03'
Storage=1,567 cf
1.69 cfs
1.22 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-8:

Inflow Area = 0.652 ac, 0.01% Impervious, Inflow Depth > 1.91" for 10_year event
Inflow = 1.55 cfs @ 12.23 hrs, Volume= 0.104 af
Outflow = 0.07 cfs @ 15.37 hrs, Volume= 0.028 af, Atten= 96%, Lag= 188.1 min
Primary = 0.07 cfs @ 15.37 hrs, Volume= 0.028 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.97' @ 15.37 hrs Surf.Area= 3,952 sf Storage= 3,372 cf
Flood Elev= 176.00' Surf.Area= 5,077 sf Storage= 8,003 cf

Plug-Flow detention time= 313.4 min calculated for 0.028 af (27% of inflow)
Center-of-Mass det. time= 202.2 min ( 1,015.7 - 813.5 )

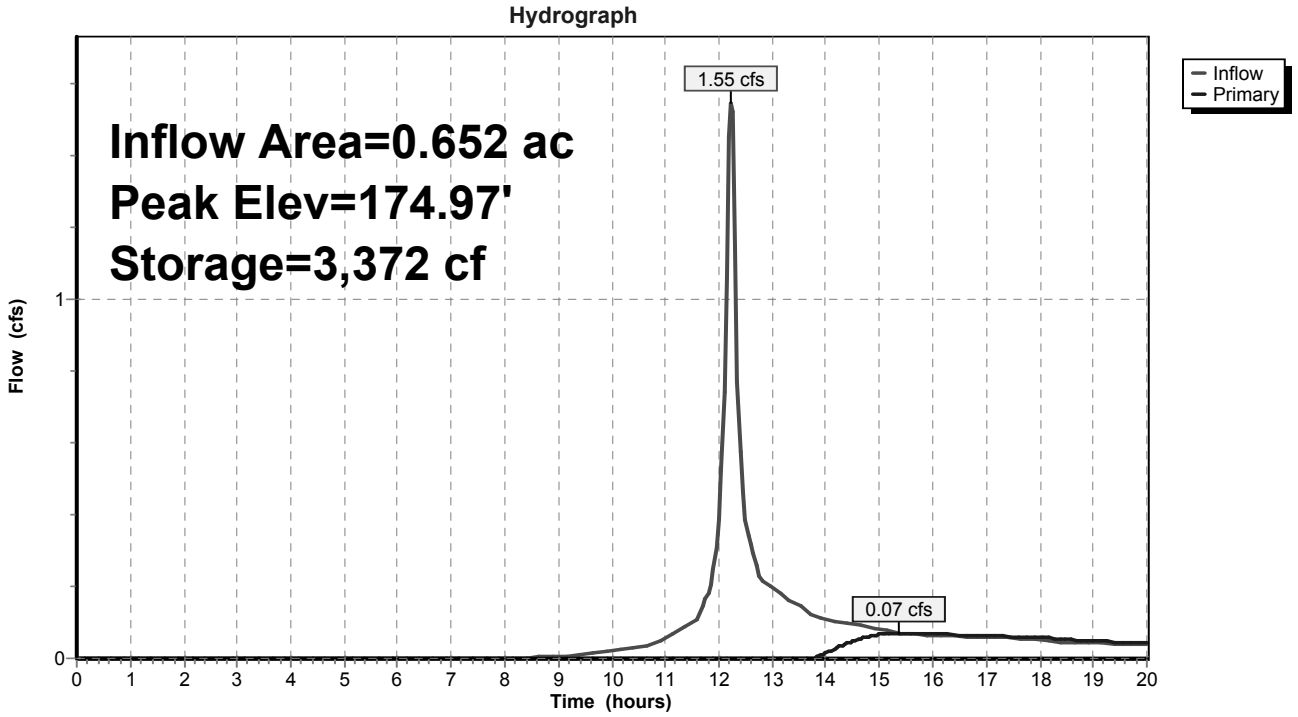
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 174.00' | 8,003 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 174.00 | 2,972 | 0 | 0 |
| 175.00 | 3,978 | 3,475 | 3,475 |
| 176.00 | 5,077 | 4,528 | 8,003 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 174.90' | **4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 170.40' | **18.0" Round RCP_Round 18"**<br>L= 91.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 170.40' / 169.20' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.07 cfs @ 15.37 hrs HW=174.97' TW=170.99' (Dynamic Tailwater)
↑—**2=RCP_Round 18"** (Passes 0.07 cfs of 16.73 cfs potential flow)
↑—**1=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.89 fps)

## Pond P-RG-E-8:


Hydrograph
Inflow Area=0.652 ac
Peak Elev=174.97'
Storage=3,372 cf
1.55 cfs
0.07 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-W-2: 306

Inflow Area = 4.854 ac, 0.00% Impervious, Inflow Depth > 1.60" for 10_year event
Inflow = 9.07 cfs @ 12.23 hrs, Volume= 0.646 af
Outflow = 5.03 cfs @ 12.35 hrs, Volume= 0.513 af, Atten= 45%, Lag= 7.0 min
Primary = 5.03 cfs @ 12.35 hrs, Volume= 0.513 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.57' @ 12.35 hrs Surf.Area= 7,141 sf Storage= 8,490 cf
Flood Elev= 174.00' Surf.Area= 14,642 sf Storage= 34,022 cf

Plug-Flow detention time= 99.6 min calculated for 0.513 af (79% of inflow)
Center-of-Mass det. time= 39.7 min ( 868.1 - 828.4 )

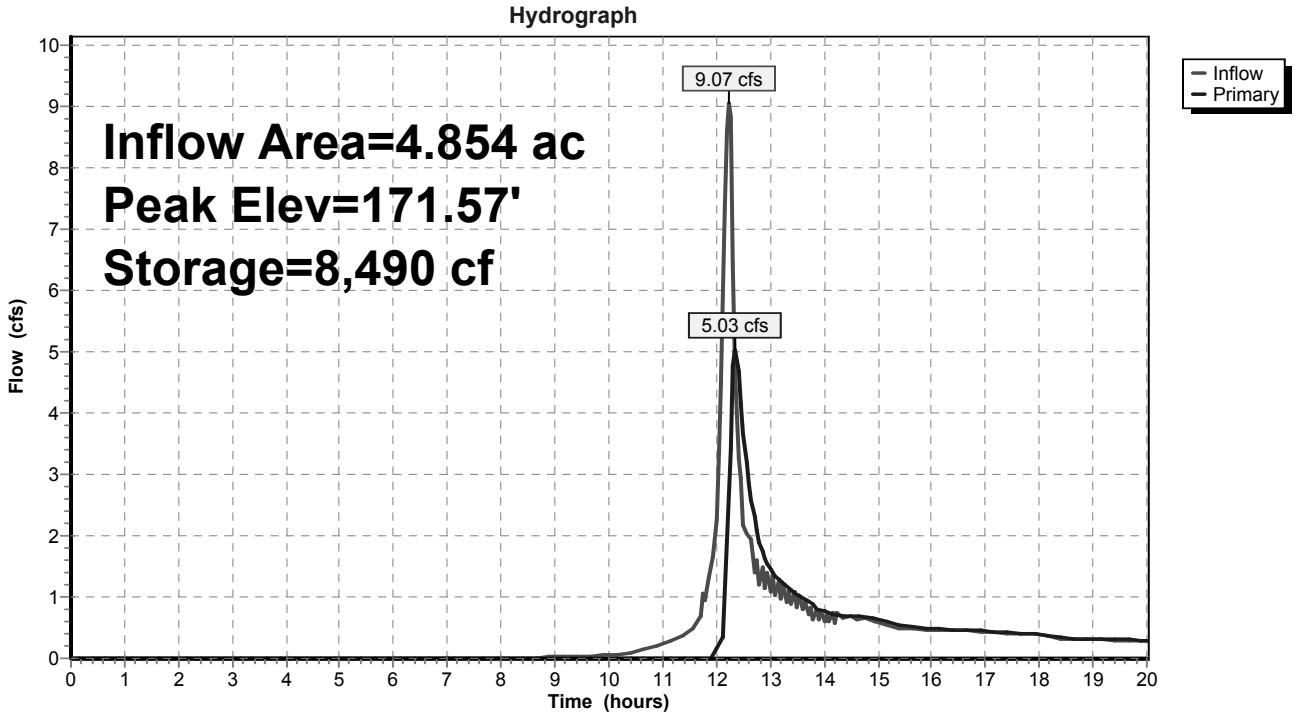
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 34,022 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 3,744 | 0 | 0 |
| 171.00 | 5,804 | 4,774 | 4,774 |
| 172.00 | 8,133 | 6,969 | 11,743 |
| 173.00 | 10,892 | 9,513 | 21,255 |
| 174.00 | 14,642 | 12,767 | 34,022 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.10' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 162.10' | **18.0" Round RCP_Round 18"**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.10' / 160.80' S= 0.0096 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=5.01 cfs @ 12.35 hrs HW=171.57' TW=155.73' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 5.01 cfs of 22.55 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 5.01 cfs @ 2.25 fps)

## Pond P-RG-W-2: 306



## Summary for Pond P-RG-W-3:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.85 in/hr to drawdown in 72 hours.

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Inflow Area = 4.660 ac, 0.00% Impervious, Inflow Depth > 1.27" for 10_year event
Inflow = 6.12 cfs @ 12.23 hrs, Volume= 0.495 af
Outflow = 0.26 cfs @ 20.00 hrs, Volume= 0.030 af, Atten= 96%, Lag= 466.0 min
Primary = 0.26 cfs @ 20.00 hrs, Volume= 0.030 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.03' @ 20.00 hrs Surf.Area= 11,873 sf Storage= 20,249 cf
Flood Elev= 173.00' Surf.Area= 24,206 sf Storage= 71,944 cf

Plug-Flow detention time= 572.3 min calculated for 0.030 af (6% of inflow)
Center-of-Mass det. time= 327.9 min ( 1,158.0 - 830.1 )

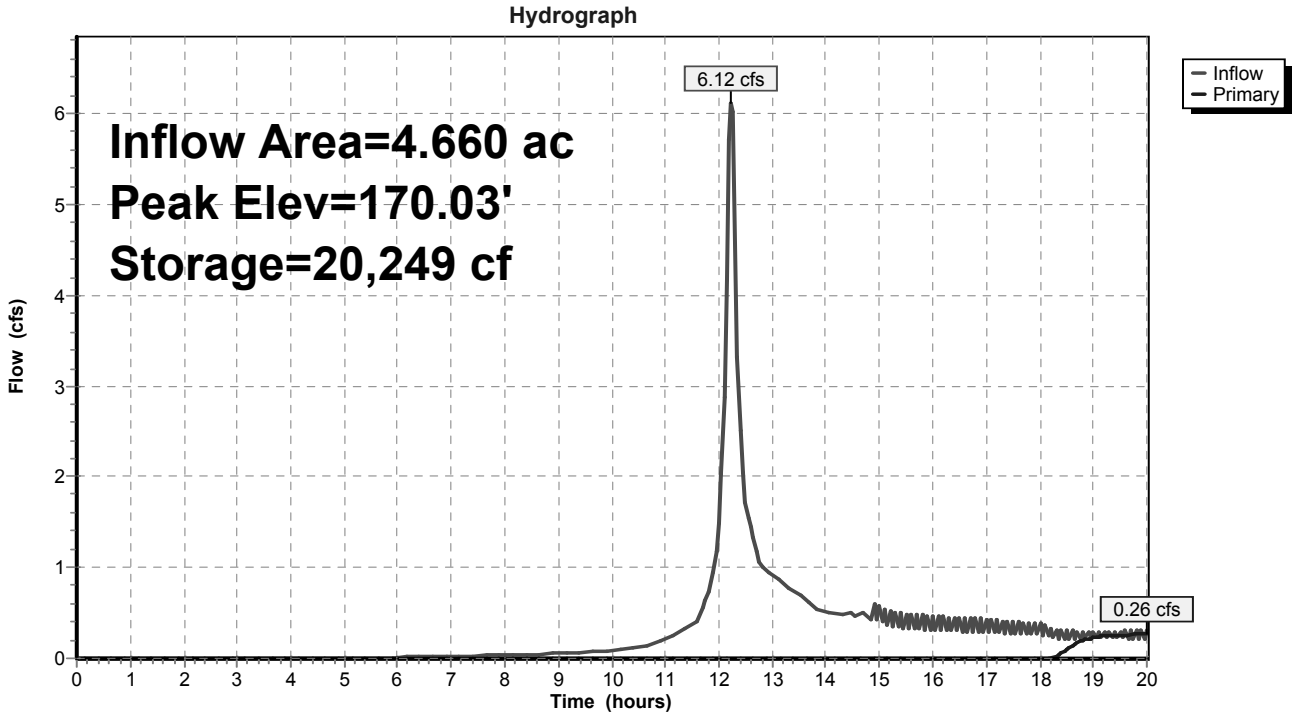
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 71,944 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 1,954 | 0 | 0 |
| 168.00 | 4,656 | 3,305 | 3,305 |
| 169.00 | 8,325 | 6,491 | 9,796 |
| 170.00 | 11,764 | 10,045 | 19,840 |
| 171.00 | 14,923 | 13,344 | 33,184 |
| 172.00 | 19,196 | 17,060 | 50,243 |
| 173.00 | 24,206 | 21,701 | 71,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 170.00' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 133.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.00' S= 0.0075 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.26 cfs @ 20.00 hrs HW=170.03' TW=153.00' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 0.26 cfs of 17.51 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 0.26 cfs @ 0.61 fps)

## Pond P-RG-W-3:


Hydrograph
Inflow Area=4.660 ac
Peak Elev=170.03'
Storage=20,249 cf
6.12 cfs
0.26 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

## Summary for Pond P-RG-W-4:

Inflow Area = 2.305 ac, 0.00% Impervious, Inflow Depth > 1.91" for 10_year event
Inflow = 5.46 cfs @ 12.23 hrs, Volume= 0.367 af
Outflow = 4.44 cfs @ 12.30 hrs, Volume= 0.296 af, Atten= 19%, Lag= 3.7 min
Primary = 4.44 cfs @ 12.30 hrs, Volume= 0.296 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.56' @ 12.30 hrs Surf.Area= 4,134 sf Storage= 4,353 cf
Flood Elev= 172.00' Surf.Area= 5,024 sf Storage= 6,366 cf

Plug-Flow detention time= 90.5 min calculated for 0.295 af (80% of inflow)
Center-of-Mass det. time= 34.4 min ( 847.8 - 813.4 )

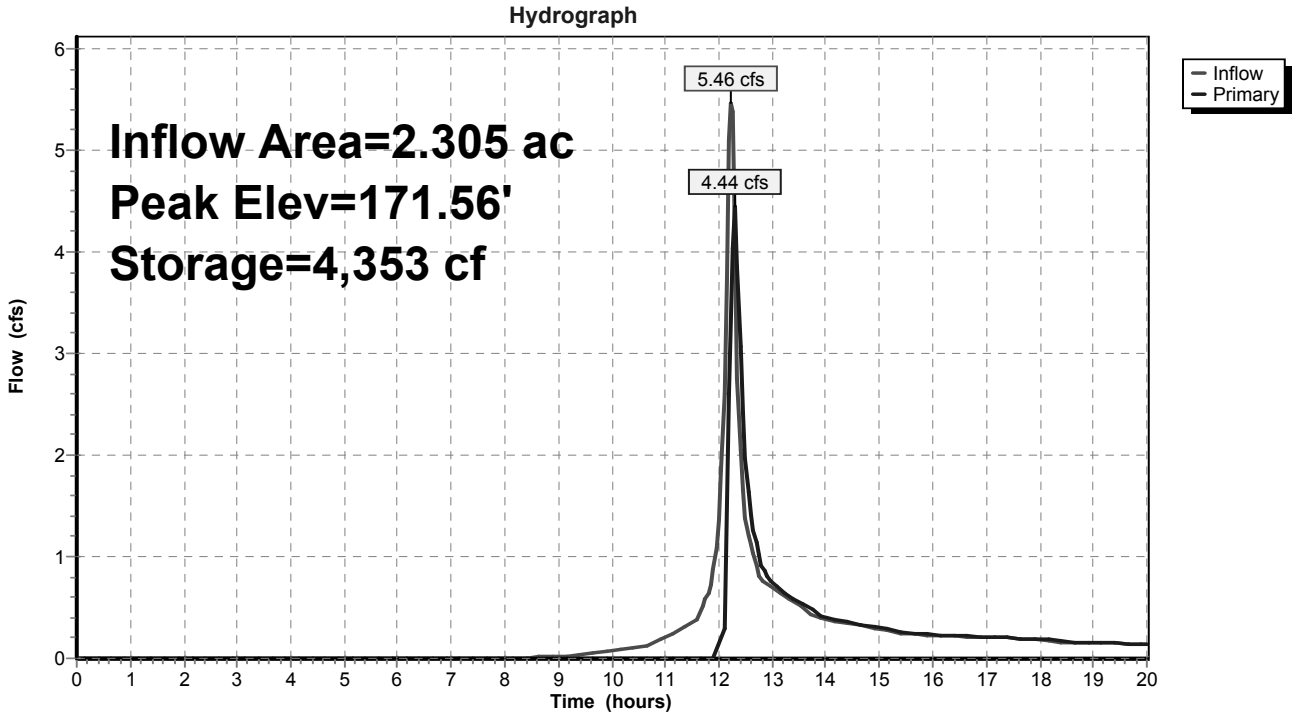
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 15,687 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 1,710 | 0 | 0 |
| 171.00 | 2,999 | 2,355 | 2,355 |
| 172.00 | 5,024 | 4,012 | 6,366 |
| 173.00 | 13,618 | 9,321 | 15,687 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 166.40' | **18.0" Round RCP_Round 18"**<br>L= 42.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.40' / 166.00' S= 0.0095 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=4.40 cfs @ 12.30 hrs HW=171.56' TW=153.11' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 4.40 cfs of 20.36 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 4.40 cfs @ 1.96 fps)

## Pond P-RG-W-4:


Hydrograph
Inflow Area=2.305 ac
Peak Elev=171.56'
Storage=4,353 cf
5.46 cfs
4.44 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

## Summary for Pond R-CULV-1: PIPE 1

Inflow Area = 3.188 ac, 0.00% Impervious, Inflow Depth > 1.70" for 10_year event
Inflow = 2.94 cfs @ 12.24 hrs, Volume= 0.451 af
Outflow = 2.94 cfs @ 12.24 hrs, Volume= 0.451 af, Atten= 0%, Lag= 0.0 min
Primary = 2.94 cfs @ 12.24 hrs, Volume= 0.451 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

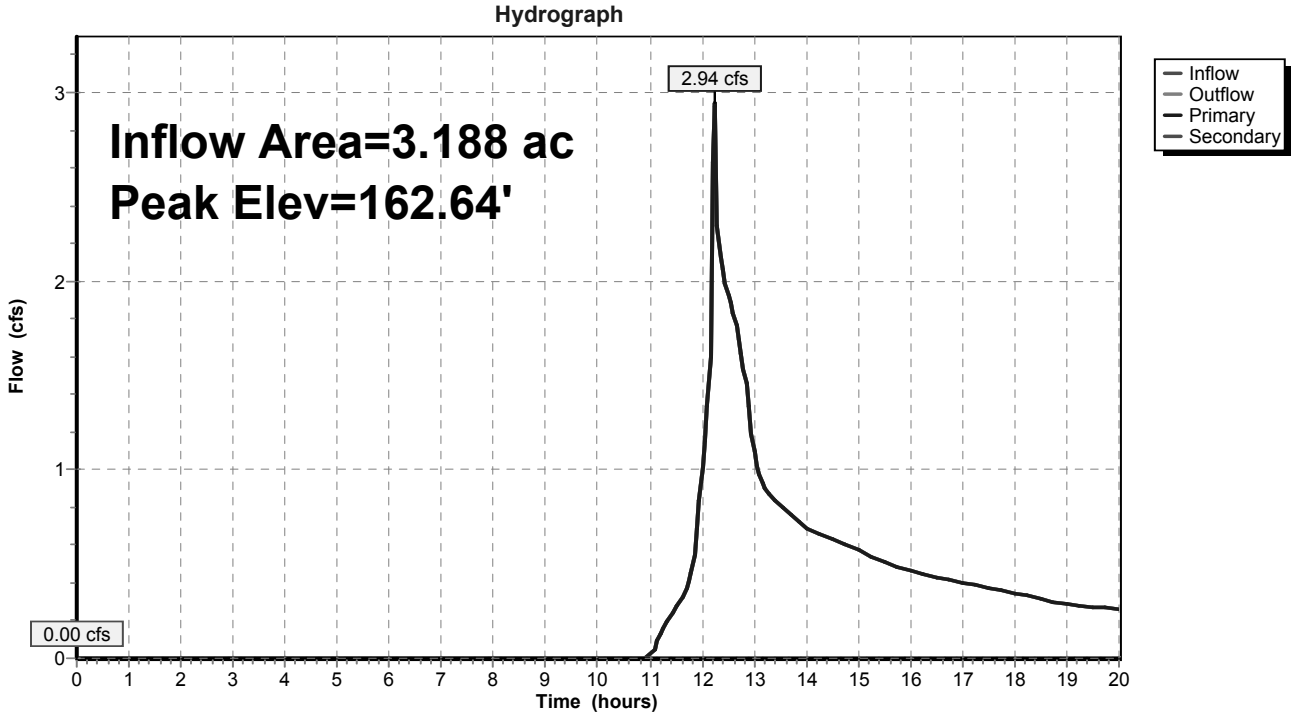
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.64' @ 12.24 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **24.0" Round RCP_Round 24"**<br>L= 195.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 158.10' S= 0.0200 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 173.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=2.88 cfs @ 12.24 hrs HW=162.63' TW=158.73' (Dynamic Tailwater)
↑—**1=RCP_Round 24"** (Inlet Controls 2.88 cfs @ 3.38 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-1: PIPE 1



## Summary for Pond R-CULV-10: PIPE 10

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 1.45" for 10_year event
Inflow = 18.47 cfs @ 12.41 hrs, Volume= 2.398 af
Outflow = 18.47 cfs @ 12.41 hrs, Volume= 2.398 af, Atten= 0%, Lag= 0.0 min
Primary = 18.47 cfs @ 12.41 hrs, Volume= 2.398 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

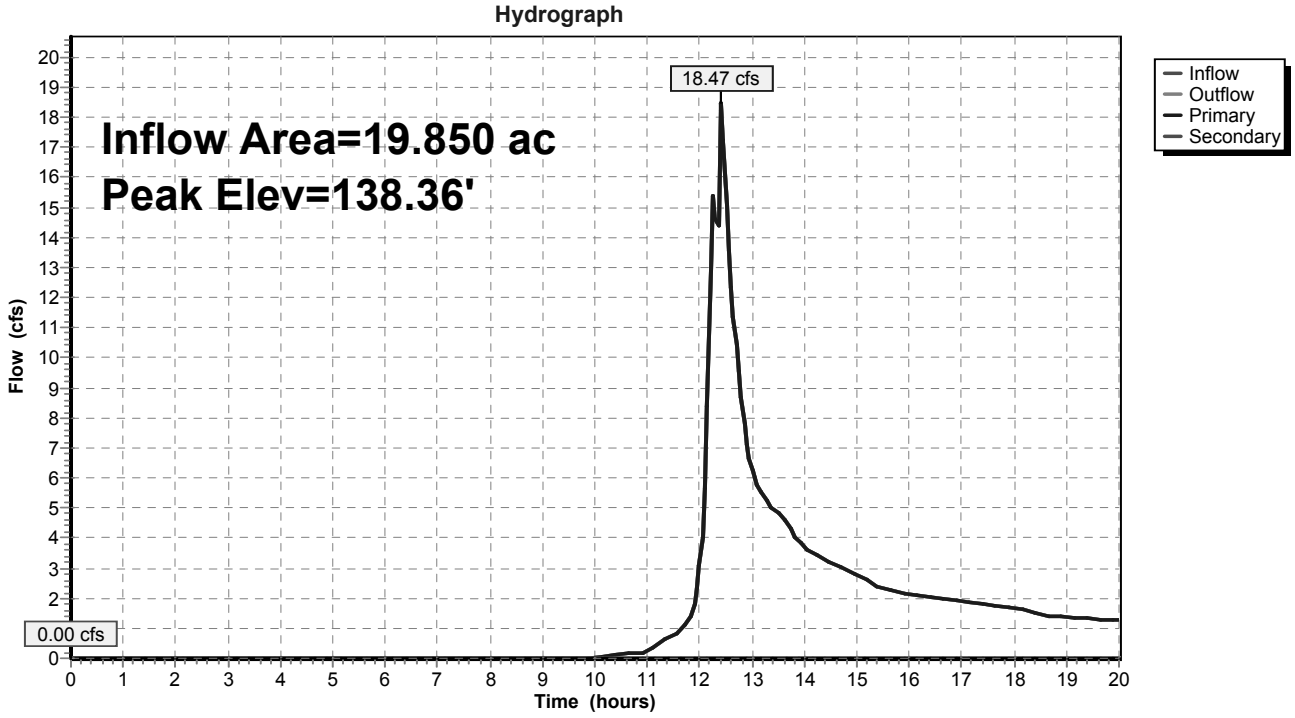
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 138.36' @ 12.41 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 136.50' | **36.0" Round Culvert**<br>L= 339.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 136.50' / 135.00' S= 0.0044 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 144.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=17.96 cfs @ 12.41 hrs HW=138.33' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 17.96 cfs @ 5.71 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=136.50' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-10: PIPE 10



## Summary for Pond R-CULV-2: PIPE 2

Inflow Area = 10.999 ac, 3.37% Impervious, Inflow Depth > 1.44" for 10_year event
Inflow = 10.52 cfs @ 12.42 hrs, Volume= 1.321 af
Outflow = 10.52 cfs @ 12.42 hrs, Volume= 1.321 af, Atten= 0%, Lag= 0.0 min
Primary = 10.52 cfs @ 12.42 hrs, Volume= 1.321 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

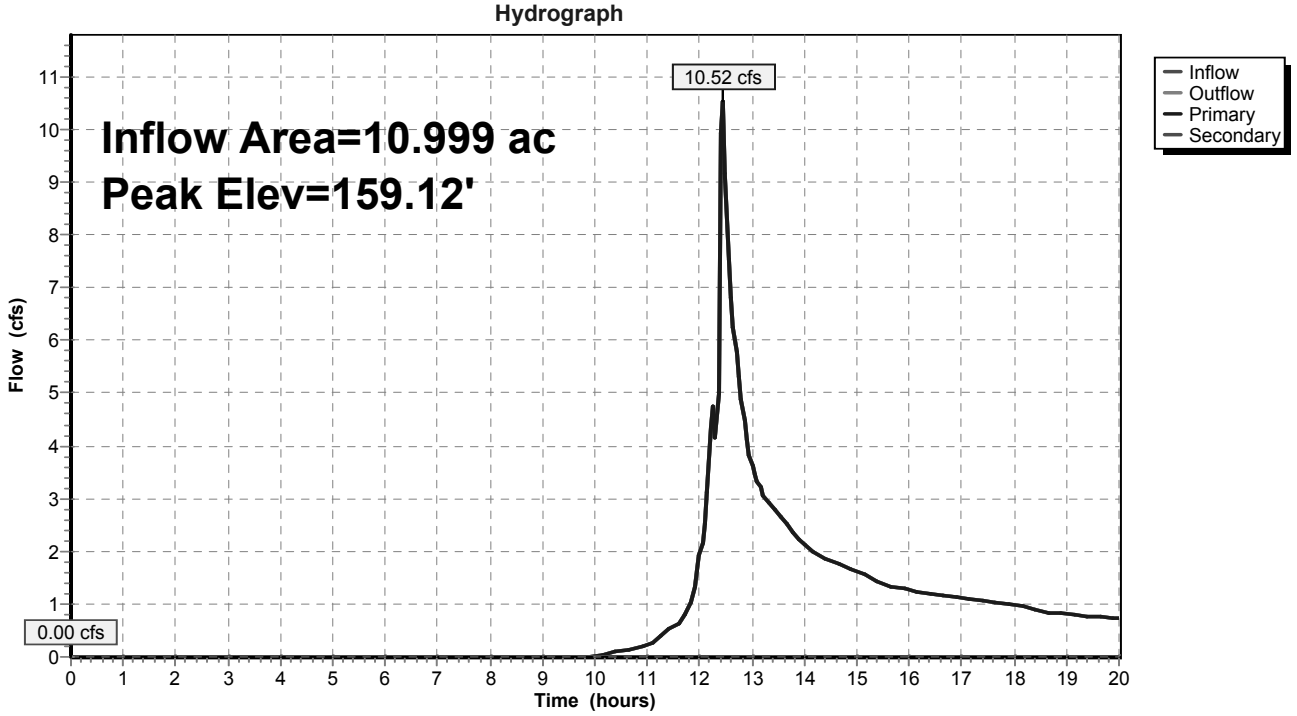
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 159.12' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **36.0" Round Culvert**<br>L= 191.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 158.00' / 155.10' S= 0.0152 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 166.80' | **36.0" Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=9.89 cfs @ 12.42 hrs HW=159.07' TW=156.58' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 9.89 cfs @ 6.49 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=158.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-2: PIPE 2



## Summary for Pond R-CULV-3: PIPE 3

Inflow Area = 14.512 ac, 2.87% Impervious, Inflow Depth > 1.52" for 10_year event
Inflow = 14.97 cfs @ 12.42 hrs, Volume= 1.841 af
Outflow = 14.97 cfs @ 12.42 hrs, Volume= 1.841 af, Atten= 0%, Lag= 0.0 min
Primary = 14.97 cfs @ 12.42 hrs, Volume= 1.841 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

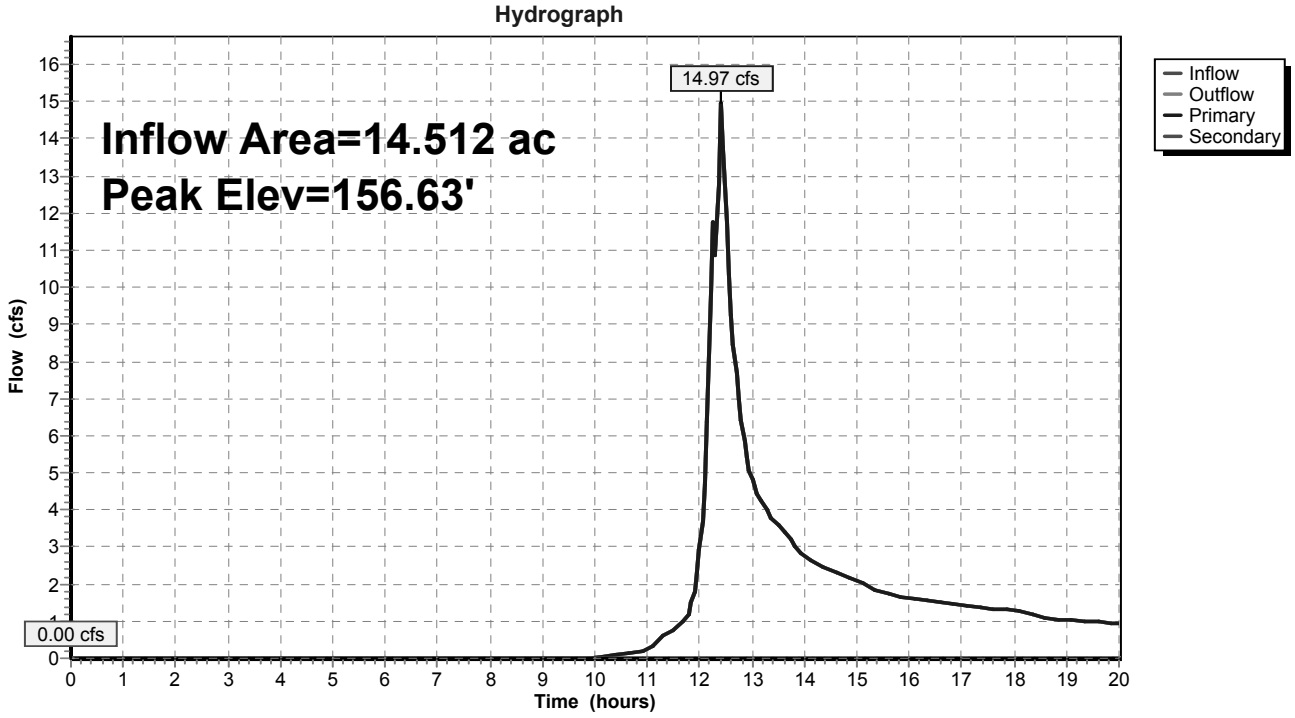
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 156.63' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.00' | **24.0" Round Culvert**<br>L= 230.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.00' / 150.10' S= 0.0213 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=14.44 cfs @ 12.42 hrs HW=156.60' TW=151.91' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 14.44 cfs @ 5.38 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=155.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-3: PIPE 3



## Summary for Pond R-CULV-4: PIPE 4

Inflow Area = 15.897 ac, 2.62% Impervious, Inflow Depth > 1.44" for 10_year event
Inflow = 14.97 cfs @ 12.42 hrs, Volume= 1.913 af
Outflow = 14.97 cfs @ 12.42 hrs, Volume= 1.913 af, Atten= 0%, Lag= 0.0 min
Primary = 14.97 cfs @ 12.42 hrs, Volume= 1.913 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

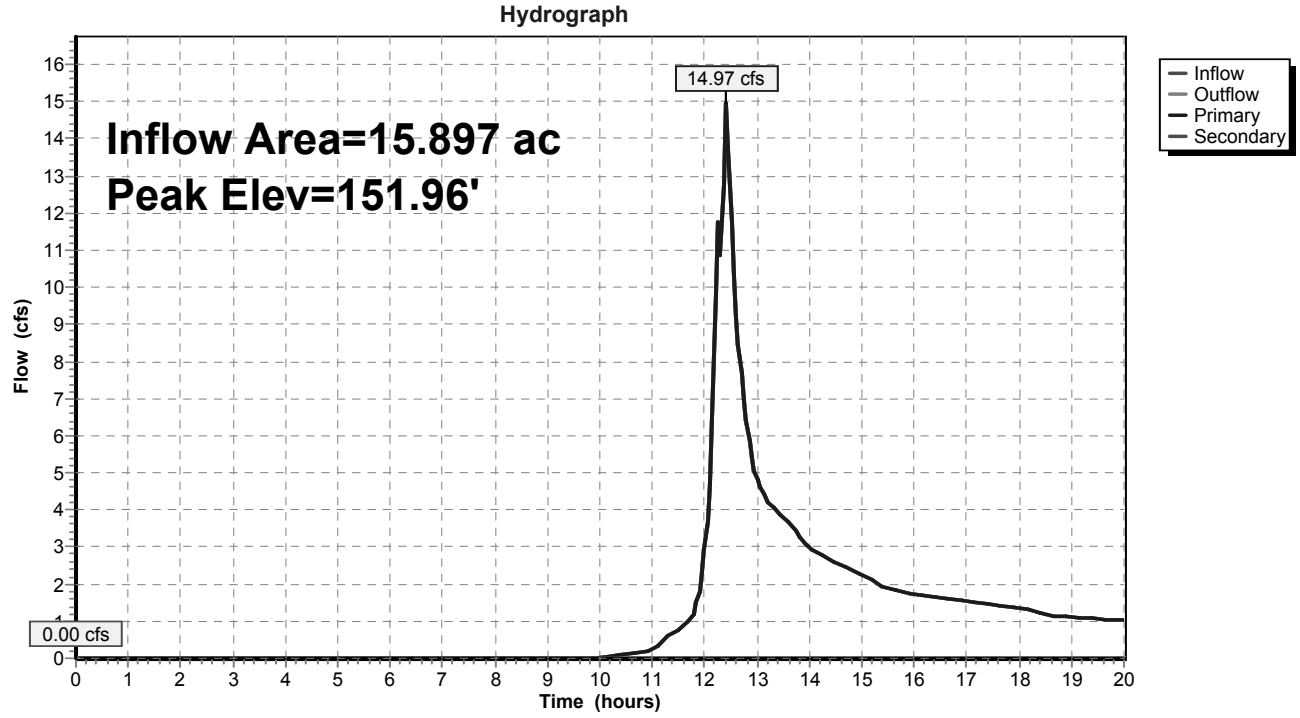
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 151.96' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.00' | **24.0" Round Culvert**<br>L= 38.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 150.00' / 149.50' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=14.42 cfs @ 12.42 hrs HW=151.91' TW=151.03' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 14.42 cfs @ 6.00 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=150.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-4: PIPE 4



## Summary for Pond R-CULV-5: PIPE 5

Inflow Area = 16.805 ac, 2.48% Impervious, Inflow Depth > 1.43" for 10_year event
Inflow = 15.13 cfs @ 12.42 hrs, Volume= 2.000 af
Outflow = 15.13 cfs @ 12.42 hrs, Volume= 2.000 af, Atten= 0%, Lag= 0.0 min
Primary = 15.13 cfs @ 12.42 hrs, Volume= 2.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

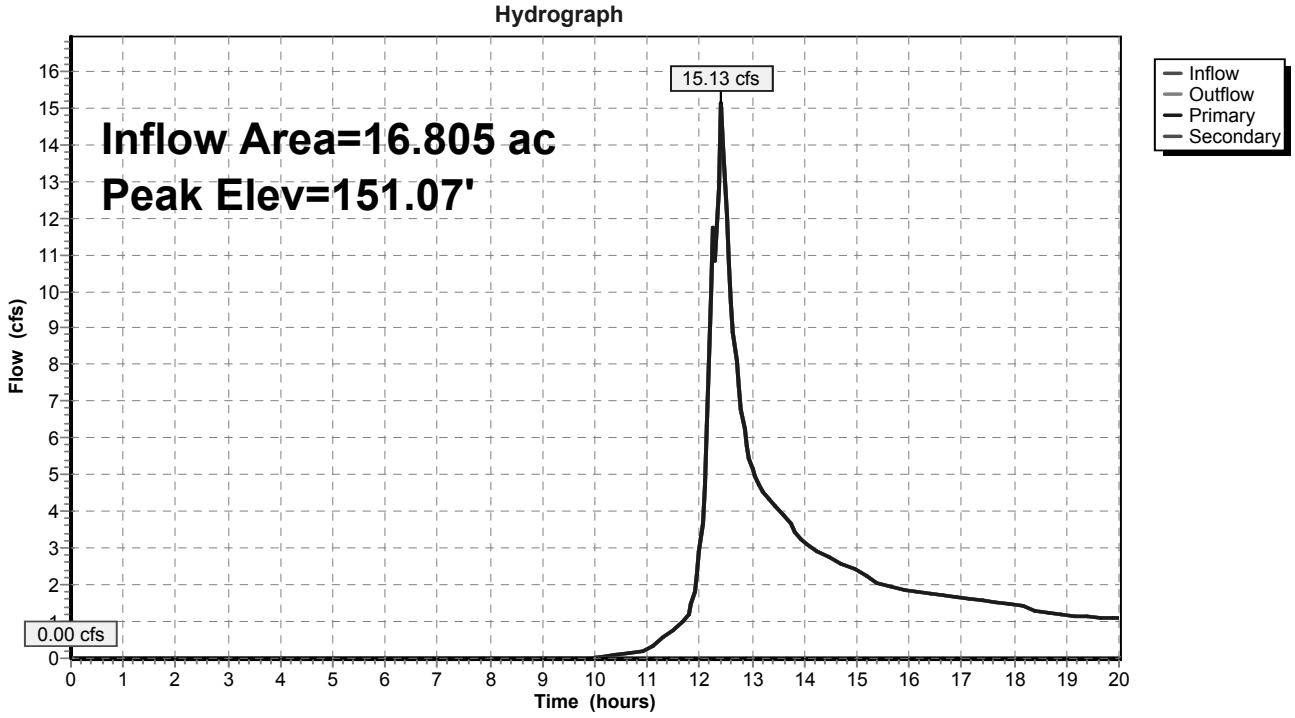
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 151.07' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 149.40' | **24.0" Round Culvert**<br>L= 78.3' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 149.40' / 148.10' S= 0.0166 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 170.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=14.59 cfs @ 12.42 hrs HW=151.02' TW=149.35' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 14.59 cfs @ 7.28 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=149.40' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-5: PIPE 5



## Summary for Pond R-CULV-6: PIPE 6

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 1.44" for 10_year event
Inflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Outflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af, Atten= 0%, Lag= 0.0 min
Primary = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

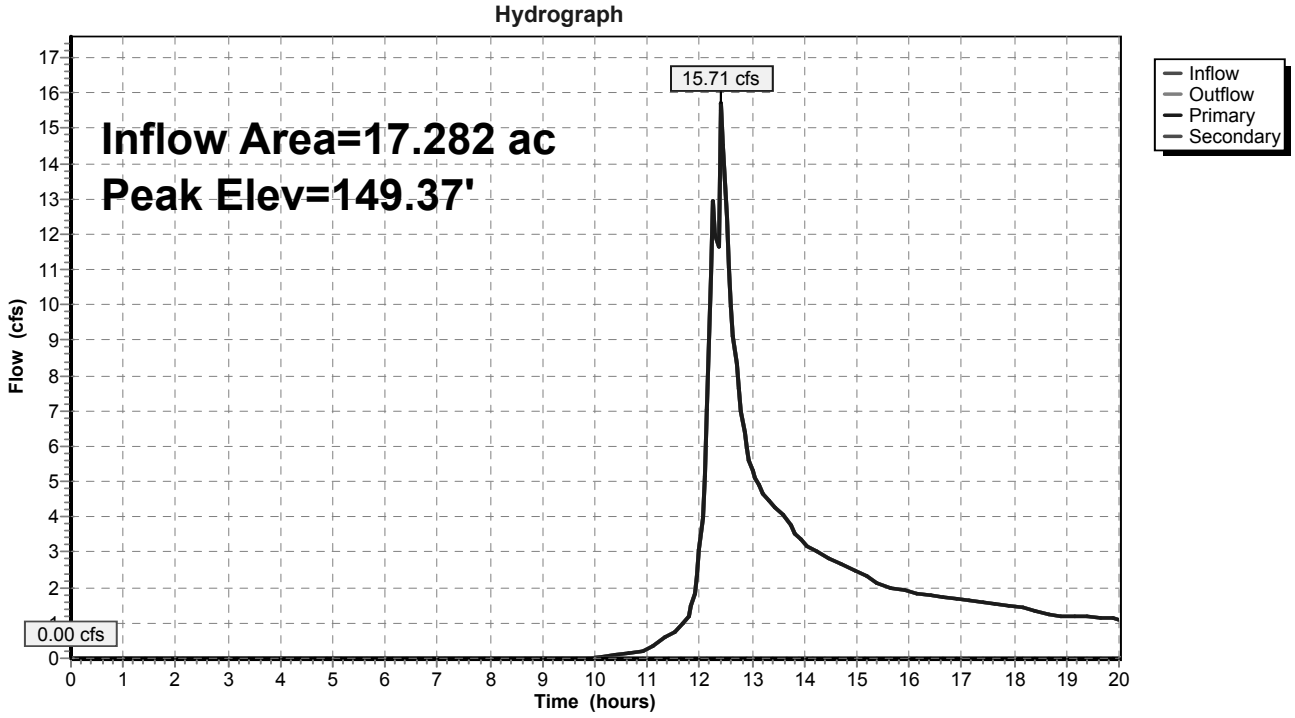
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 149.37' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.00' | **36.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 148.00' / 145.10' S= 0.0215 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 161.10' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=15.20 cfs @ 12.42 hrs HW=149.35' TW=146.35' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 15.20 cfs @ 4.94 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=148.00' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-6: PIPE 6



## Summary for Pond R-CULV-7: PIPE 7

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 1.44" for 10_year event
Inflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Outflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af, Atten= 0%, Lag= 0.0 min
Primary = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

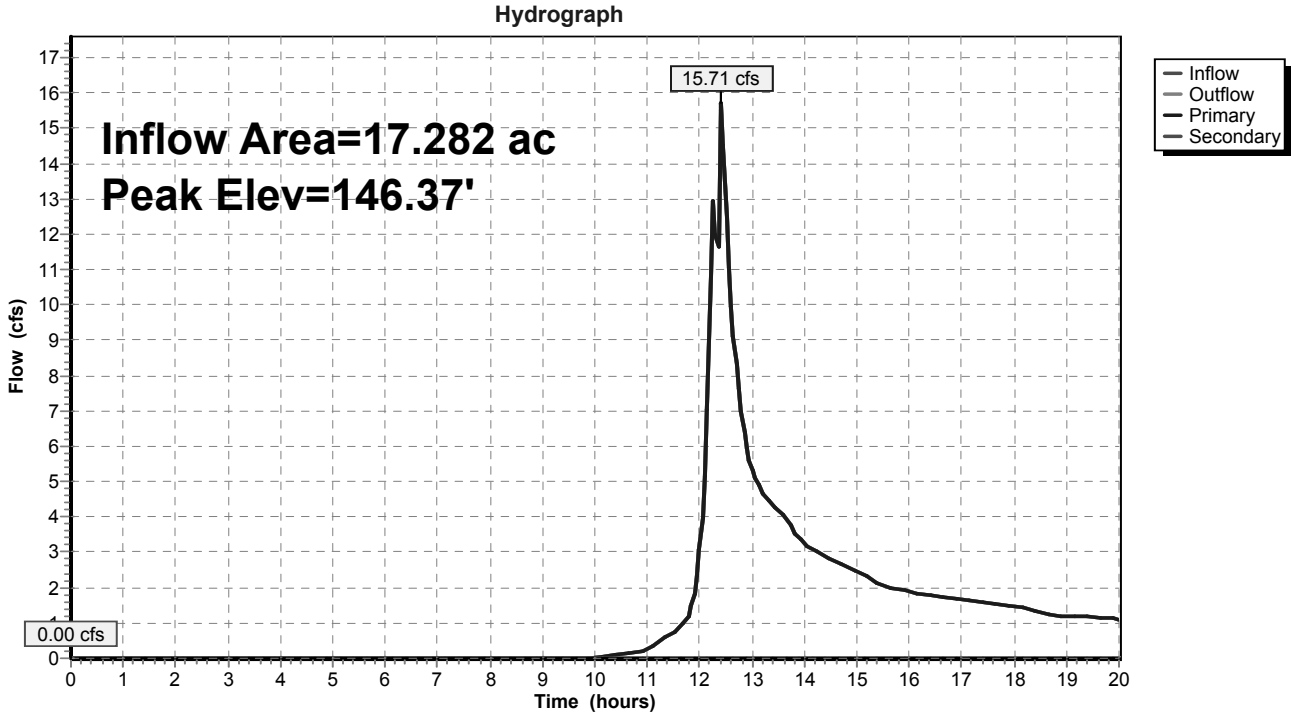
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 146.37' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 145.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 145.00' / 141.10' S= 0.0198 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=15.20 cfs @ 12.42 hrs HW=146.35' TW=142.42' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 15.20 cfs @ 4.94 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=145.00' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-7: PIPE 7



## Summary for Pond R-CULV-8: PIPE 8

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 1.44" for 10_year event
Inflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Outflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af, Atten= 0%, Lag= 0.0 min
Primary = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

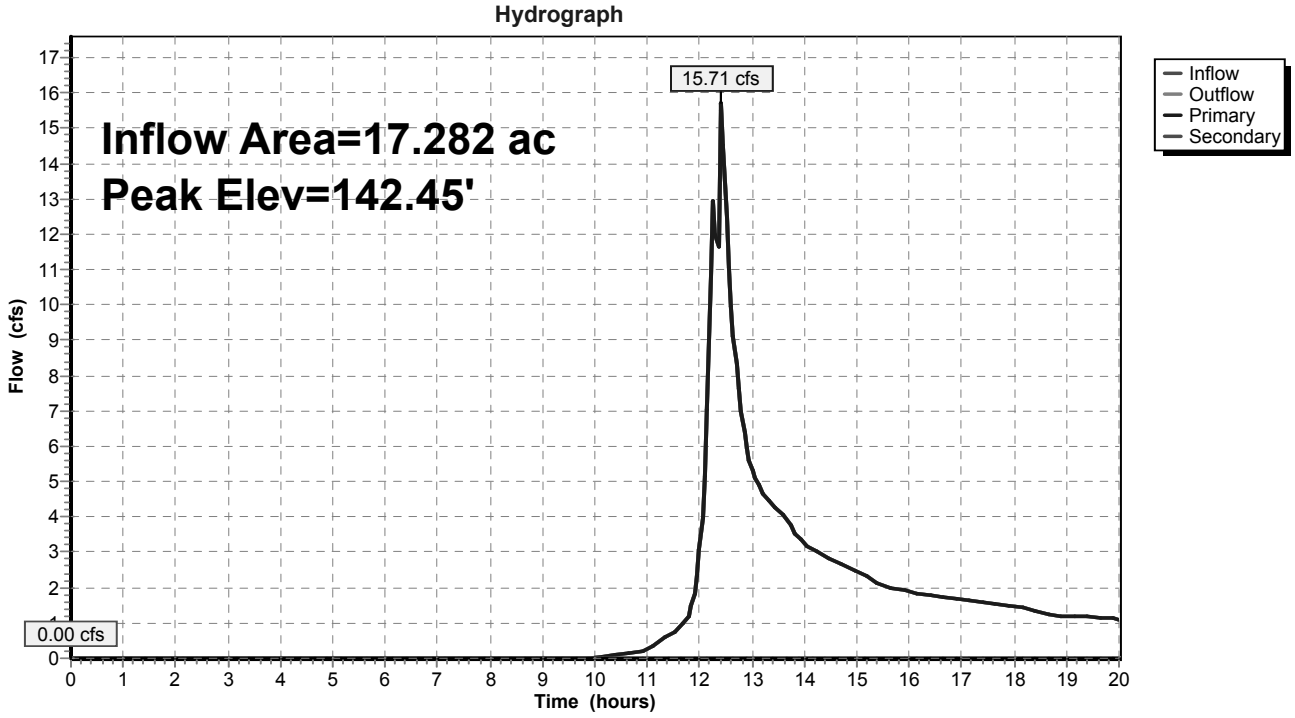
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 142.45' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 141.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 141.00' / 138.70' S= 0.0117 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=15.11 cfs @ 12.42 hrs HW=142.42' TW=140.21' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 15.11 cfs @ 6.70 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=141.00' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-8: PIPE 8



## Summary for Pond R-CULV-9: PIPE 9

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 1.44" for 10_year event
Inflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Outflow = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af, Atten= 0%, Lag= 0.0 min
Primary = 15.71 cfs @ 12.42 hrs, Volume= 2.074 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

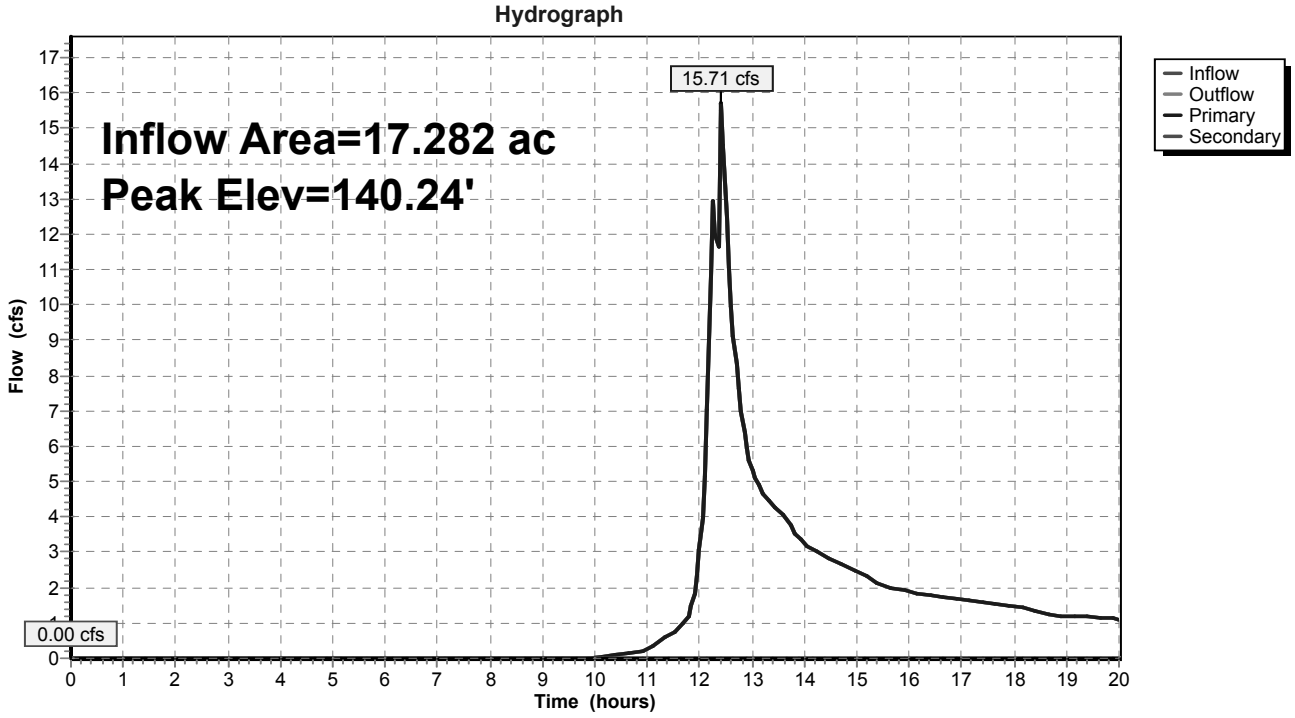
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 140.24' @ 12.42 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 138.71' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 138.71' / 136.60' S= 0.0107 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 143.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=15.20 cfs @ 12.42 hrs HW=140.21' TW=138.33' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 15.20 cfs @ 6.28 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=138.71' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-9: PIPE 9

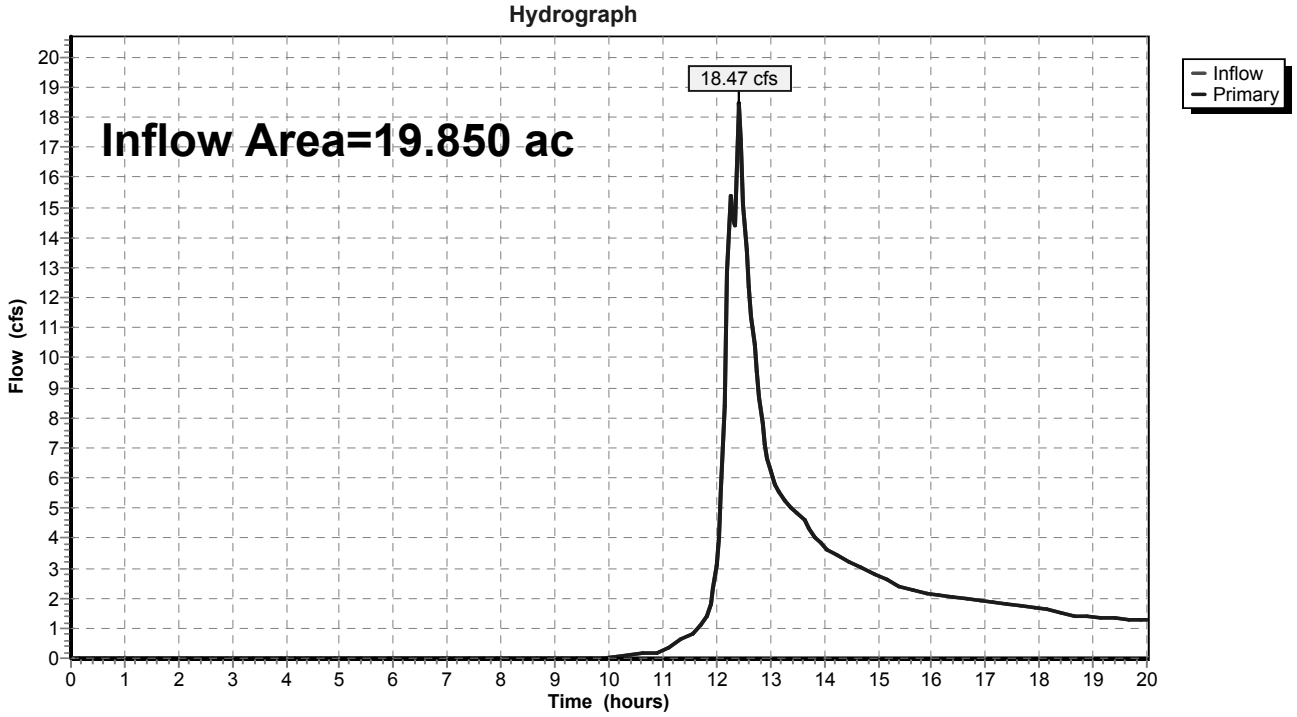


## Summary for Link DP CULV: outflow from culvert

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 1.45" for 10_year event
Inflow = 18.47 cfs @ 12.41 hrs, Volume= 2.398 af
Primary = 18.47 cfs @ 12.41 hrs, Volume= 2.398 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP CULV: outflow from culvert

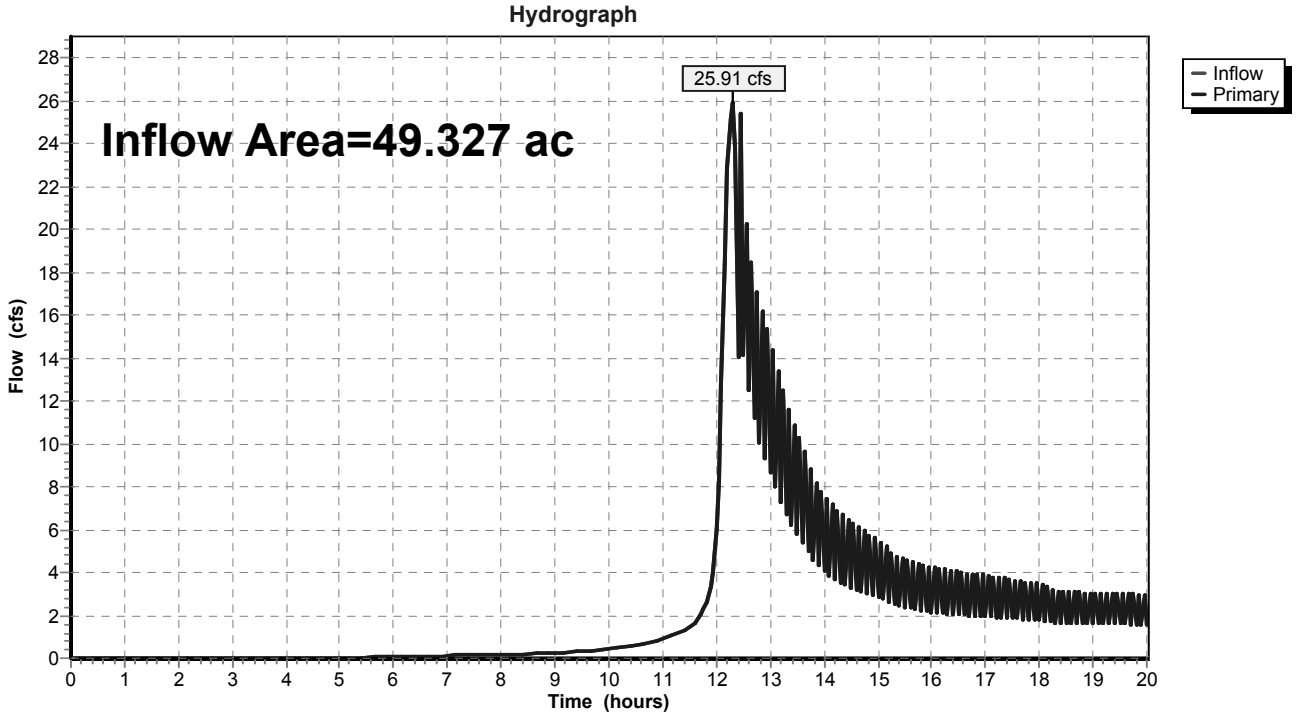


## Summary for Link DP North: DP North

Inflow Area = 49.327 ac, 7.79% Impervious, Inflow Depth > 0.95" for 10_year event
Inflow = 25.91 cfs @ 12.29 hrs, Volume= 3.891 af
Primary = 25.91 cfs @ 12.29 hrs, Volume= 3.891 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

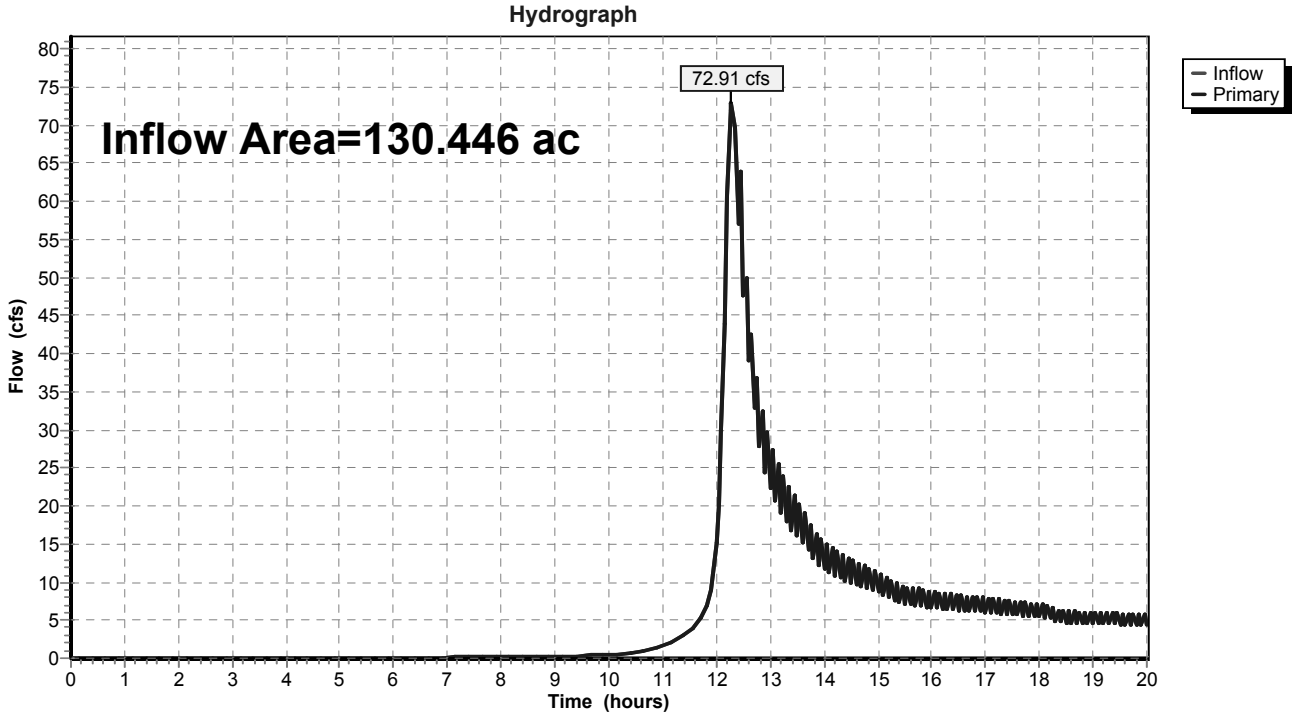


## Summary for Link DP Sudbury: DP Sudbury

Inflow Area = 130.446 ac, 6.65% Impervious, Inflow Depth > 0.86" for 10_year event
Inflow = 72.91 cfs @ 12.28 hrs, Volume= 9.341 af
Primary = 72.91 cfs @ 12.28 hrs, Volume= 9.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: DP Sudbury

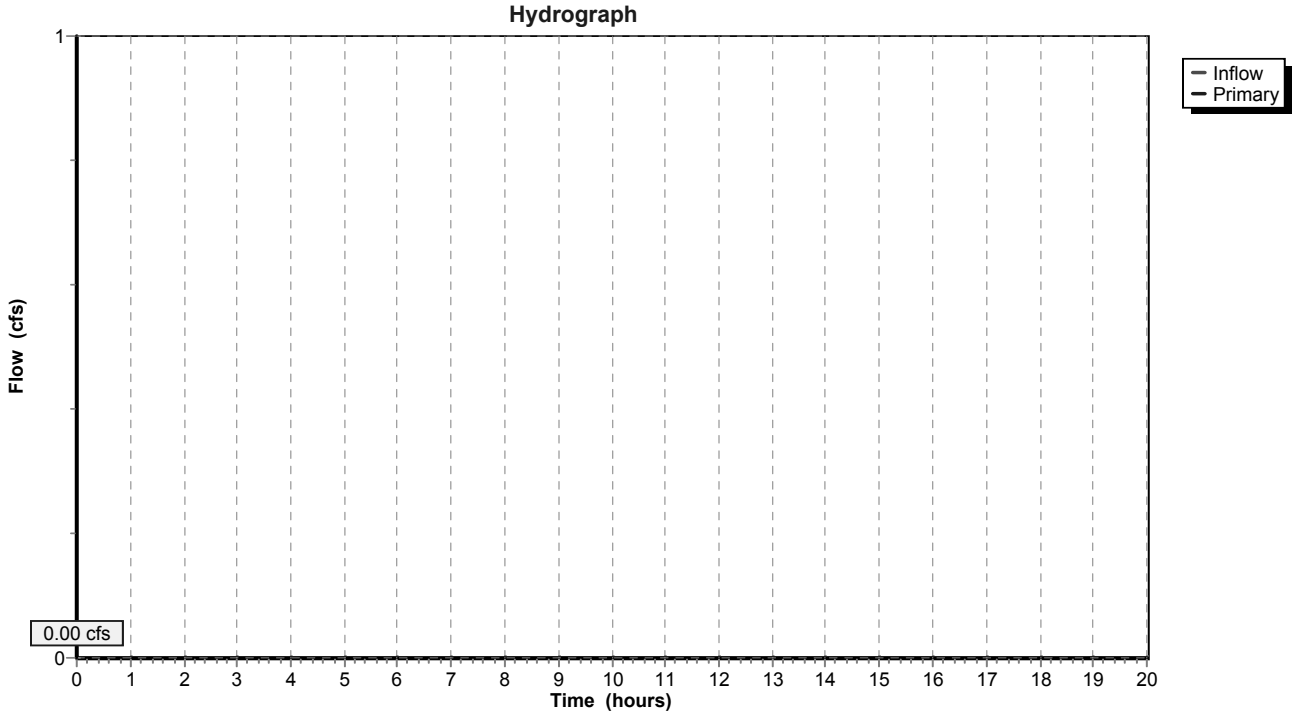


## Summary for Link DP Wellhead: DP Wellhead

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

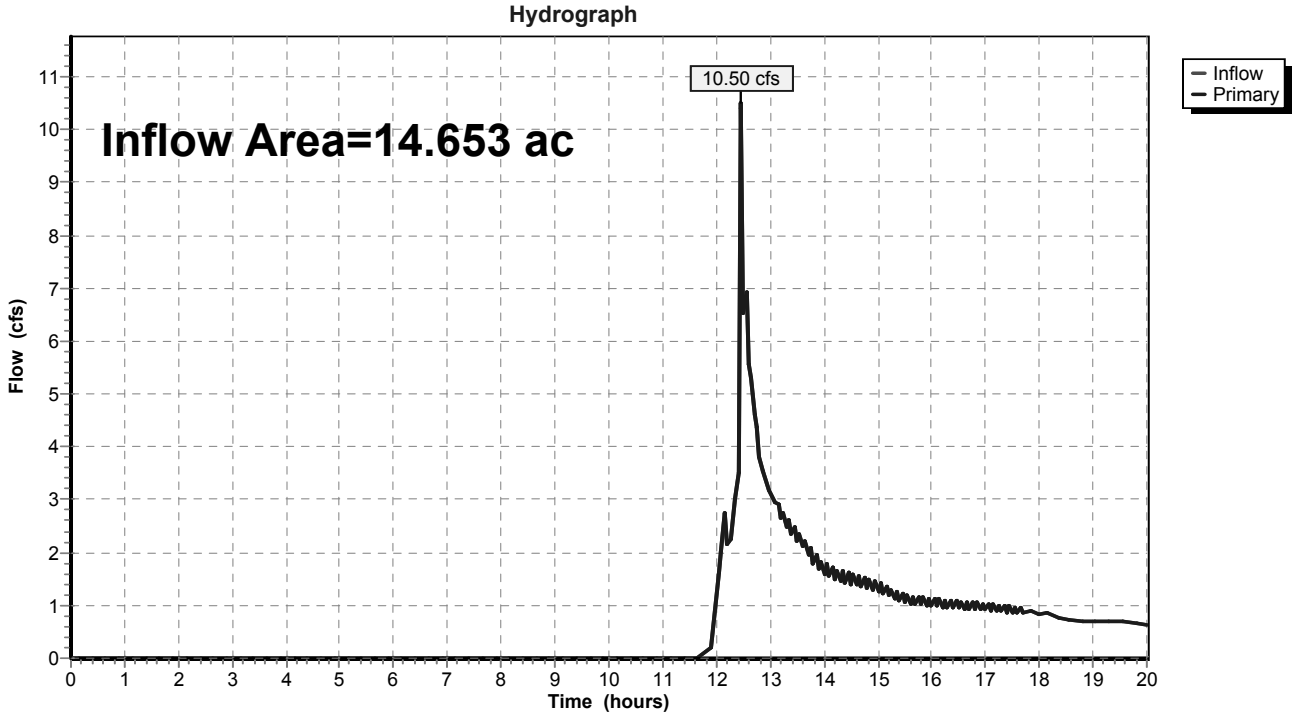


## Summary for Link DP West: DP West

Inflow Area = 14.653 ac, 3.51% Impervious, Inflow Depth > 0.84" for 10_year event
Inflow = 10.50 cfs @ 12.46 hrs, Volume= 1.025 af
Primary = 10.50 cfs @ 12.46 hrs, Volume= 1.025 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

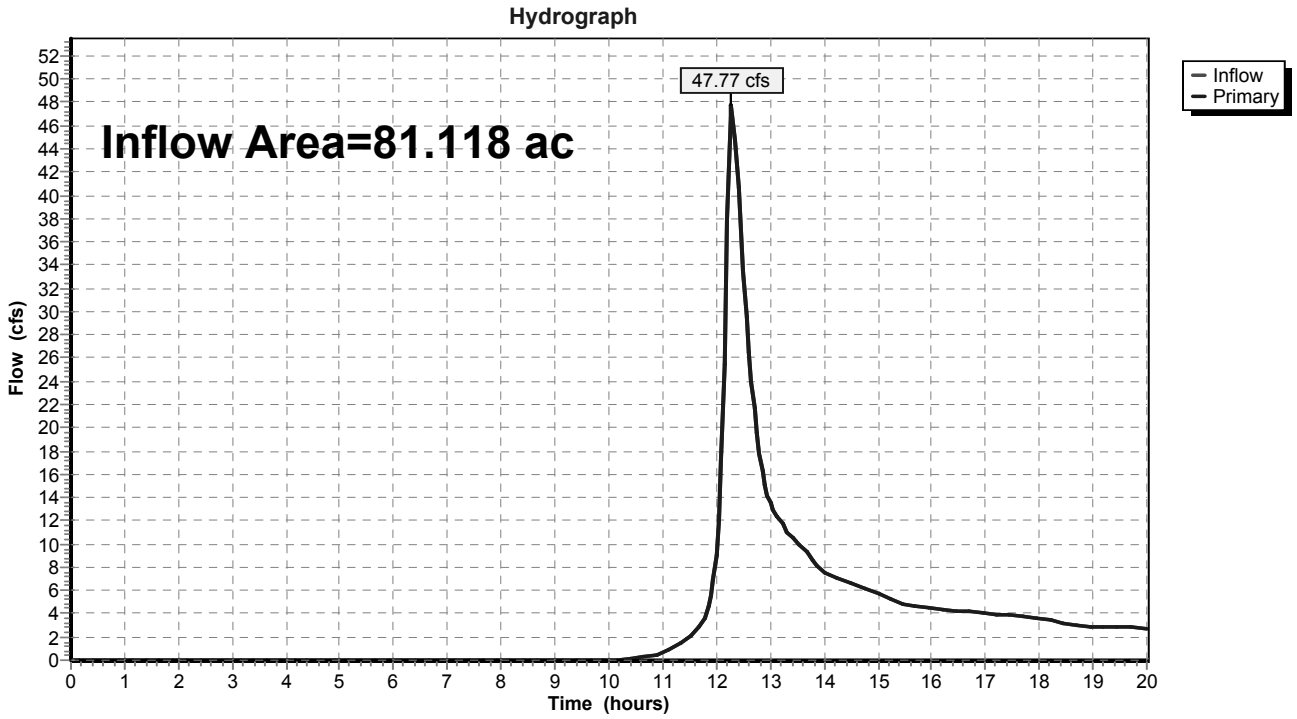


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 81.118 ac, 5.95% Impervious, Inflow Depth > 0.81" for 10_year event
Inflow = 47.77 cfs @ 12.27 hrs, Volume= 5.450 af
Primary = 47.77 cfs @ 12.27 hrs, Volume= 5.450 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

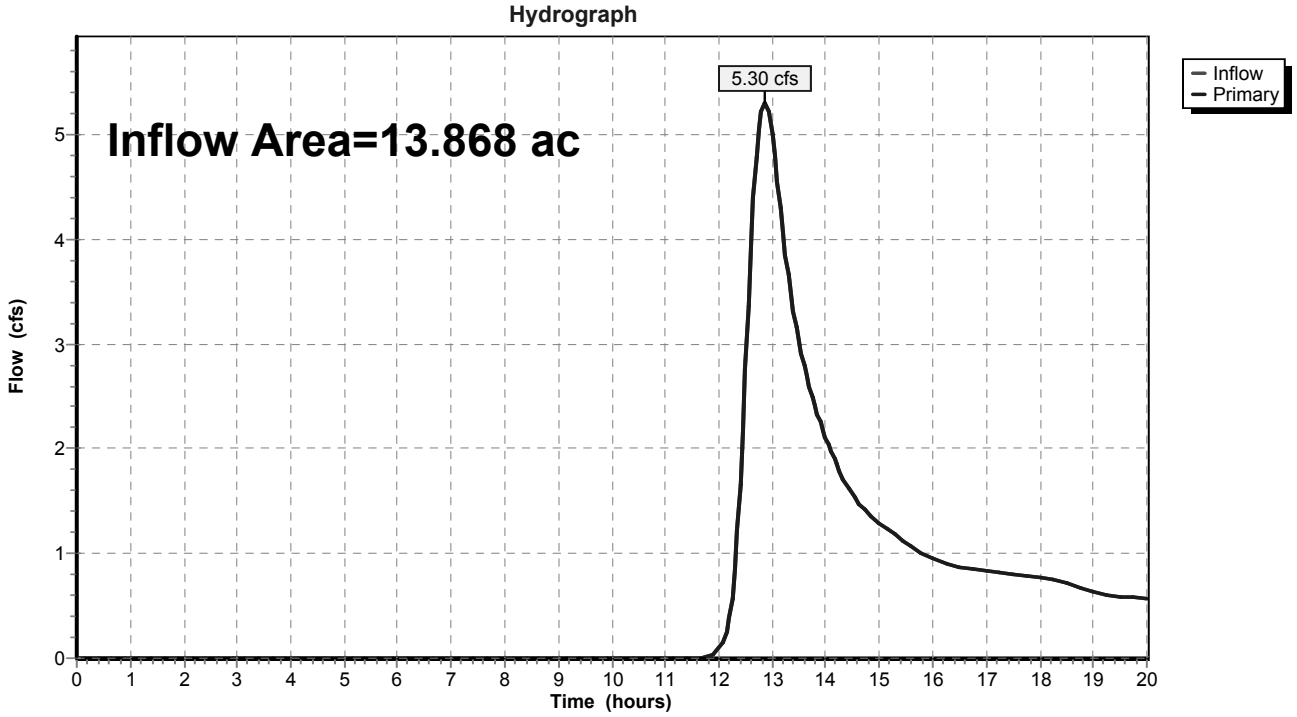


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.868 ac, 9.70% Impervious, Inflow Depth > 0.84" for 10_year event
Inflow = 5.30 cfs @ 12.86 hrs, Volume= 0.968 af
Primary = 5.30 cfs @ 12.86 hrs, Volume= 0.968 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

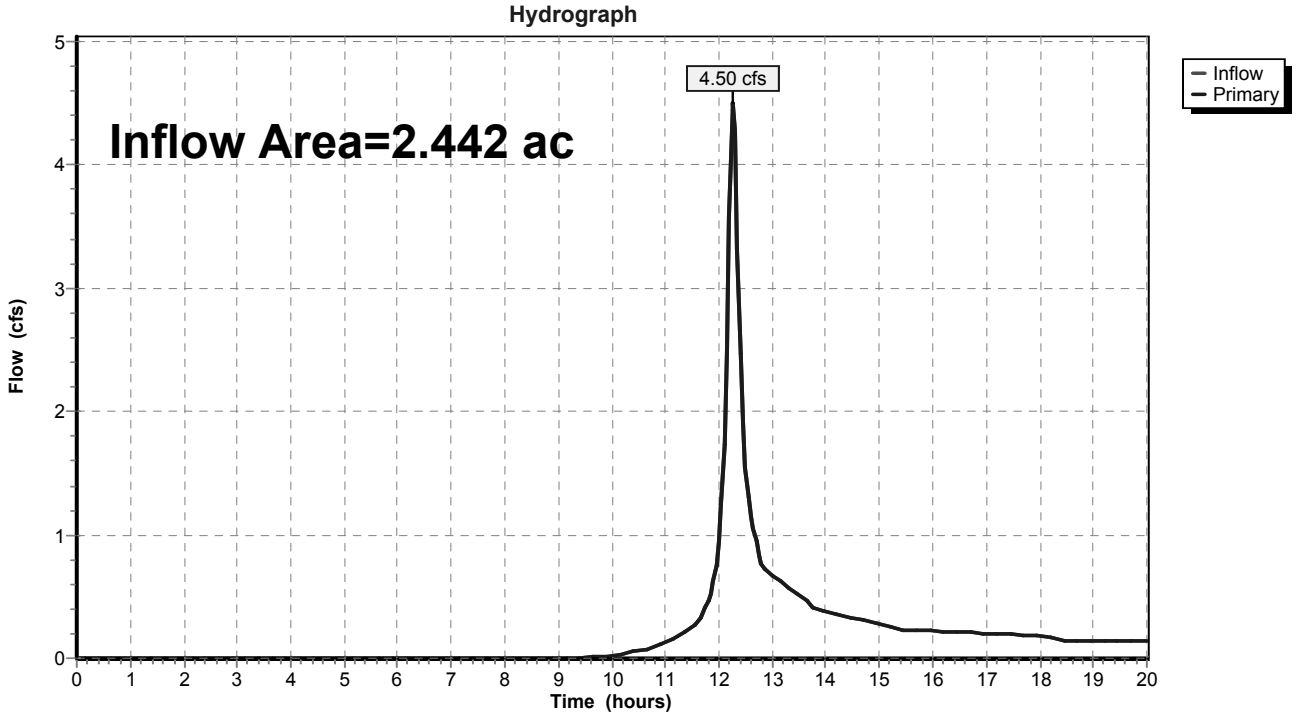


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 1.61" for 10_year event
Inflow = 4.50 cfs @ 12.27 hrs, Volume= 0.329 af
Primary = 4.50 cfs @ 12.27 hrs, Volume= 0.329 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 10.0: L W 10.0

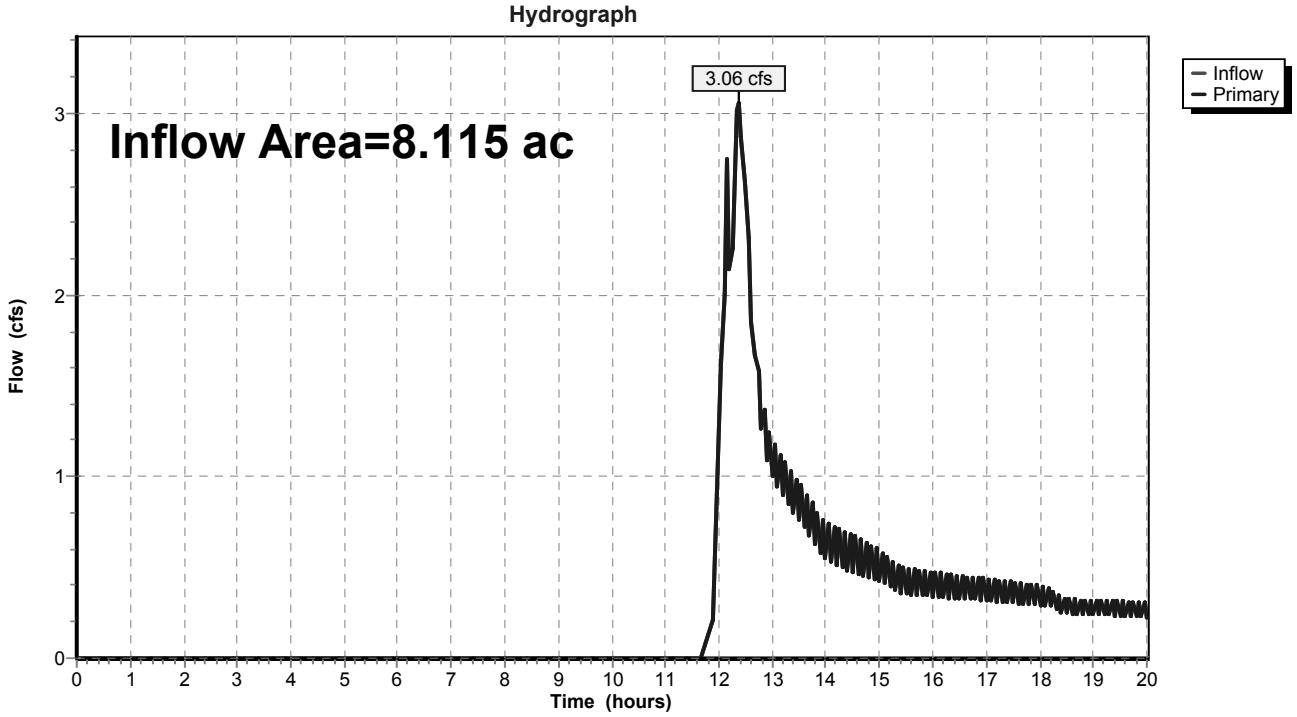


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 8.115 ac, 3.16% Impervious, Inflow Depth > 0.64" for 10_year event
Inflow = 3.06 cfs @ 12.37 hrs, Volume= 0.430 af
Primary = 3.06 cfs @ 12.37 hrs, Volume= 0.430 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 2.0: L W 2.0

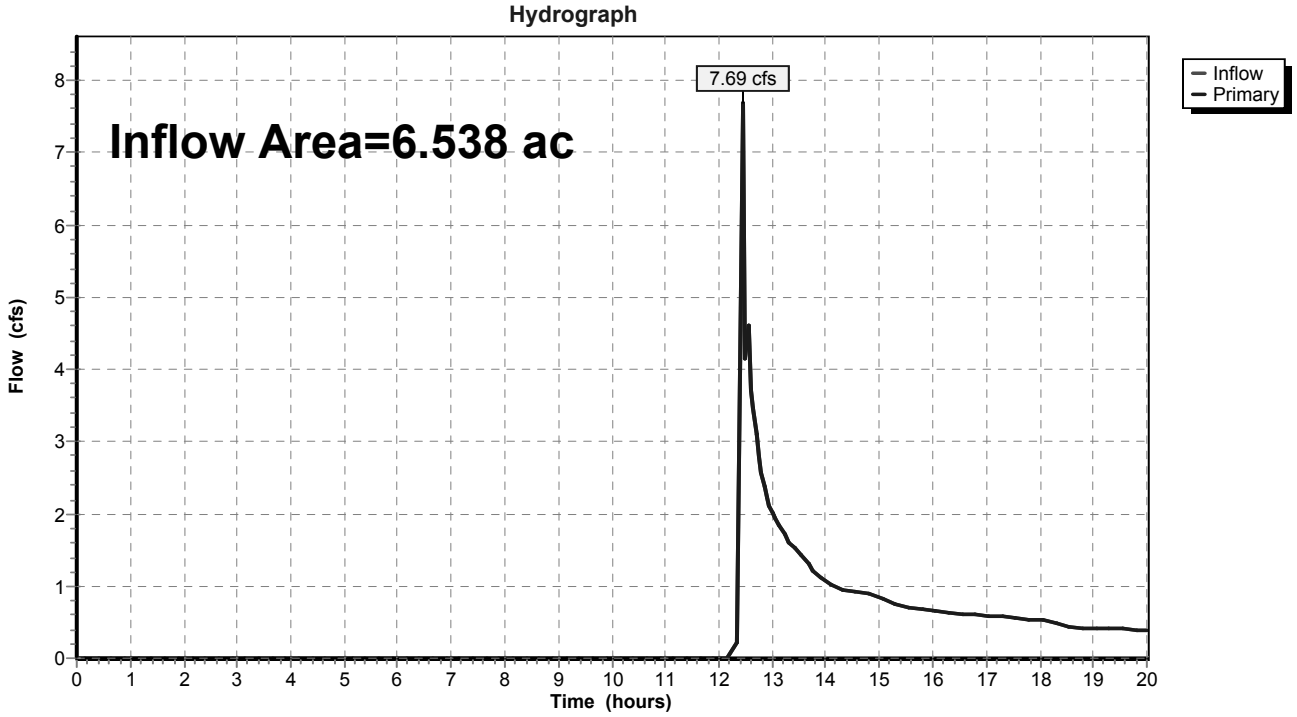


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 1.09" for 10_year event
Inflow = 7.69 cfs @ 12.46 hrs, Volume= 0.595 af
Primary = 7.69 cfs @ 12.46 hrs, Volume= 0.595 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 3.0: L W 3.0

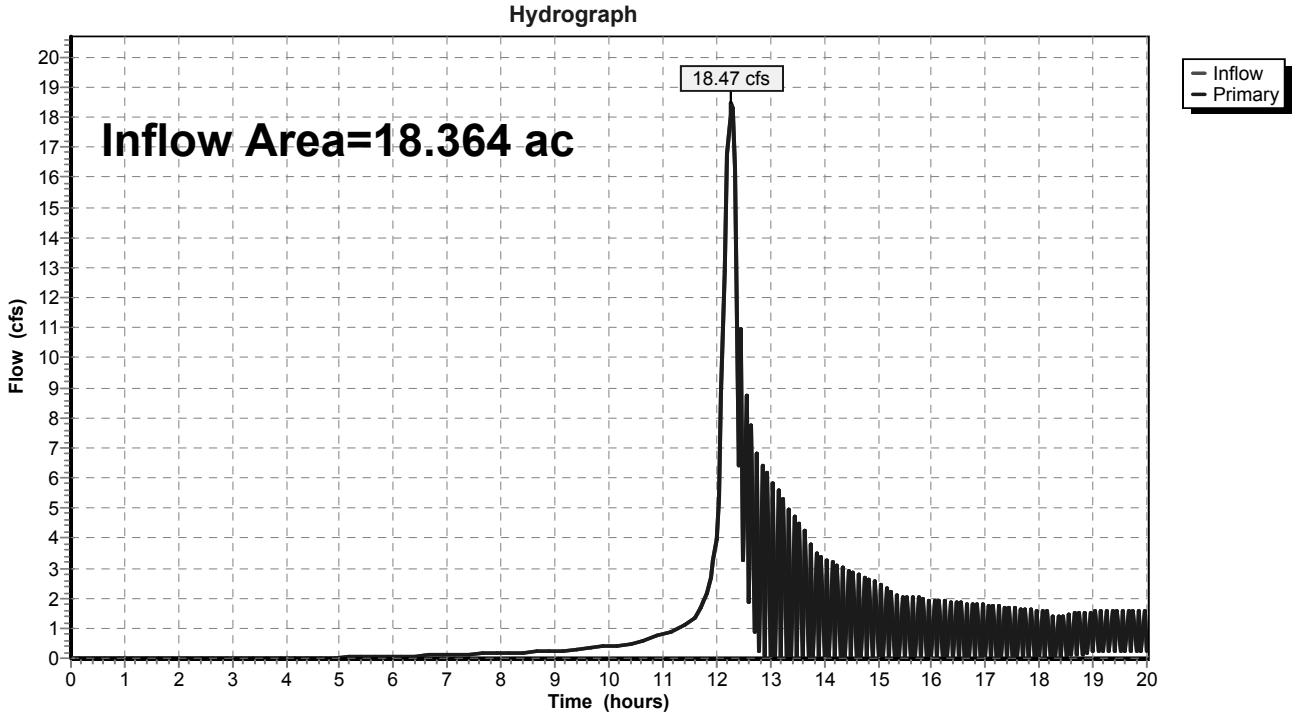


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.03" for 10_year event
Inflow = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af
Primary = 18.47 cfs @ 12.28 hrs, Volume= 1.570 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

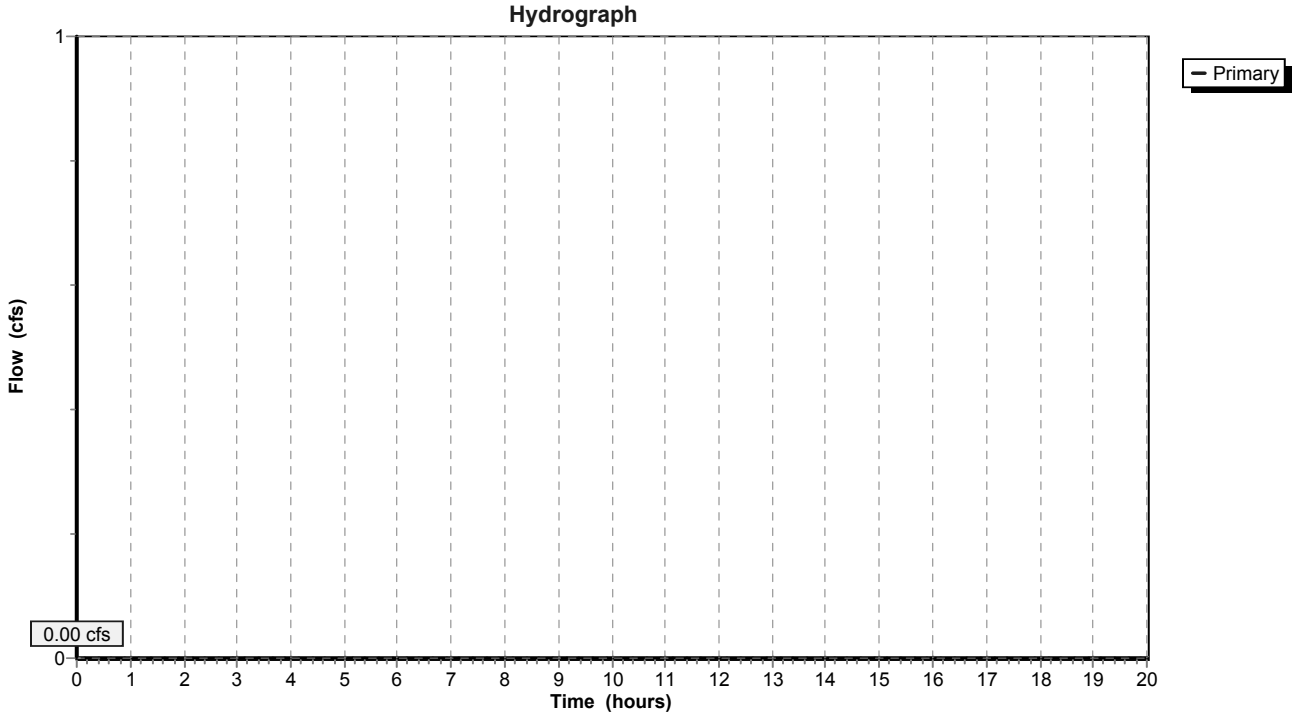


## Summary for Link L Well 1.1B: L Well 1.1B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.1B: L Well 1.1B

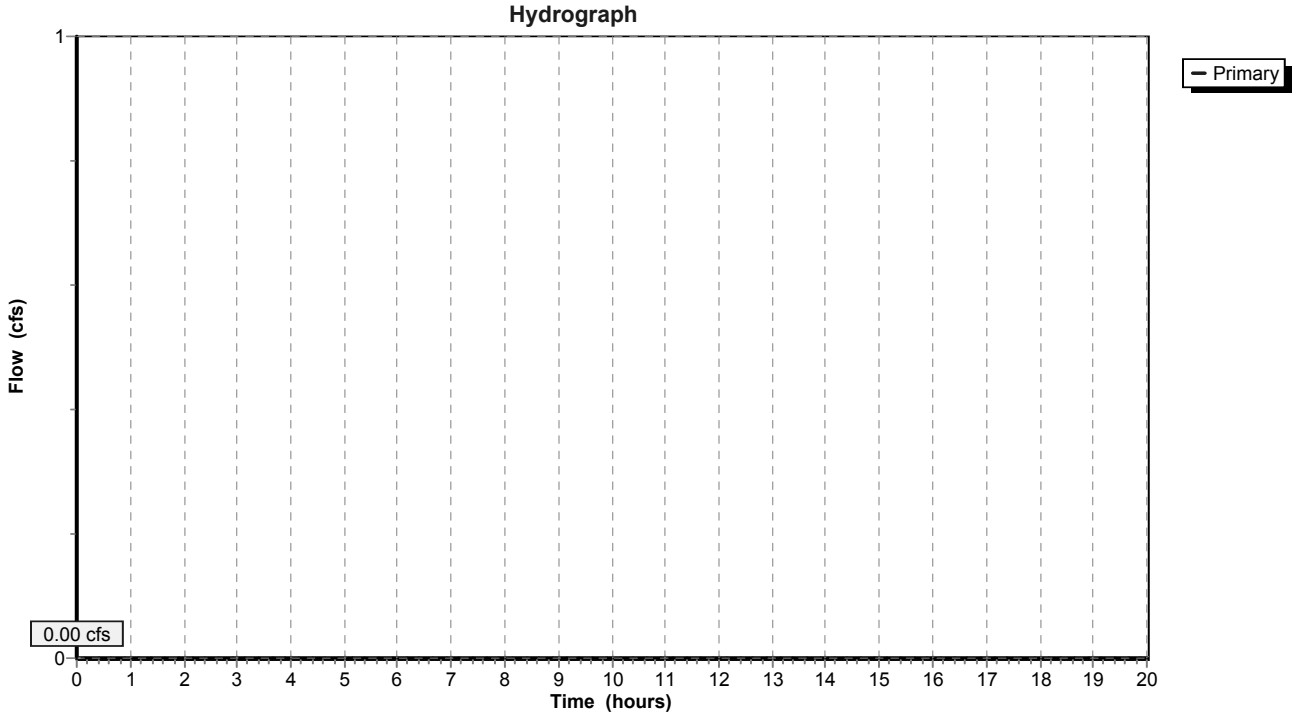


## Summary for Link L Well 1.2A: L Well 1.2A

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2A: L Well 1.2A

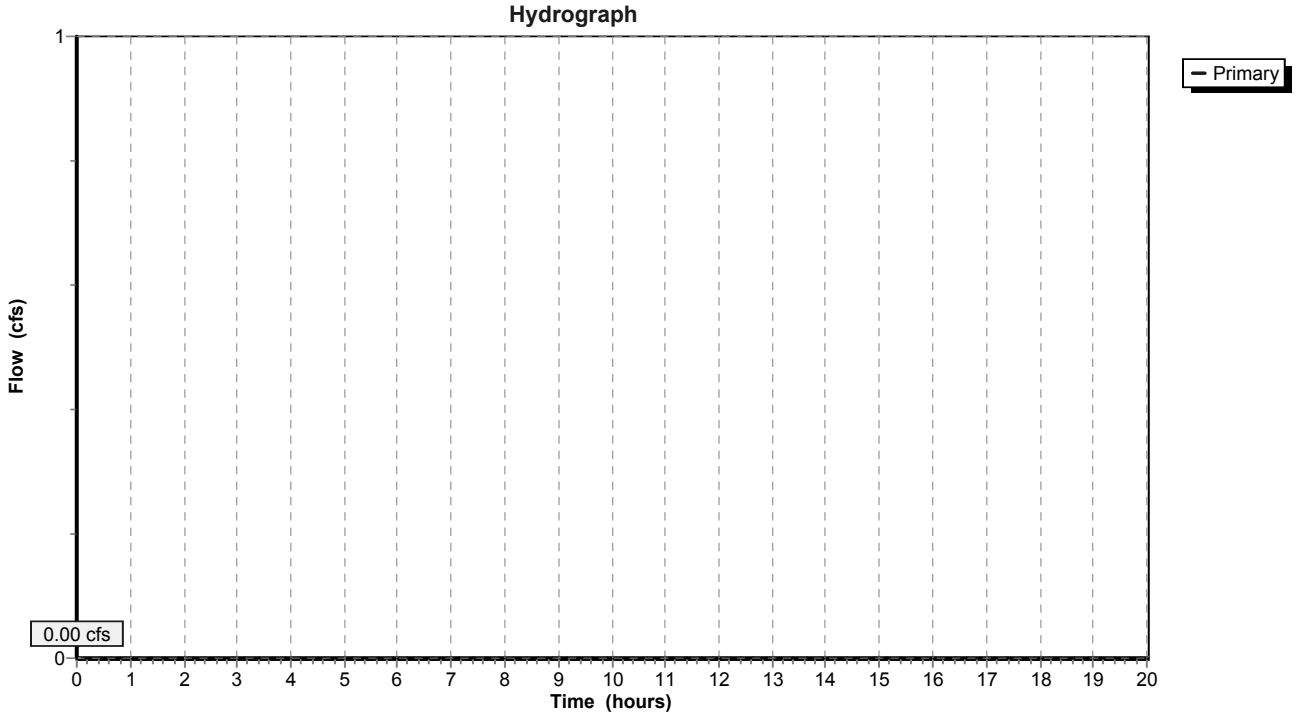


## Summary for Link L Well 1.2B: L Well 1.2B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2B: L Well 1.2B

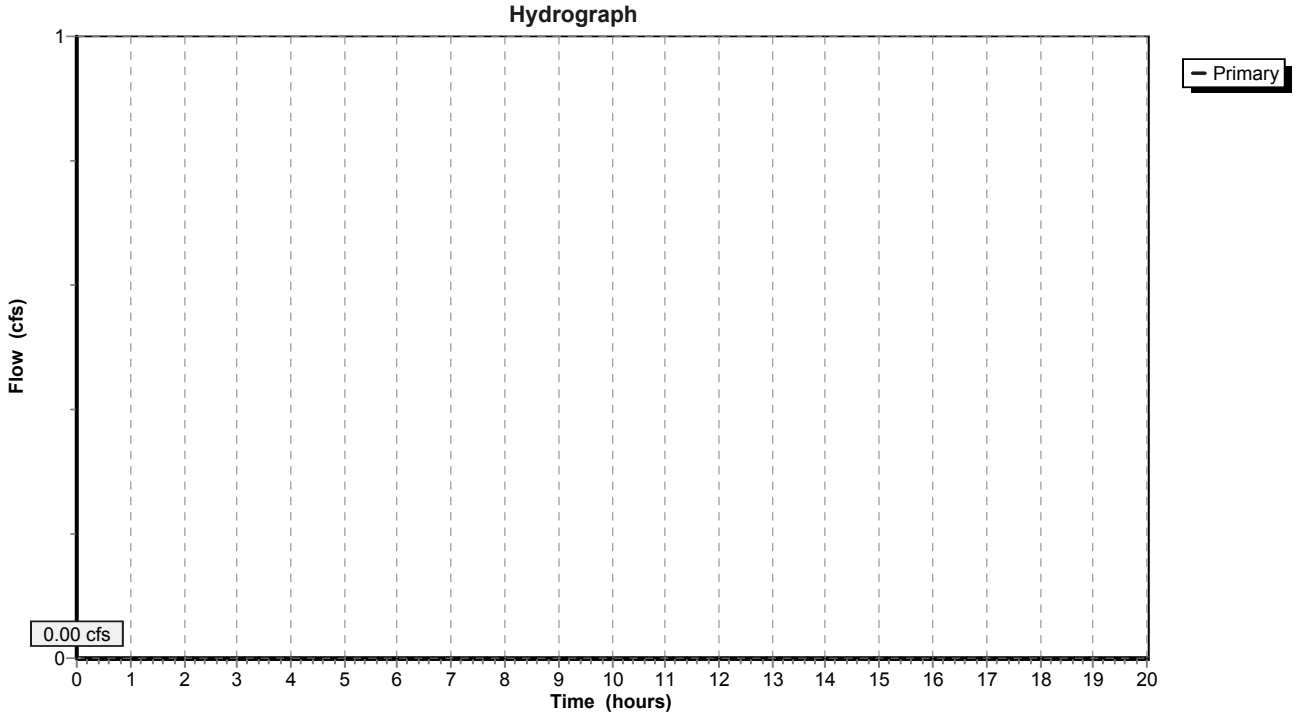


## Summary for Link L Well 1.2C: L Well 1.2C

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2C: L Well 1.2C



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>2.03"
Flow Length=583' Tc=11.3 min CN=65 Runoff=27.86 cfs 2.288 af

**SubcatchmentE 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>3.10"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.33 cfs 0.023 af

**SubcatchmentE 1.0B: (blank)** Runoff Area=33,902 sf 25.51% Impervious Runoff Depth>1.13"
Flow Length=186' Tc=6.0 min CN=53 Runoff=0.98 cfs 0.074 af

**SubcatchmentE 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>2.04"
Flow Length=277' Tc=6.0 min CN=65 Runoff=15.73 cfs 1.106 af

**SubcatchmentE 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>1.49"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=2.10 cfs 0.151 af

**SubcatchmentE 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>3.59"
Flow Length=346' Tc=6.0 min CN=82 Runoff=11.02 cfs 0.808 af

**SubcatchmentE 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>1.11"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=2.67 cfs 0.389 af

**SubcatchmentE 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>1.34"
Flow Length=252' Tc=7.5 min CN=56 Runoff=1.99 cfs 0.152 af

**SubcatchmentE 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>1.27"
Flow Length=139' Tc=6.0 min CN=55 Runoff=7.77 cfs 0.570 af

**SubcatchmentE 1.1B-4: (blank)** Runoff Area=38,504 sf 0.00% Impervious Runoff Depth>1.72"
Tc=0.0 min CN=61 Runoff=2.07 cfs 0.127 af

**SubcatchmentE 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>1.33"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=4.69 cfs 0.554 af

**SubcatchmentE 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>1.57"
Flow Length=344' Tc=6.0 min CN=59 Runoff=2.59 cfs 0.185 af

**SubcatchmentE 1.2A-2: (blank)** Runoff Area=48,650 sf 0.01% Impervious Runoff Depth>1.07"
Flow Length=93' Tc=6.0 min CN=52 Runoff=1.30 cfs 0.099 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>3.29"
Flow Length=448' Tc=6.0 min CN=79 Runoff=7.23 cfs 0.522 af

**SubcatchmentE 1.2B-1: (blank)** Runoff Area=28,861 sf 2.32% Impervious Runoff Depth>1.80"
Flow Length=182' Tc=8.0 min CN=62 Runoff=1.32 cfs 0.099 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>3.59"
Flow Length=193' Tc=6.0 min CN=82 Runoff=4.31 cfs 0.316 af

**SubcatchmentE 1.2C-1: (blank)** Runoff Area=15,993 sf 0.21% Impervious Runoff Depth>2.12"
Flow Length=98' Tc=6.0 min CN=66 Runoff=0.92 cfs 0.065 af

**SubcatchmentE 1.2C-2: (blank)** Runoff Area=20,935 sf 0.00% Impervious Runoff Depth>1.72"
Flow Length=288' Tc=7.7 min CN=61 Runoff=0.92 cfs 0.069 af

**SubcatchmentE 1.3A: (blank)** Runoff Area=201,598 sf 29.96% Impervious Runoff Depth>1.94"
Flow Length=1,196' Tc=20.9 min CN=64 Runoff=7.12 cfs 0.749 af

**SubcatchmentE 4.0: (blank)** Runoff Area=604,094 sf 9.70% Impervious Runoff Depth>1.45"
Flow Length=1,859' Tc=50.0 min CN=58 Runoff=9.77 cfs 1.676 af

**SubcatchmentE-CULV-S: (blank)** Runoff Area=196,467 sf 0.93% Impervious Runoff Depth>1.95"
Flow Length=319' Tc=9.5 min CN=64 Runoff=9.35 cfs 0.734 af

**SubcatchmentRG-E-1: (blank)** Runoff Area=104,917 sf 0.00% Impervious Runoff Depth>2.55"
Flow Length=750' Tc=7.6 min CN=71 Runoff=6.96 cfs 0.512 af

**SubcatchmentRG-E-2: (blank)** Runoff Area=20,767 sf 0.08% Impervious Runoff Depth>3.20"
Flow Length=270' Tc=6.0 min CN=78 Runoff=1.76 cfs 0.127 af

**SubcatchmentRG-E-4A: (blank)** Runoff Area=21,054 sf 0.00% Impervious Runoff Depth>2.73"
Flow Length=114' Tc=6.0 min CN=73 Runoff=1.55 cfs 0.110 af

**SubcatchmentRG-E-4B: (blank)** Runoff Area=22,865 sf 0.00% Impervious Runoff Depth>3.69"
Flow Length=197' Tc=6.0 min CN=83 Runoff=2.19 cfs 0.161 af

**SubcatchmentRG-E-7: (blank)** Runoff Area=41,427 sf 0.00% Impervious Runoff Depth>4.42"
Flow Length=88' Tc=6.0 min CN=90 Runoff=4.50 cfs 0.350 af

**SubcatchmentRG-E-8: (blank)** Runoff Area=28,390 sf 0.01% Impervious Runoff Depth>2.82"
Flow Length=252' Tc=6.0 min CN=74 Runoff=2.16 cfs 0.153 af

**SubcatchmentRG-E-9A: (blank)** Runoff Area=43,781 sf 0.00% Impervious Runoff Depth>2.91"
Flow Length=372' Tc=8.2 min CN=75 Runoff=3.23 cfs 0.244 af

**SubcatchmentRG-E-9B: (blank)** Runoff Area=22,781 sf 0.00% Impervious Runoff Depth>1.64"
Flow Length=186' Tc=6.0 min CN=60 Runoff=1.01 cfs 0.072 af

**SubcatchmentRG-W-1: (blank)** Runoff Area=65,101 sf 0.00% Impervious Runoff Depth>2.91"
Flow Length=495' Tc=6.0 min CN=75 Runoff=5.09 cfs 0.363 af

**SubcatchmentRG-W-2: (blank)** Runoff Area=111,691 sf 0.00% Impervious Runoff Depth>2.21"
Flow Length=336' Tc=6.0 min CN=67 Runoff=6.70 cfs 0.471 af

**SubcatchmentRG-W-3: (blank)** Runoff Area=91,227 sf 0.00% Impervious Runoff Depth>1.96"
Flow Length=97' Tc=6.0 min CN=64 Runoff=4.85 cfs 0.342 af

**SubcatchmentRG-W-3A: (blank)** Runoff Area=37,790 sf 0.00% Impervious Runoff Depth>4.00"
Flow Length=365' Tc=6.0 min CN=86 Runoff=3.84 cfs 0.289 af

**SubcatchmentRG-W-4: (blank)** Runoff Area=100,346 sf 0.00% Impervious Runoff Depth>2.82"
Flow Length=452' Tc=6.1 min CN=74 Runoff=7.61 cfs 0.541 af

**SubcatchmentRG-W-5: (blank)** Runoff Area=42,562 sf 0.79% Impervious Runoff Depth>2.29"
Flow Length=182' Tc=6.0 min CN=68 Runoff=2.65 cfs 0.186 af

**SubcatchmentROOF-1: (blank)** Runoff Area=4,580 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-10: (blank)** Runoff Area=4,268 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.57 cfs 0.044 af

**SubcatchmentROOF-100: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-101: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-102: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-103: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-104: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-105: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-106: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-107: (blank)** Runoff Area=1,154 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-108: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-109: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-11: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.67 cfs 0.051 af

**SubcatchmentROOF-110: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-111: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.42 cfs 0.032 af

**SubcatchmentROOF-112: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-113: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-114: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.42 cfs 0.032 af

**SubcatchmentROOF-115: (blank)** Runoff Area=2,606 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.027 af

**SubcatchmentROOF-117: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-118: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.027 af

**SubcatchmentROOF-119: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-11MAIL: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-12: (blank)** Runoff Area=2,311 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-120: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-121: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.027 af

**SubcatchmentROOF-122: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-123: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.027 af

**SubcatchmentROOF-13: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-14: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-15: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-16: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-17: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.42 cfs 0.032 af

**SubcatchmentROOF-18: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.015 af

**SubcatchmentROOF-19: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.015 af

**SubcatchmentROOF-2: (blank)** Runoff Area=5,339 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.72 cfs 0.054 af

**SubcatchmentROOF-20: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.015 af

**SubcatchmentROOF-21: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.015 af

**SubcatchmentROOF-22: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.015 af

**SubcatchmentROOF-23: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.015 af

**SubcatchmentROOF-24: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.42 cfs 0.032 af

**SubcatchmentROOF-25: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-26: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-27: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.59 cfs 0.045 af

**SubcatchmentROOF-28: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-29: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-3: (blank)** Runoff Area=11,005 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=1.48 cfs 0.112 af

**SubcatchmentROOF-30: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-31: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.027 af

**SubcatchmentROOF-32: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-33: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-34: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-35: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-36: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-37: (blank)** Runoff Area=1,153 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.012 af

**SubcatchmentROOF-38: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-39: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-4: (blank)** Runoff Area=9,675 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=1.30 cfs 0.099 af

**SubcatchmentROOF-40: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-41: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-42: (blank)** Runoff Area=1,505 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.015 af

**SubcatchmentROOF-43: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.016 af

**SubcatchmentROOF-44: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-45: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-46: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-47: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-48: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-49: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-5: (blank)** Runoff Area=9,831 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=1.32 cfs 0.100 af

**SubcatchmentROOF-50: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-51: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-52: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-53: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-54: (blank)** Runoff Area=2,936 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.39 cfs 0.030 af

**SubcatchmentROOF-55: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-56: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-57: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-58: (blank)** Runoff Area=2,942 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-59: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.59 cfs 0.045 af

**SubcatchmentROOF-6: (blank)** Runoff Area=9,941 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=1.34 cfs 0.101 af

**SubcatchmentROOF-60: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-61: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.59 cfs 0.045 af

**SubcatchmentROOF-62: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-63: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-64: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.59 cfs 0.045 af

**SubcatchmentROOF-65: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.59 cfs 0.045 af

**SubcatchmentROOF-66: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-67: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-68: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.59 cfs 0.045 af

**SubcatchmentROOF-69: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-7: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.67 cfs 0.051 af

**SubcatchmentROOF-70: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-71: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-72: (blank)** Runoff Area=1,156 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-73: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-74: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-75: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-76: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-77: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-78: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-79: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-8: (blank)** Runoff Area=11,381 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=1.53 cfs 0.116 af

**SubcatchmentROOF-80: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-81: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-82: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-83: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-84: (blank)** Runoff Area=1,149 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.012 af

**SubcatchmentROOF-85: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-86: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-87: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-88: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-89: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-9: (blank)** Runoff Area=4,992 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.67 cfs 0.051 af

**SubcatchmentROOF-90: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-91: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.40 cfs 0.030 af

**SubcatchmentROOF-92: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.31 cfs 0.024 af

**SubcatchmentROOF-93: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.35 cfs 0.027 af

**SubcatchmentROOF-94: (blank)** Runoff Area=1,301 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.17 cfs 0.013 af

**SubcatchmentROOF-95: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-96: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.59 cfs 0.045 af

**SubcatchmentROOF-97: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.62 cfs 0.047 af

**SubcatchmentROOF-98: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-99: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.012 af

**SubcatchmentROOF-BS1: (blank)** Runoff Area=84 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL20: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.02 cfs 0.002 af

**SubcatchmentROOF-MAIL29: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL5: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.02 cfs 0.002 af

**SubcatchmentROOF-MAIL64: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL8: (blank)** Runoff Area=97 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL91: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAINT11: (blank)** Runoff Area=1,104 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.011 af

**SubcatchmentROOF-PL11: (blank)** Runoff Area=1,431 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.015 af

**SubcatchmentROOF-PL6: (blank)** Runoff Area=1,429 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.19 cfs 0.015 af

**SubcatchmentROOF-POOL: (blank)** Runoff Area=449 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.06 cfs 0.005 af

**SubcatchmentROOF-RECY: (blank)** Runoff Area=854 sf 0.00% Impervious Runoff Depth>5.33"
Tc=0.0 min CN=98 Runoff=0.11 cfs 0.009 af

**SubcatchmentS-CB-E-1: (blank)** Runoff Area=47,382 sf 0.00% Impervious Runoff Depth>3.20"
Flow Length=297' Tc=6.0 min CN=78 Runoff=4.03 cfs 0.290 af

**SubcatchmentS-CB-INF-E-3: (blank)** Runoff Area=25,604 sf 0.00% Impervious Runoff Depth>4.54"
Tc=0.0 min CN=91 Runoff=3.23 cfs 0.222 af

**SubcatchmentS-CB-INF-E-4A: (blank)** Runoff Area=25,704 sf 0.00% Impervious Runoff Depth>4.87"
Tc=0.0 min CN=94 Runoff=3.36 cfs 0.240 af

**SubcatchmentS-DET-1: (blank)** Runoff Area=17,810 sf 0.18% Impervious Runoff Depth>1.87"
Flow Length=96' Tc=9.6 min CN=63 Runoff=0.81 cfs 0.064 af

**SubcatchmentS-DET-3: (blank)** Runoff Area=17,177 sf 0.00% Impervious Runoff Depth>2.12"
Flow Length=131' Tc=8.8 min CN=66 Runoff=0.91 cfs 0.070 af

**SubcatchmentS-INF-E-1: (blank)** Runoff Area=51,657 sf 0.00% Impervious Runoff Depth>3.19"
Flow Length=363' Tc=8.3 min CN=78 Runoff=4.13 cfs 0.315 af

**SubcatchmentS-INF-E-2: (blank)** Runoff Area=50,824 sf 0.00% Impervious Runoff Depth>3.69"
Flow Length=358' Tc=6.6 min CN=83 Runoff=4.80 cfs 0.358 af

**SubcatchmentS-INF-E-3: (blank)** Runoff Area=74,846 sf 0.00% Impervious Runoff Depth>3.00"
Flow Length=616' Tc=13.2 min CN=76 Runoff=4.92 cfs 0.429 af

**SubcatchmentS-LD-1: (blank)** Runoff Area=46,138 sf 4.25% Impervious Runoff Depth>2.03"
Flow Length=447' Tc=13.4 min CN=65 Runoff=2.05 cfs 0.179 af

**SubcatchmentS-LD-11: (blank)** Runoff Area=18,104 sf 0.00% Impervious Runoff Depth>2.13"
Tc=0.0 min CN=66 Runoff=1.21 cfs 0.074 af

**SubcatchmentS-LD-2: (blank)** Runoff Area=74,501 sf 9.20% Impervious Runoff Depth>2.29"
Flow Length=214' Tc=6.0 min CN=68 Runoff=4.64 cfs 0.326 af

**SubcatchmentS-LD-4: (blank)** Runoff Area=94,445 sf 9.85% Impervious Runoff Depth>2.91"
Flow Length=345' Tc=8.3 min CN=75 Runoff=6.95 cfs 0.526 af

**SubcatchmentW 10.0: (blank)** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>2.46"
Flow Length=509' Tc=8.8 min CN=70 Runoff=6.56 cfs 0.501 af

**SubcatchmentW 2.0: (blank)** Runoff Area=331,247 sf 3.38% Impervious Runoff Depth>0.99"
Flow Length=793' Tc=15.6 min CN=51 Runoff=5.97 cfs 0.630 af

**SubcatchmentW 3.1: (blank)** Runoff Area=57,507 sf 19.47% Impervious Runoff Depth>2.64"
Flow Length=413' Tc=8.1 min CN=72 Runoff=3.88 cfs 0.290 af

**SubcatchmentW 3.2: (blank)** Runoff Area=34,449 sf 0.01% Impervious Runoff Depth>1.71"
Flow Length=456' Tc=12.9 min CN=61 Runoff=1.30 cfs 0.113 af

**SubcatchmentW 3.3: (blank)** Runoff Area=88,756 sf 10.36% Impervious Runoff Depth>4.31"
Flow Length=530' Tc=6.0 min CN=89 Runoff=9.50 cfs 0.732 af

**SubcatchmentW 3.4: (blank)** Runoff Area=132,546 sf 5.02% Impervious Runoff Depth>0.42"
Flow Length=460' Tc=14.6 min CN=41 Runoff=0.52 cfs 0.106 af

**SubcatchmentW 9.1A: (blank)** Runoff Area=64,234 sf 61.01% Impervious Runoff Depth>3.89"
Flow Length=323' Tc=6.0 min CN=85 Runoff=6.40 cfs 0.478 af

**SubcatchmentW 9.1B: (blank)** Runoff Area=24,364 sf 16.02% Impervious Runoff Depth>1.88"
Flow Length=235' Tc=6.0 min CN=63 Runoff=1.24 cfs 0.087 af

**SubcatchmentW-CULV-N: (blank)** Runoff Area=74,124 sf 5.73% Impervious Runoff Depth>0.69"
Flow Length=84' Tc=6.0 min CN=46 Runoff=1.07 cfs 0.098 af

**SubcatchmentW-D-1: (blank)** Runoff Area=26,114 sf 0.00% Impervious Runoff Depth>0.57"
Flow Length=312' Tc=22.9 min CN=44 Runoff=0.16 cfs 0.028 af

**SubcatchmentW-D-3: (blank)** Runoff Area=6,640 sf 9.99% Impervious Runoff Depth>0.52"
Flow Length=89' Slope=0.1229 '/' Tc=6.0 min CN=43 Runoff=0.06 cfs 0.007 af

**Reach R-SWALE1: (new Reach)** Avg. Flow Depth=0.02' Max Vel=0.78 fps Inflow=1.32 cfs 0.099 af
n=0.035 L=377.0' S=0.0531 '/' Capacity=189.21 cfs Outflow=1.06 cfs 0.098 af

**Reach R-SWALE2: (new Reach)** Avg. Flow Depth=0.15' Max Vel=1.57 fps Inflow=14.99 cfs 1.128 af
n=0.035 L=174.0' S=0.0172 '/' Capacity=107.87 cfs Outflow=14.74 cfs 1.123 af

**Reach R-SWALE3: (new Reach)** Avg. Flow Depth=0.14' Max Vel=1.12 fps Inflow=20.21 cfs 1.533 af
n=0.035 L=302.0' S=0.0099 '/' Capacity=161.76 cfs Outflow=18.76 cfs 1.519 af

**Pond DET-1: 387** Peak Elev=169.48' Storage=6,302 cf Inflow=3.34 cfs 0.286 af
Outflow=1.61 cfs 0.159 af

**Pond DET-2: 391** Peak Elev=165.36' Storage=3,914 cf Inflow=4.55 cfs 0.328 af
Outflow=1.81 cfs 0.288 af

**Pond DET-3: 395** Peak Elev=175.29' Storage=4,638 cf Inflow=4.03 cfs 0.337 af
Outflow=1.68 cfs 0.281 af

**Pond INF-ROOF-100: 368** Peak Elev=174.53' Storage=2,969 cf Inflow=0.97 cfs 0.074 af
Outflow=0.03 cfs 0.006 af

**Pond INF-ROOF-110: 299** Peak Elev=166.77' Storage=121 cf Inflow=0.93 cfs 0.071 af
Outflow=0.91 cfs 0.069 af

**Pond INF-ROOF-114: 297** Peak Elev=164.39' Storage=2,434 cf Inflow=1.46 cfs 0.111 af
Outflow=1.57 cfs 0.058 af

**Pond INF-ROOF-117: 295** Peak Elev=164.10' Storage=1,405 cf Inflow=0.66 cfs 0.050 af
Outflow=0.19 cfs 0.018 af

**Pond INF-ROOF-123: 119** Peak Elev=148.93' Storage=2,933 cf Inflow=1.83 cfs 0.139 af
Outflow=1.79 cfs 0.075 af

**Pond INF-ROOF-13: 384** Peak Elev=183.01' Storage=1,605 cf Inflow=0.49 cfs 0.037 af
Outflow=0.00 cfs 0.000 af

**Pond INF-ROOF-16: 375** Peak Elev=184.52' Storage=1,978 cf Inflow=0.66 cfs 0.050 af
Outflow=0.02 cfs 0.005 af

**Pond INF-ROOF-19: 377** Peak Elev=178.70' Storage=1,516 cf Inflow=0.81 cfs 0.061 af
Outflow=0.76 cfs 0.027 af

**Pond INF-ROOF-23: 372** Peak Elev=184.55' Storage=1,984 cf Inflow=0.78 cfs 0.059 af
Outflow=0.06 cfs 0.014 af

**Pond INF-ROOF-25: 382** Peak Elev=176.07' Storage=1,400 cf Inflow=0.63 cfs 0.048 af
Outflow=0.11 cfs 0.016 af

**Pond INF-ROOF-28:** Peak Elev=174.89' Storage=1,182 cf Inflow=1.61 cfs 0.122 af
Outflow=1.57 cfs 0.096 af

**Pond INF-ROOF-3: 370** Peak Elev=190.19' Storage=4,716 cf Inflow=2.11 cfs 0.161 af
Outflow=0.53 cfs 0.052 af

**Pond INF-ROOF-36: 366** Peak Elev=190.40' Storage=2,096 cf Inflow=1.24 cfs 0.094 af
Outflow=1.64 cfs 0.046 af

**Pond INF-ROOF-43: 364** Peak Elev=190.04' Storage=1,572 cf Inflow=0.62 cfs 0.047 af
Outflow=0.05 cfs 0.011 af

**Pond INF-ROOF-53: 362** Peak Elev=190.07' Storage=2,620 cf Inflow=1.02 cfs 0.077 af
Outflow=0.13 cfs 0.017 af

**Pond INF-ROOF-55: 314** Peak Elev=190.21' Storage=3,144 cf Inflow=1.45 cfs 0.110 af
Outflow=0.60 cfs 0.038 af

**Pond INF-ROOF-62: 310** Peak Elev=190.27' Storage=1,048 cf Inflow=0.79 cfs 0.060 af
Outflow=0.89 cfs 0.036 af

**Pond INF-ROOF-63: 308** Peak Elev=190.63' Storage=3,144 cf Inflow=2.99 cfs 0.227 af
Outflow=2.92 cfs 0.155 af

**Pond INF-ROOF-67: 316** Peak Elev=190.31' Storage=1,048 cf Inflow=1.21 cfs 0.092 af
Outflow=1.13 cfs 0.068 af

**Pond INF-ROOF-71: 312** Peak Elev=190.50' Storage=2,620 cf Inflow=2.13 cfs 0.162 af
Outflow=2.28 cfs 0.102 af

**Pond INF-ROOF-76: 318** Peak Elev=190.15' Storage=2,620 cf Inflow=1.19 cfs 0.091 af
Outflow=0.37 cfs 0.030 af

**Pond INF-ROOF-89: 338** Peak Elev=190.13' Storage=4,716 cf Inflow=1.85 cfs 0.141 af
Outflow=0.30 cfs 0.032 af

**Pond INF-ROOF-90: 336** Peak Elev=190.15' Storage=3,144 cf Inflow=1.43 cfs 0.109 af
Outflow=0.37 cfs 0.037 af

**Pond INF-ROOF-94: 342** Peak Elev=190.23' Storage=1,572 cf Inflow=0.80 cfs 0.061 af
Outflow=0.73 cfs 0.024 af

**Pond INF-ROOF-95: 340** Peak Elev=190.28' Storage=1,572 cf Inflow=0.90 cfs 0.068 af
Outflow=1.00 cfs 0.032 af

**Pond INF-ROOF-96: 344** Peak Elev=190.31' Storage=1,048 cf Inflow=1.21 cfs 0.092 af
Outflow=1.13 cfs 0.068 af

**Pond P E 1.1A: 284** Peak Elev=133.84' Storage=35,178 cf Inflow=11.02 cfs 0.808 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B: 283** Peak Elev=146.62' Storage=109,056 cf Inflow=27.33 cfs 2.506 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.2A: 282** Peak Elev=135.03' Storage=52,242 cf Inflow=18.76 cfs 1.519 af
Outflow=0.95 cfs 0.332 af

**Pond P E-CULV-S: 231** Peak Elev=168.83' Storage=1,631 cf Inflow=9.35 cfs 0.734 af
Outflow=9.00 cfs 0.723 af

**Pond P INF-E-1:** Peak Elev=165.63' Storage=6,801 cf Inflow=4.20 cfs 0.336 af
Discarded=0.02 cfs 0.025 af Primary=1.09 cfs 0.173 af Outflow=1.11 cfs 0.198 af

**Pond P INF-E-2: 142** Peak Elev=167.37' Storage=3,564 cf Inflow=4.81 cfs 0.359 af
Discarded=0.01 cfs 0.013 af Primary=4.58 cfs 0.278 af Outflow=4.59 cfs 0.291 af

**Pond P INF-E-3:** Peak Elev=172.62' Storage=21,129 cf Inflow=17.78 cfs 1.631 af
Discarded=0.02 cfs 0.036 af Primary=15.84 cfs 1.182 af Outflow=15.86 cfs 1.218 af

**Pond P INF-E-4A: 145** Peak Elev=172.89' Storage=6,936 cf Inflow=4.23 cfs 0.372 af
Discarded=0.01 cfs 0.010 af Primary=0.67 cfs 0.252 af Outflow=0.68 cfs 0.261 af

**Pond P INF-E-4B: 140** Peak Elev=172.56' Storage=4,018 cf Inflow=3.36 cfs 0.240 af
Discarded=0.01 cfs 0.012 af Primary=3.03 cfs 0.176 af Outflow=3.04 cfs 0.188 af

**Pond P MH-CULV-NA: 114** Peak Elev=150.59' Inflow=25.75 cfs 2.661 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=25.75 cfs 2.661 af

**Pond P MH-CULV-NB: 115** Peak Elev=150.32' Inflow=25.75 cfs 2.661 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=25.75 cfs 2.661 af

**Pond P RG-E-7:** Peak Elev=174.02' Storage=3,116 cf Inflow=4.50 cfs 0.350 af
Outflow=4.23 cfs 0.295 af

**Pond P RG-E-9A:** Peak Elev=166.18' Storage=759 cf Inflow=7.54 cfs 0.586 af
Outflow=7.03 cfs 0.580 af

**Pond P RG-E-9B: 244** Peak Elev=150.71' Storage=5,605 cf Inflow=8.02 cfs 0.656 af
Outflow=7.99 cfs 0.544 af

**Pond P RG-W-5A: 250** Peak Elev=163.70' Storage=104 cf Inflow=3.80 cfs 0.279 af
Outflow=3.83 cfs 0.277 af

**Pond P RG-W-5B: 252** Peak Elev=162.70' Storage=81 cf Inflow=3.83 cfs 0.277 af
Outflow=3.80 cfs 0.276 af

**Pond P RG-W-5C: 254** Peak Elev=161.69' Storage=966 cf Inflow=3.80 cfs 0.276 af
Outflow=3.67 cfs 0.258 af

**Pond P S-CB-E-1: 263** Peak Elev=171.71' Storage=304 cf Inflow=4.08 cfs 0.298 af
Outflow=4.08 cfs 0.294 af

**Pond P W 3.1: 5** Peak Elev=156.13' Storage=7,965 cf Inflow=12.34 cfs 1.263 af
Discarded=0.01 cfs 0.010 af Primary=15.81 cfs 1.083 af Outflow=15.82 cfs 1.093 af

**Pond P W 3.4: 13** Peak Elev=182.08' Storage=4,613 cf Inflow=0.52 cfs 0.106 af
Outflow=0.00 cfs 0.000 af

**Pond P W 9.1B: 14** Peak Elev=157.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

**Pond P W-CULV-N: 227** Peak Elev=153.51' Storage=2,549 cf Inflow=29.18 cfs 2.657 af
36.0" x 36.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=25.75 cfs 2.661 af

**Pond P W-D-3: 111** Peak Elev=158.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.00 cfs 0.000 af

**Pond P-RG-E-1:** Peak Elev=142.32' Storage=6,308 cf Inflow=7.39 cfs 0.581 af
Primary=3.29 cfs 0.479 af Secondary=2.07 cfs 0.032 af Outflow=5.36 cfs 0.512 af

**Pond P-RG-E-2:** Peak Elev=162.69' Storage=888 cf Inflow=1.76 cfs 0.127 af
Primary=1.66 cfs 0.113 af Secondary=0.00 cfs 0.000 af Outflow=1.66 cfs 0.113 af

**Pond P-RG-E-4A:** Peak Elev=172.28' Storage=1,050 cf Inflow=1.55 cfs 0.110 af
Outflow=0.78 cfs 0.101 af

**Pond P-RG-E-4B:** Peak Elev=170.15' Storage=1,822 cf Inflow=2.19 cfs 0.162 af
Outflow=1.43 cfs 0.139 af

**Pond P-RG-E-8:** Peak Elev=175.11' Storage=3,919 cf Inflow=2.16 cfs 0.153 af
Outflow=0.19 cfs 0.077 af

**Pond P-RG-W-2: 306** Peak Elev=171.93' Storage=11,148 cf Inflow=13.01 cfs 1.007 af
Outflow=7.73 cfs 0.872 af

**Pond P-RG-W-3:** Peak Elev=170.10' Storage=21,006 cf Inflow=9.59 cfs 0.822 af
Outflow=1.26 cfs 0.355 af

**Pond P-RG-W-4:** Peak Elev=171.67' Storage=4,829 cf Inflow=7.61 cfs 0.542 af
Outflow=6.67 cfs 0.470 af

**Pond R-CULV-1: PIPE 1** Peak Elev=162.80' Inflow=4.49 cfs 0.709 af
Primary=4.49 cfs 0.709 af Secondary=0.00 cfs 0.000 af Outflow=4.49 cfs 0.709 af

**Pond R-CULV-10: PIPE 10** Peak Elev=139.34' Inflow=36.09 cfs 3.897 af
Primary=36.09 cfs 3.897 af Secondary=0.00 cfs 0.000 af Outflow=36.09 cfs 3.897 af

**Pond R-CULV-2: PIPE 2** Peak Elev=161.70' Inflow=20.60 cfs 2.179 af
Primary=20.60 cfs 2.179 af Secondary=0.00 cfs 0.000 af Outflow=20.60 cfs 2.179 af

**Pond R-CULV-3: PIPE 3** Peak Elev=161.37' Inflow=29.71 cfs 2.973 af
Primary=29.71 cfs 2.973 af Secondary=0.00 cfs 0.000 af Outflow=29.71 cfs 2.973 af

**Pond R-CULV-4: PIPE 4** Peak Elev=155.91' Inflow=29.69 cfs 3.146 af
Primary=29.69 cfs 3.146 af Secondary=0.00 cfs 0.000 af Outflow=29.69 cfs 3.146 af

**Pond R-CULV-5: PIPE 5** Peak Elev=153.45' Inflow=31.27 cfs 3.305 af
Primary=31.27 cfs 3.305 af Secondary=0.00 cfs 0.000 af Outflow=31.27 cfs 3.305 af

**Pond R-CULV-6: PIPE 6** Peak Elev=150.11' Inflow=32.88 cfs 3.417 af
Primary=32.88 cfs 3.417 af Secondary=0.00 cfs 0.000 af Outflow=32.88 cfs 3.417 af

**Pond R-CULV-7: PIPE 7** Peak Elev=147.11' Inflow=32.88 cfs 3.417 af
Primary=32.88 cfs 3.417 af Secondary=0.00 cfs 0.000 af Outflow=32.88 cfs 3.417 af

**Pond R-CULV-8: PIPE 8** Peak Elev=143.36' Inflow=32.88 cfs 3.417 af
Primary=32.88 cfs 3.417 af Secondary=0.00 cfs 0.000 af Outflow=32.88 cfs 3.417 af

**Pond R-CULV-9: PIPE 9** Peak Elev=141.21' Inflow=32.88 cfs 3.417 af
Primary=32.88 cfs 3.417 af Secondary=0.00 cfs 0.000 af Outflow=32.88 cfs 3.417 af

**Link DP CULV: outflow from culvert** Inflow=36.09 cfs 3.897 af
Primary=36.09 cfs 3.897 af

**Link DP North: DP North** Inflow=54.87 cfs 6.706 af
Primary=54.87 cfs 6.706 af

**Link DP Sudbury: DP Sudbury** Inflow=143.20 cfs 15.879 af
Primary=143.20 cfs 15.879 af

**Link DP Wellhead: DP Wellhead** Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=20.92 cfs 1.868 af
Primary=20.92 cfs 1.868 af

**Link L E 1.0: L E 1.0** Inflow=87.61 cfs 9.173 af
Primary=87.61 cfs 9.173 af

**Link L E 4.0: L E 4.0** Inflow=9.77 cfs 1.676 af
Primary=9.77 cfs 1.676 af

**Link L W 10.0: L W 10.0** Inflow=6.56 cfs 0.501 af
Primary=6.56 cfs 0.501 af

**Link L W 2.0: L W 2.0** Inflow=6.60 cfs 0.785 af
Primary=6.60 cfs 0.785 af

**Link L W 3.0: L W 3.0** Inflow=15.81 cfs 1.083 af
Primary=15.81 cfs 1.083 af

**Link L W 9.0: L W 9.0** Inflow=25.75 cfs 2.661 af
Primary=25.75 cfs 2.661 af

**Link L Well 1.1B: L Well 1.1B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2A: L Well 1.2A**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2B: L Well 1.2B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2C: L Well 1.2C**
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 130.598 ac Runoff Volume = 24.143 af Average Runoff Depth = 2.22"**
**93.35% Pervious = 121.914 ac 6.65% Impervious = 8.684 ac**

## Summary for Subcatchment E 1.0: (blank)

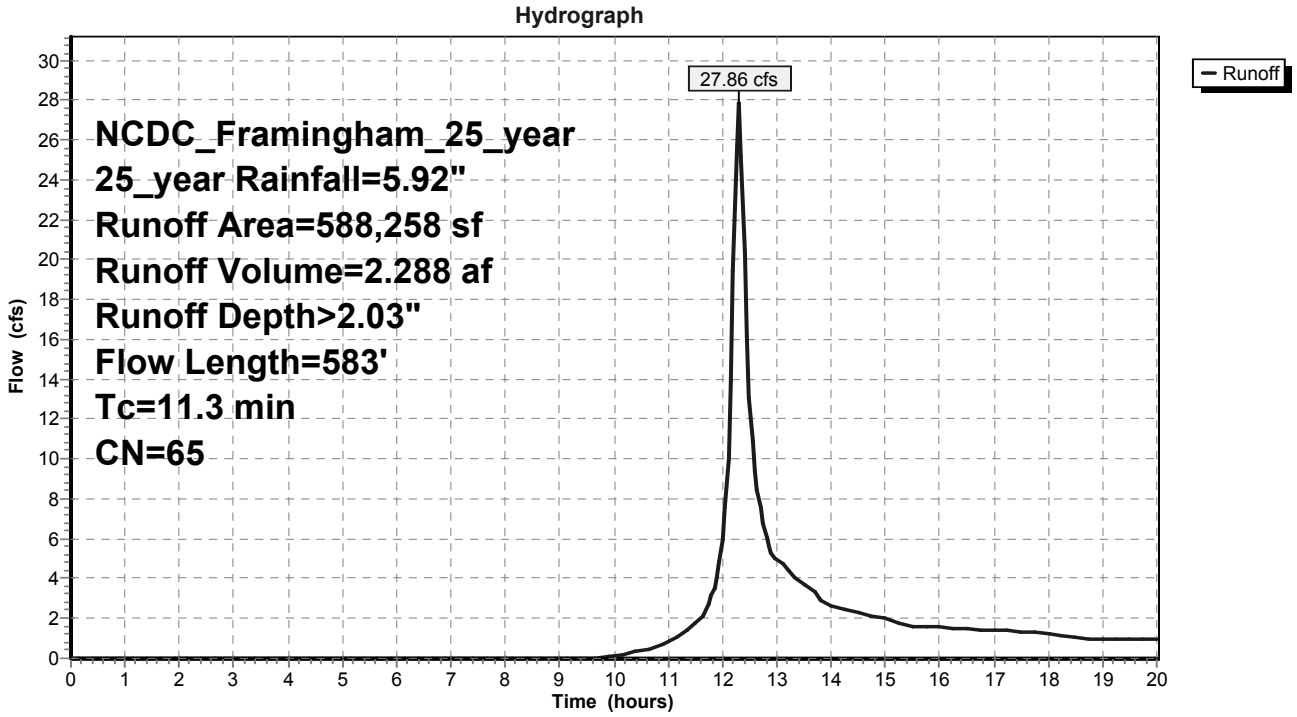
Runoff = 27.86 cfs @ 12.30 hrs, Volume= 2.288 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

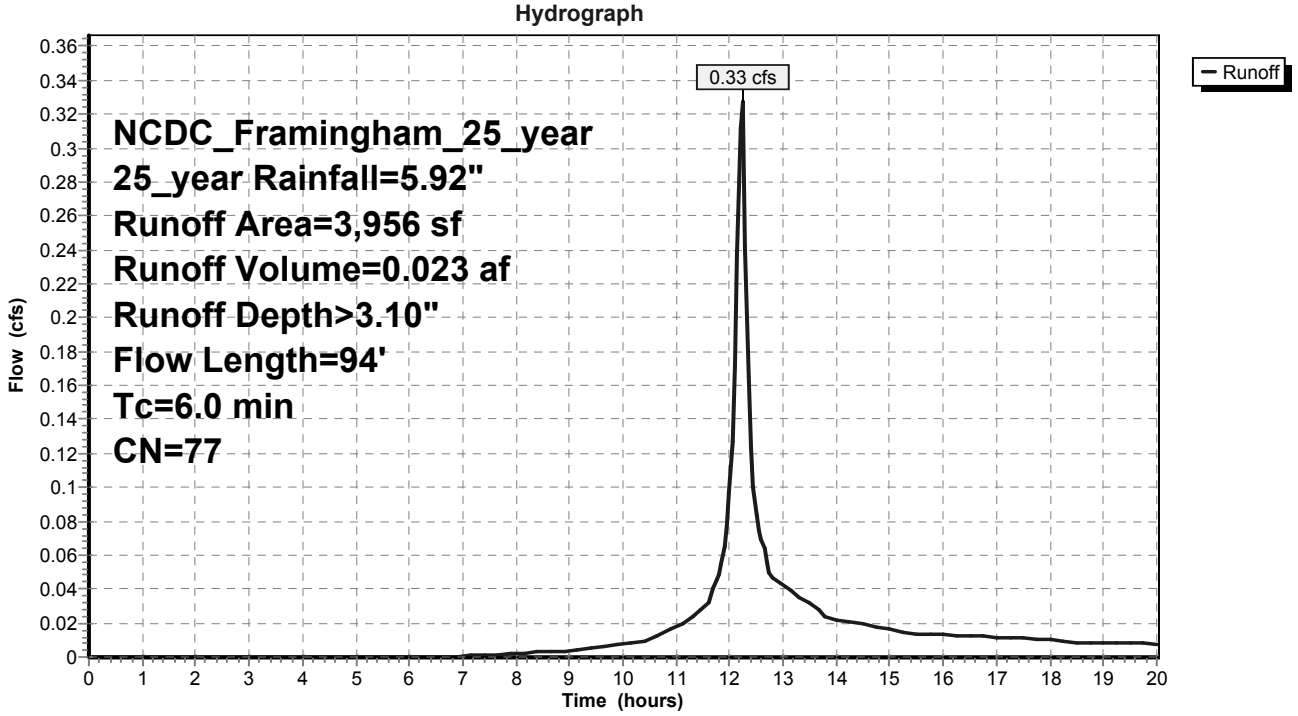
Runoff = 0.33 cfs @ 12.23 hrs, Volume= 0.023 af, Depth> 3.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: (blank)

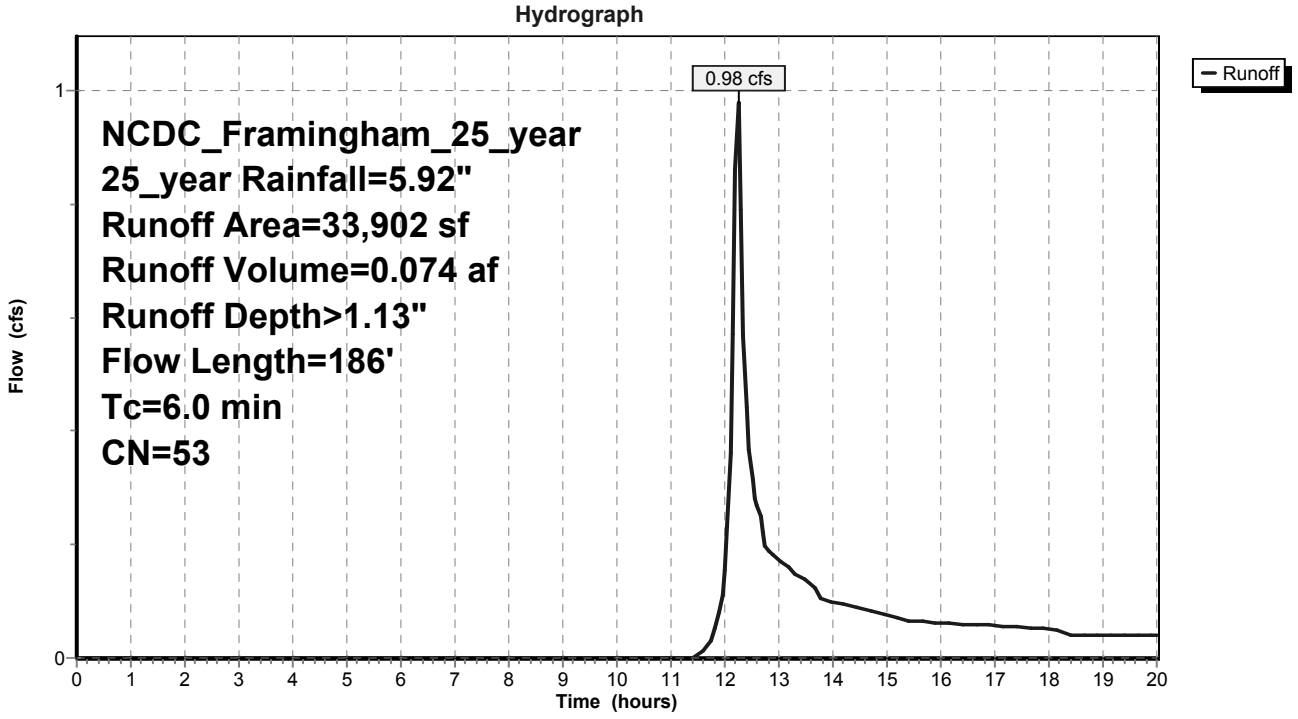
Runoff = 0.98 cfs @ 12.24 hrs, Volume= 0.074 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,518 | 39 | GRASS, 0% imperv, HSG A |
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 13,308 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,902 | 53 | Weighted Average |
| | 25,252 | | 74.49% Pervious Area |
| | 8,650 | | 25.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.5 | 34 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.5 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: (blank)



## Summary for Subcatchment E 1.0C: (blank)

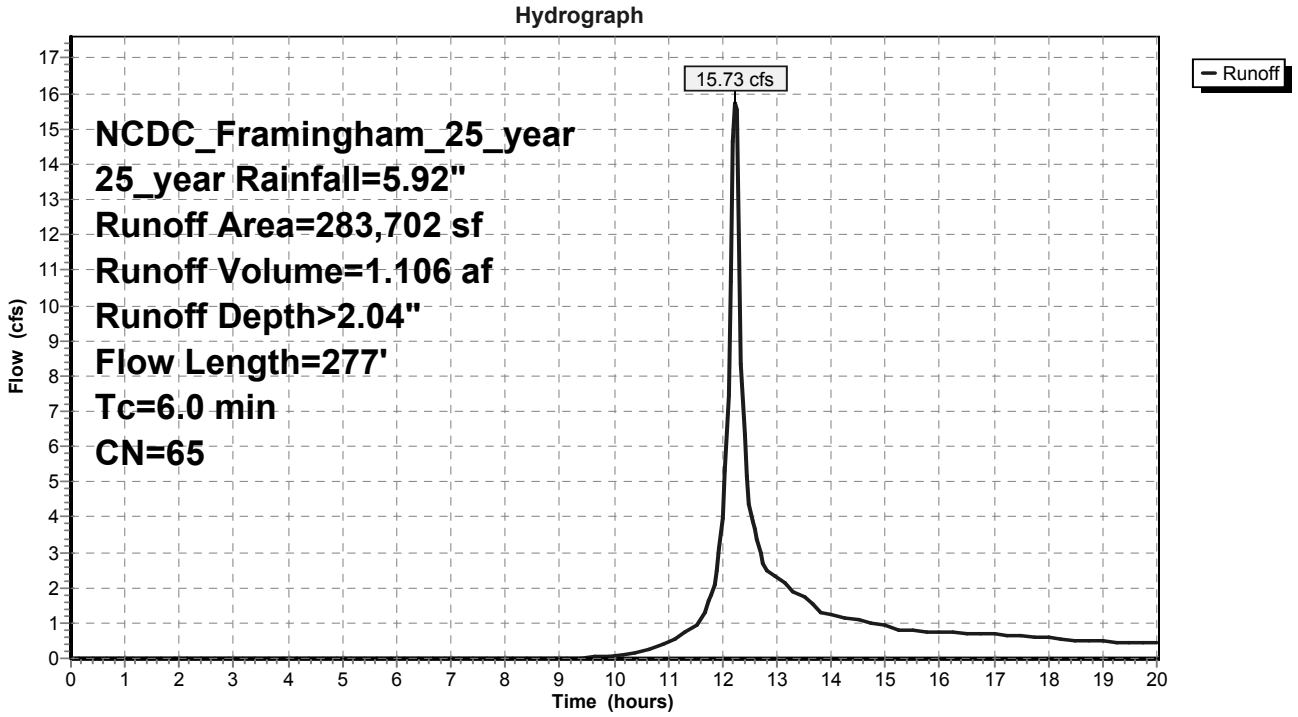
Runoff = 15.73 cfs @ 12.23 hrs, Volume= 1.106 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

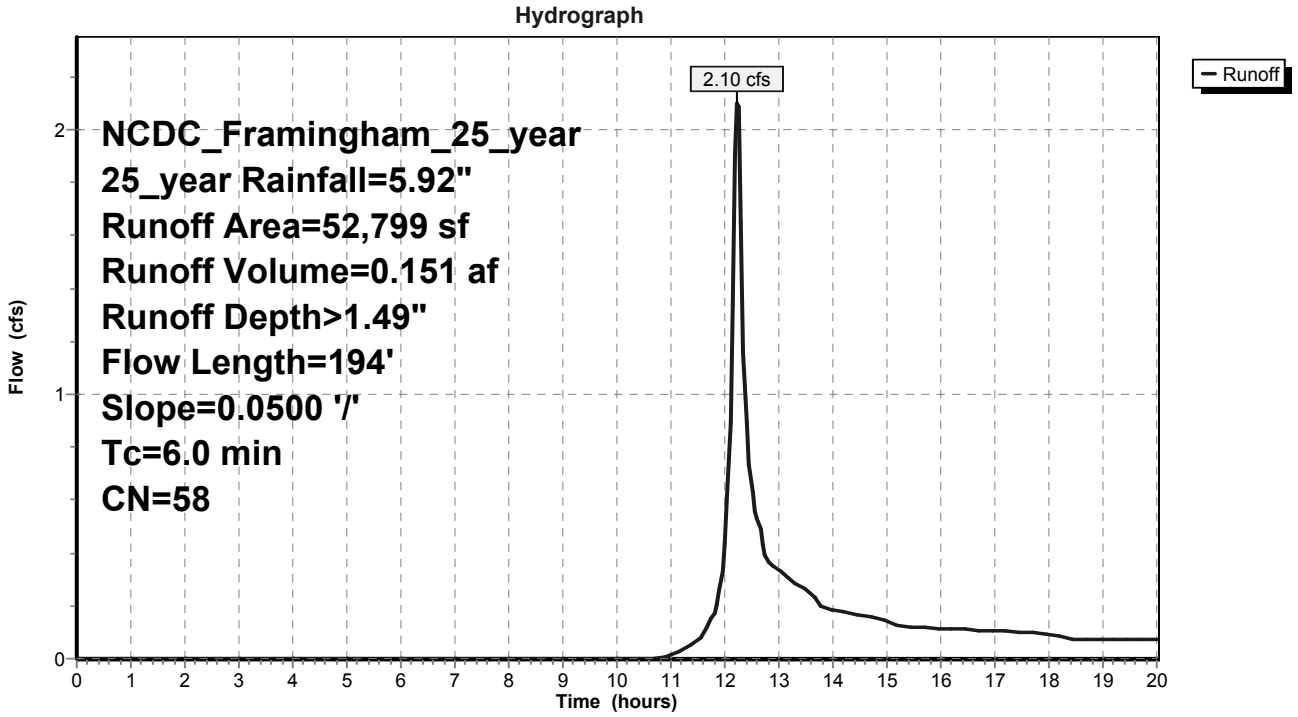
Runoff = 2.10 cfs @ 12.24 hrs, Volume= 0.151 af, Depth> 1.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

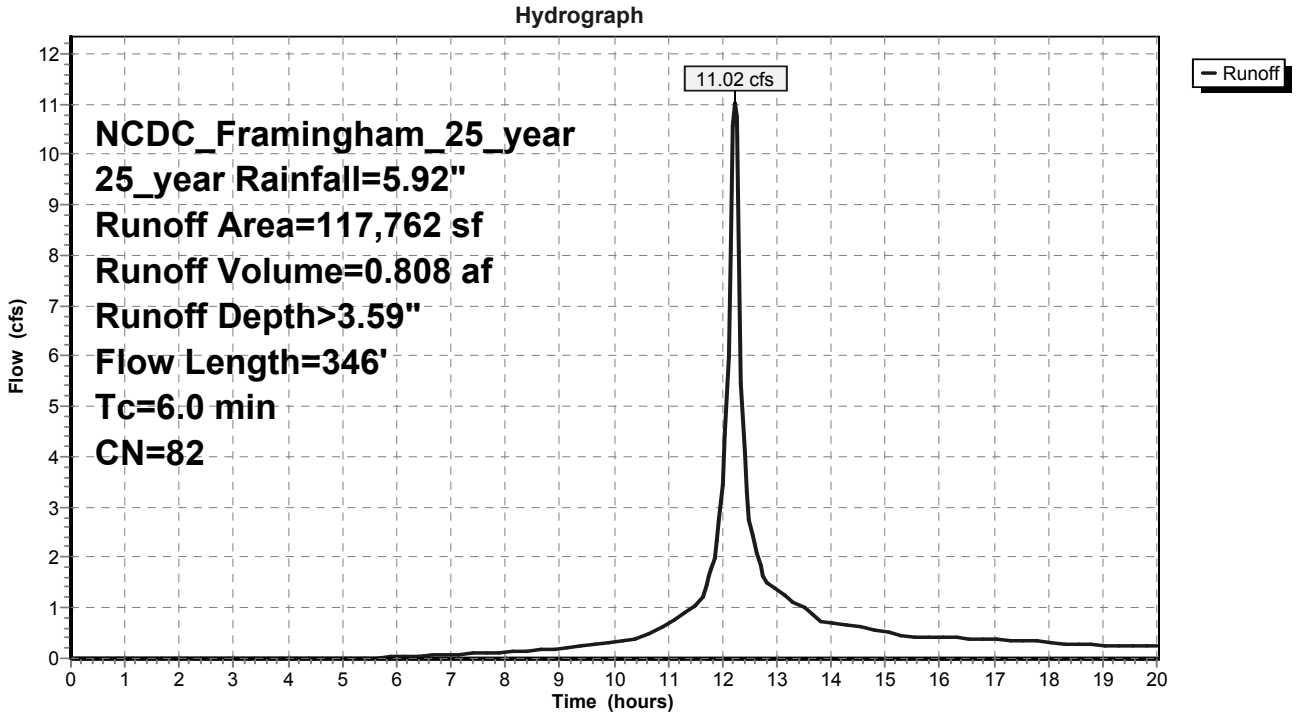
Runoff = 11.02 cfs @ 12.23 hrs, Volume= 0.808 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

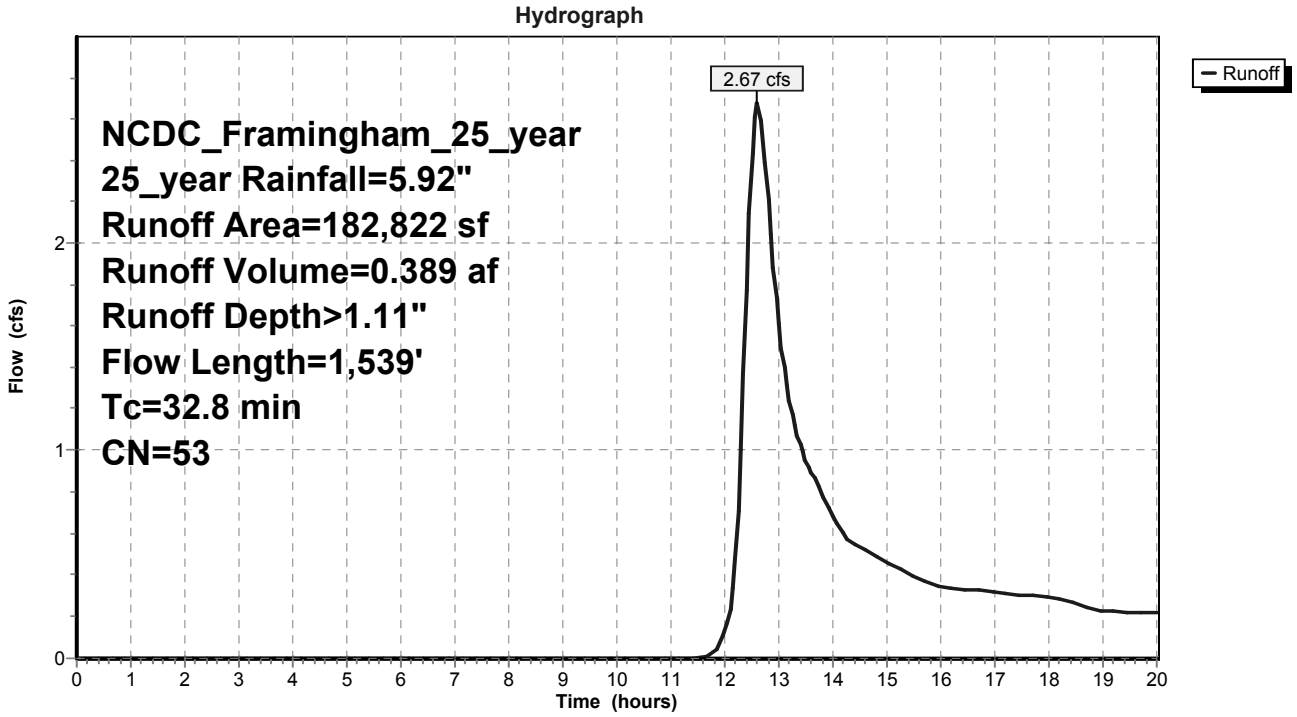
Runoff = 2.67 cfs @ 12.61 hrs, Volume= 0.389 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

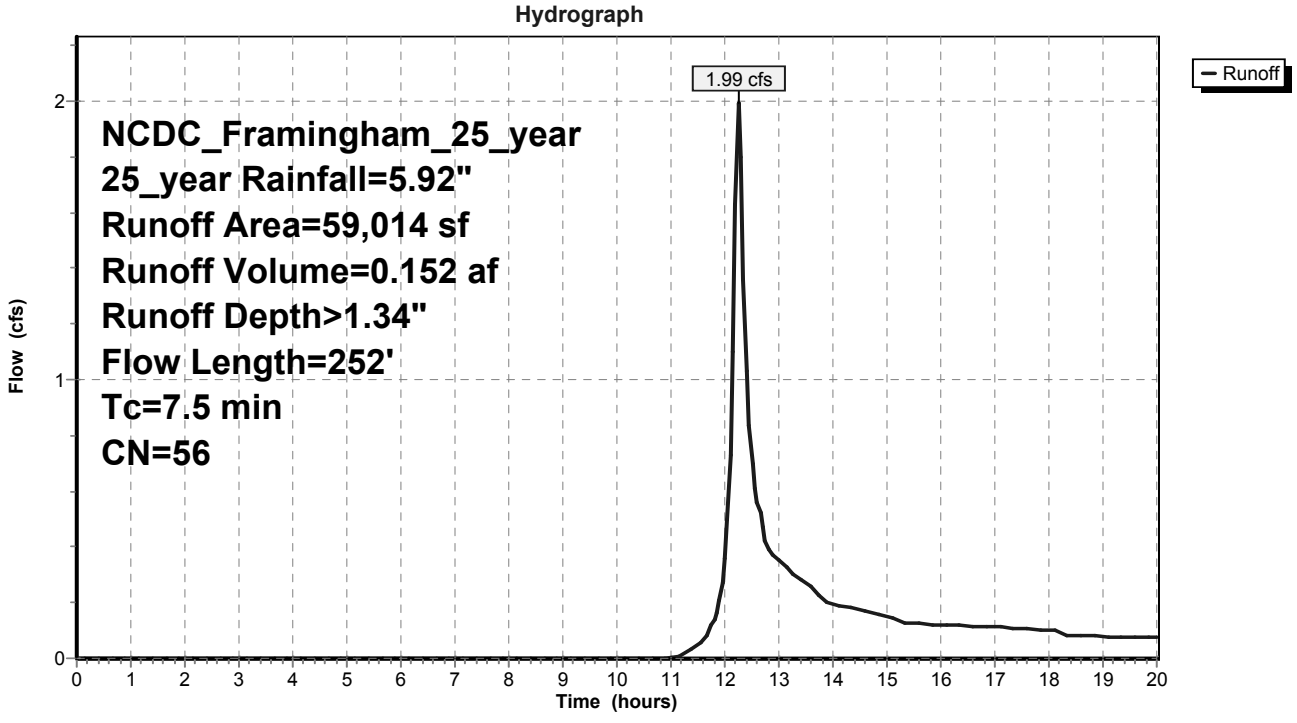
Runoff = 1.99 cfs @ 12.26 hrs, Volume= 0.152 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

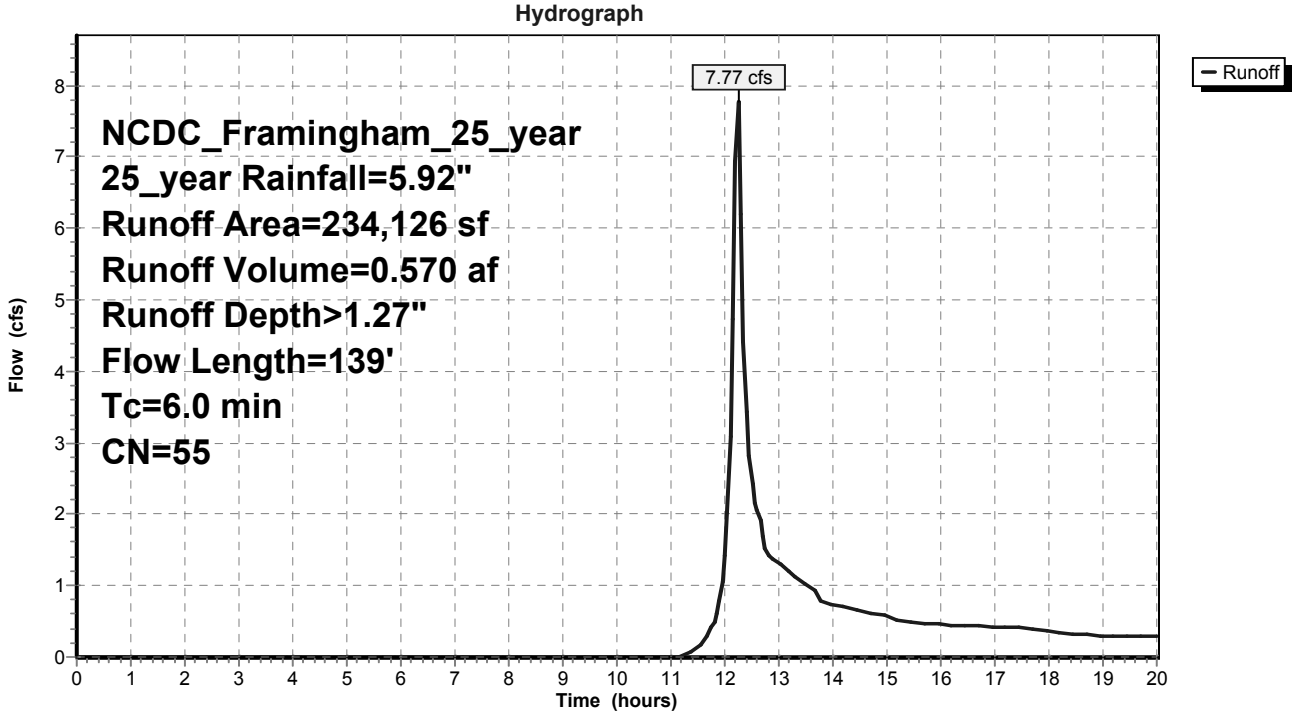
Runoff = 7.77 cfs @ 12.24 hrs, Volume= 0.570 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



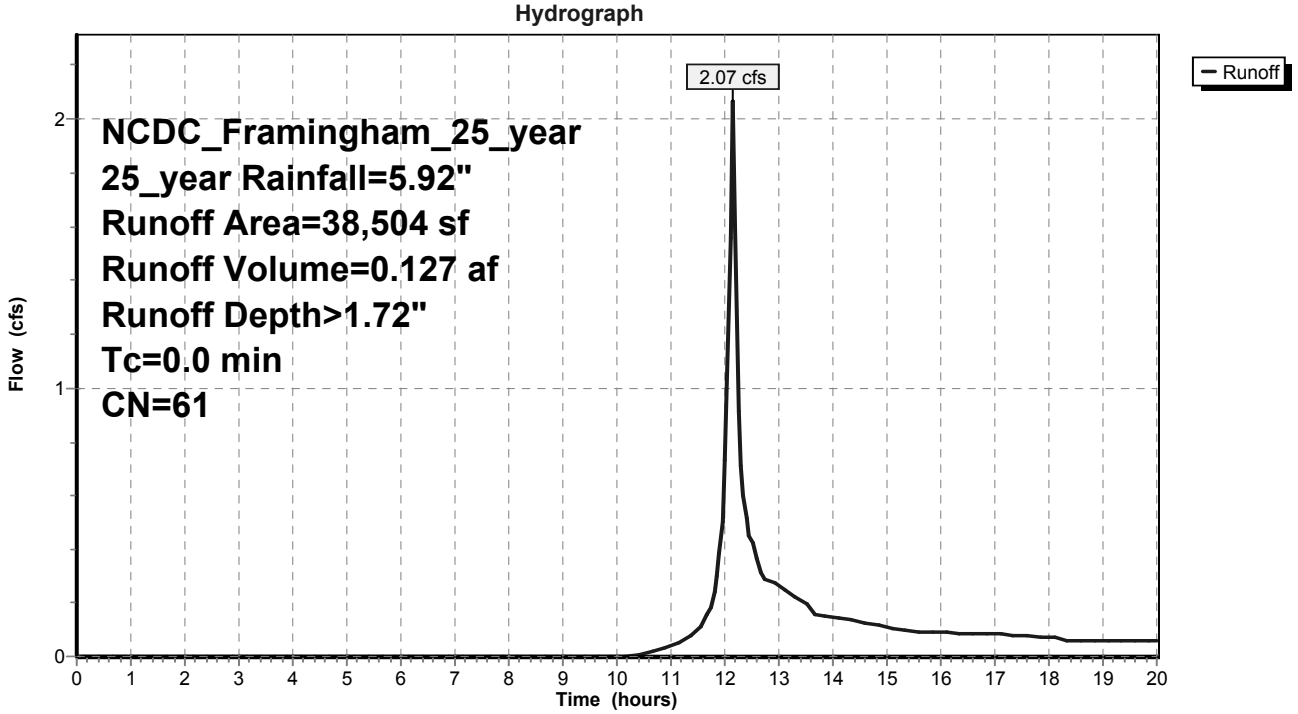
## Summary for Subcatchment E 1.1B-4: (blank)

Runoff = 2.07 cfs @ 12.15 hrs, Volume= 0.127 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,690 | 39 | GRASS, 0% imperv, HSG A |
| * | 34,430 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 55 | WOODS, 0% imperv, HSG B |
| * | 398 | 98 | DECK, 100% imperv, HSG B |
| * | 984 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 38,504 | 61 | Weighted Average |
| | 38,504 | | 100.00% Pervious Area |

## Subcatchment E 1.1B-4: (blank)



## Summary for Subcatchment E 1.2A: (blank)

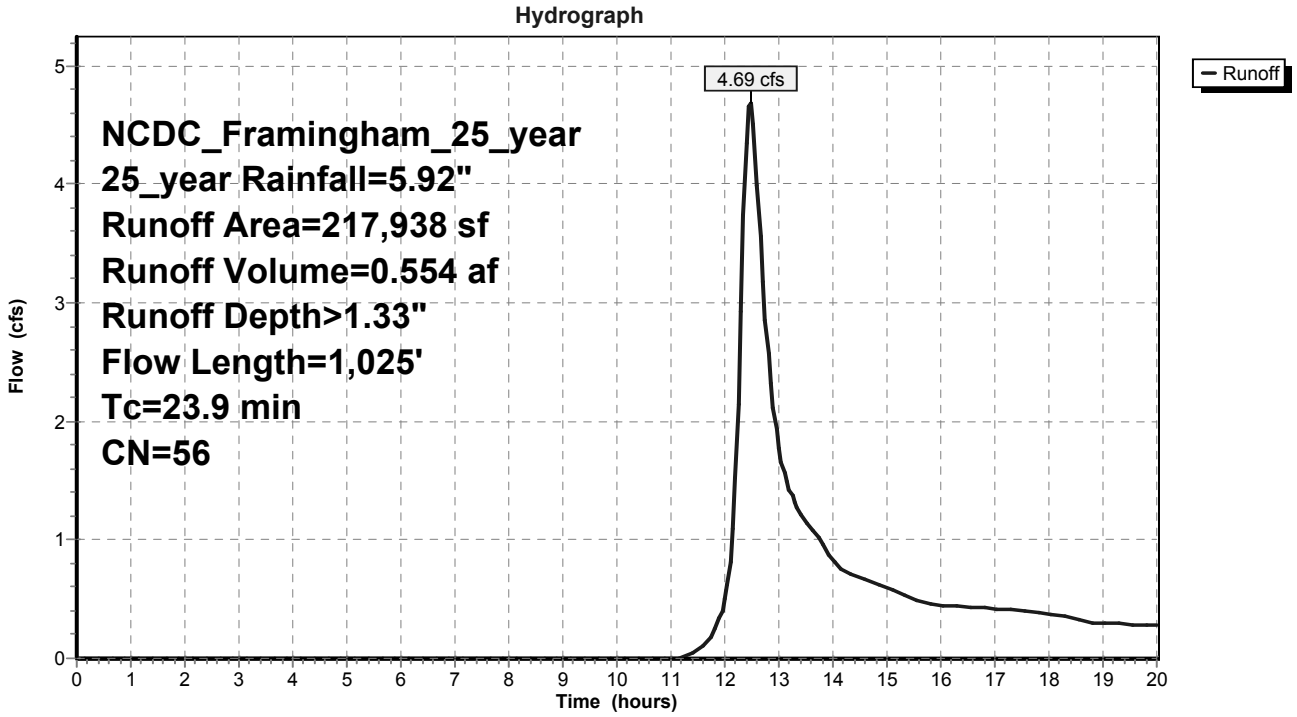
Runoff = 4.69 cfs @ 12.47 hrs, Volume= 0.554 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

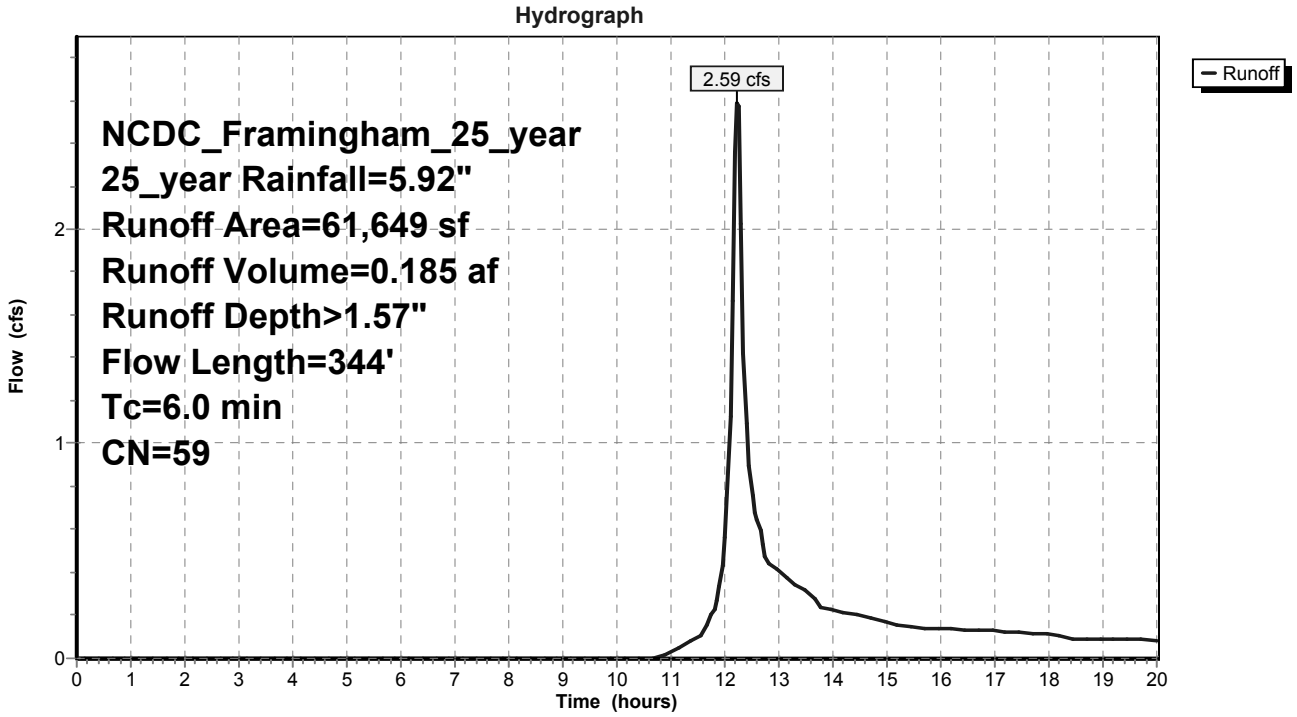
Runoff = 2.59 cfs @ 12.24 hrs, Volume= 0.185 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: (blank)

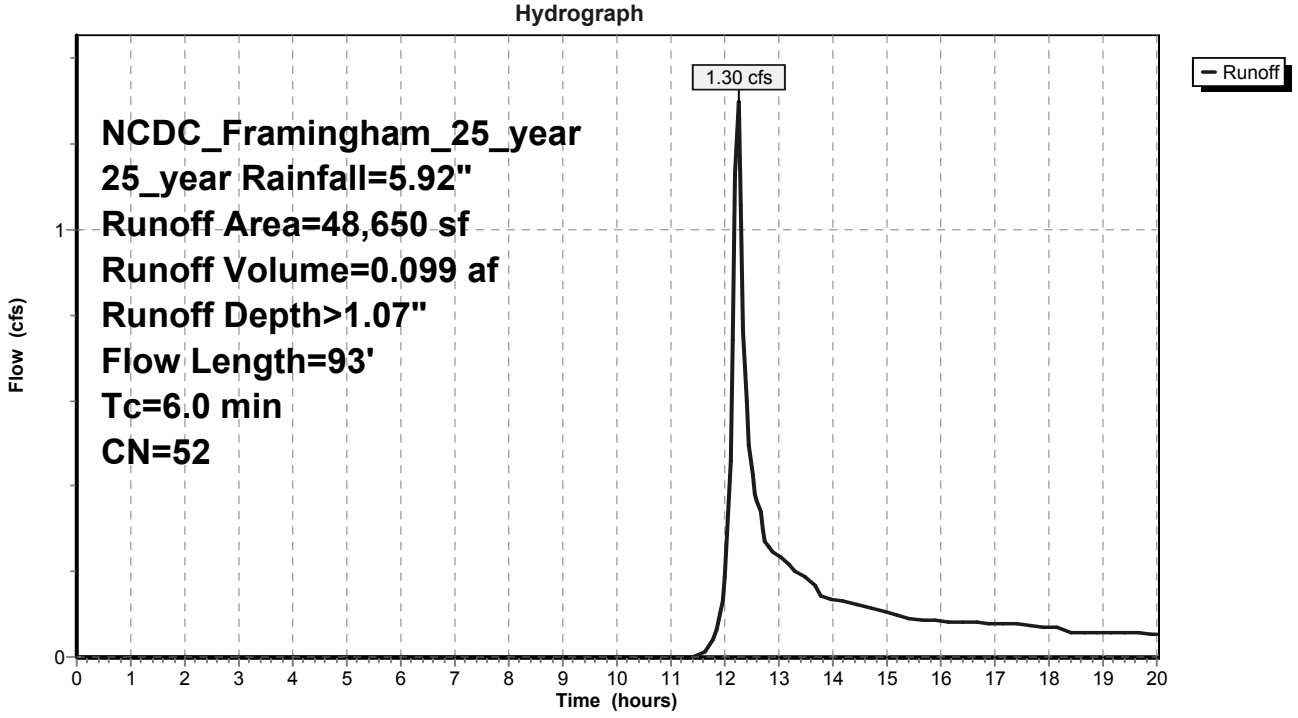
Runoff = 1.30 cfs @ 12.25 hrs, Volume= 0.099 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,296 | 39 | GRASS, 0% imperv, HSG A |
| * | 28,321 | 61 | GRASS, 0% imperv, HSG B |
| * | 1 | 30 | WOODS, 0% imperv, HSG A |
| * | 24 | 55 | WOODS, 0% imperv, HSG B |
| * | 0 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG B |
| | 48,650 | 52 | Weighted Average |
| | 48,646 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.8 | 50 | 0.1251 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 43 | 0.1289 | 2.51 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.1 | 93 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-2: (blank)



## Summary for Subcatchment E 1.2B: (blank)

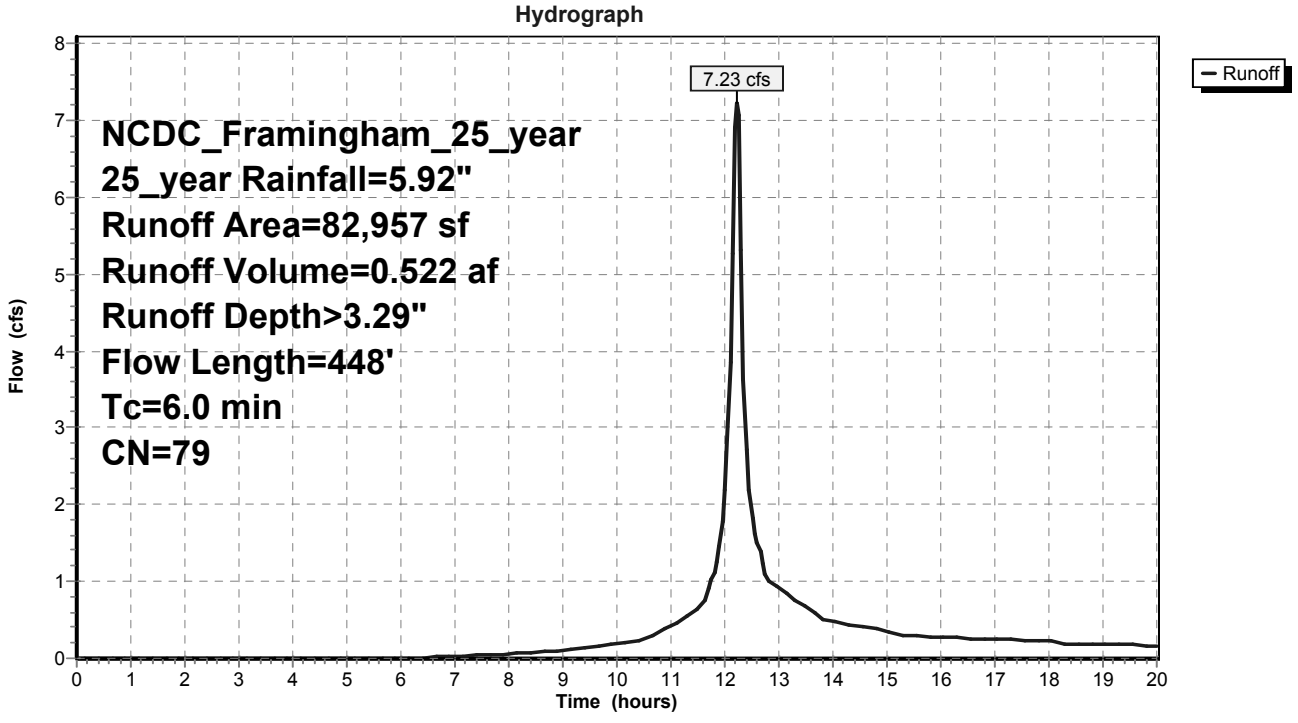
Runoff = 7.23 cfs @ 12.23 hrs, Volume= 0.522 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: (blank)

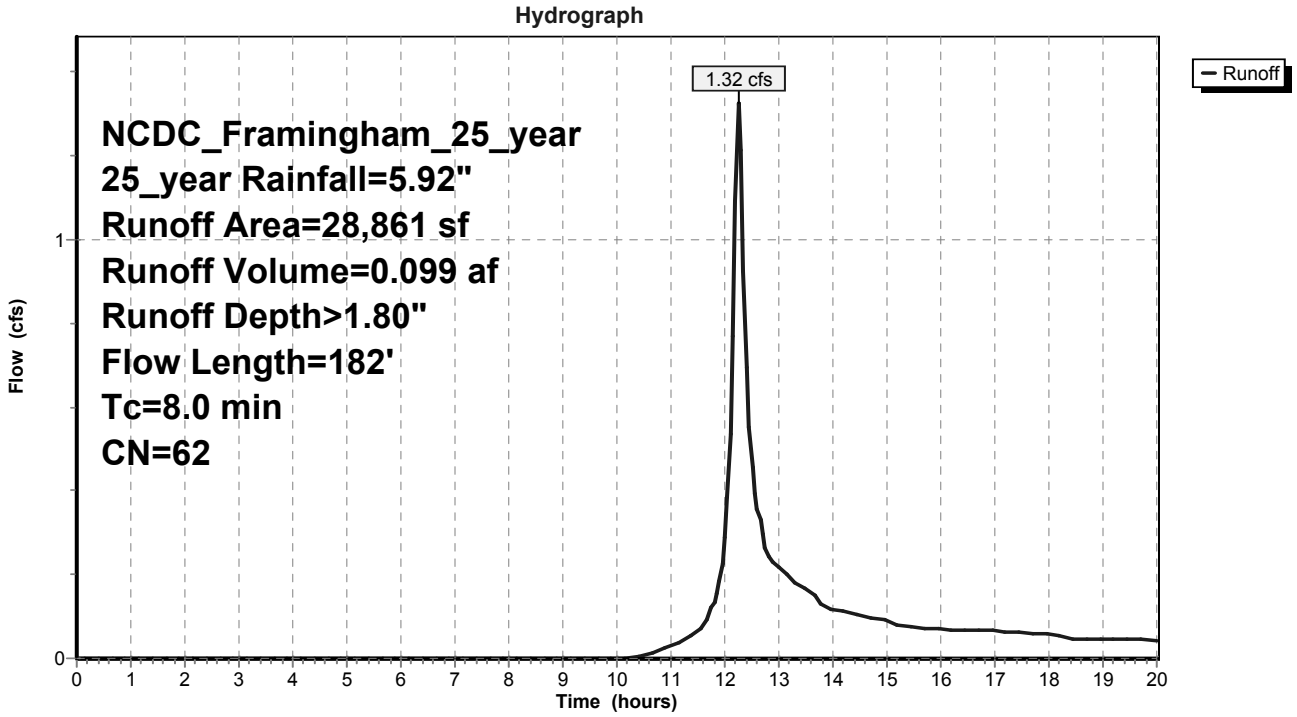
Runoff = 1.32 cfs @ 12.26 hrs, Volume= 0.099 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,232 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,162 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,032 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 145 | 98 | DECK, 100% imperv, HSG B |
| * | 0 | 98 | IMP, 100% imperv, HSG B |
| * | 289 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,861 | 62 | Weighted Average |
| | 28,190 | | 97.68% Pervious Area |
| | 671 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.9 | 50 | 0.0129 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 127 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 3 | 0.0270 | 0.82 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0294 | 2.76 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 182 | Total | | | |

## Subcatchment E 1.2B-1: (blank)



## Summary for Subcatchment E 1.2C: (blank)

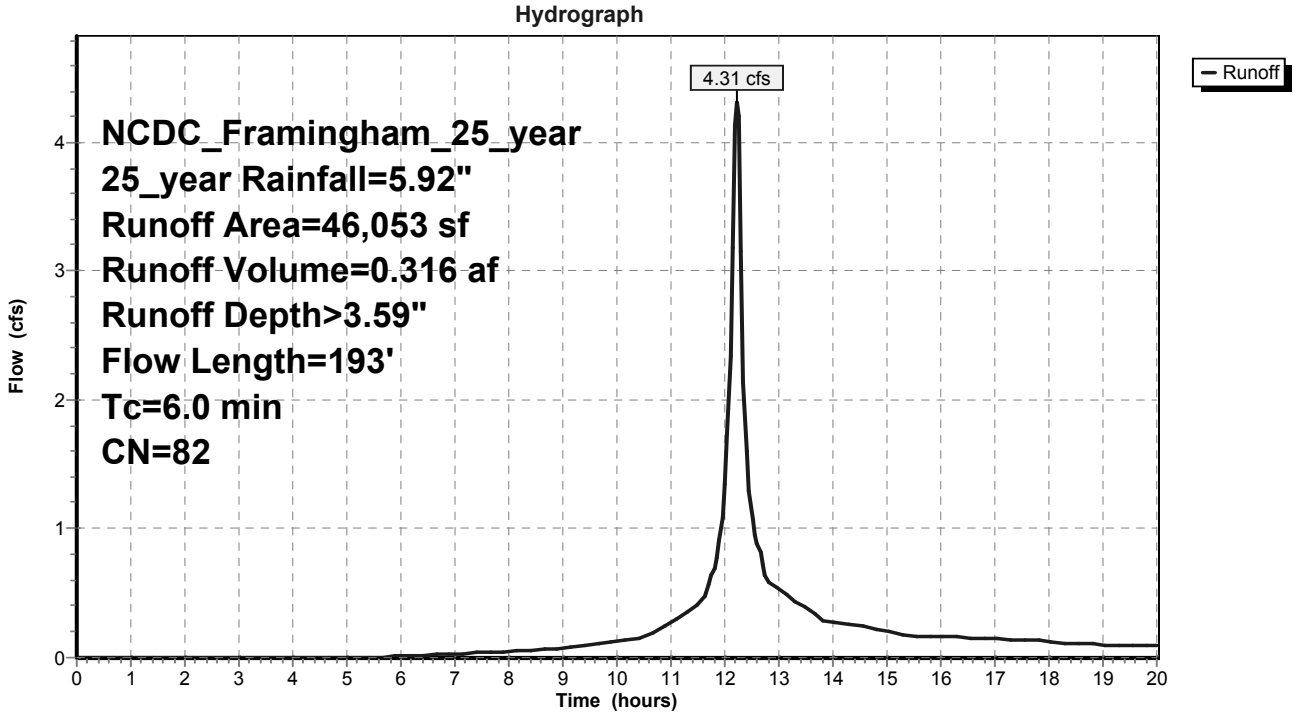
Runoff = 4.31 cfs @ 12.23 hrs, Volume= 0.316 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: (blank)

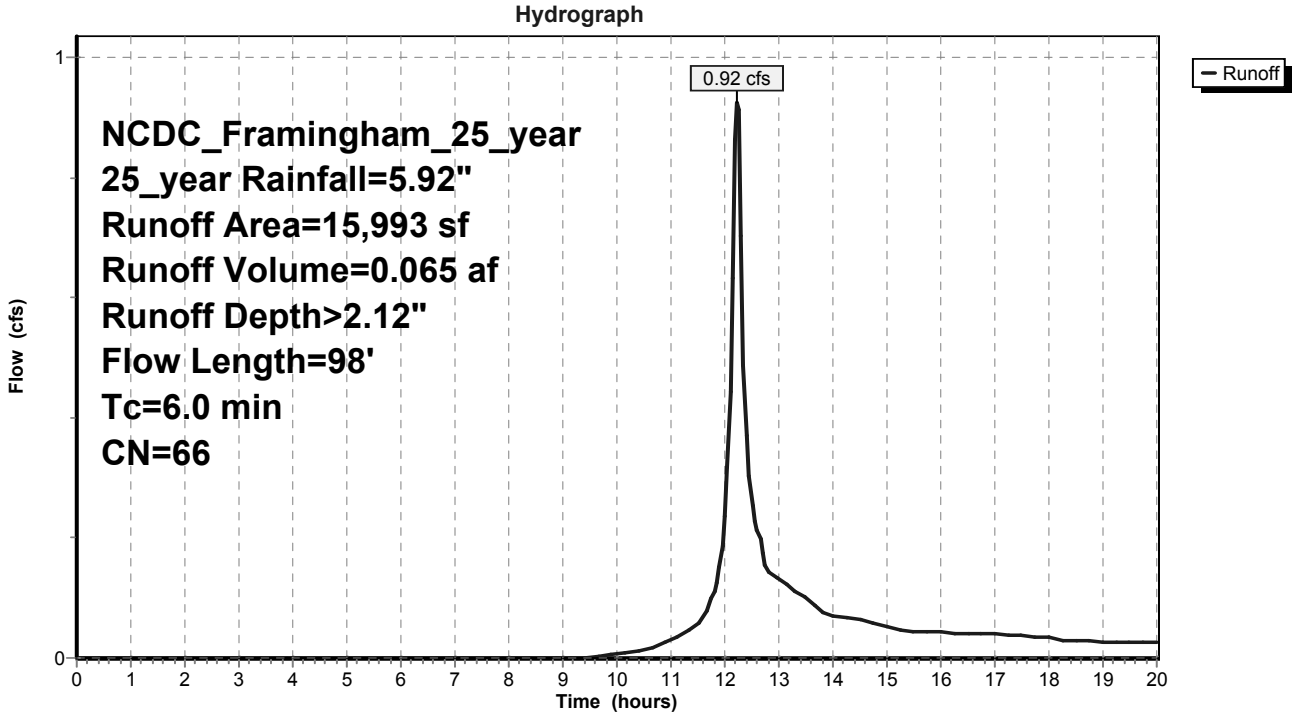
Runoff = 0.92 cfs @ 12.23 hrs, Volume= 0.065 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,637 | 61 | GRASS, 0% imperv, HSG B |
| * | 53 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 449 | 98 | DECK, 100% imperv, HSG B |
| * | 2 | 98 | IMP, 100% imperv, HSG B |
| * | 1,852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 15,993 | 66 | Weighted Average |
| | 15,959 | | 99.79% Pervious Area |
| | 34 | | 0.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.6 | 50 | 0.1160 | 0.32 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 48 | 0.3500 | 2.96 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 98 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: (blank)



## Summary for Subcatchment E 1.2C-2: (blank)

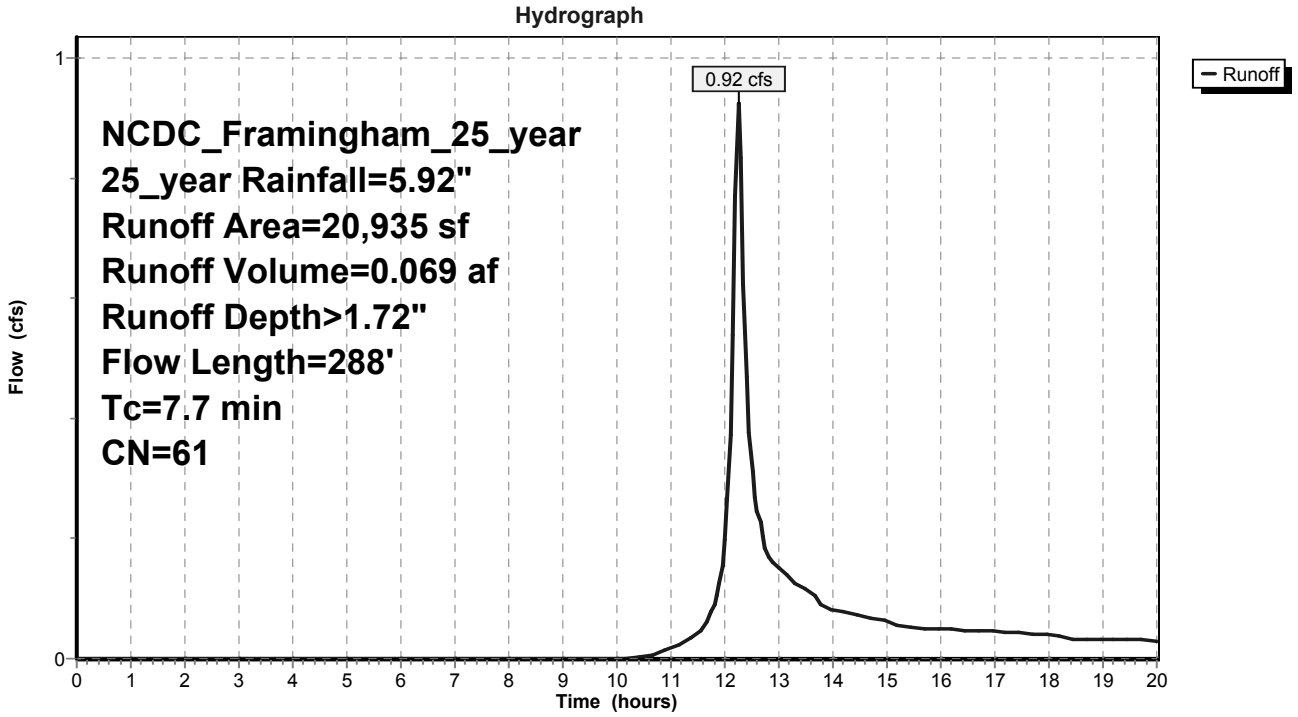
Runoff = 0.92 cfs @ 12.26 hrs, Volume= 0.069 af, Depth> 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,831 | 61 | GRASS, 0% imperv, HSG B |
| * | 99 | 55 | WOODS, 0% imperv, HSG B |
| * | 4 | 98 | ROOF, 100% imperv, HSG B |
| | 20,935 | 61 | Weighted Average |
| | 20,935 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 238 | 0.0295 | 1.20 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 7.7 | 288 | Total | | | |

## Subcatchment E 1.2C-2: (blank)



## Summary for Subcatchment E 1.3A: (blank)

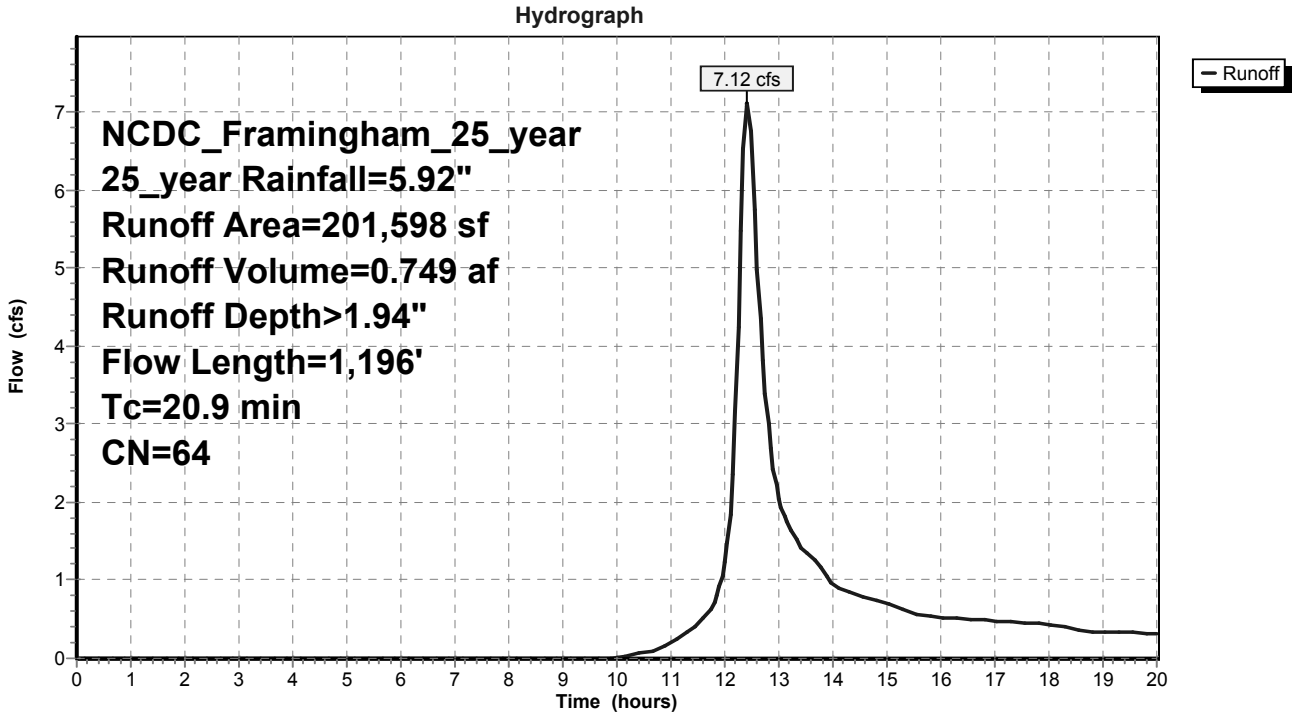
Runoff = 7.12 cfs @ 12.42 hrs, Volume= 0.749 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,522 | 39 | GRASS, 0% imperv, HSG A |
| * | 23,999 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 4,288 | 30 | WOODS, 0% imperv, HSG A |
| * | 61,112 | 55 | WOODS, 0% imperv, HSG B |
| * | 82,137 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 201,598 | 64 | Weighted Average |
| | 141,195 | | 70.04% Pervious Area |
| | 60,402 | | 29.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 1 | 1.6445 | 6.41 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 12 | 0.0806 | 4.57 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 54 | 0.0186 | 0.68 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.9 | 1,196 | Total | | | |

## Subcatchment E 1.3A: (blank)



## Summary for Subcatchment E 4.0: (blank)

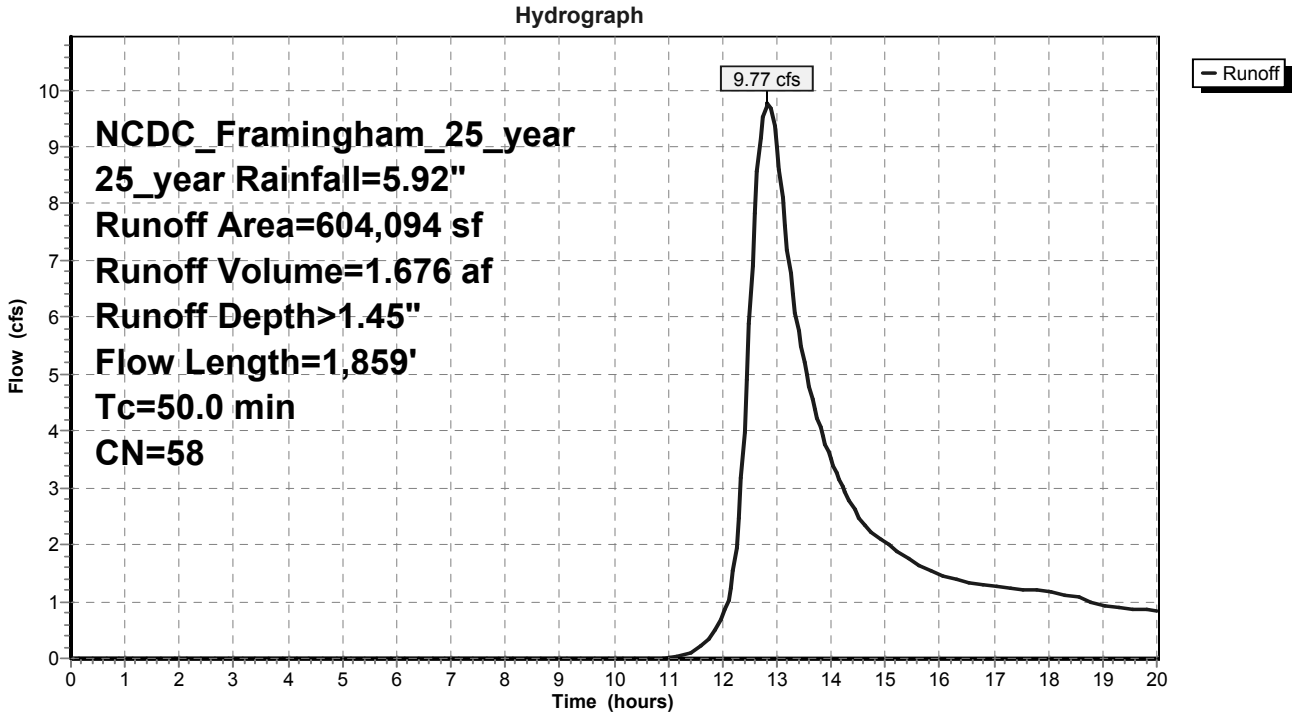
Runoff = 9.77 cfs @ 12.84 hrs, Volume= 1.676 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 82,277 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 20,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,226 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,230 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 100% imperv, HSG A |
| * | 6,325 | 98 | Water, 100% imperv, HSG C |
| * | 12,063 | 98 | Water, 100% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 604,094 | 58 | Weighted Average |
| | 545,526 | | 90.30% Pervious Area |
| | 58,568 | | 9.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 6.5 | 194 | 0.0399 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 17.3 | 227 | 0.0076 | 0.22 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 50.0 | 1,859 | Total | | | |

## Subcatchment E 4.0: (blank)



## Summary for Subcatchment E-CULV-S: (blank)

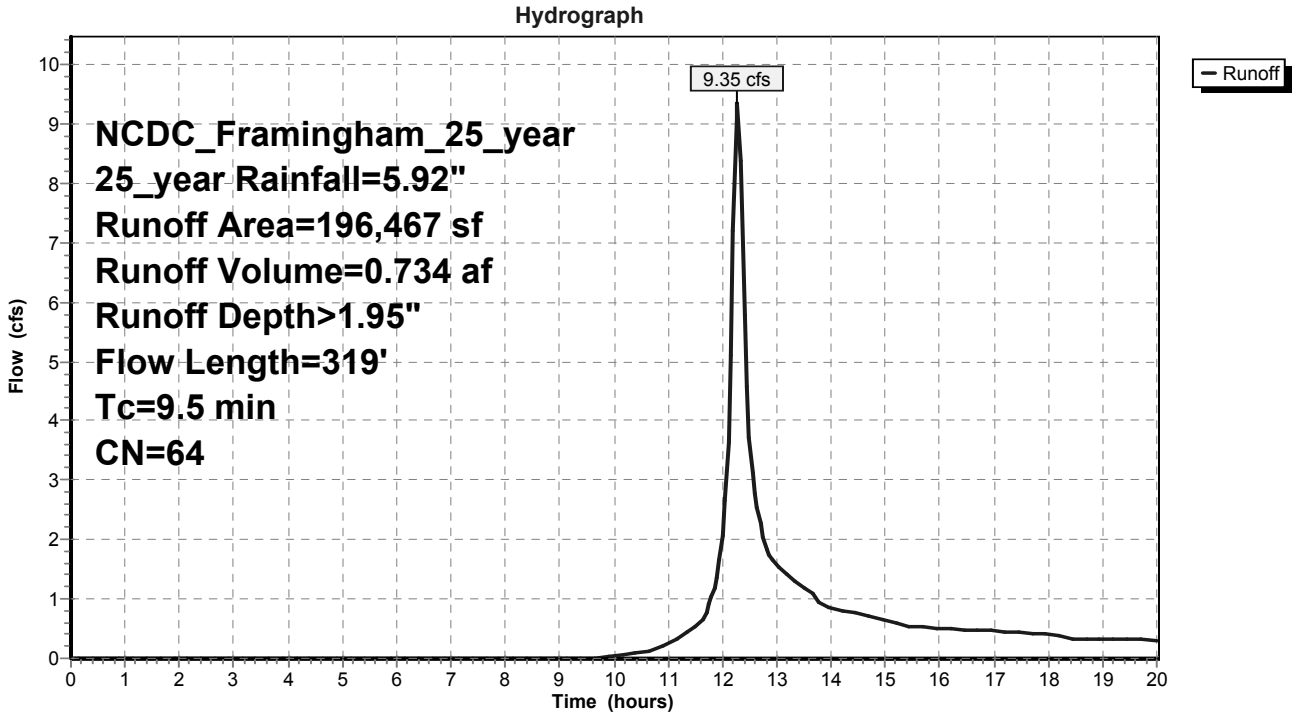
Runoff = 9.35 cfs @ 12.28 hrs, Volume= 0.734 af, Depth> 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,373 | 39 | GRASS, 0% imperv, HSG A |
| * | 153,204 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,809 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 18,529 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 8 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 196,467 | 64 | Weighted Average |
| | 194,642 | | 99.07% Pervious Area |
| | 1,826 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 128 | 0.1151 | 2.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 141 | 0.0163 | 2.59 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 9.5 | 319 | Total | | | |

## Subcatchment E-CULV-S: (blank)



## Summary for Subcatchment RG-E-1: (blank)

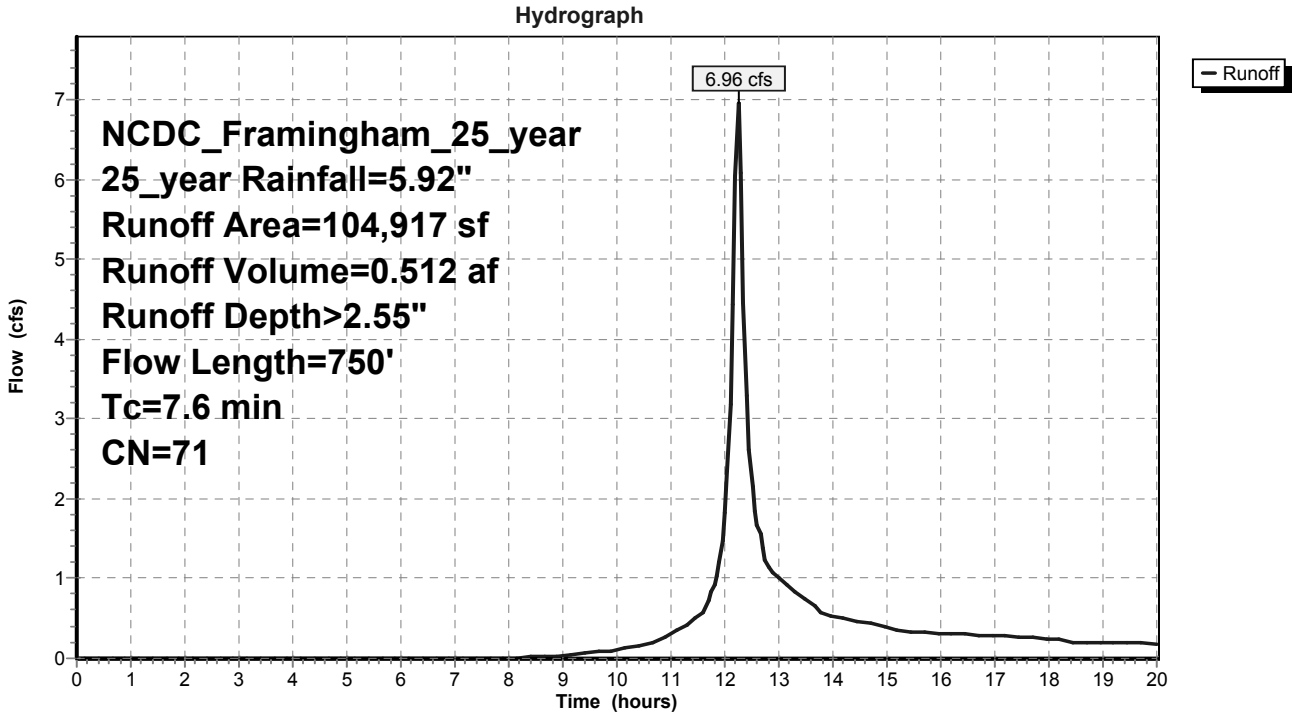
Runoff = 6.96 cfs @ 12.25 hrs, Volume= 0.512 af, Depth> 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 54,529 | 61 | GRASS, 0% imperv, HSG B |
| * | 171 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 98 | DECK, 100% imperv, HSG A |
| * | 700 | 98 | DECK, 100% imperv, HSG B |
| * | 3,592 | 98 | IMP, 100% imperv, HSG A |
| * | 29,105 | 98 | IMP, 100% imperv, HSG B |
| * | 27 | 98 | ROOF, 100% imperv, HSG B |
| * | 262 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,962 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 104,917 | 71 | Weighted Average |
| | 104,917 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2000 | 0.36 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.3 | 700 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.6 | 750 | Total | | | |

## Subcatchment RG-E-1: (blank)



## Summary for Subcatchment RG-E-2: (blank)

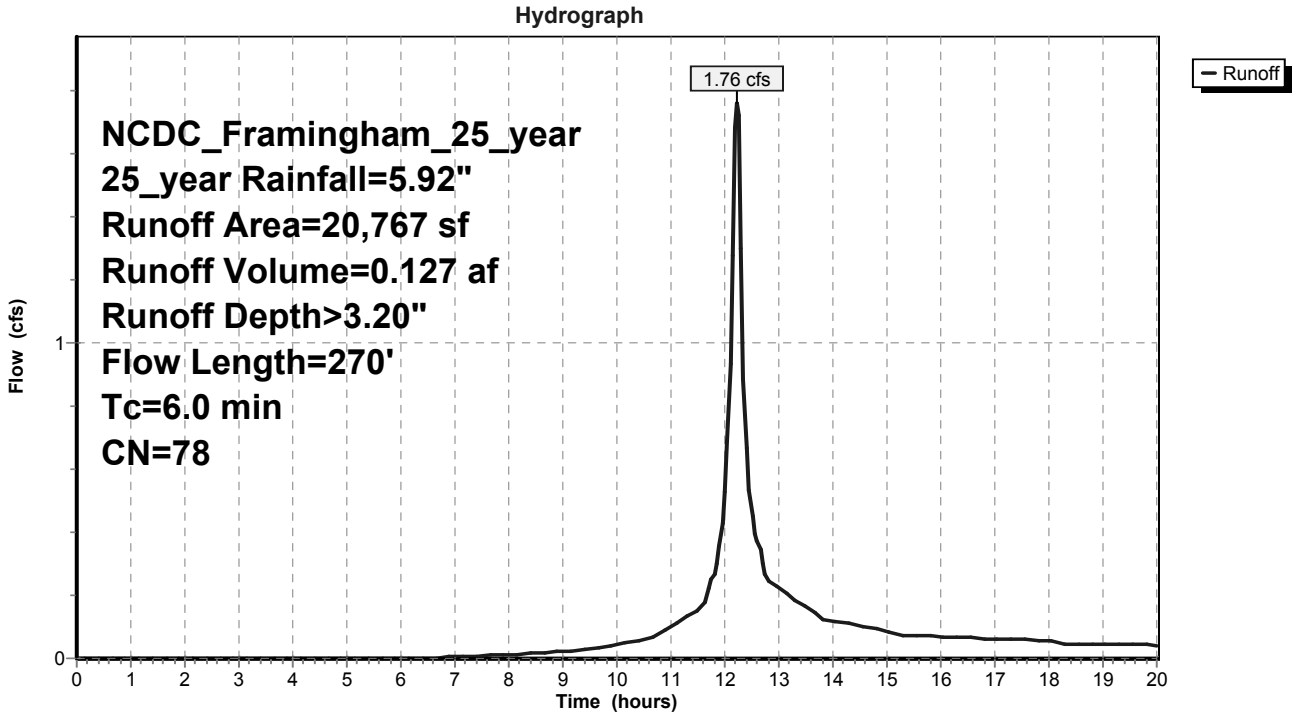
Runoff = 1.76 cfs @ 12.23 hrs, Volume= 0.127 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 11,066 | 61 | GRASS, 0% imperv, HSG B |
| * | 27 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 142 | 98 | DECK, 100% imperv, HSG B |
| * | 9,131 | 98 | IMP, 100% imperv, HSG B |
| * | 402 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 20,767 | 78 | Weighted Average |
| | 20,750 | | 99.92% Pervious Area |
| | 18 | | 0.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0110 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 38 | 0.0310 | 3.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 7 | 0.0034 | 0.41 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.9 | 175 | 0.0486 | 1.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.3 | 270 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-2: (blank)



## Summary for Subcatchment RG-E-4A: (blank)

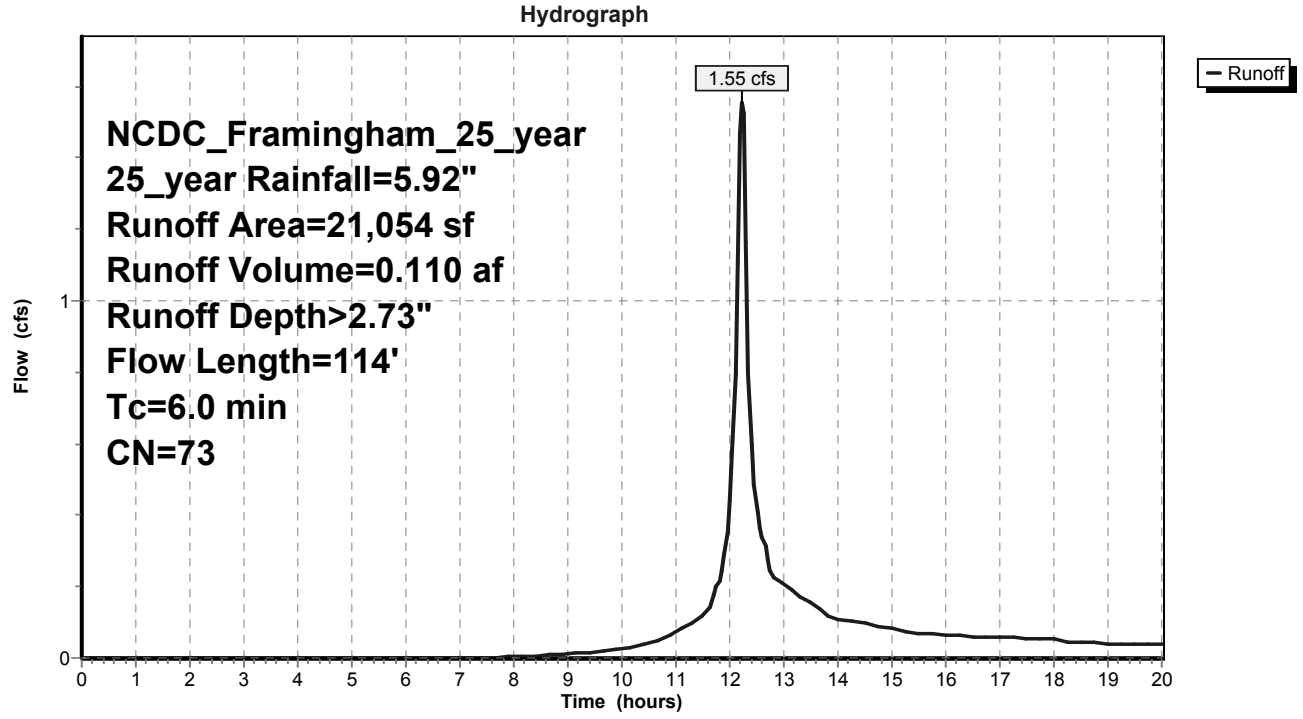
Runoff = 1.55 cfs @ 12.23 hrs, Volume= 0.110 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,476 | 61 | GRASS, 0% imperv, HSG B |
| * | 408 | 98 | DECK, 100% imperv, HSG B |
| * | 4,883 | 98 | IMP, 100% imperv, HSG B |
| * | 1,286 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 21,054 | 73 | Weighted Average |
| | 21,054 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0344 | 1.44 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 2 | 0.0253 | 3.23 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 62 | 0.0359 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.4 | 114 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4A: (blank)



## Summary for Subcatchment RG-E-4B: (blank)

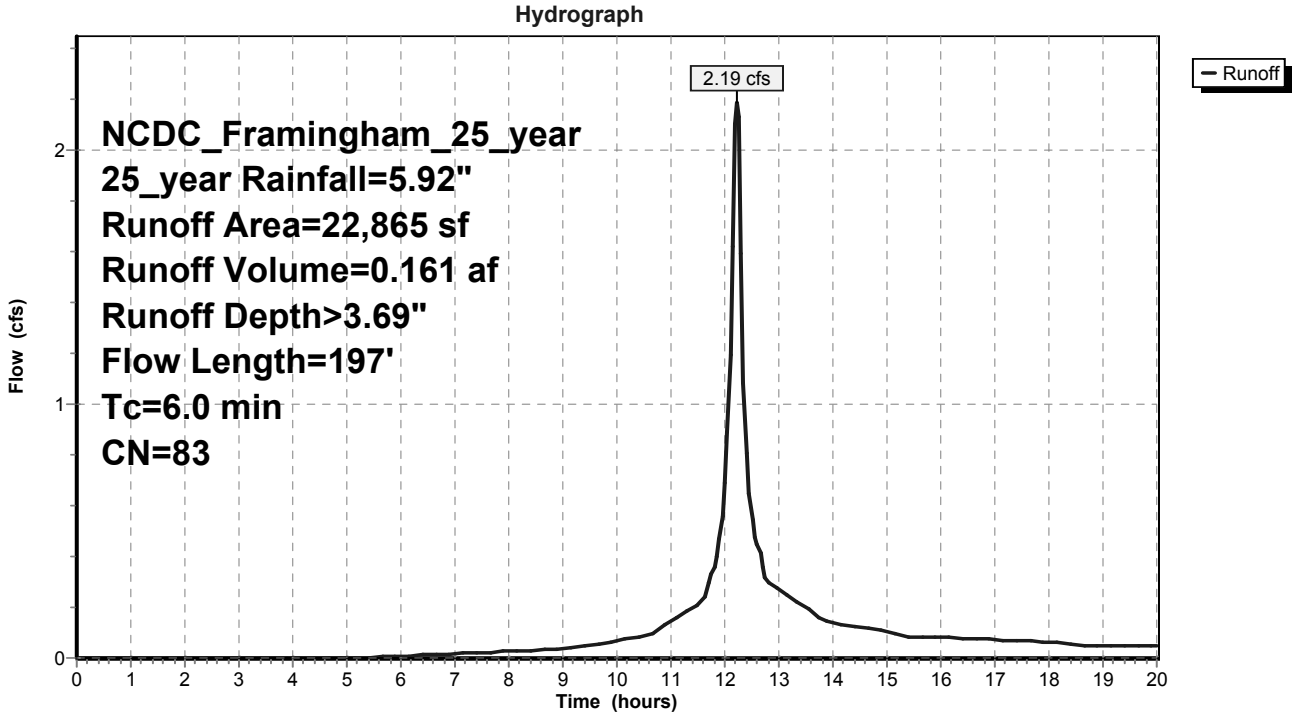
Runoff = 2.19 cfs @ 12.23 hrs, Volume= 0.161 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,428 | 61 | GRASS, 0% imperv, HSG B |
| * | 293 | 98 | DECK, 100% imperv, HSG B |
| * | 11,895 | 98 | IMP, 100% imperv, HSG B |
| * | 1,250 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,865 | 83 | Weighted Average |
| | 22,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.8 | 50 | 0.0137 | 1.00 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.9 | 138 | 0.0142 | 2.42 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.1488 | 2.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.8 | 197 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4B: (blank)



## Summary for Subcatchment RG-E-7: (blank)

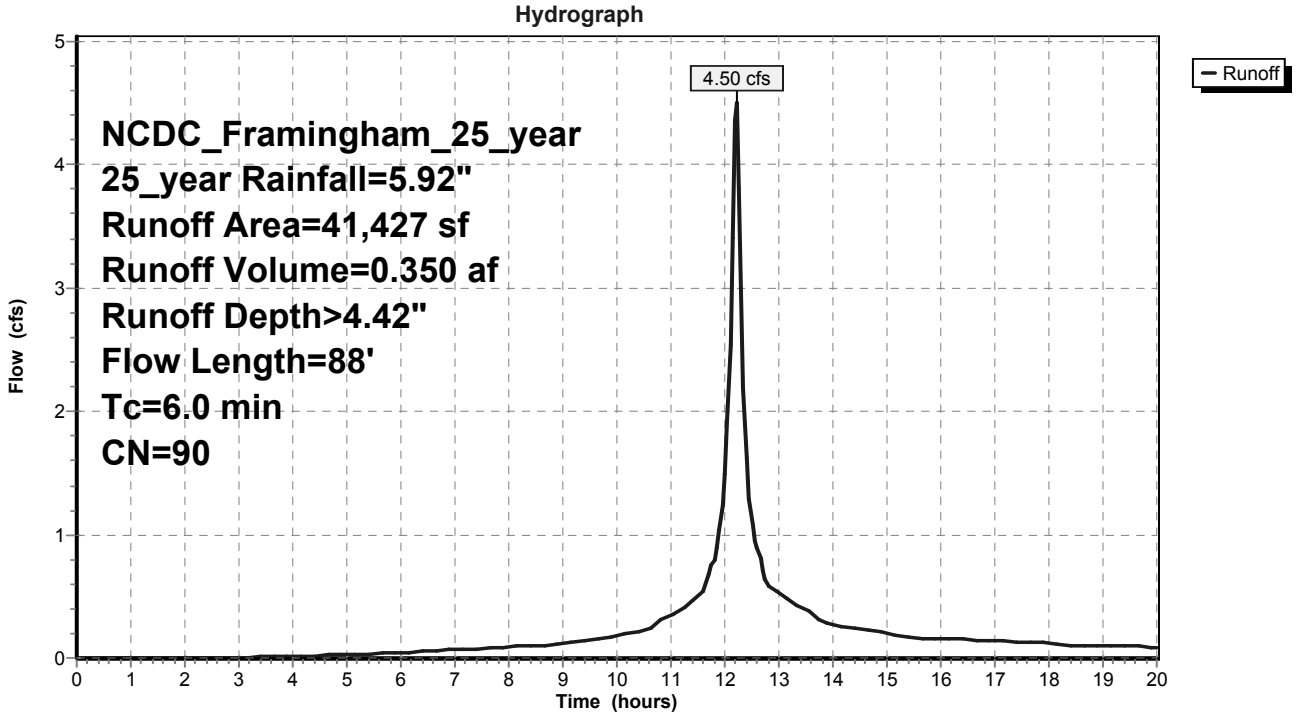
Runoff = 4.50 cfs @ 12.23 hrs, Volume= 0.350 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,373 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,458 | 98 | IMP, 100% imperv, HSG B |
| * | 3,411 | 98 | ROOF, 100% imperv, HSG B |
| * | 185 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 41,427 | 90 | Weighted Average |
| | 41,427 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0269 | 1.31 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 27 | 0.0251 | 3.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 11 | 0.0299 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 88 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-7: (blank)



## Summary for Subcatchment RG-E-8: (blank)

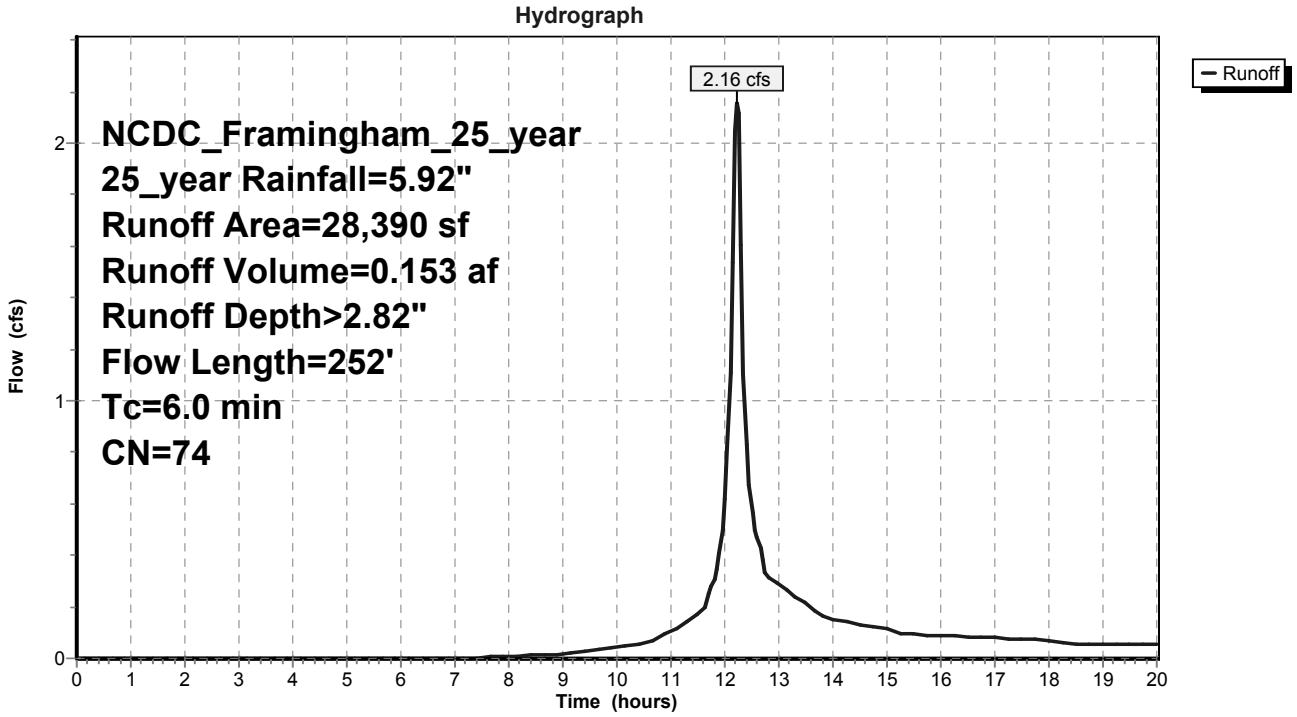
Runoff = 2.16 cfs @ 12.23 hrs, Volume= 0.153 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 18,045 | 61 | GRASS, 0% imperv, HSG B |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 355 | 98 | DECK, 100% imperv, HSG B |
| * | 9,134 | 98 | IMP, 100% imperv, HSG B |
| * | 852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,390 | 74 | Weighted Average |
| | 28,387 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0517 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 32 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0331 | 3.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 51 | 0.0546 | 4.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.1 | 113 | 0.0620 | 1.74 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 252 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-8: (blank)



## Summary for Subcatchment RG-E-9A: (blank)

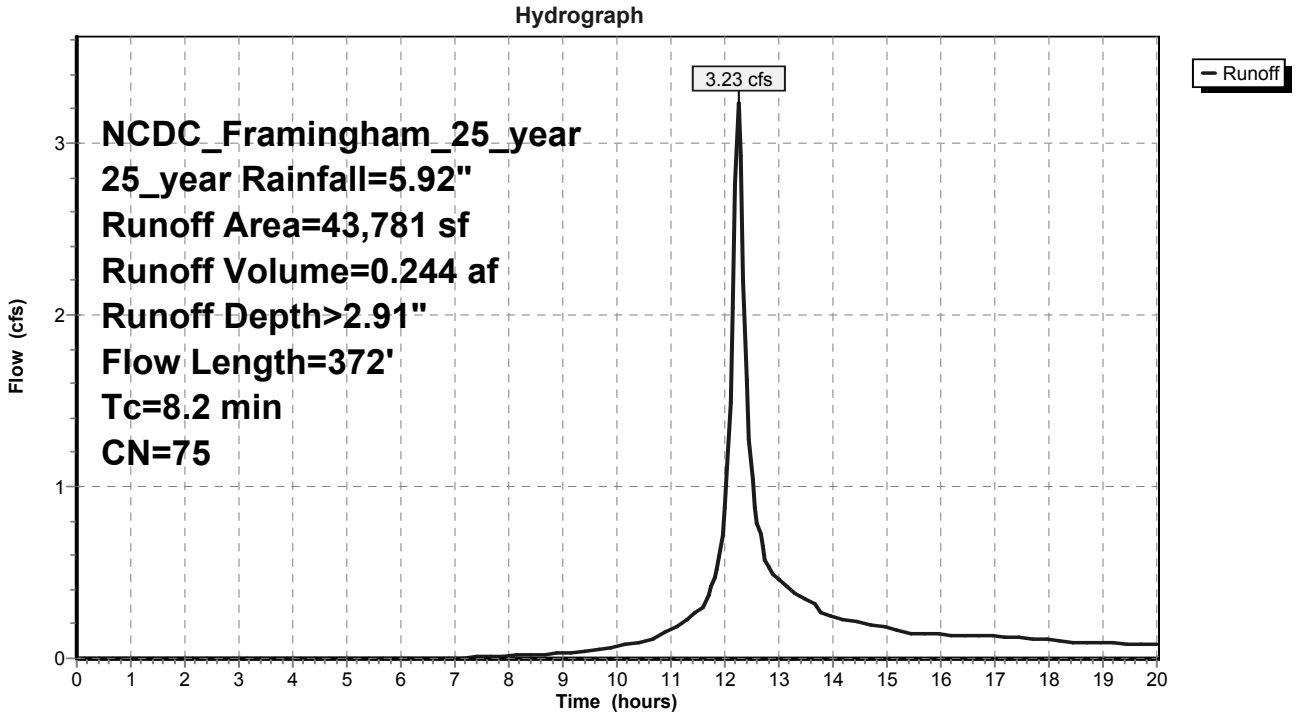
Runoff = 3.23 cfs @ 12.26 hrs, Volume= 0.244 af, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 10,864 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,515 | 61 | GRASS, 0% imperv, HSG B |
| * | 314 | 98 | DECK, 100% imperv, HSG A |
| * | 336 | 98 | DECK, 100% imperv, HSG B |
| * | 5,552 | 98 | IMP, 100% imperv, HSG A |
| * | 13,443 | 98 | IMP, 100% imperv, HSG B |
| * | 800 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 2,957 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 43,781 | 75 | Weighted Average |
| | 43,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 42 | 0.0271 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 8 | 0.0426 | 1.08 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.0 | 158 | 0.0180 | 2.72 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.9 | 65 | 0.0068 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0114 | 5.72 | 4.49 | **Pipe Channel, Smooth surfaces** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 |
| 0.6 | 66 | 0.0646 | 1.78 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.2 | 372 | Total | | | |

## Subcatchment RG-E-9A: (blank)



## Summary for Subcatchment RG-E-9B: (blank)

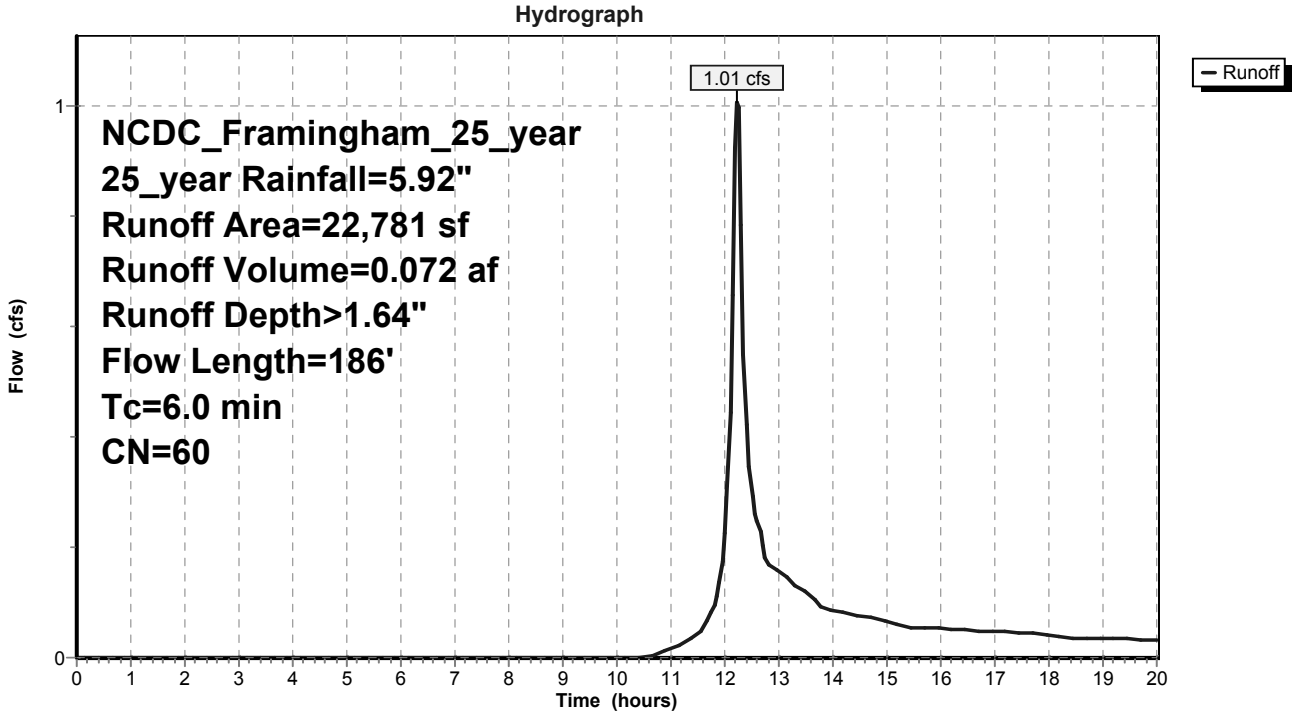
Runoff = 1.01 cfs @ 12.24 hrs, Volume= 0.072 af, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,064 | 39 | GRASS, 0% imperv, HSG A |
| * | 2,638 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 98 | DECK, 100% imperv, HSG A |
| * | 829 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 6,248 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,781 | 60 | Weighted Average |
| | 22,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.4 | 50 | 0.0010 | 0.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.3 | 80 | 0.3019 | 3.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.3 | 56 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.0 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-9B: (blank)



## Summary for Subcatchment RG-W-1: (blank)

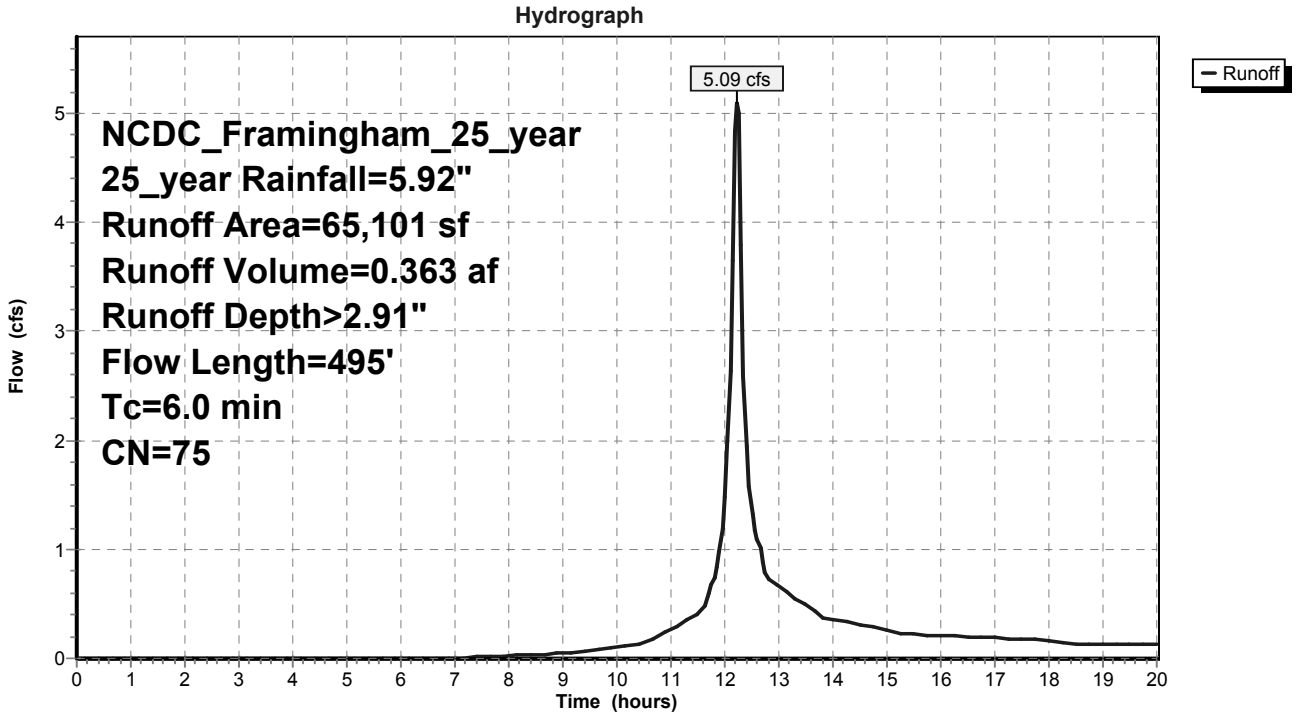
Runoff = 5.09 cfs @ 12.23 hrs, Volume= 0.363 af, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,550 | 39 | GRASS, 0% imperv, HSG A |
| * | 14,690 | 61 | GRASS, 0% imperv, HSG B |
| * | 733 | 98 | DECK, 100% imperv, HSG A |
| * | 379 | 98 | DECK, 100% imperv, HSG B |
| * | 23,694 | 98 | IMP, 100% imperv, HSG A |
| * | 7,512 | 98 | IMP, 100% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,345 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 194 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 65,101 | 75 | Weighted Average |
| | 65,101 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0185 | 1.12 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.8 | 280 | 0.0159 | 2.56 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.3 | 165 | 0.0281 | 1.17 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.8 | 495 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-1: (blank)



## Summary for Subcatchment RG-W-2: (blank)

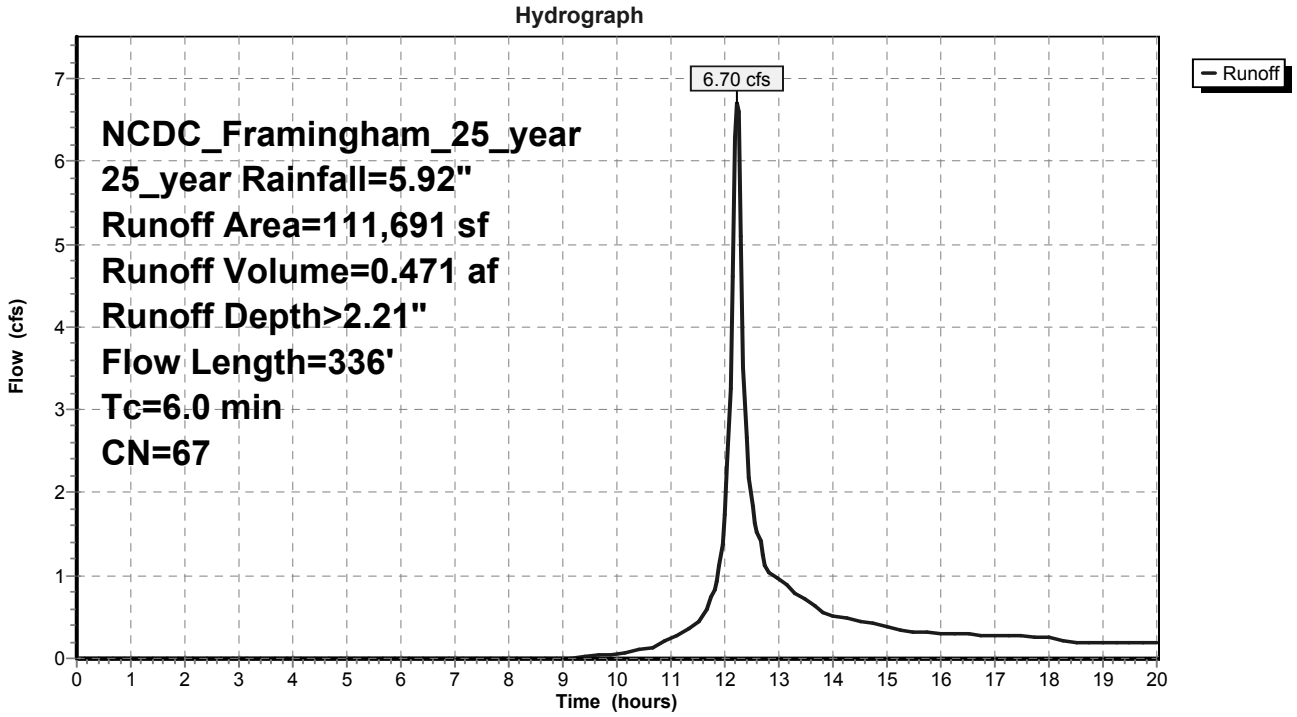
Runoff = 6.70 cfs @ 12.23 hrs, Volume= 0.471 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,818 | 39 | GRASS, 0% imperv, HSG A |
| * | 48,934 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,542 | 98 | DECK, 100% imperv, HSG A |
| * | 2,092 | 98 | DECK, 100% imperv, HSG B |
| * | 10,373 | 98 | IMP, 100% imperv, HSG A |
| * | 19,162 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG A |
| * | 864 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 111,691 | 67 | Weighted Average |
| | 111,691 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.2 | 33 | 0.0376 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 4 | 0.0215 | 0.73 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 13 | 0.0217 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.0 | 274 | 0.0124 | 2.26 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 11 | 0.1347 | 2.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 336 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-2: (blank)



## Summary for Subcatchment RG-W-3: (blank)

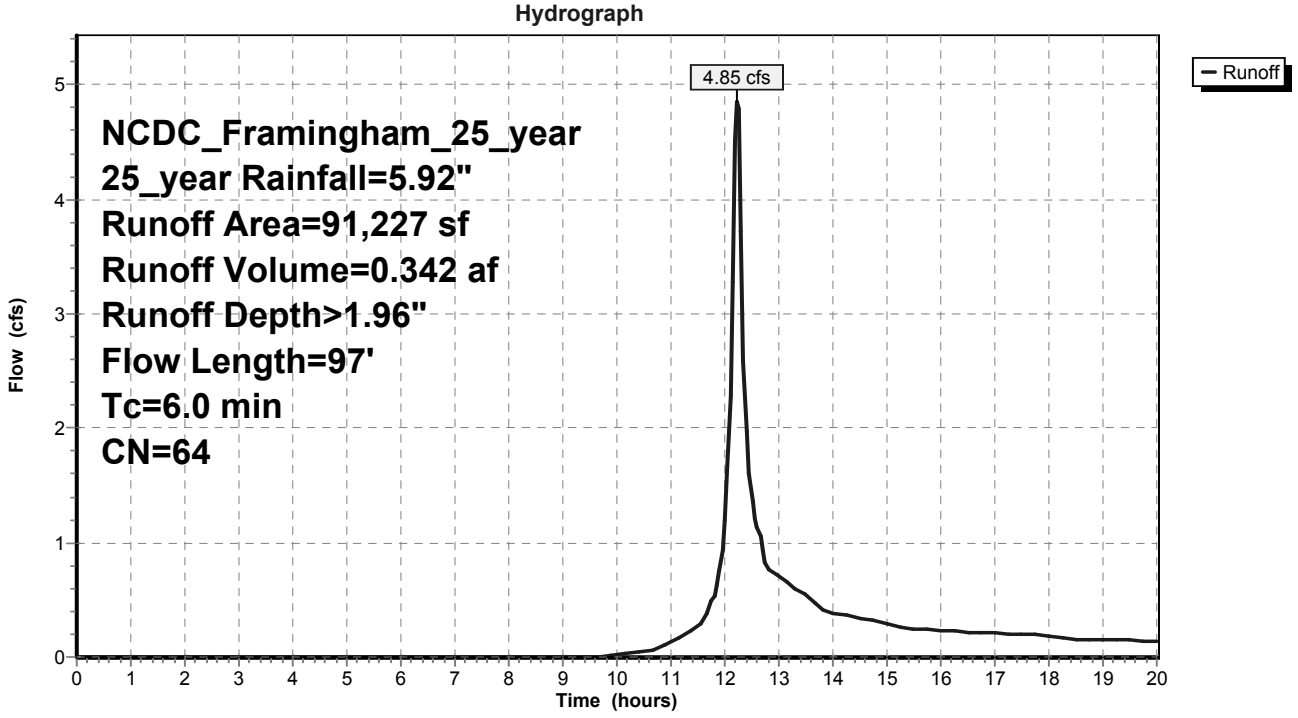
Runoff = 4.85 cfs @ 12.24 hrs, Volume= 0.342 af, Depth> 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,998 | 39 | GRASS, 0% imperv, HSG A |
| * | 60,494 | 61 | GRASS, 0% imperv, HSG B |
| * | 751 | 98 | DECK, 100% imperv, HSG A |
| * | 1,912 | 98 | DECK, 100% imperv, HSG B |
| * | 11,505 | 98 | IMP, 100% imperv, HSG A |
| * | 1,575 | 98 | IMP, 100% imperv, HSG B |
| * | 12 | 98 | ROOF, 100% imperv, HSG B |
| * | 980 | 98 | SIDEWALK, 100% imperv, HSG A |
| | 91,227 | 64 | Weighted Average |
| | 91,227 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | 50 | 0.0296 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 47 | 0.2223 | 3.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.2 | 97 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3: (blank)



## Summary for Subcatchment RG-W-3A: (blank)

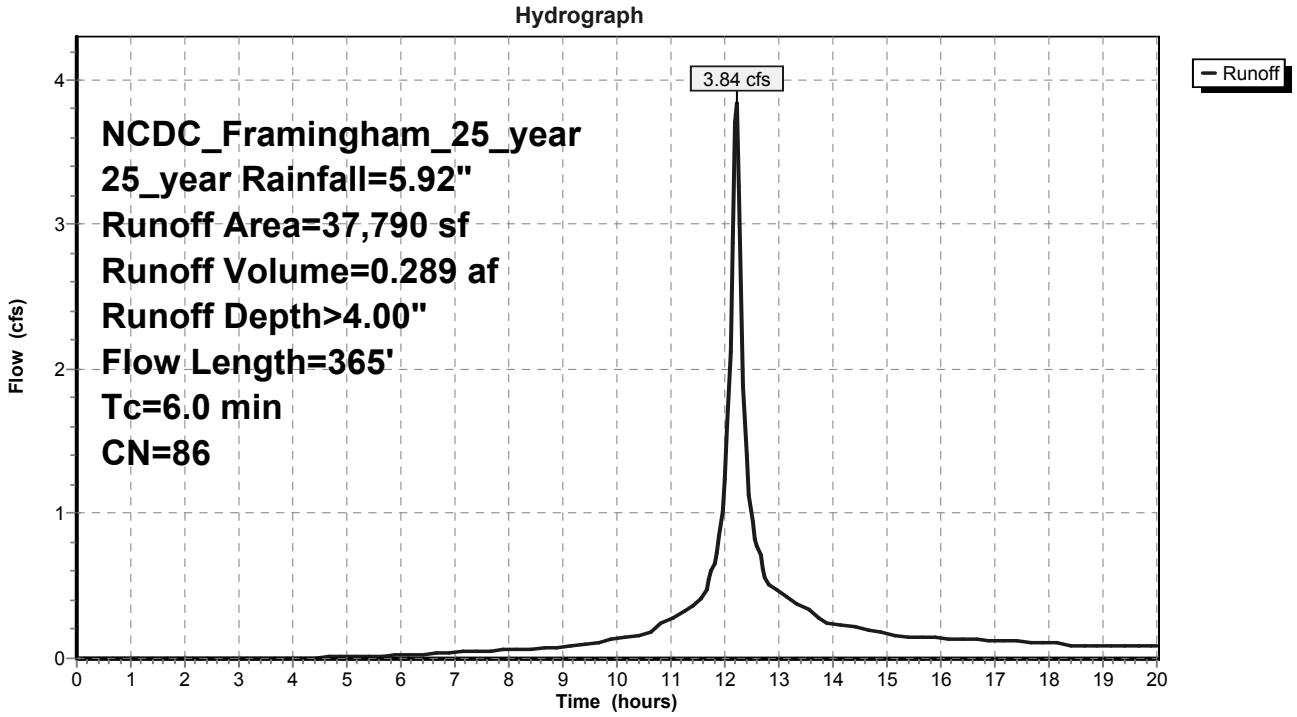
Runoff = 3.84 cfs @ 12.23 hrs, Volume= 0.289 af, Depth> 4.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,877 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,646 | 61 | GRASS, 0% imperv, HSG B |
| * | 52 | 98 | DECK, 100% imperv, HSG A |
| * | 386 | 98 | DECK, 100% imperv, HSG B |
| * | 7,875 | 98 | IMP, 100% imperv, HSG A |
| * | 16,446 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| * | 340 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,166 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 37,790 | 86 | Weighted Average |
| | 37,790 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.4 | 50 | 0.0037 | 0.59 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.1 | 315 | 0.0153 | 2.51 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.5 | 365 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3A: (blank)



## Summary for Subcatchment RG-W-4: (blank)

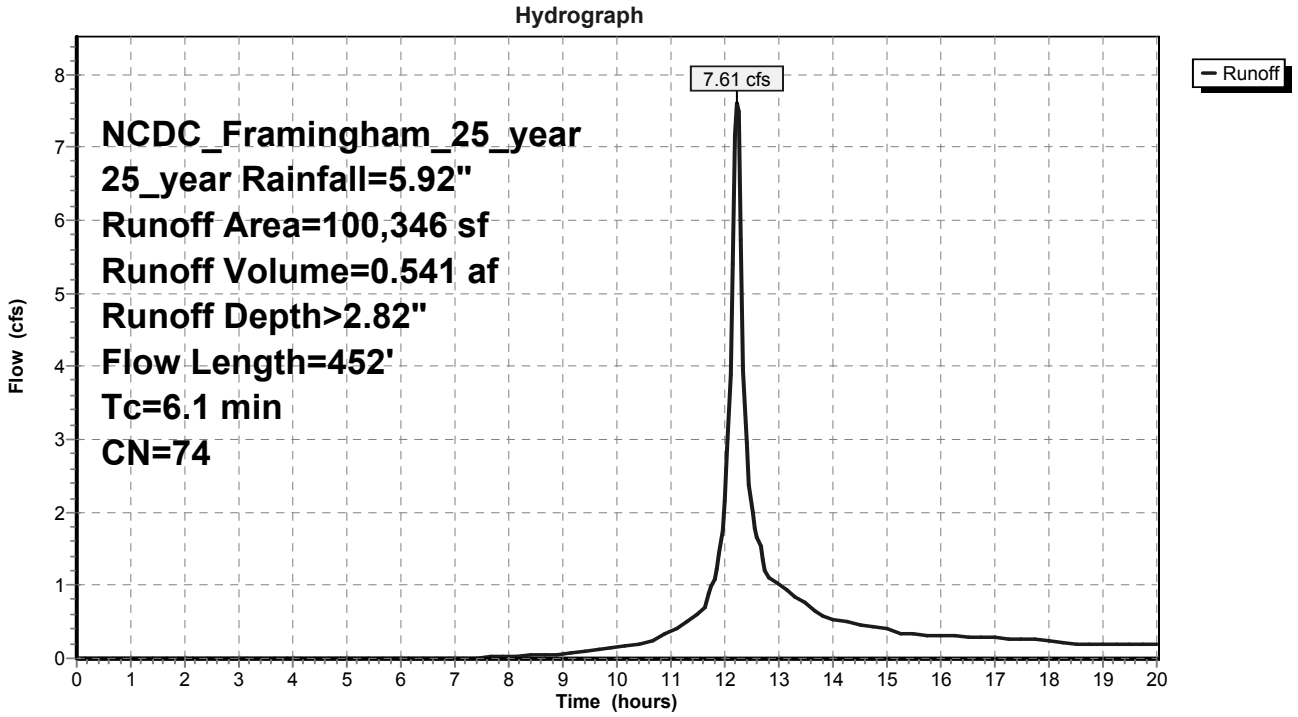
Runoff = 7.61 cfs @ 12.23 hrs, Volume= 0.541 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 820 | 39 | GRASS, 0% imperv, HSG A |
| * | 65,039 | 61 | GRASS, 0% imperv, HSG B |
| * | 108 | 98 | DECK, 100% imperv, HSG A |
| * | 657 | 98 | DECK, 100% imperv, HSG B |
| * | 19 | 98 | IMP, 100% imperv, HSG A |
| * | 32,102 | 98 | IMP, 100% imperv, HSG B |
| * | 76 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,525 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 100,346 | 74 | Weighted Average |
| | 100,346 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0228 | 1.22 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 127 | 0.0184 | 2.76 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.6 | 275 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.1 | 452 | Total | | | |

## Subcatchment RG-W-4: (blank)



## Summary for Subcatchment RG-W-5: (blank)

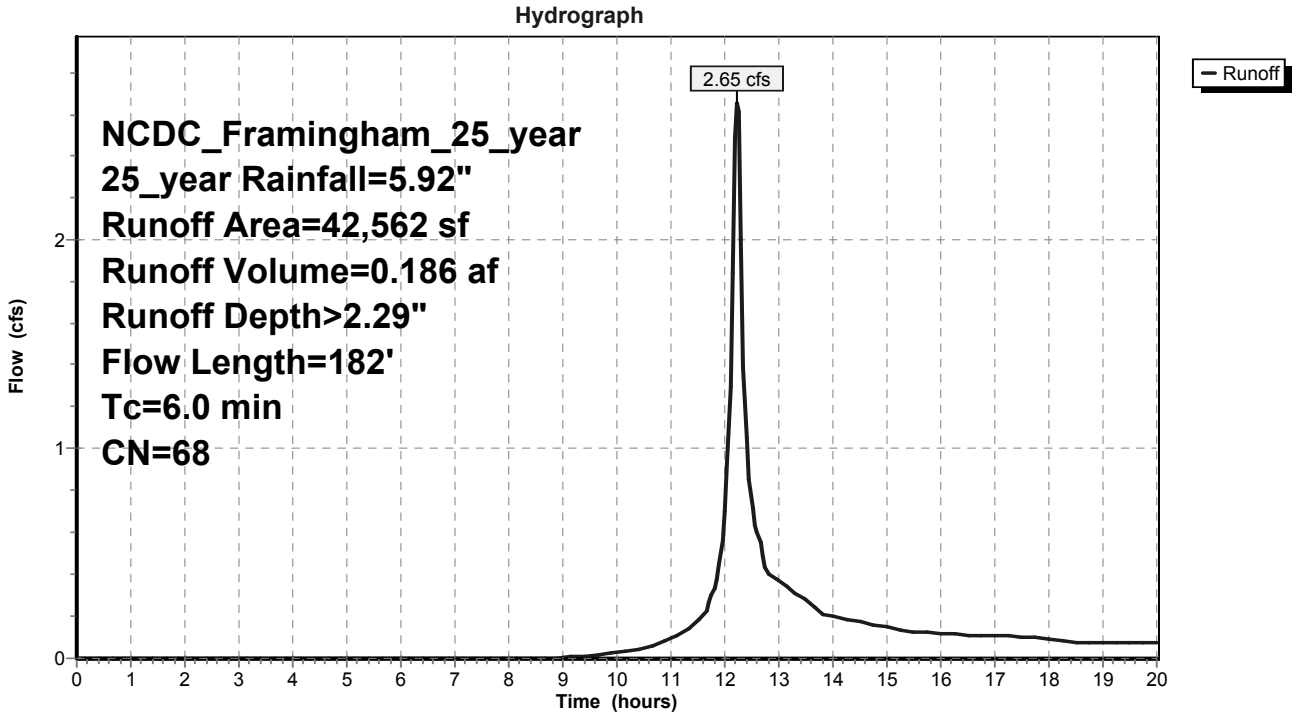
Runoff = 2.65 cfs @ 12.23 hrs, Volume= 0.186 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 723 | 39 | GRASS, 0% imperv, HSG A |
| * | 31,185 | 61 | GRASS, 0% imperv, HSG B |
| * | 704 | 30 | WOODS, 0% imperv, HSG A |
| * | 126 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 219 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,120 | 98 | DECK, 100% imperv, HSG B |
| * | 205 | 98 | IMP, 100% imperv, HSG A |
| * | 7,984 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| | 42,562 | 68 | Weighted Average |
| | 42,227 | | 99.21% Pervious Area |
| | 335 | | 0.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0413 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 38 | 0.0260 | 1.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 24 | 0.0354 | 3.82 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 31 | 0.0362 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 11 | 0.0429 | 4.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.1361 | 2.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 182 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-5: (blank)



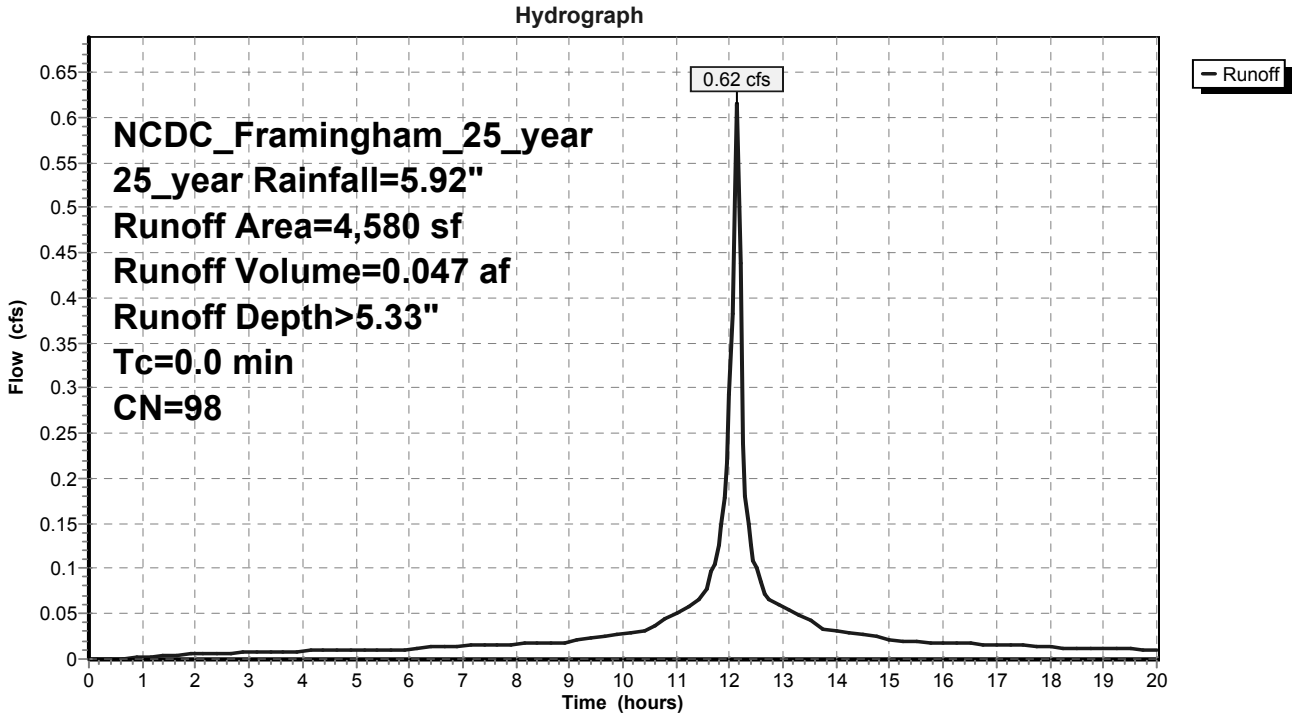
## Summary for Subcatchment ROOF-1: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,478 | 98 | ROOF, 100% imperv, HSG A |
| * | 3,102 | 98 | ROOF, 100% imperv, HSG B |
| | 4,580 | 98 | Weighted Average |
| | 4,580 | | 100.00% Pervious Area |

## Subcatchment ROOF-1: (blank)



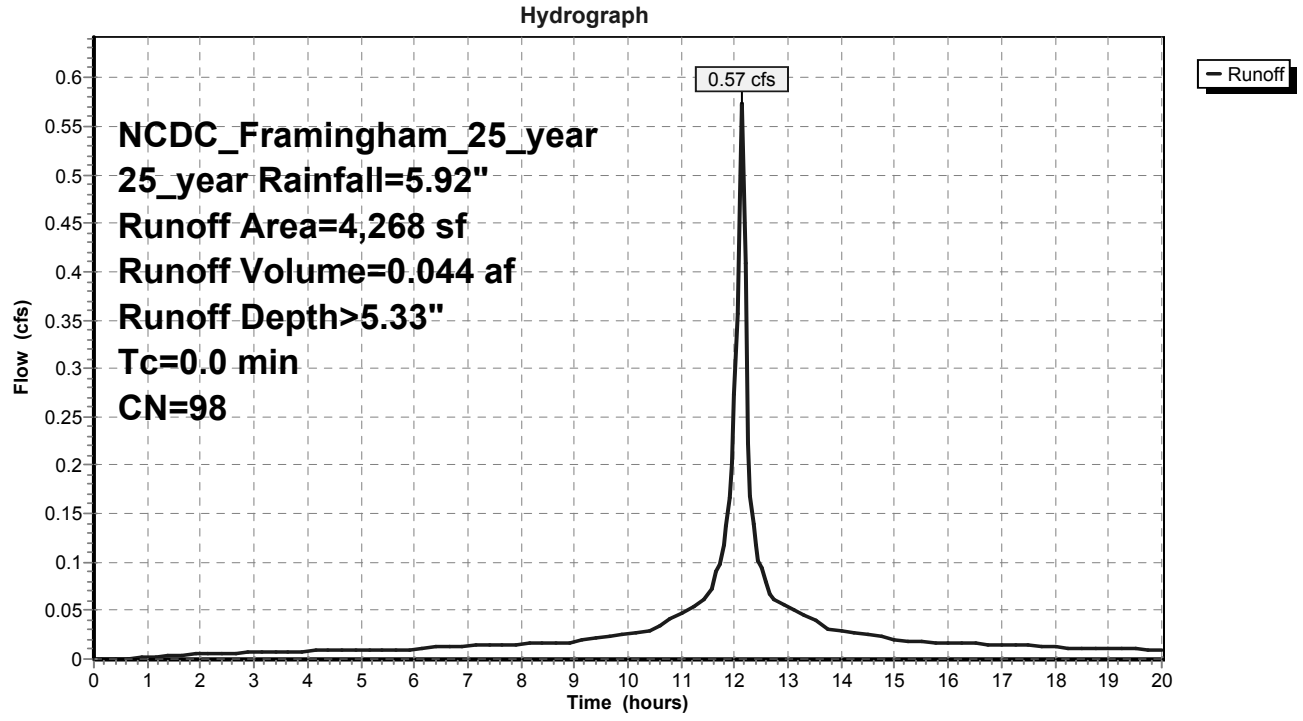
## Summary for Subcatchment ROOF-10: (blank)

Runoff = 0.57 cfs @ 12.14 hrs, Volume= 0.044 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 3,776 | 98 | ROOF, 100% imperv, HSG B |
| | 4,268 | 98 | Weighted Average |
| | 4,268 | | 100.00% Pervious Area |

## Subcatchment ROOF-10: (blank)



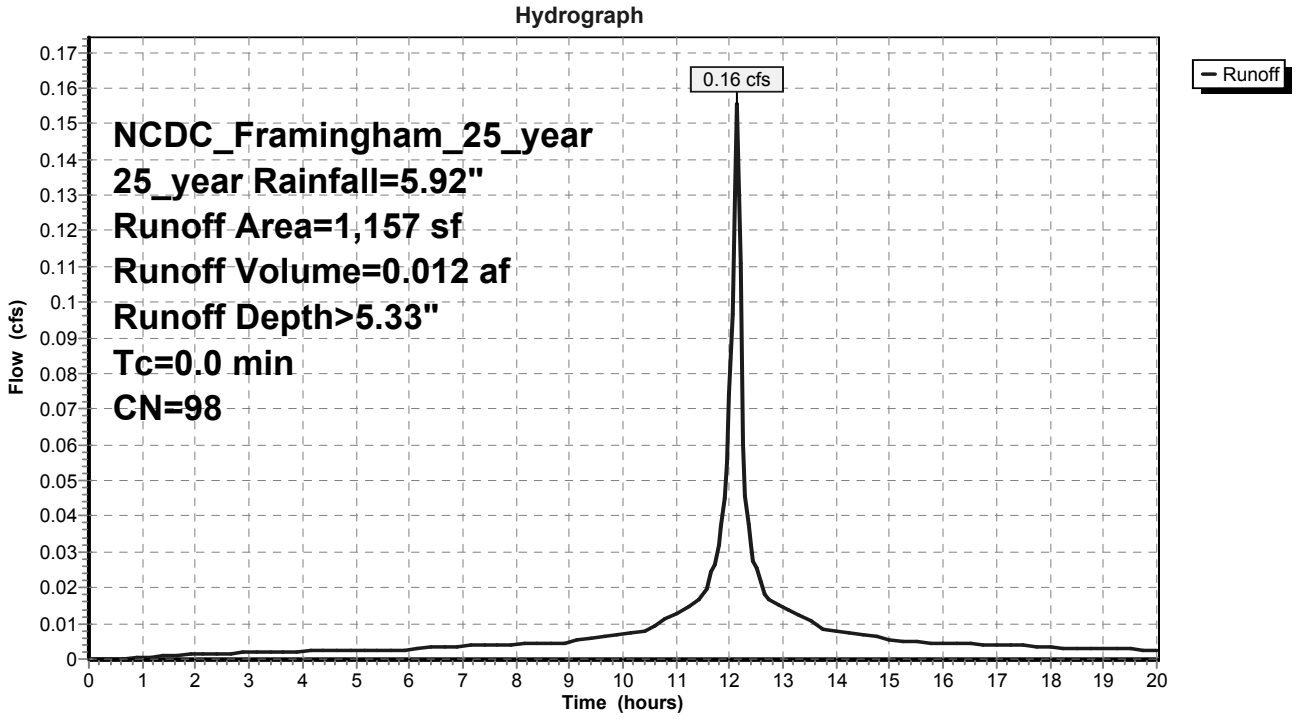
## Summary for Subcatchment ROOF-100: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-100: (blank)



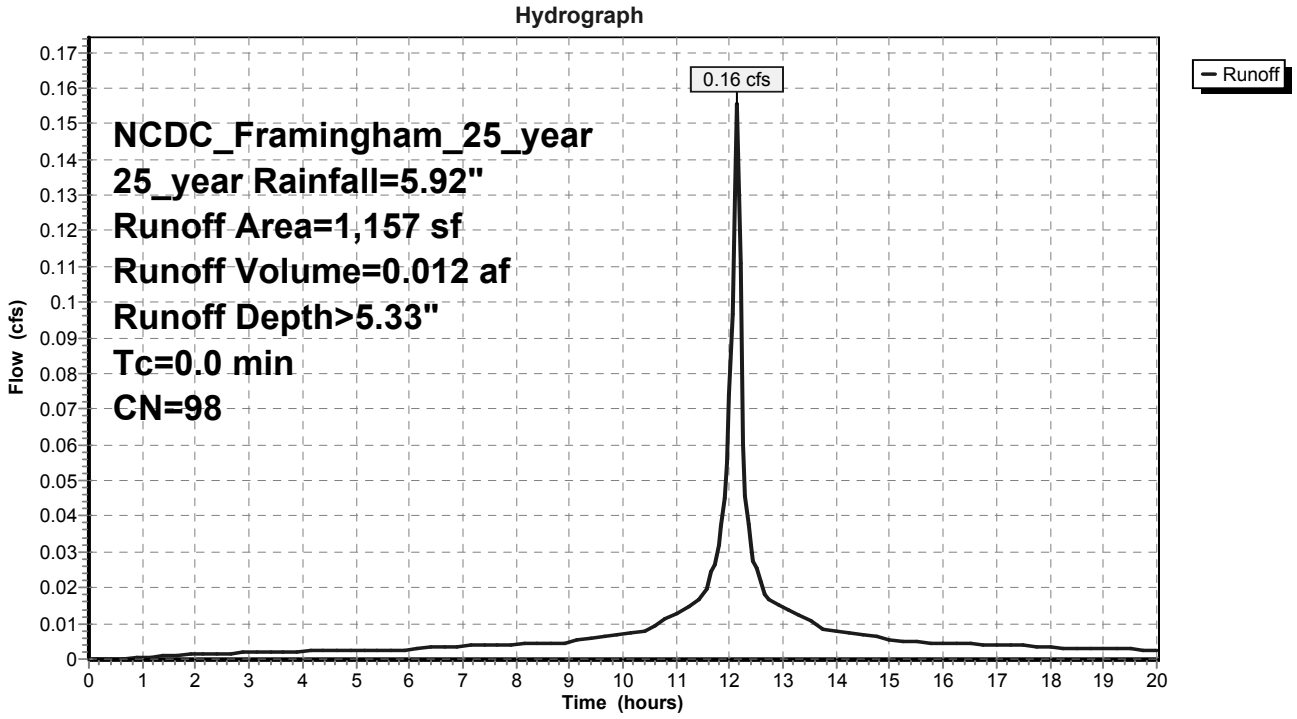
## Summary for Subcatchment ROOF-101: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-101: (blank)



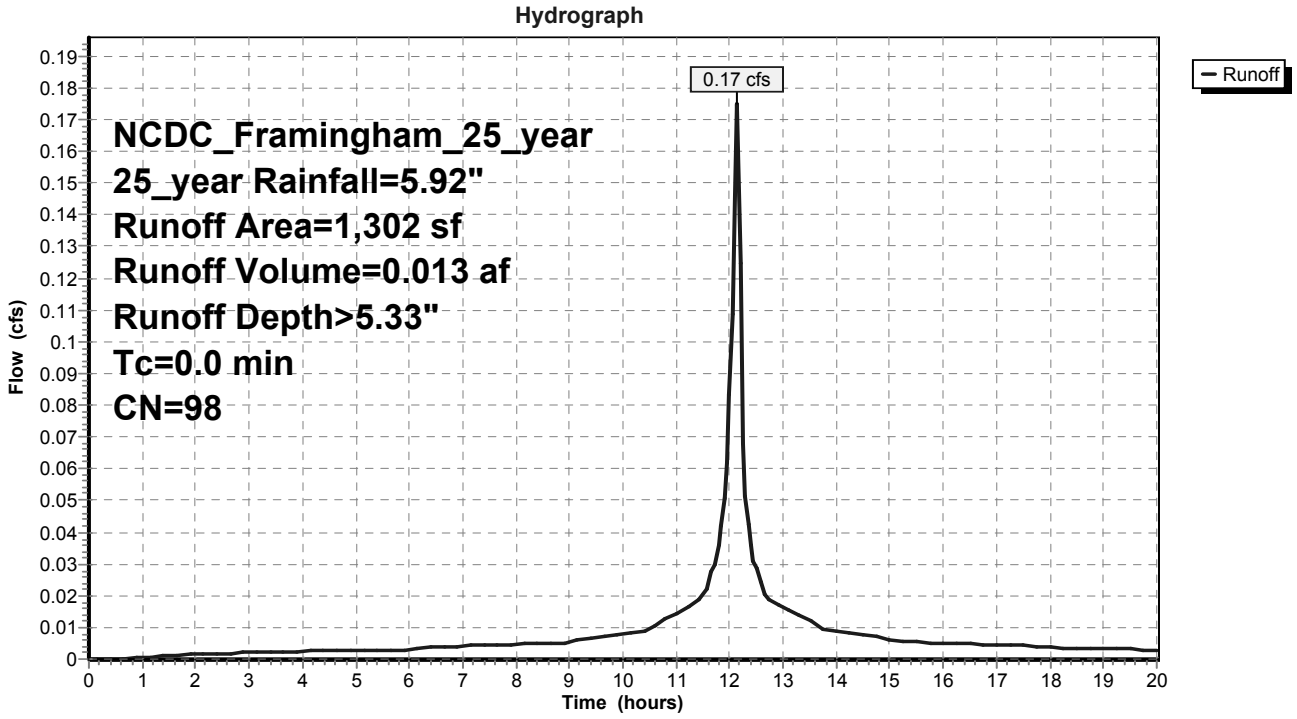
## Summary for Subcatchment ROOF-102: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-102: (blank)



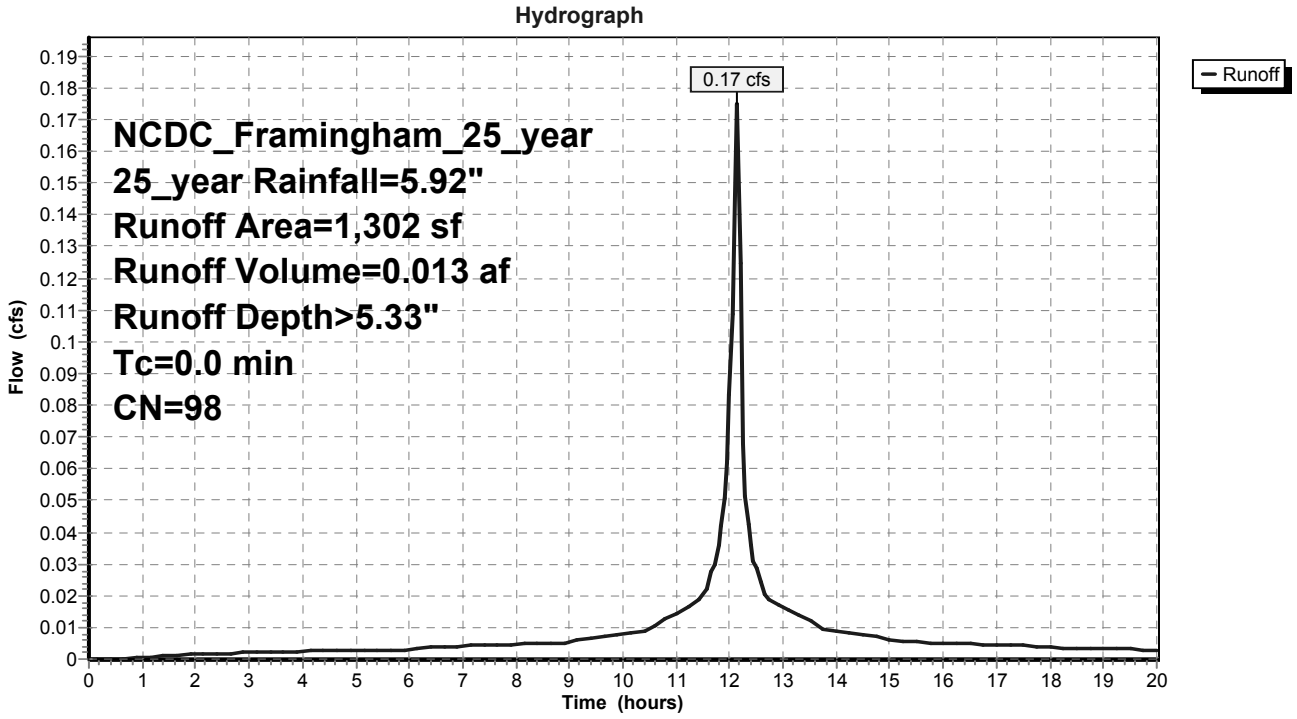
## Summary for Subcatchment ROOF-103: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-103: (blank)



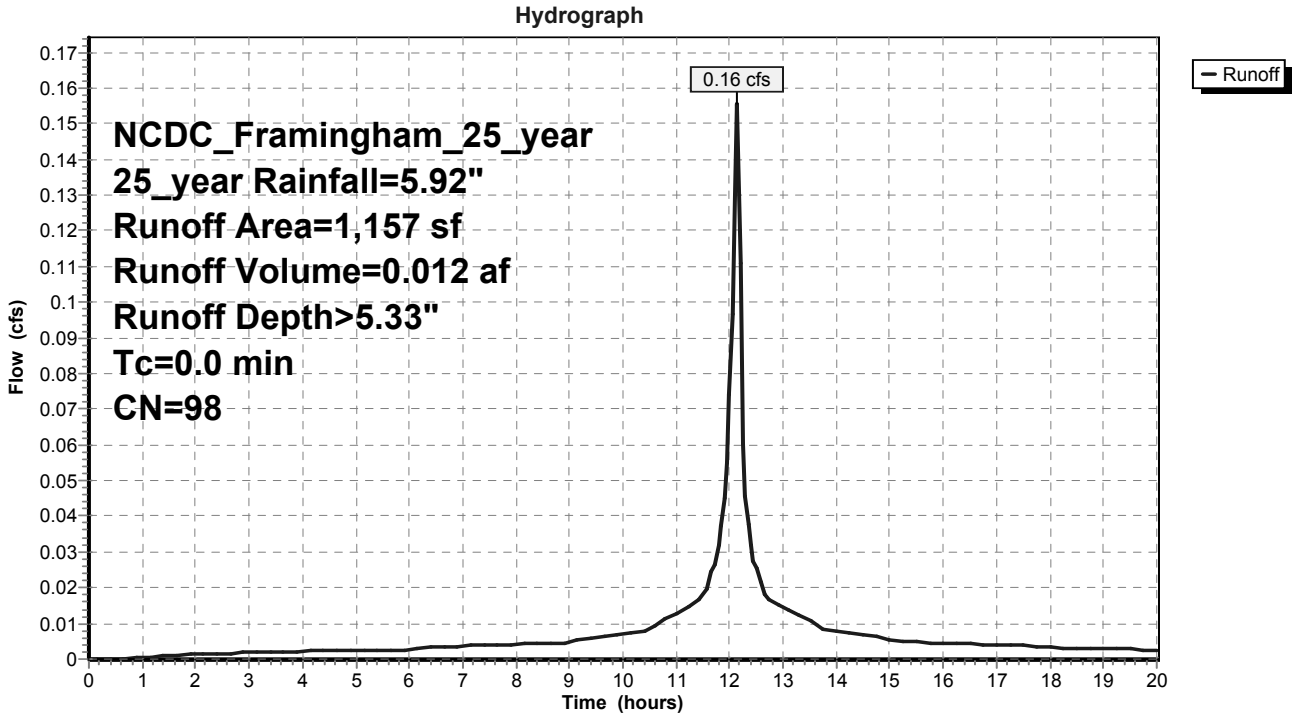
## Summary for Subcatchment ROOF-104: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-104: (blank)



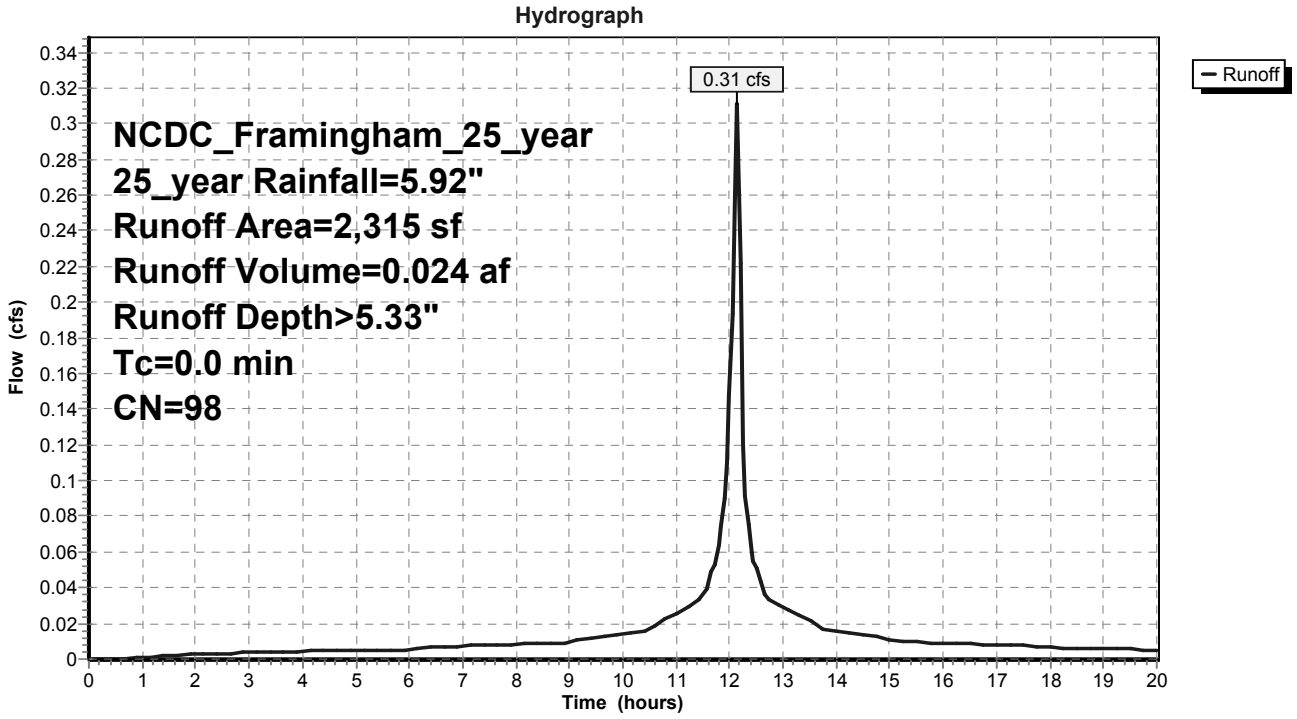
## Summary for Subcatchment ROOF-105: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-105: (blank)



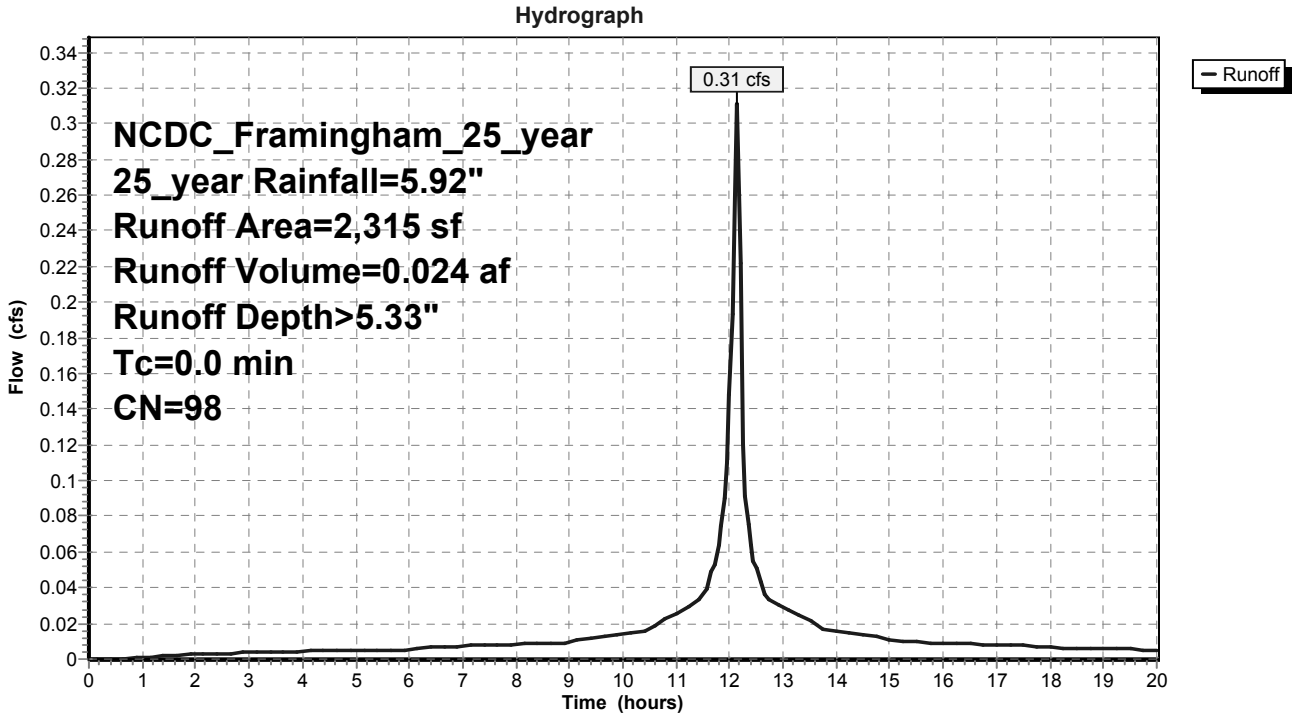
## Summary for Subcatchment ROOF-106: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-106: (blank)



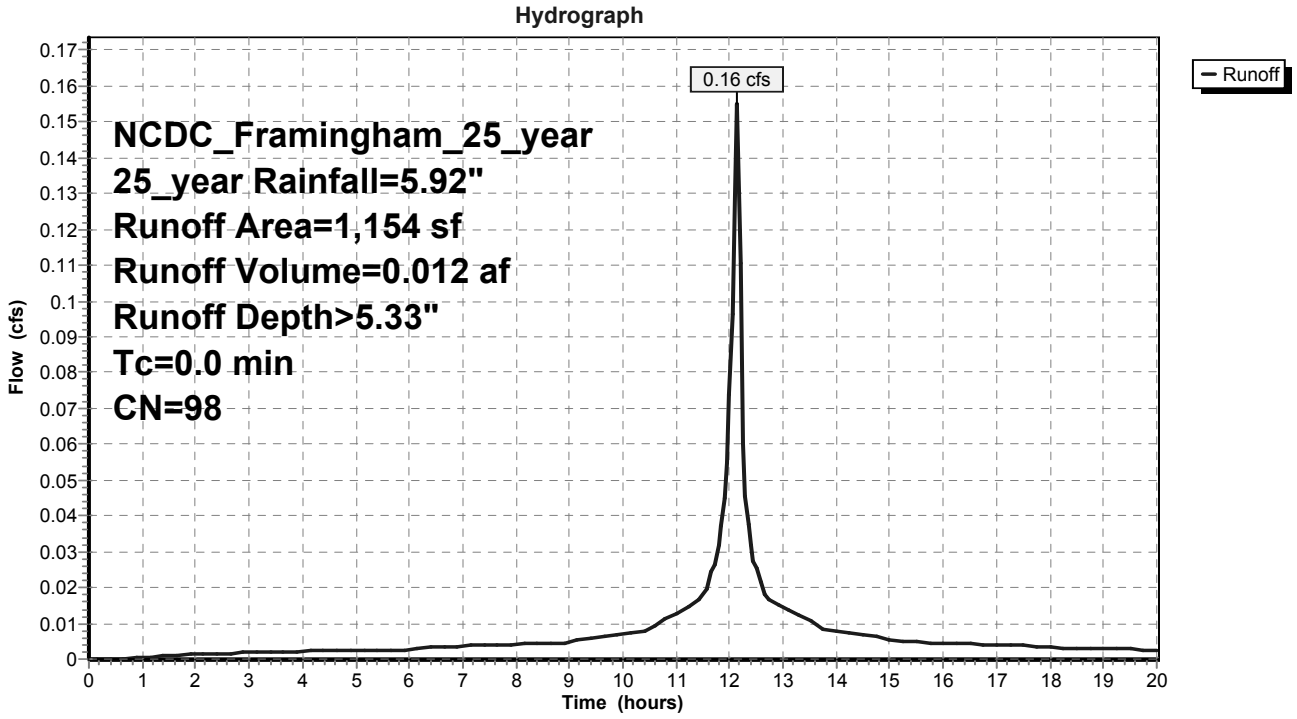
## Summary for Subcatchment ROOF-107: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,154 | 98 | ROOF, 100% imperv, HSG B |
| | 1,154 | | 100.00% Pervious Area |

## Subcatchment ROOF-107: (blank)



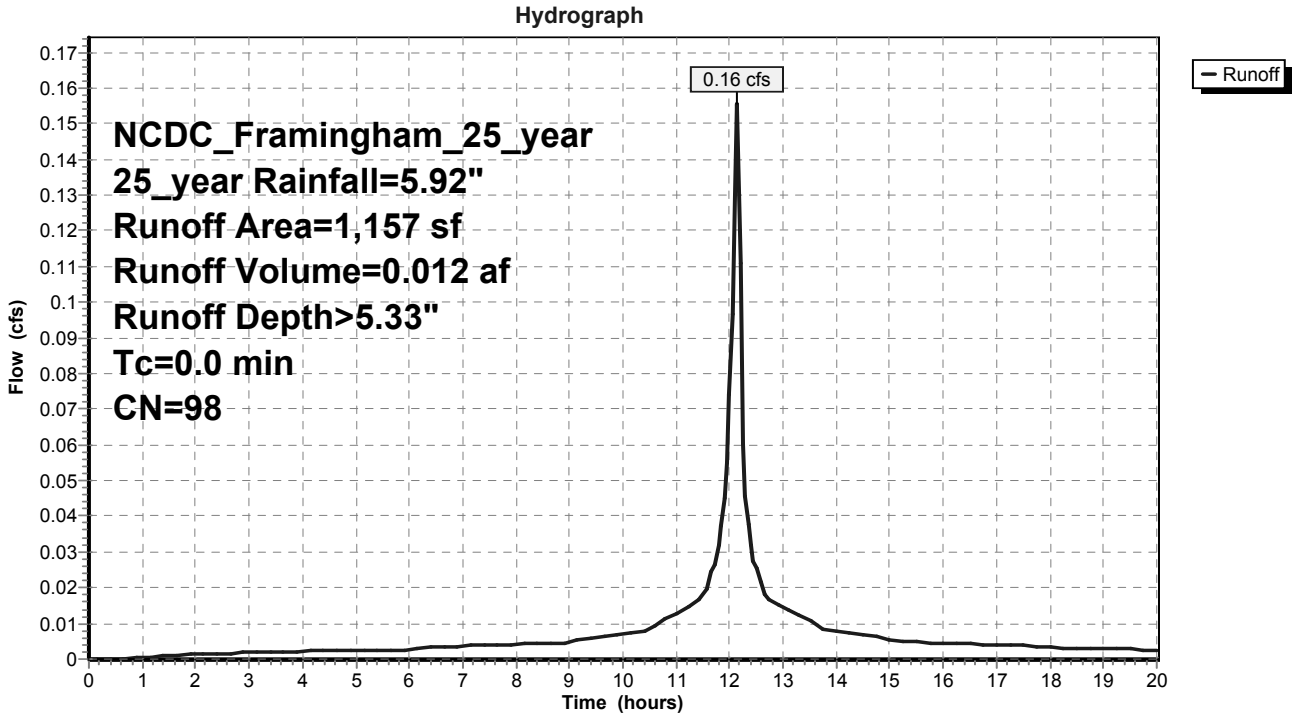
## Summary for Subcatchment ROOF-108: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-108: (blank)



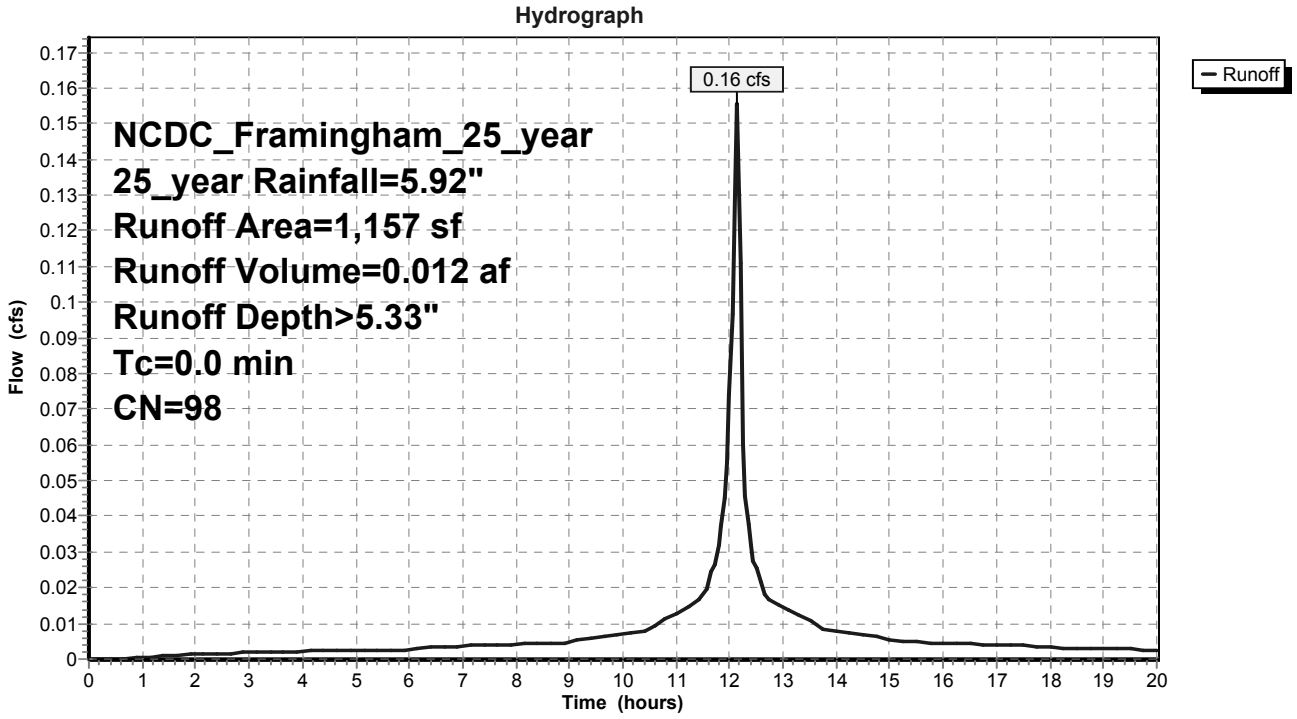
## Summary for Subcatchment ROOF-109: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-109: (blank)



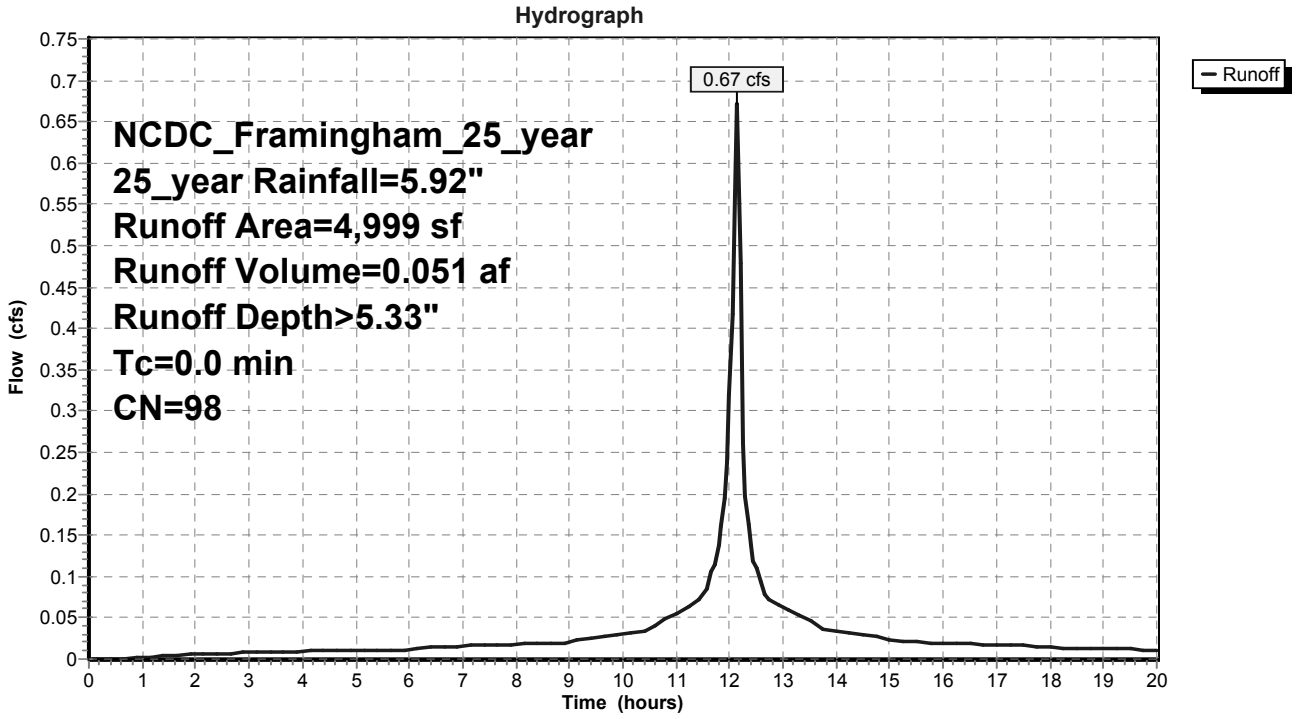
## Summary for Subcatchment ROOF-11: (blank)

Runoff = 0.67 cfs @ 12.14 hrs, Volume= 0.051 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-11: (blank)



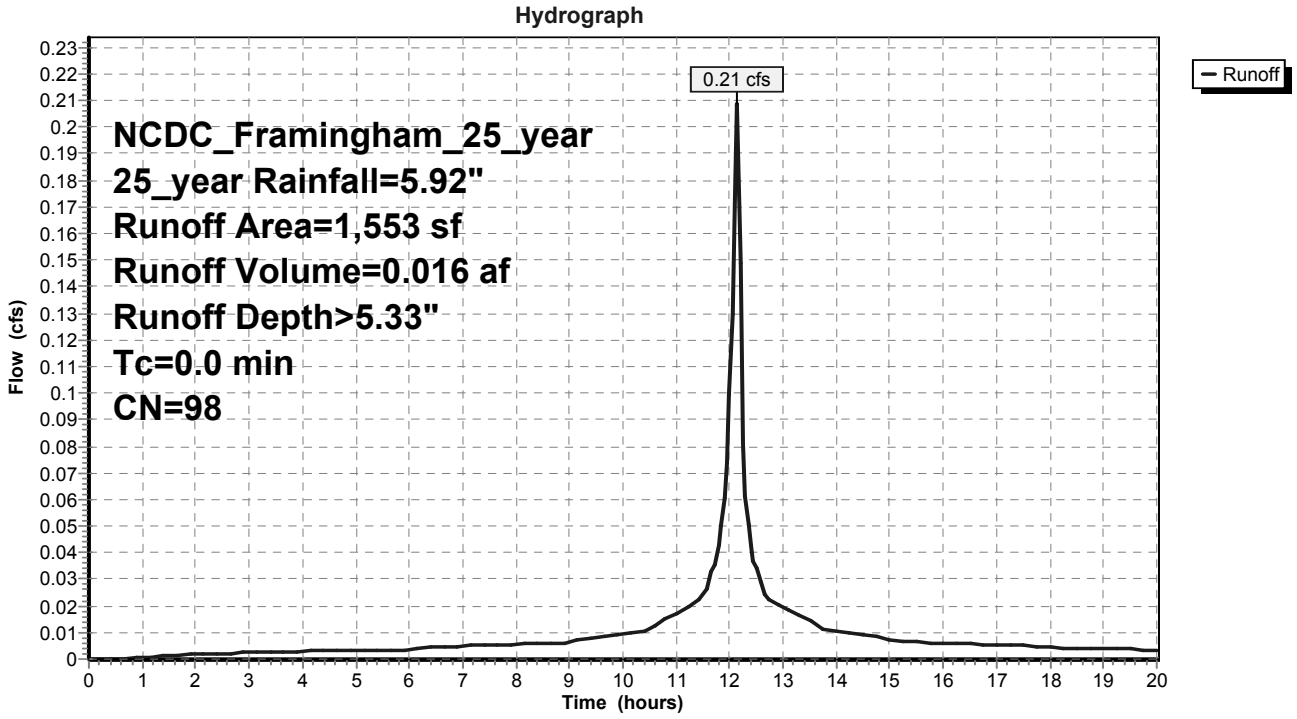
## Summary for Subcatchment ROOF-110: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-110: (blank)



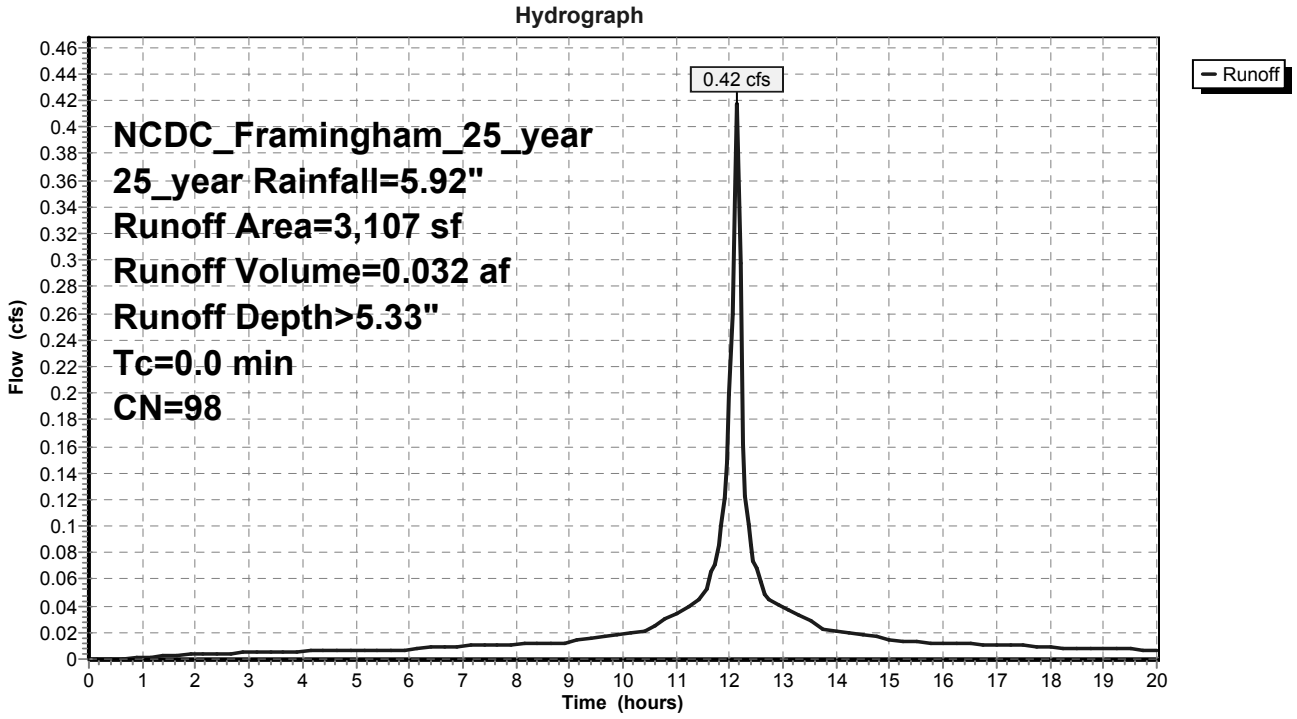
## Summary for Subcatchment ROOF-111: (blank)

Runoff = 0.42 cfs @ 12.14 hrs, Volume= 0.032 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-111: (blank)



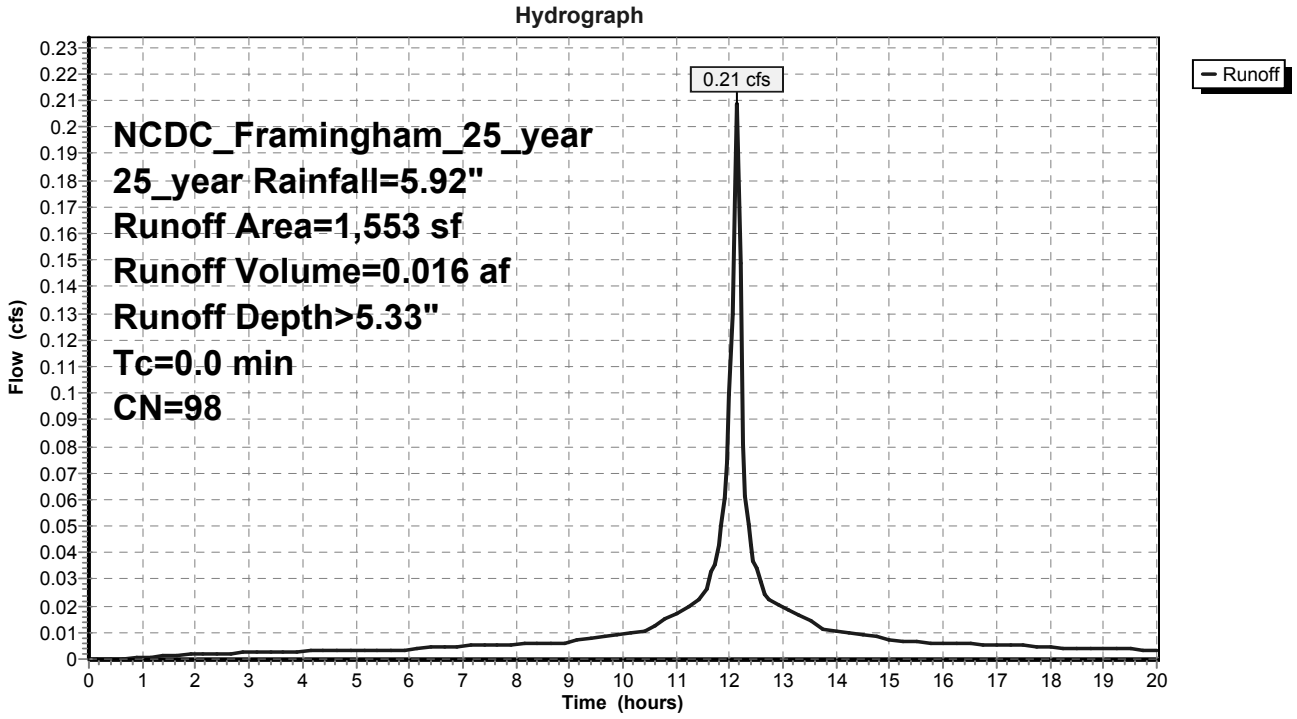
## Summary for Subcatchment ROOF-112: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-112: (blank)



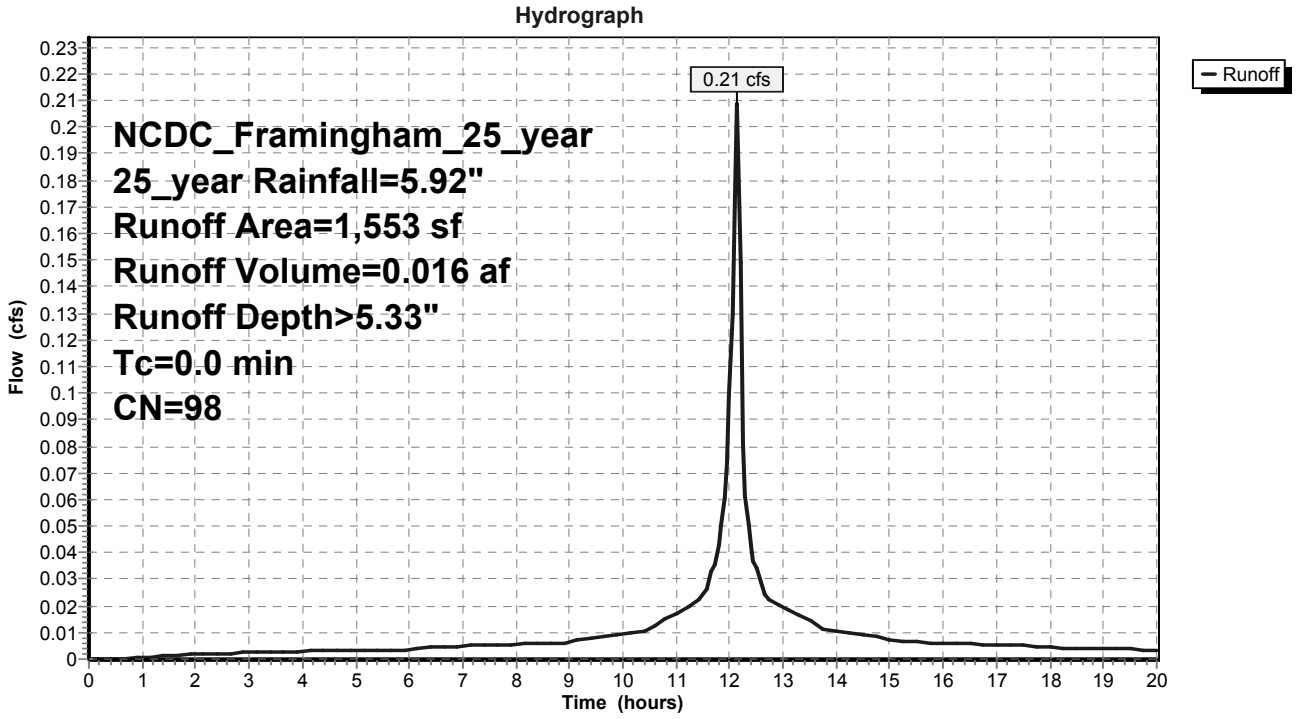
## Summary for Subcatchment ROOF-113: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-113: (blank)



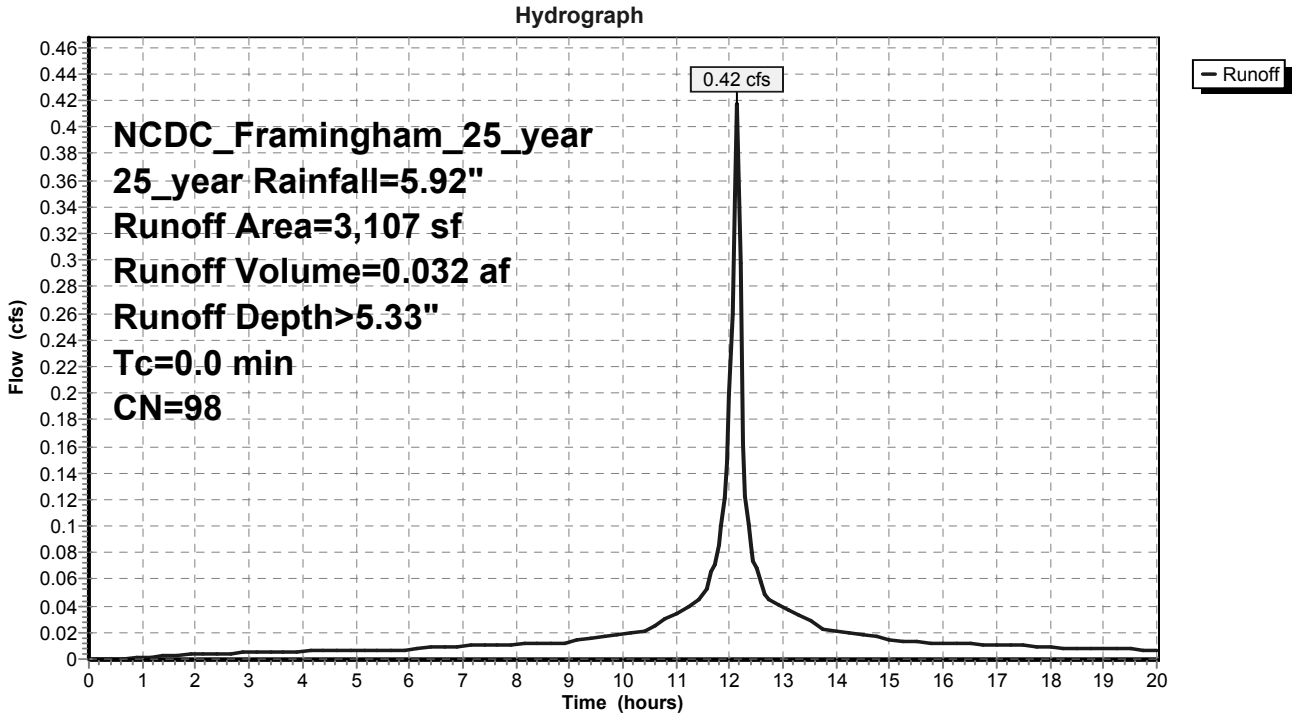
## Summary for Subcatchment ROOF-114: (blank)

Runoff = 0.42 cfs @ 12.14 hrs, Volume= 0.032 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-114: (blank)



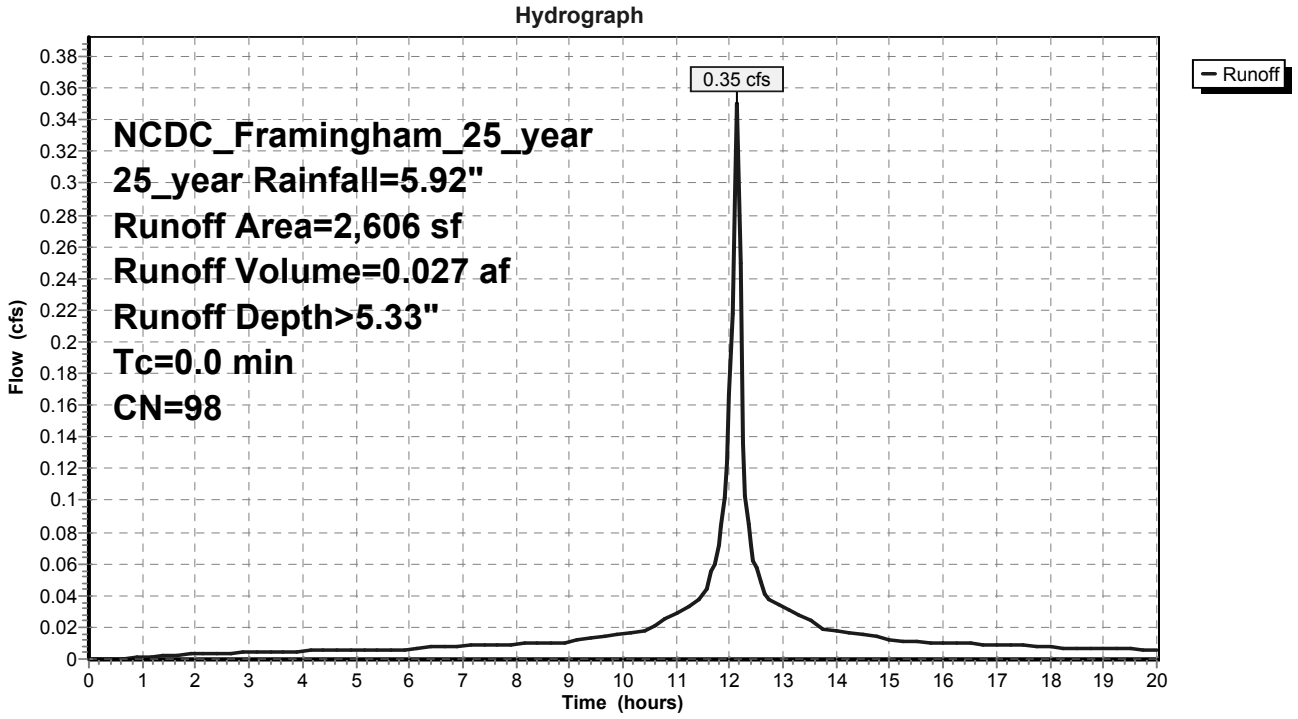
## Summary for Subcatchment ROOF-115: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,602 | 98 | ROOF, 100% imperv, HSG B |
| | 2,606 | 98 | Weighted Average |
| | 2,606 | | 100.00% Pervious Area |

## Subcatchment ROOF-115: (blank)



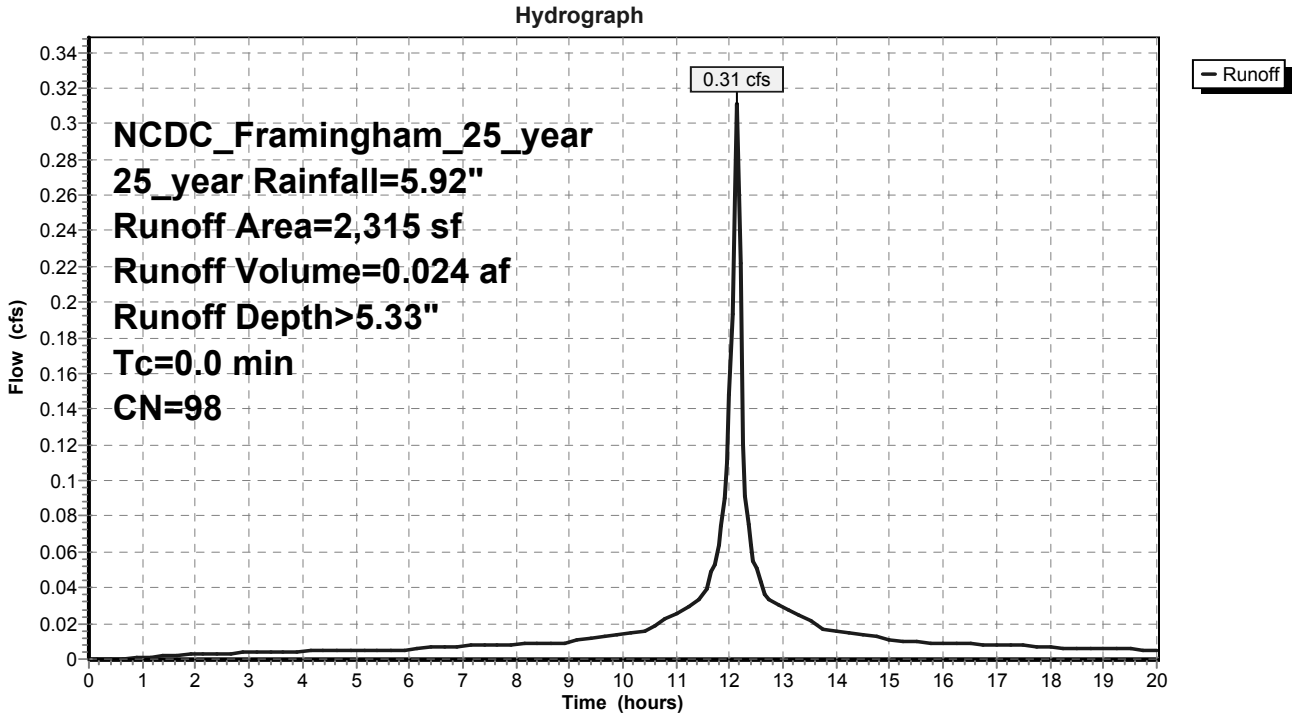
## Summary for Subcatchment ROOF-117: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-117: (blank)



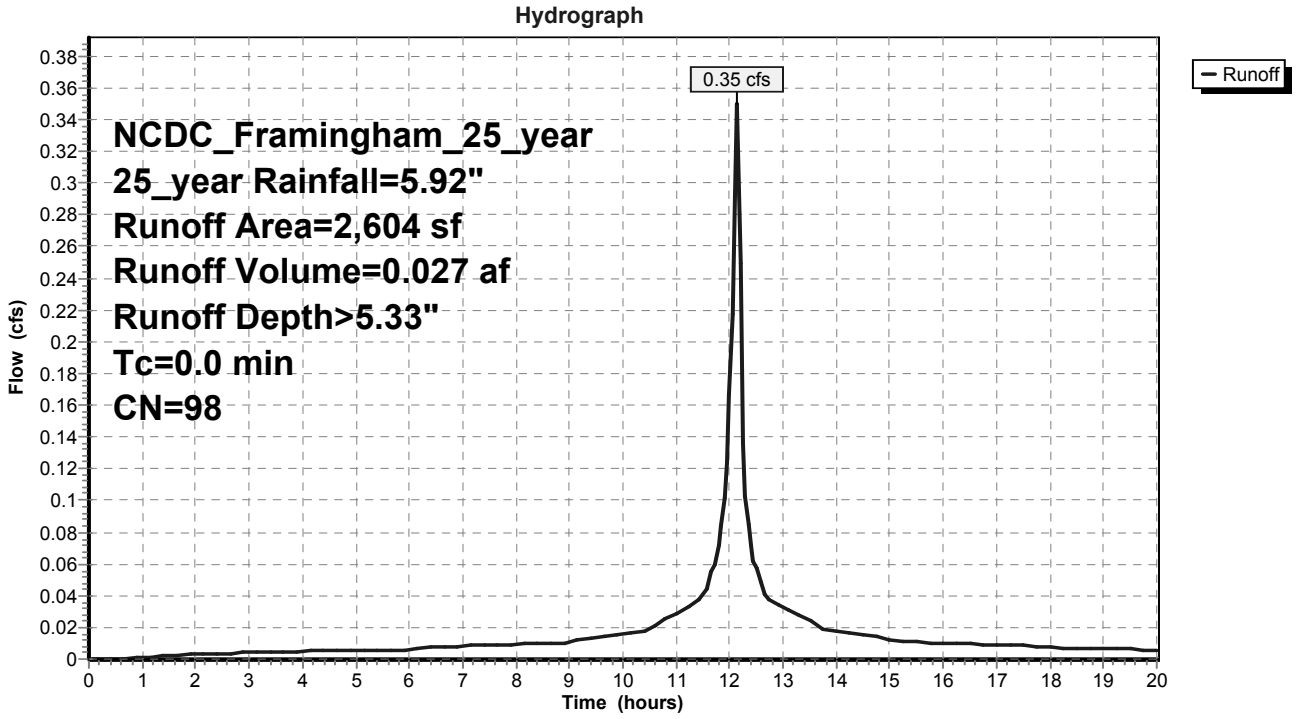
## Summary for Subcatchment ROOF-118: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-118: (blank)



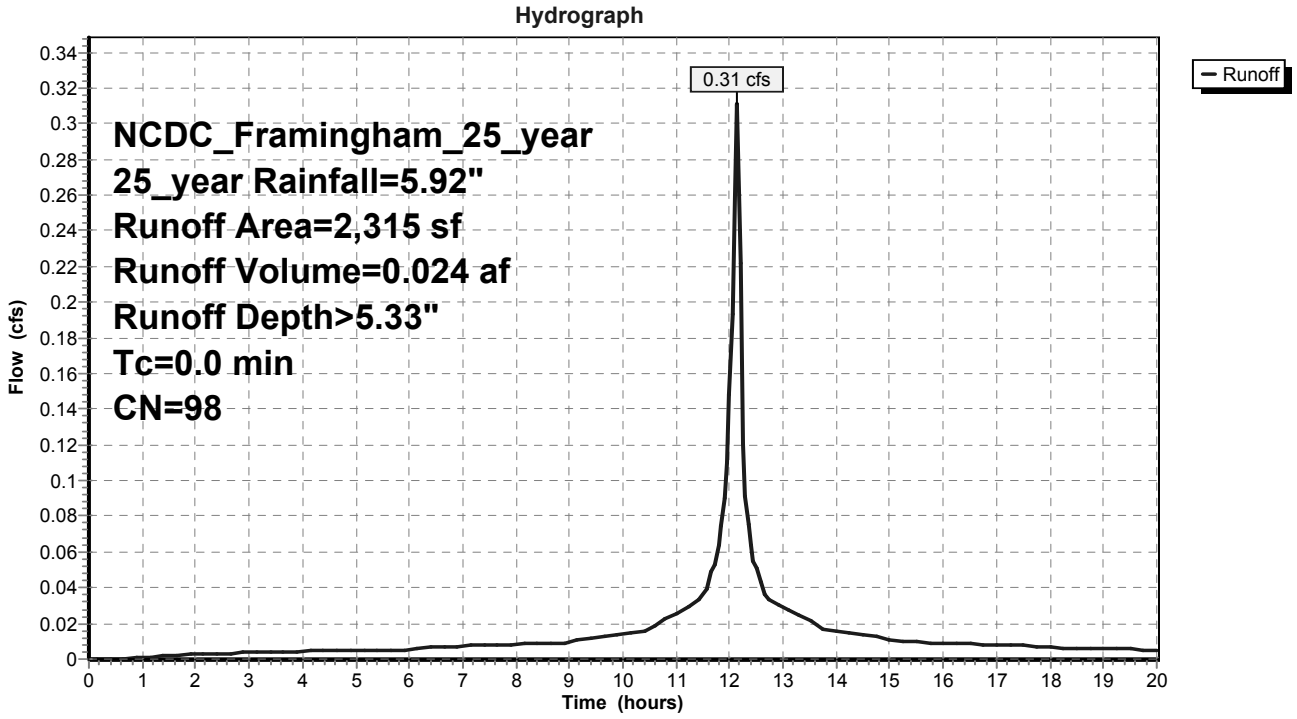
## Summary for Subcatchment ROOF-119: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-119: (blank)



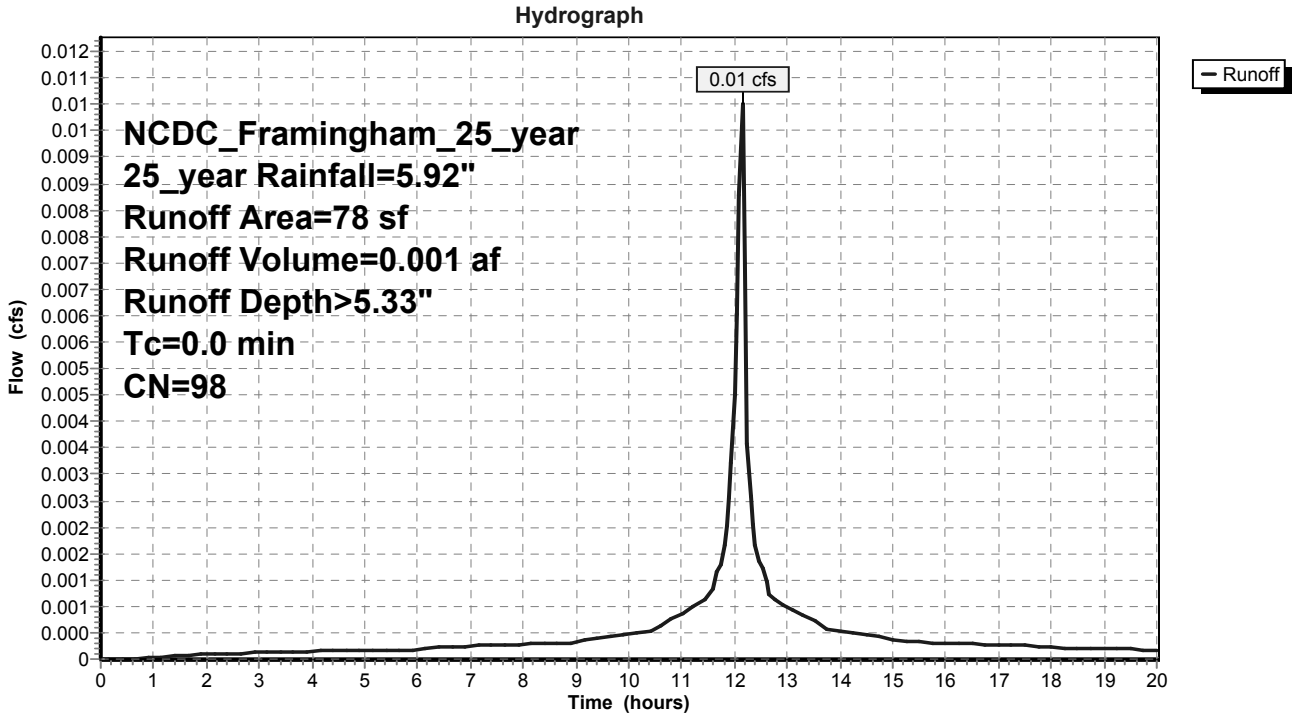
## Summary for Subcatchment ROOF-11MAIL: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-11MAIL: (blank)



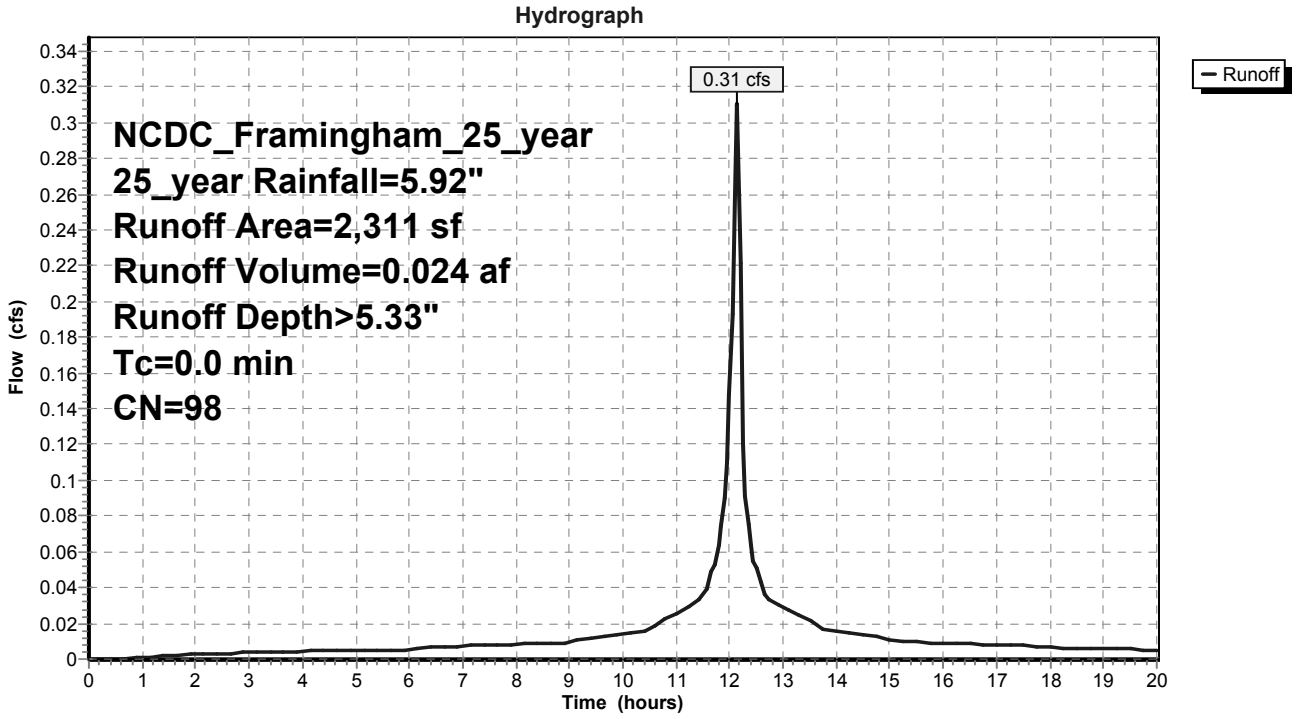
## Summary for Subcatchment ROOF-12: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,311 | 98 | ROOF, 100% imperv, HSG B |
| | 2,311 | | 100.00% Pervious Area |

## Subcatchment ROOF-12: (blank)



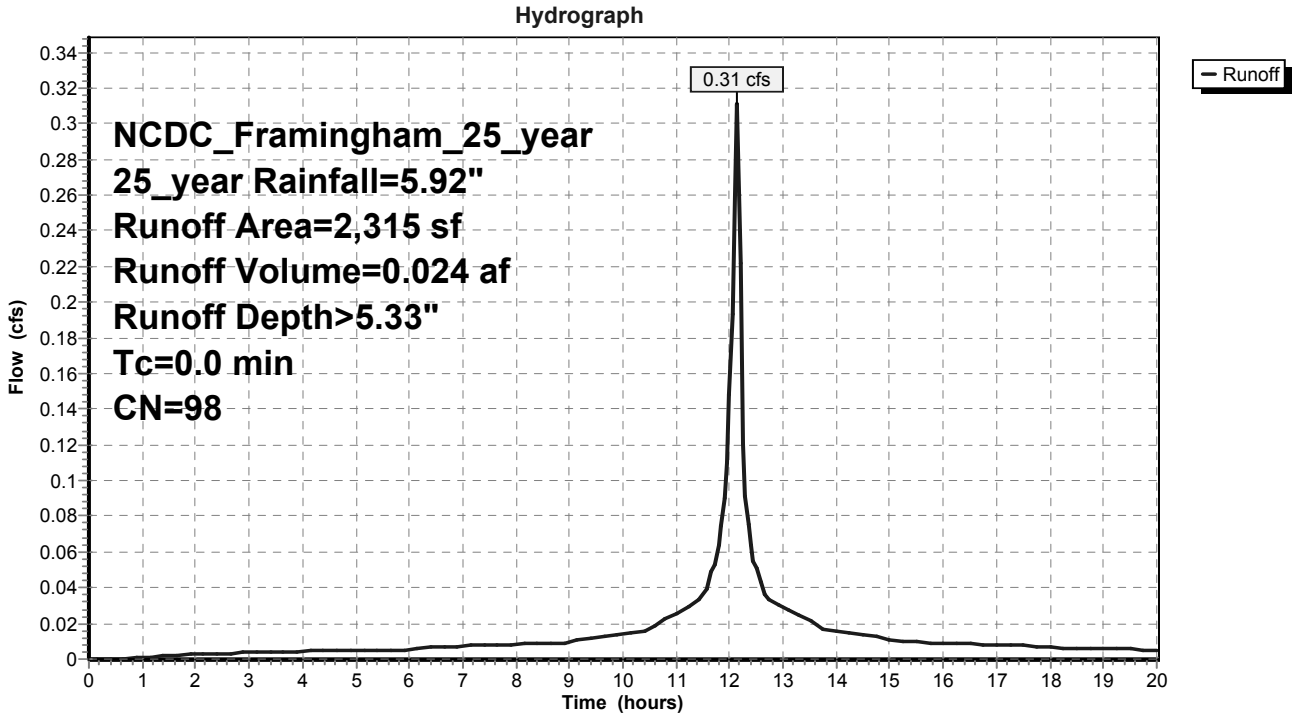
## Summary for Subcatchment ROOF-120: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-120: (blank)



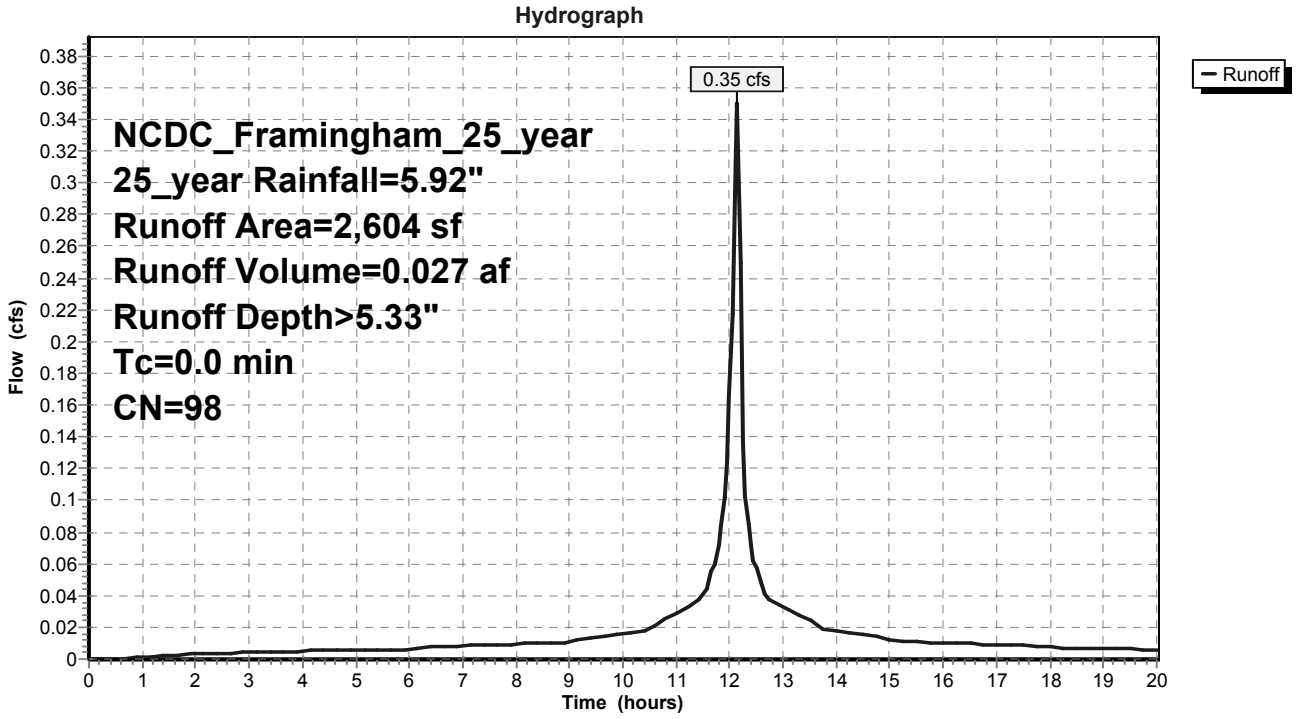
## Summary for Subcatchment ROOF-121: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 138 | 98 | ROOF, 100% imperv, HSG A |
| * | 2,467 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-121: (blank)



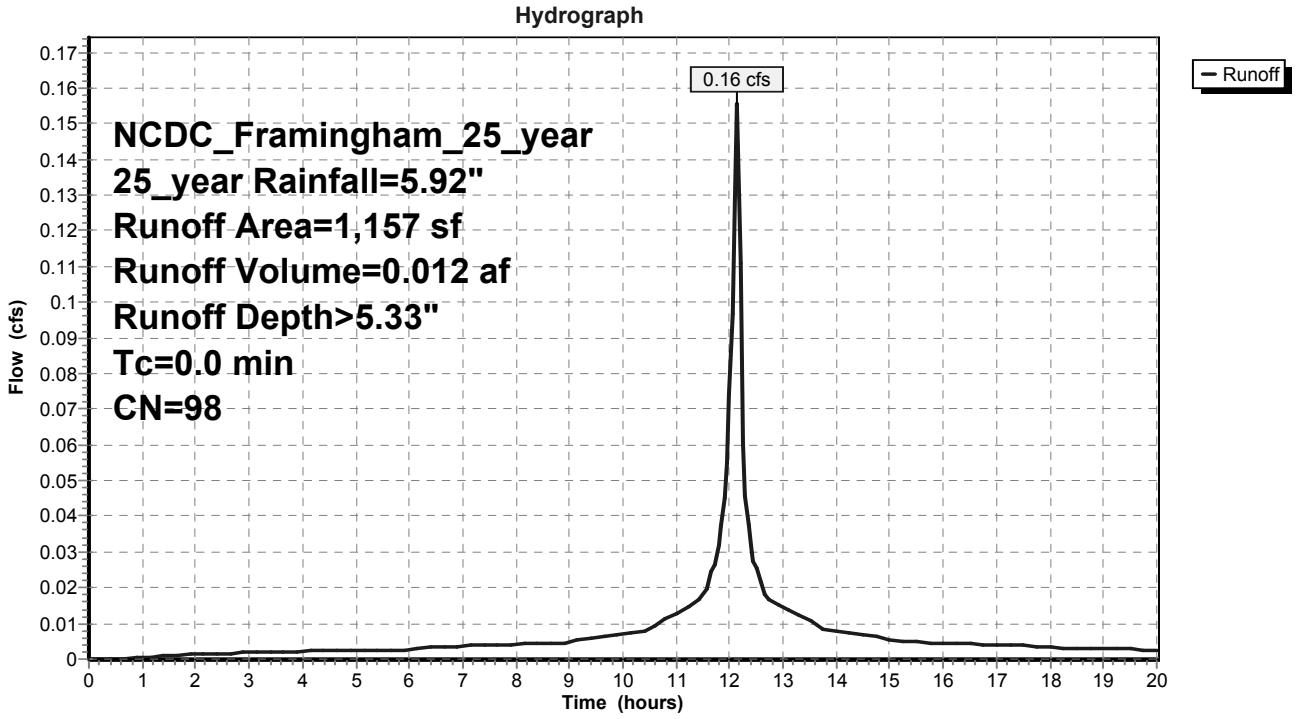
## Summary for Subcatchment ROOF-122: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-122: (blank)



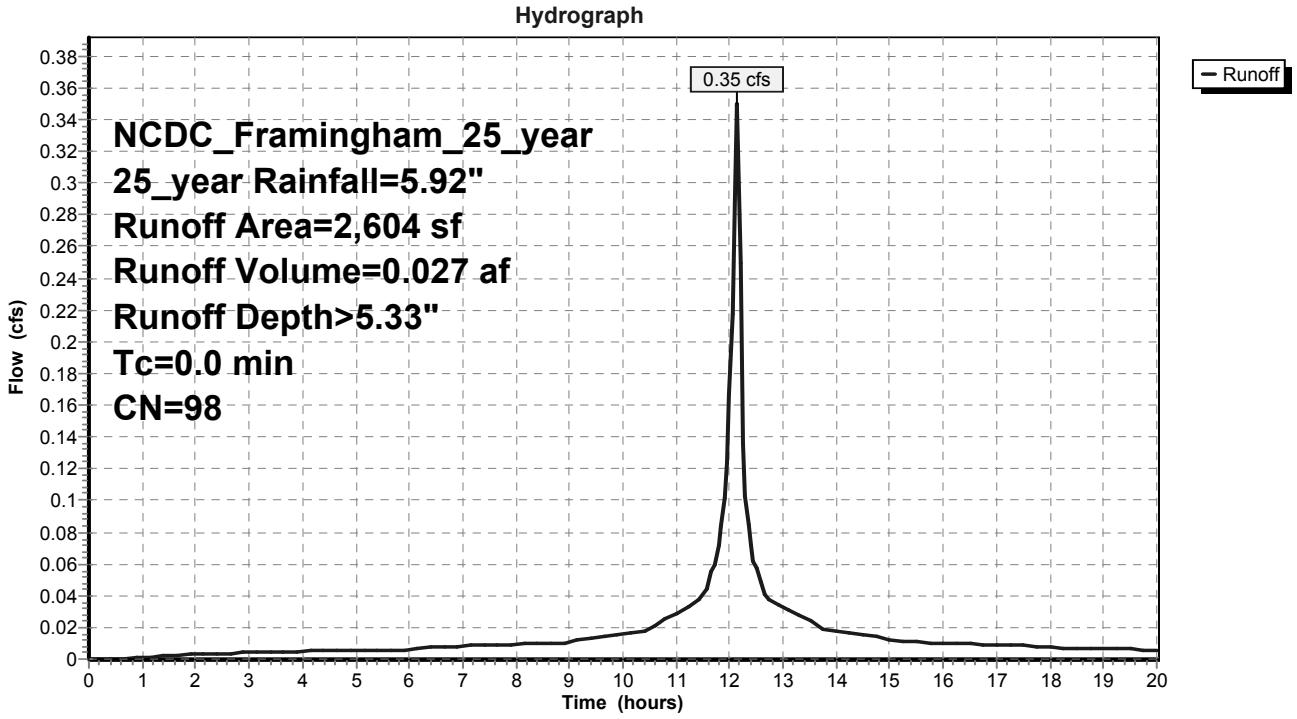
## Summary for Subcatchment ROOF-123: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG A |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-123: (blank)



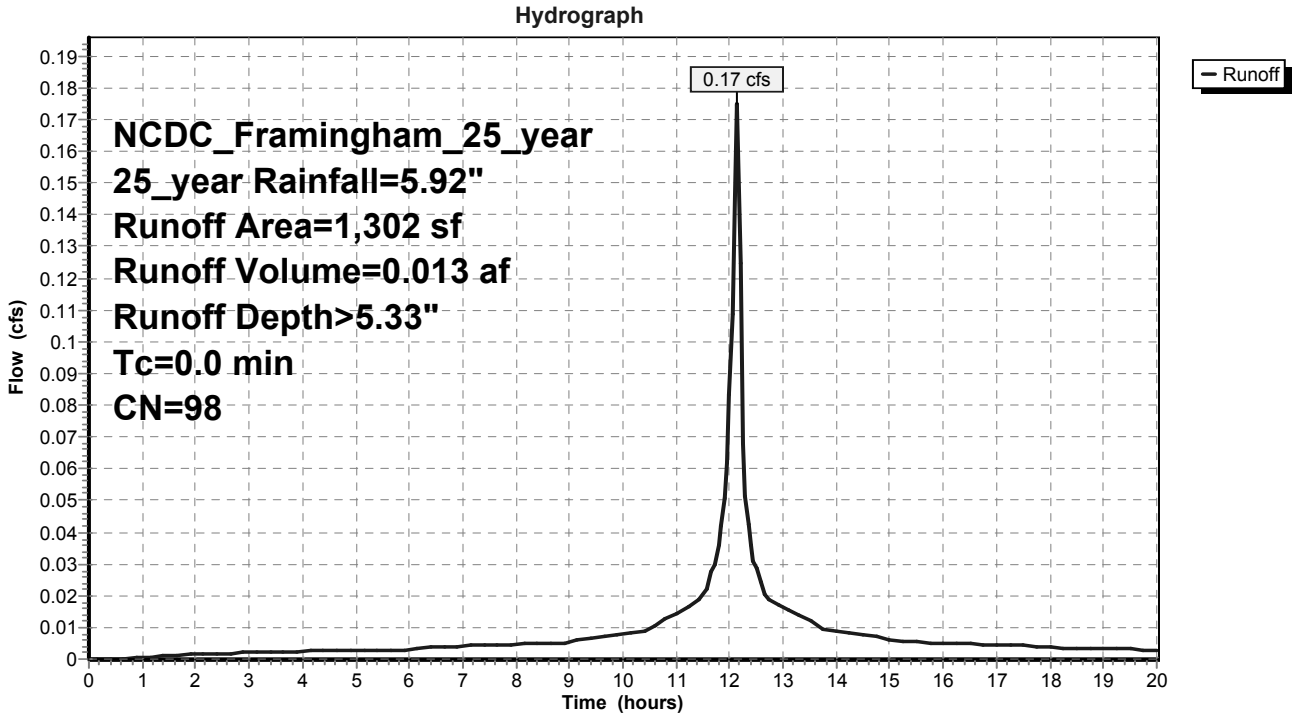
## Summary for Subcatchment ROOF-13: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-13: (blank)



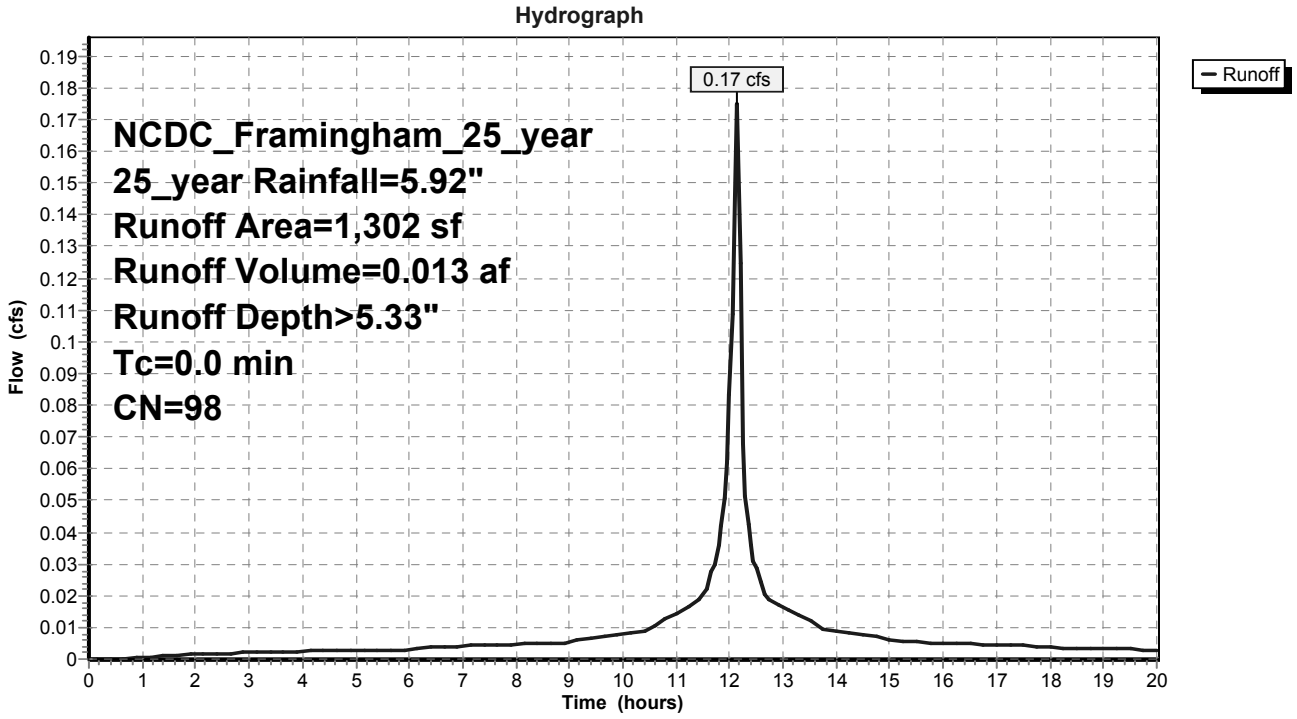
## Summary for Subcatchment ROOF-14: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-14: (blank)



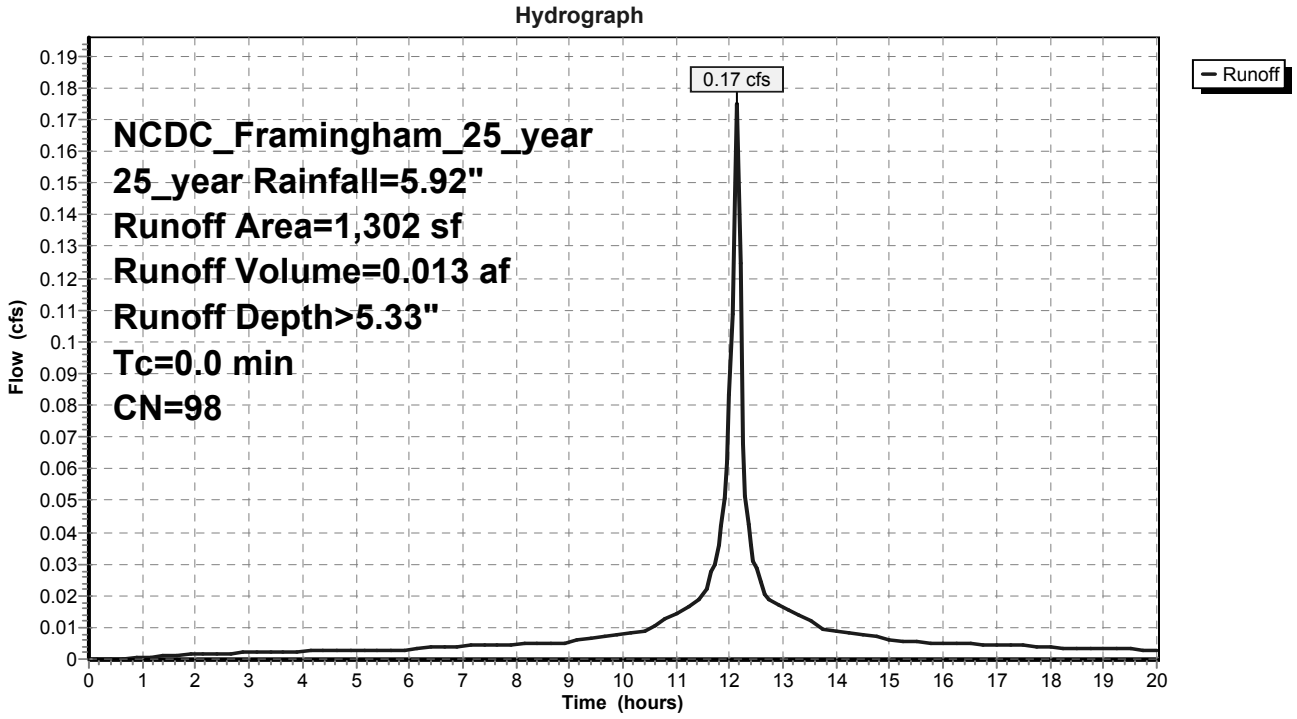
## Summary for Subcatchment ROOF-15: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-15: (blank)



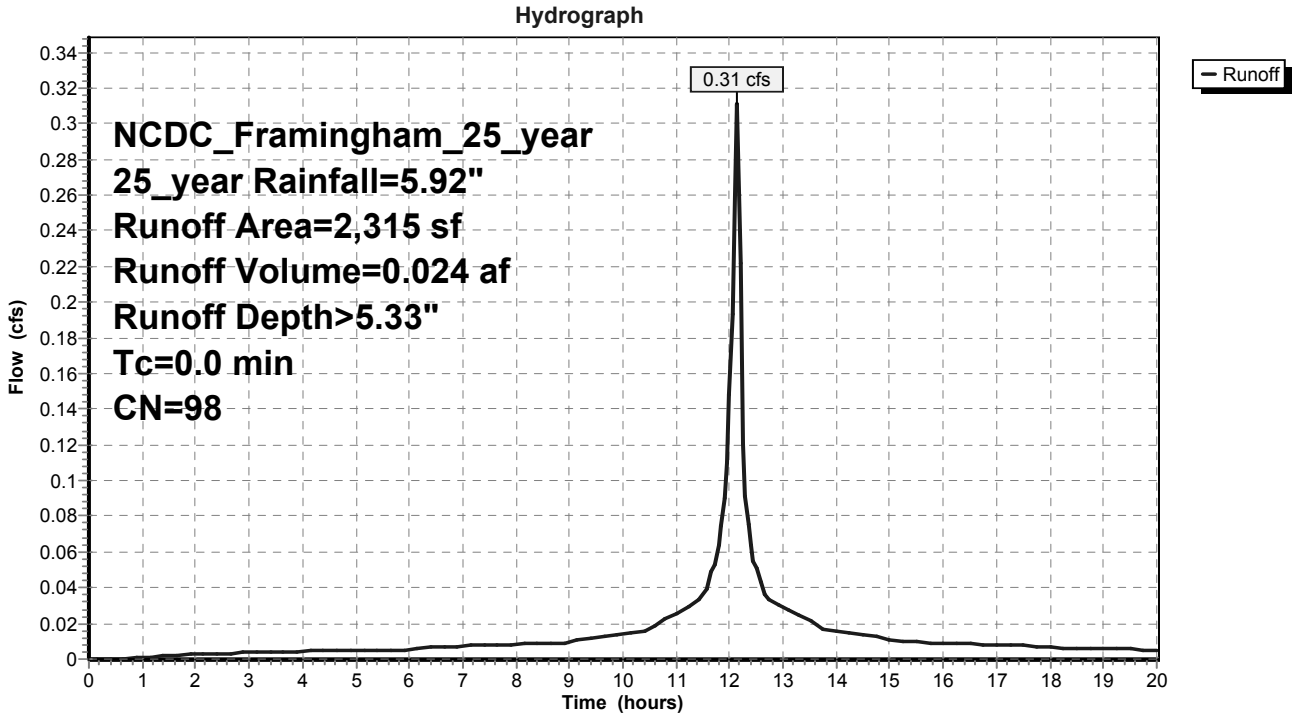
## Summary for Subcatchment ROOF-16: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-16: (blank)



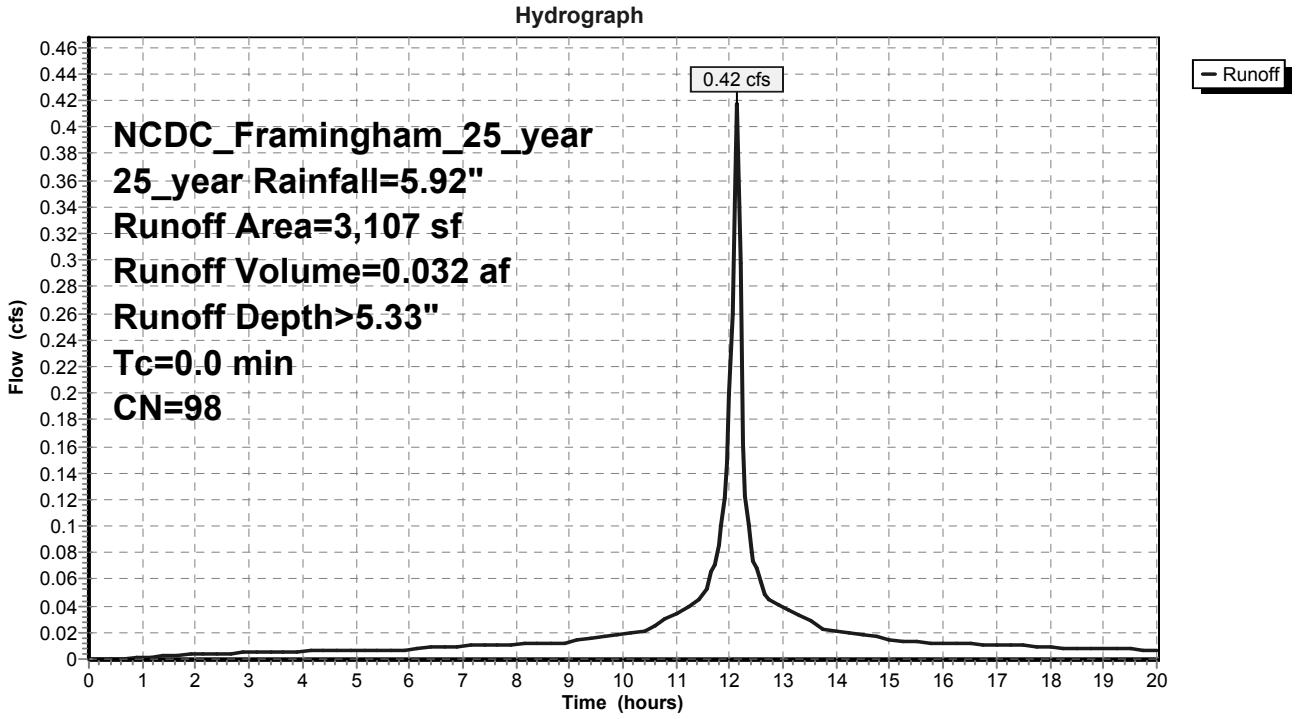
## Summary for Subcatchment ROOF-17: (blank)

Runoff = 0.42 cfs @ 12.14 hrs, Volume= 0.032 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-17: (blank)



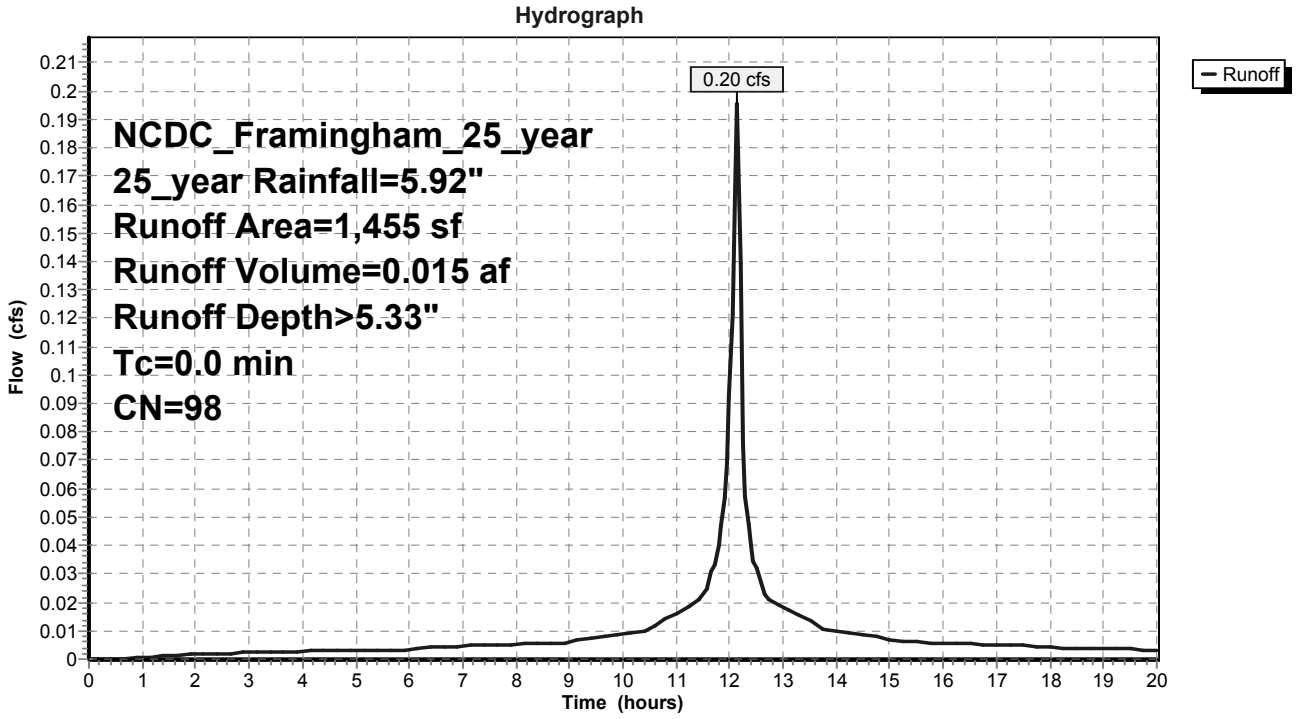
## Summary for Subcatchment ROOF-18: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-18: (blank)



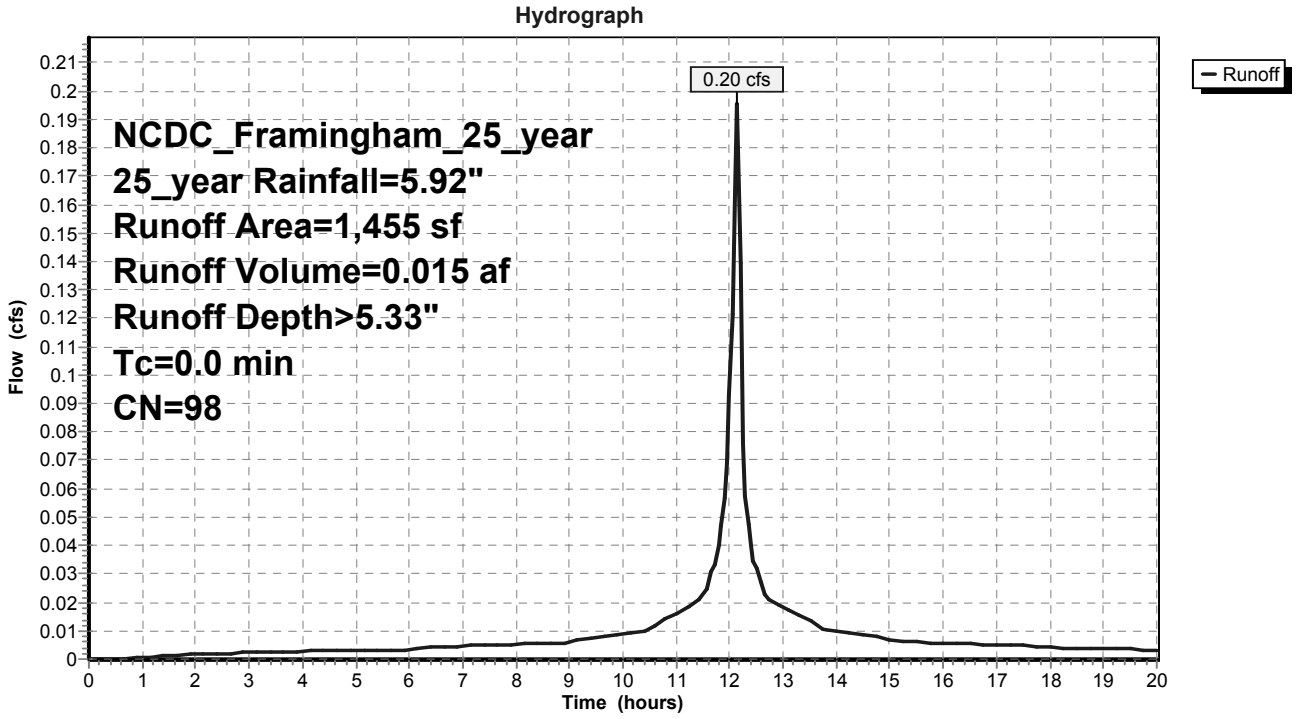
## Summary for Subcatchment ROOF-19: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-19: (blank)



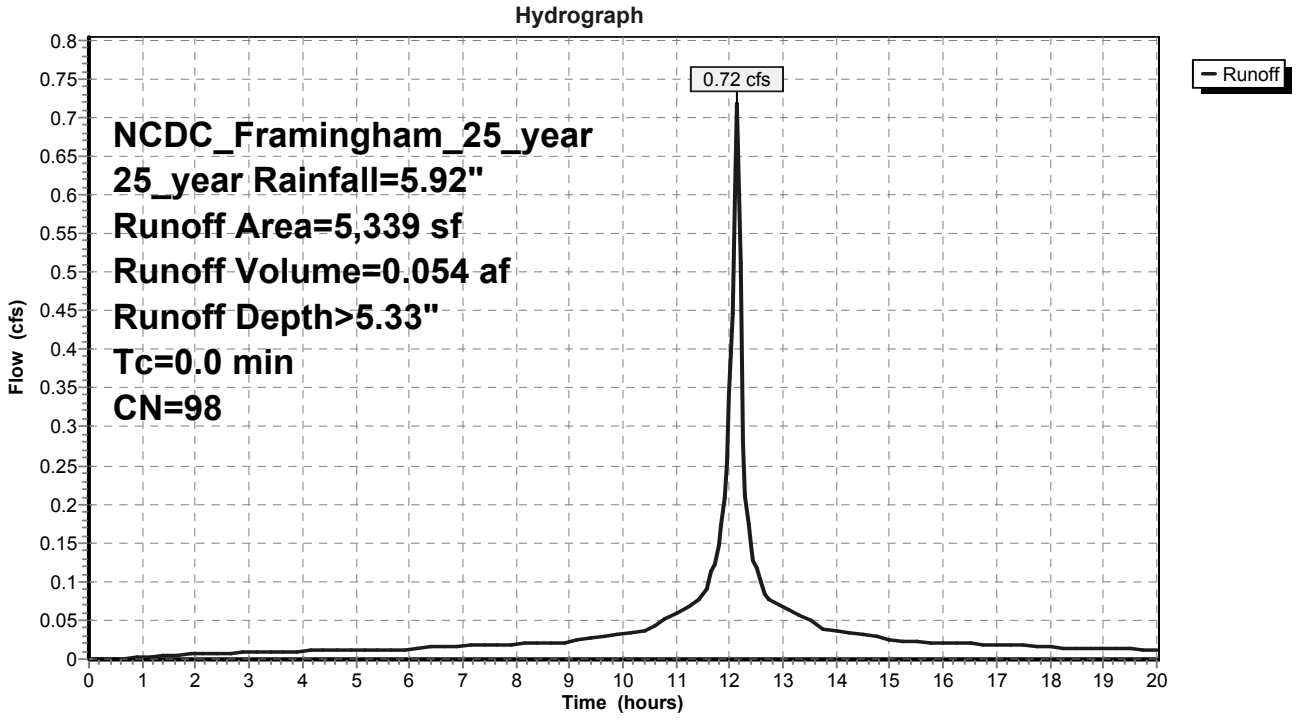
## Summary for Subcatchment ROOF-2: (blank)

Runoff = 0.72 cfs @ 12.14 hrs, Volume= 0.054 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 5,339 | 98 | ROOF, 100% imperv, HSG B |
| | 5,339 | 98 | Weighted Average |
| | 5,339 | | 100.00% Pervious Area |

## Subcatchment ROOF-2: (blank)



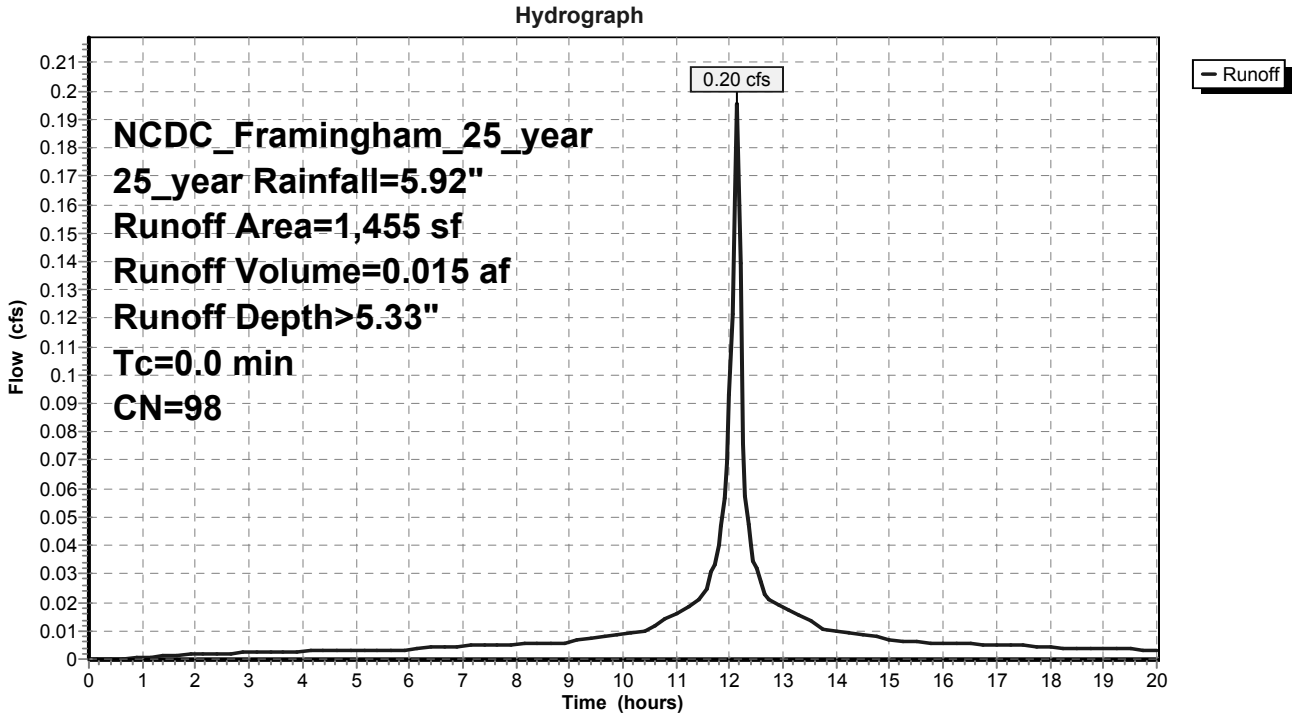
## Summary for Subcatchment ROOF-20: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-20: (blank)



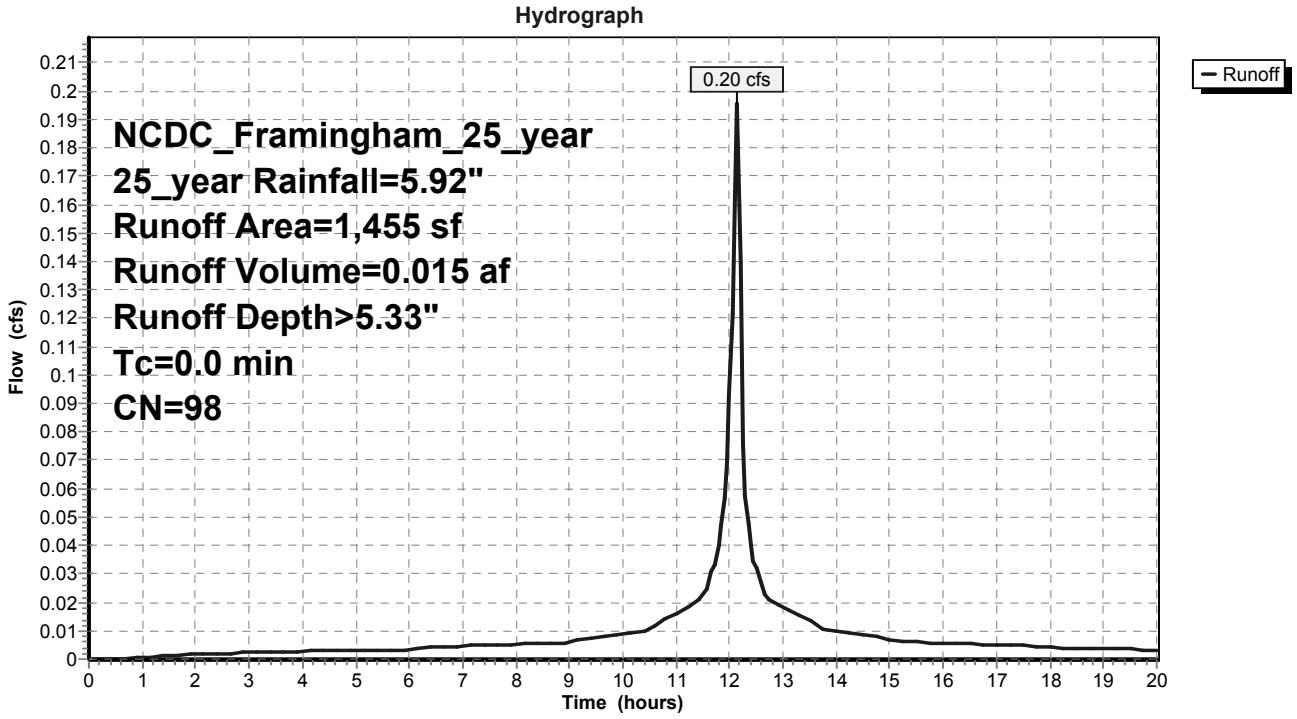
## Summary for Subcatchment ROOF-21: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-21: (blank)



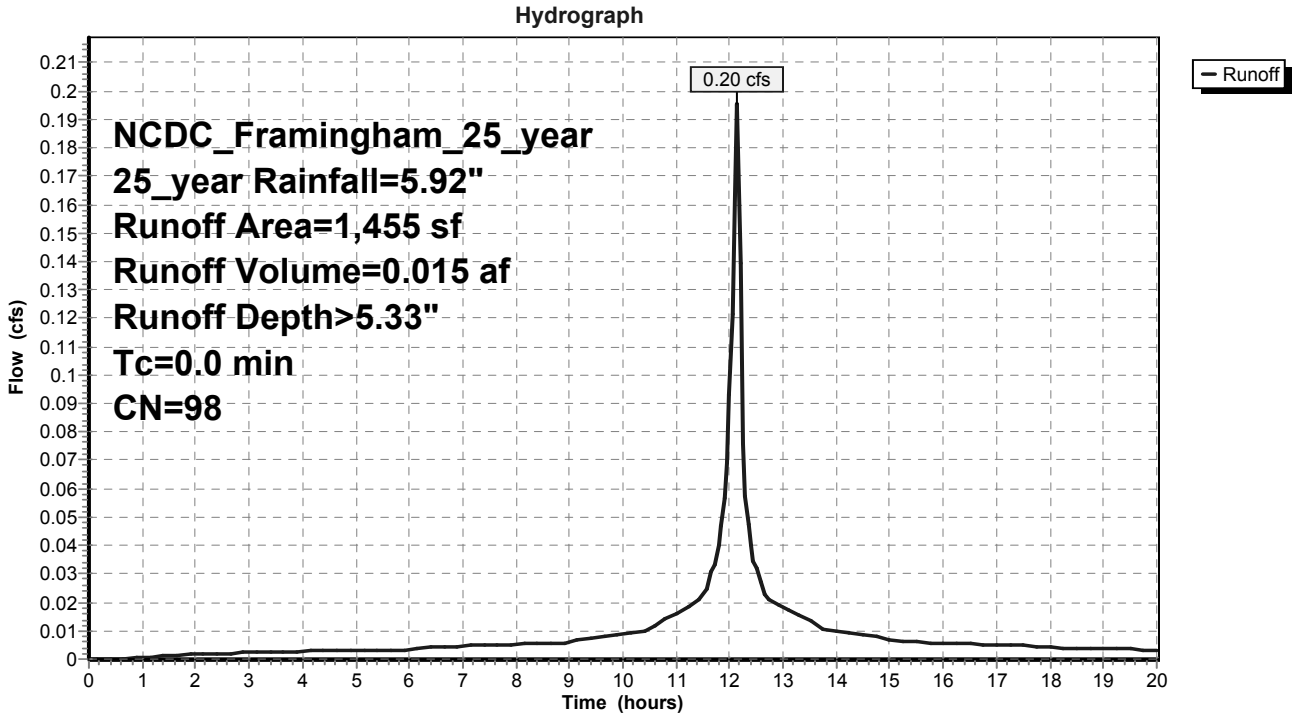
## Summary for Subcatchment ROOF-22: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-22: (blank)



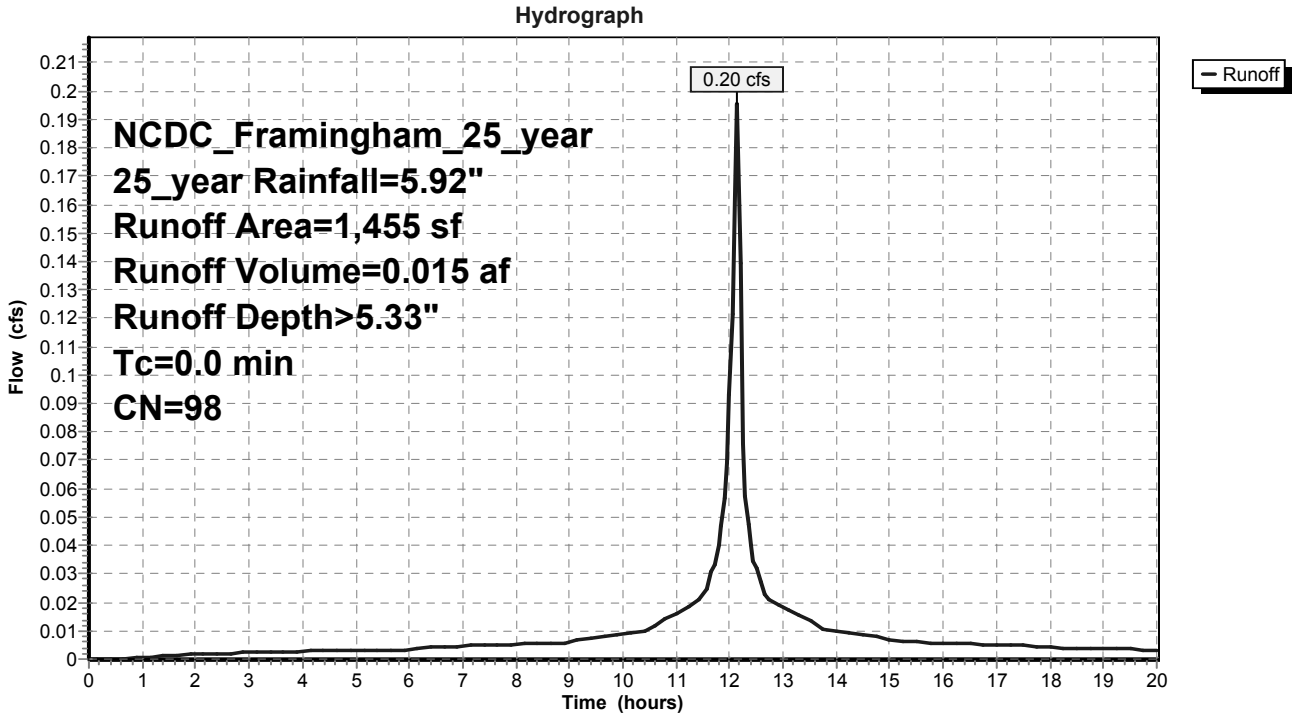
## Summary for Subcatchment ROOF-23: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-23: (blank)



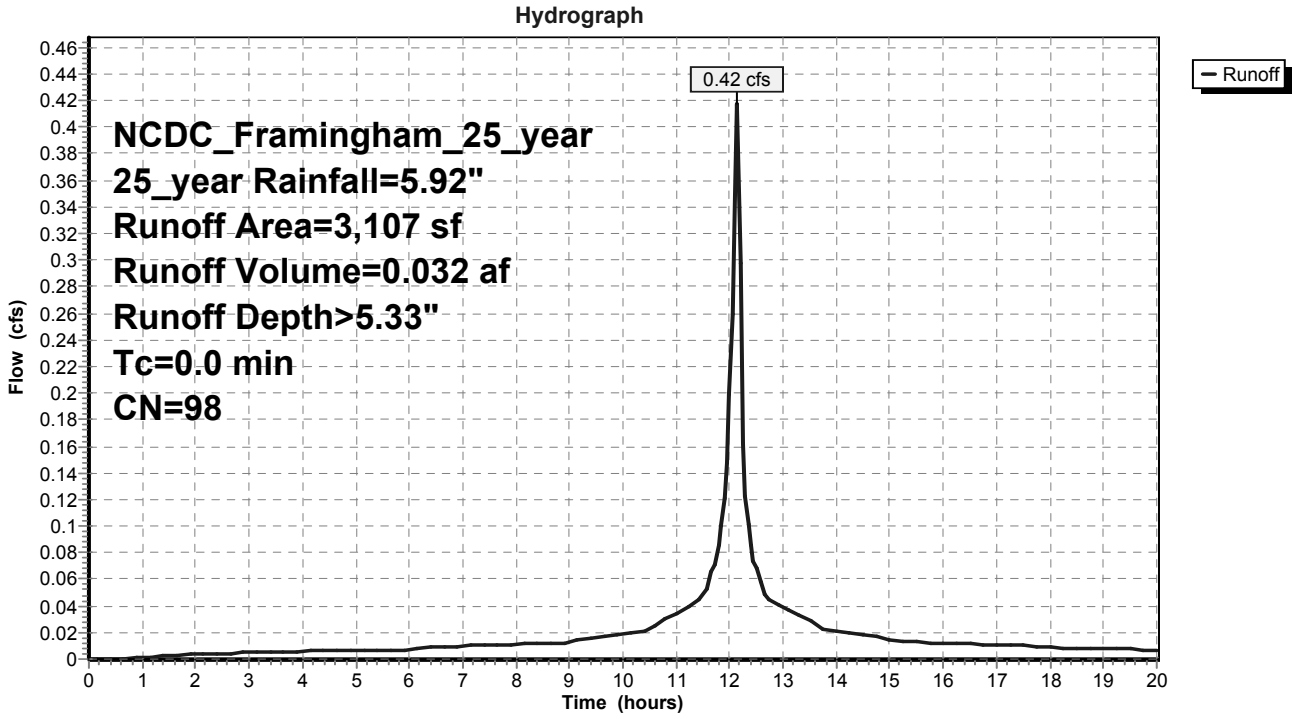
## Summary for Subcatchment ROOF-24: (blank)

Runoff = 0.42 cfs @ 12.14 hrs, Volume= 0.032 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-24: (blank)



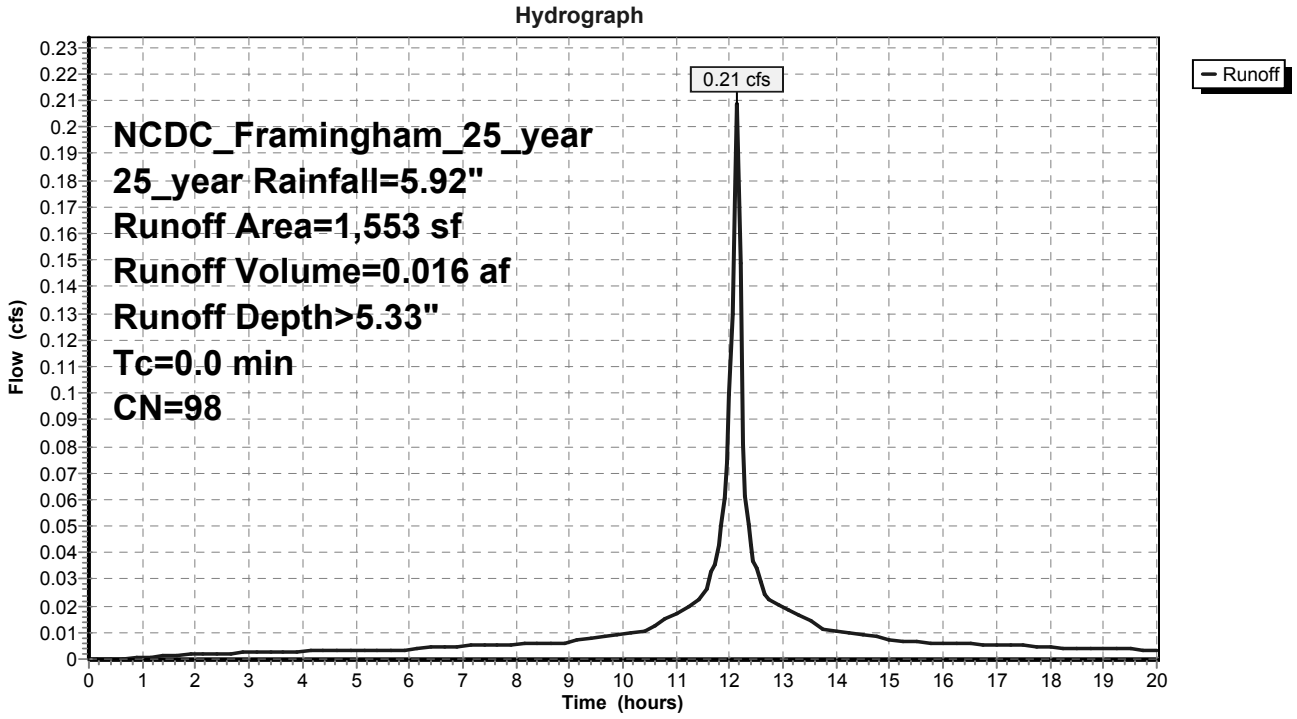
## Summary for Subcatchment ROOF-25: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-25: (blank)



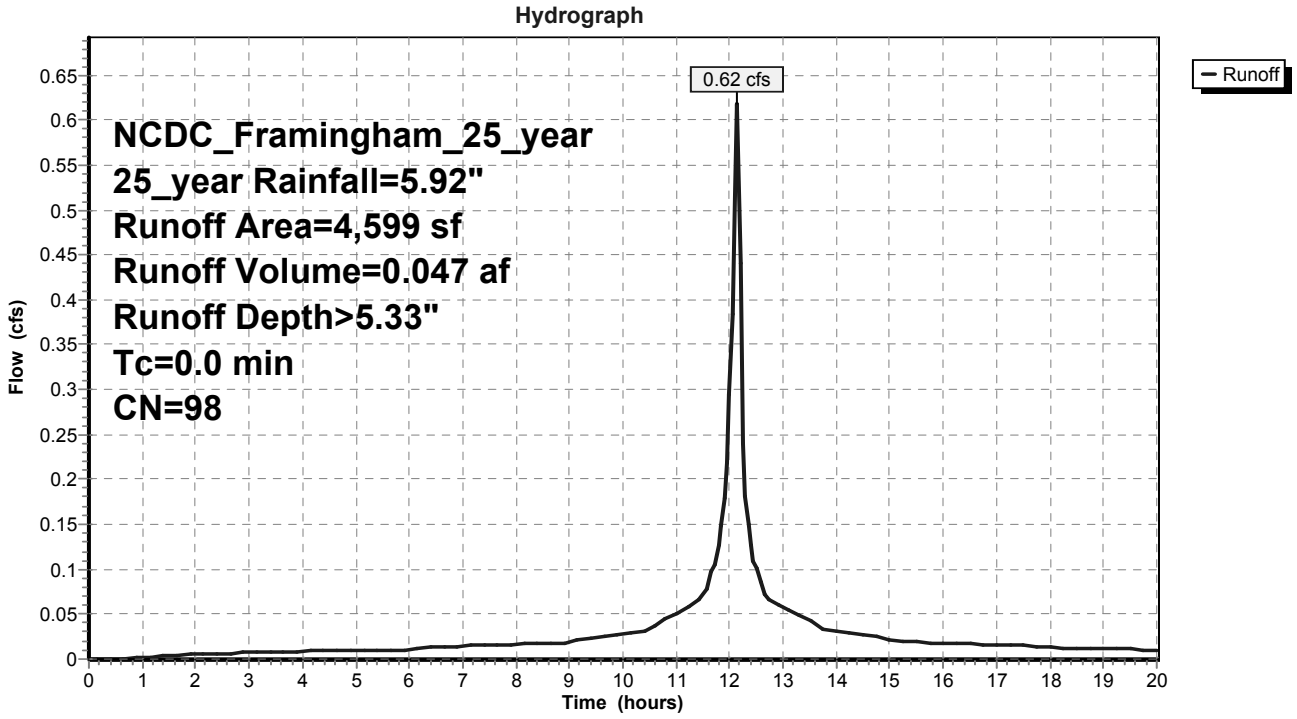
## Summary for Subcatchment ROOF-26: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-26: (blank)



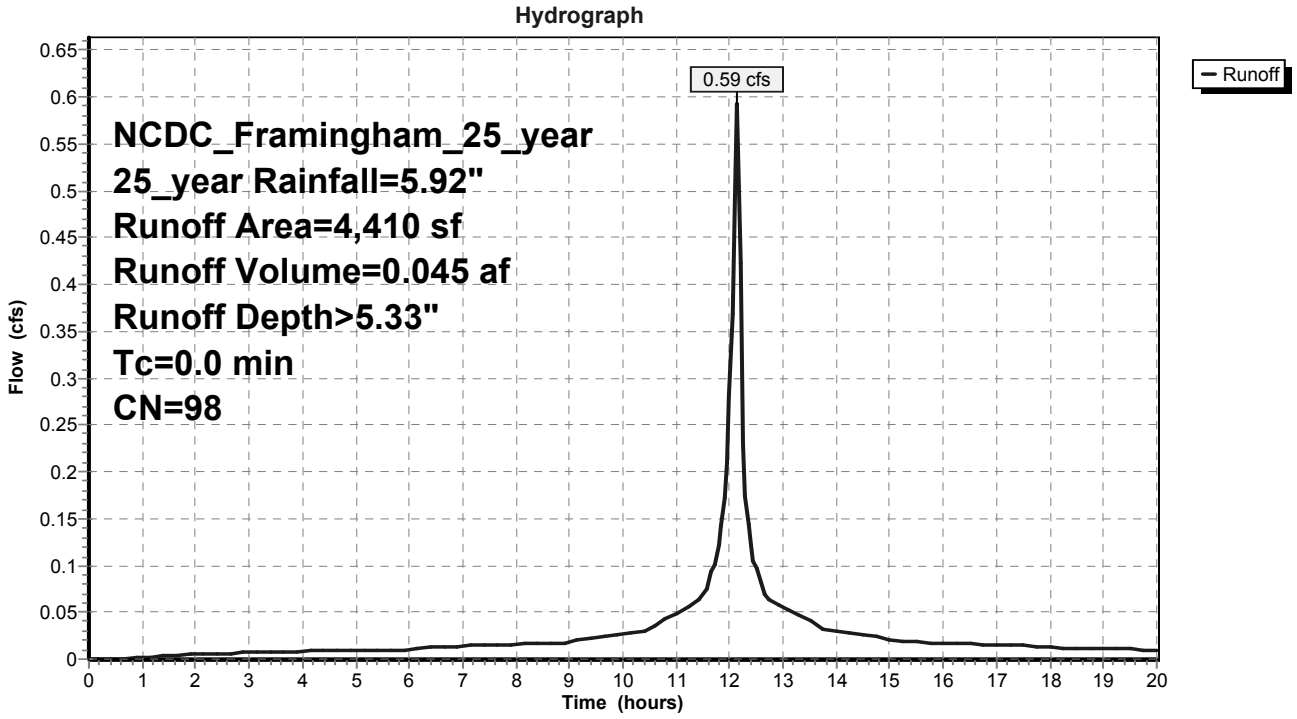
## Summary for Subcatchment ROOF-27: (blank)

Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-27: (blank)



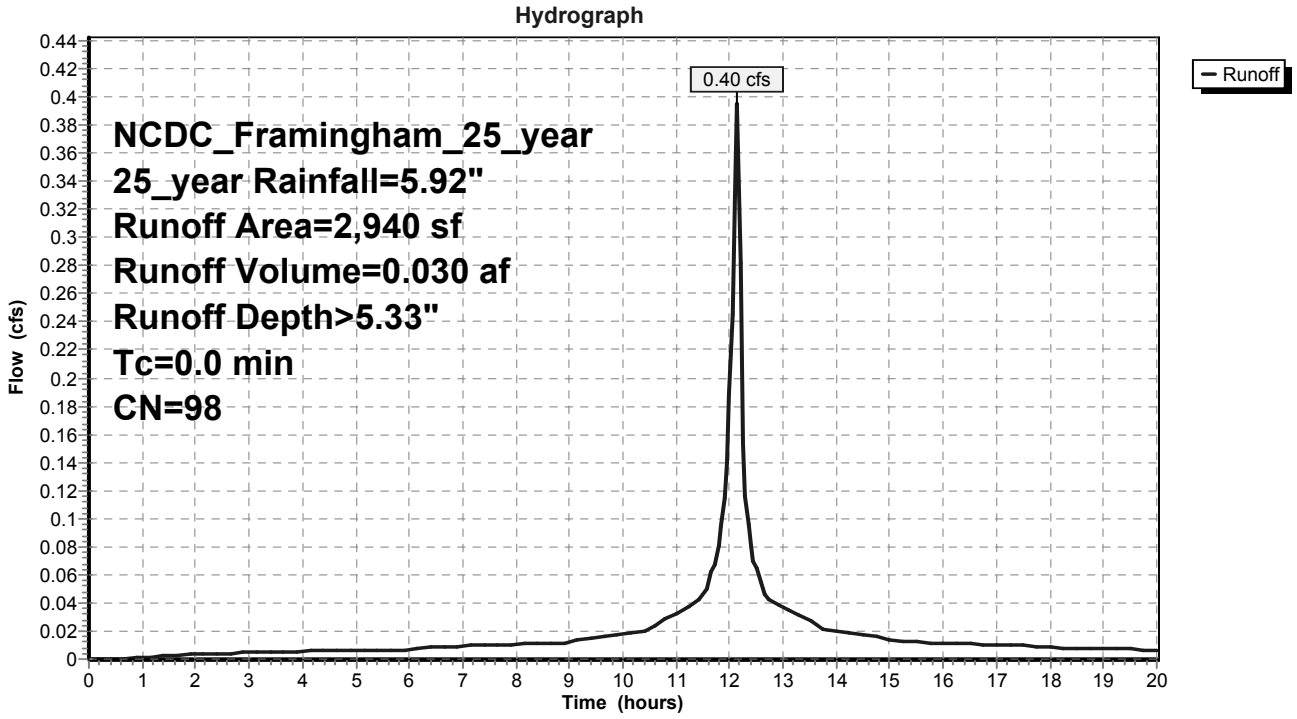
## Summary for Subcatchment ROOF-28: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-28: (blank)



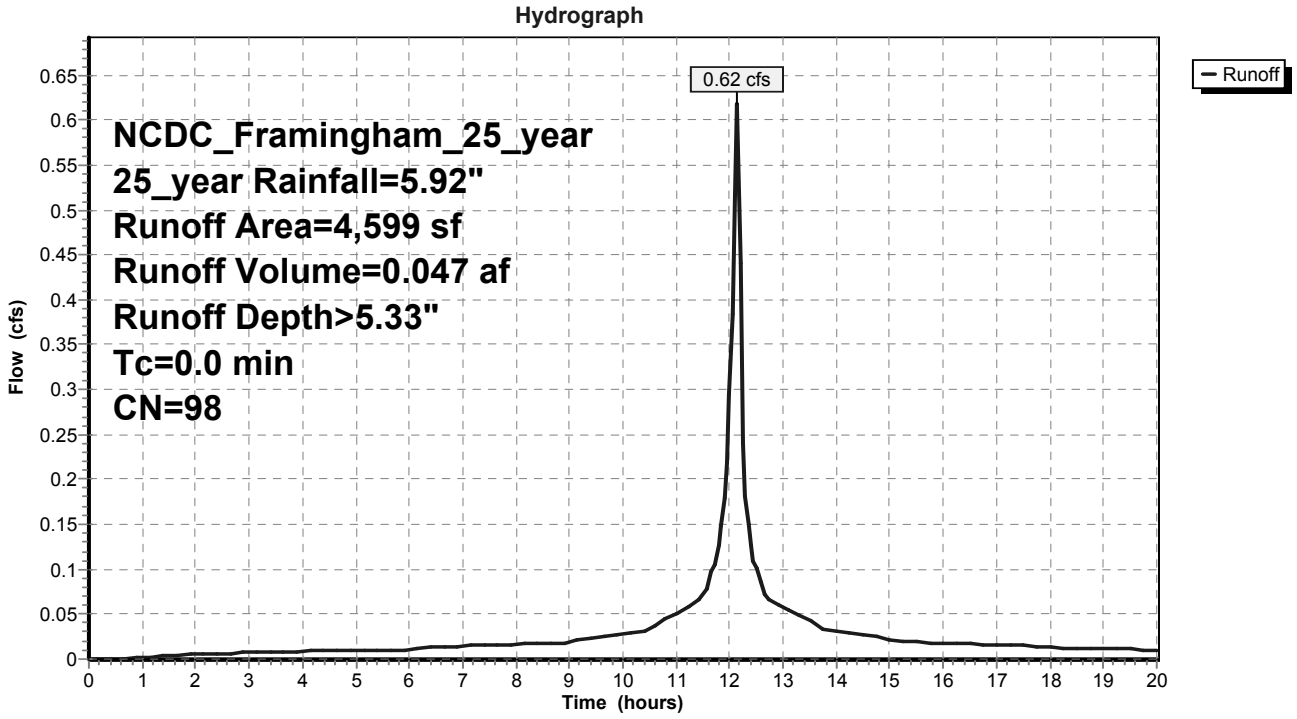
## Summary for Subcatchment ROOF-29: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-29: (blank)



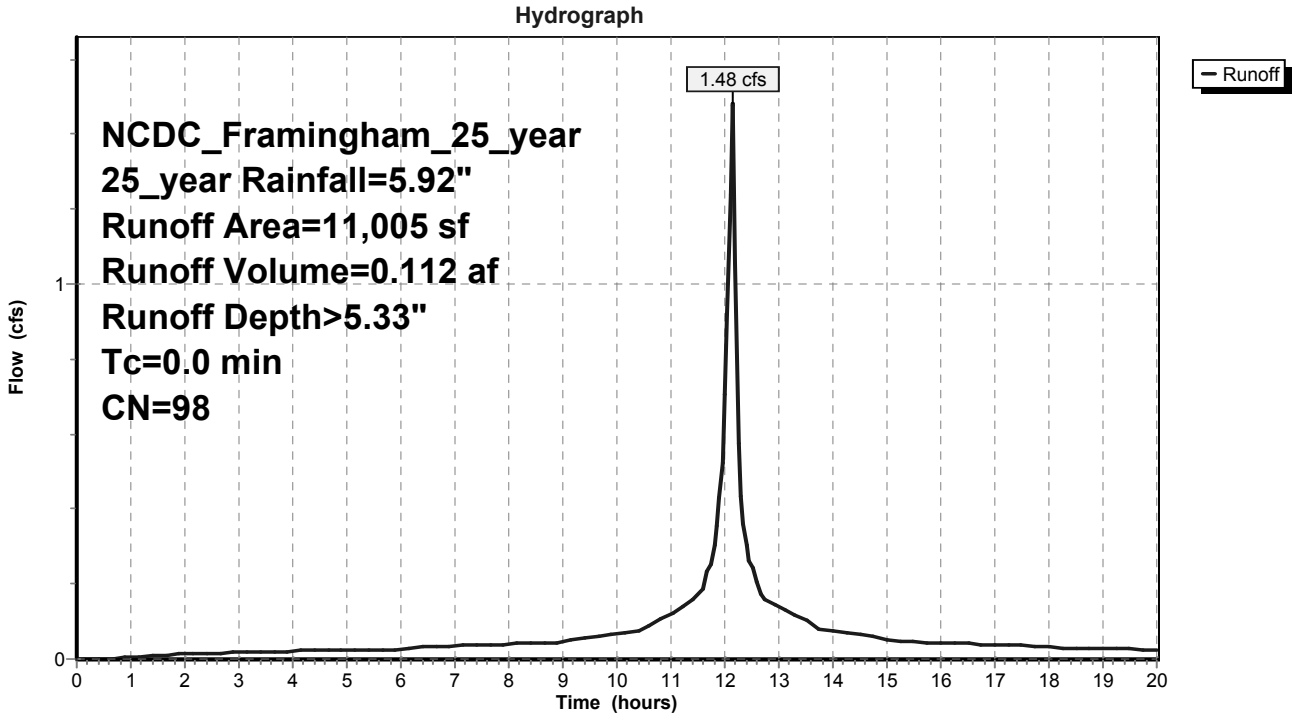
## Summary for Subcatchment ROOF-3: (blank)

Runoff = 1.48 cfs @ 12.14 hrs, Volume= 0.112 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 98 | DECK, 100% imperv, HSG B |
| * | 11,004 | 98 | ROOF, 100% imperv, HSG B |
| | 11,005 | 98 | Weighted Average |
| | 11,005 | | 100.00% Pervious Area |

## Subcatchment ROOF-3: (blank)



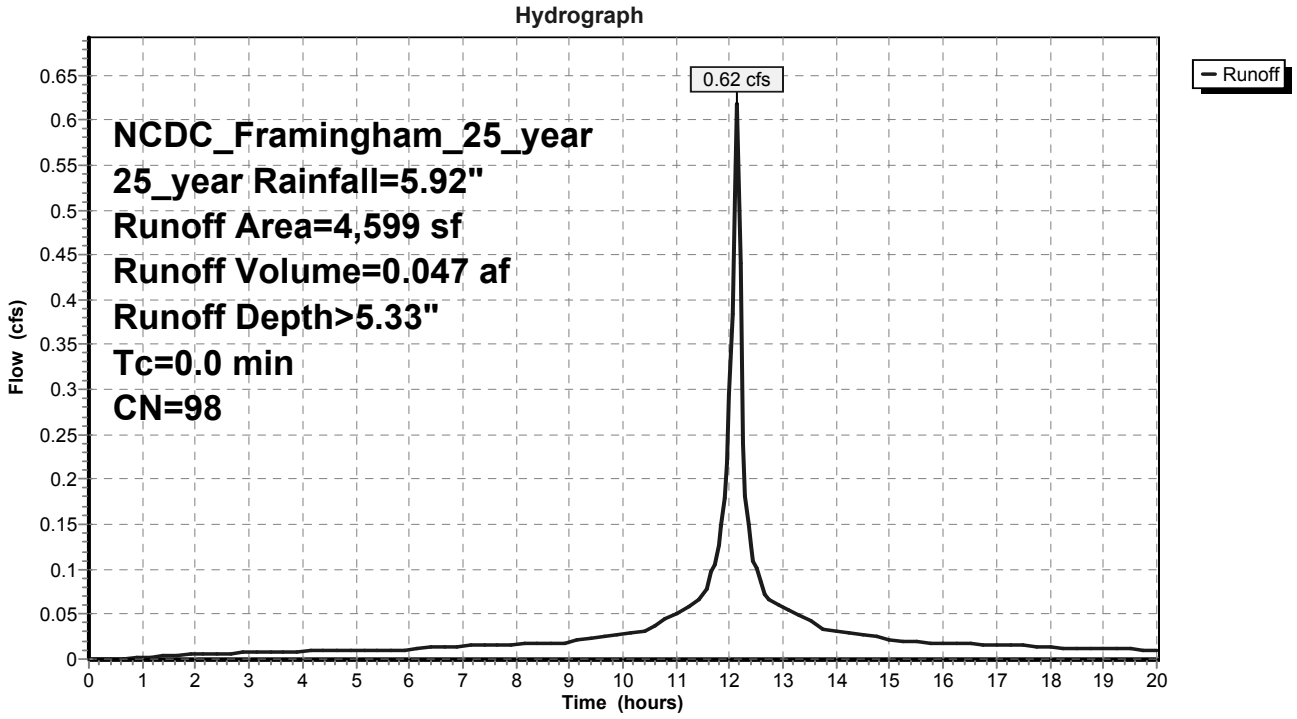
## Summary for Subcatchment ROOF-30: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-30: (blank)



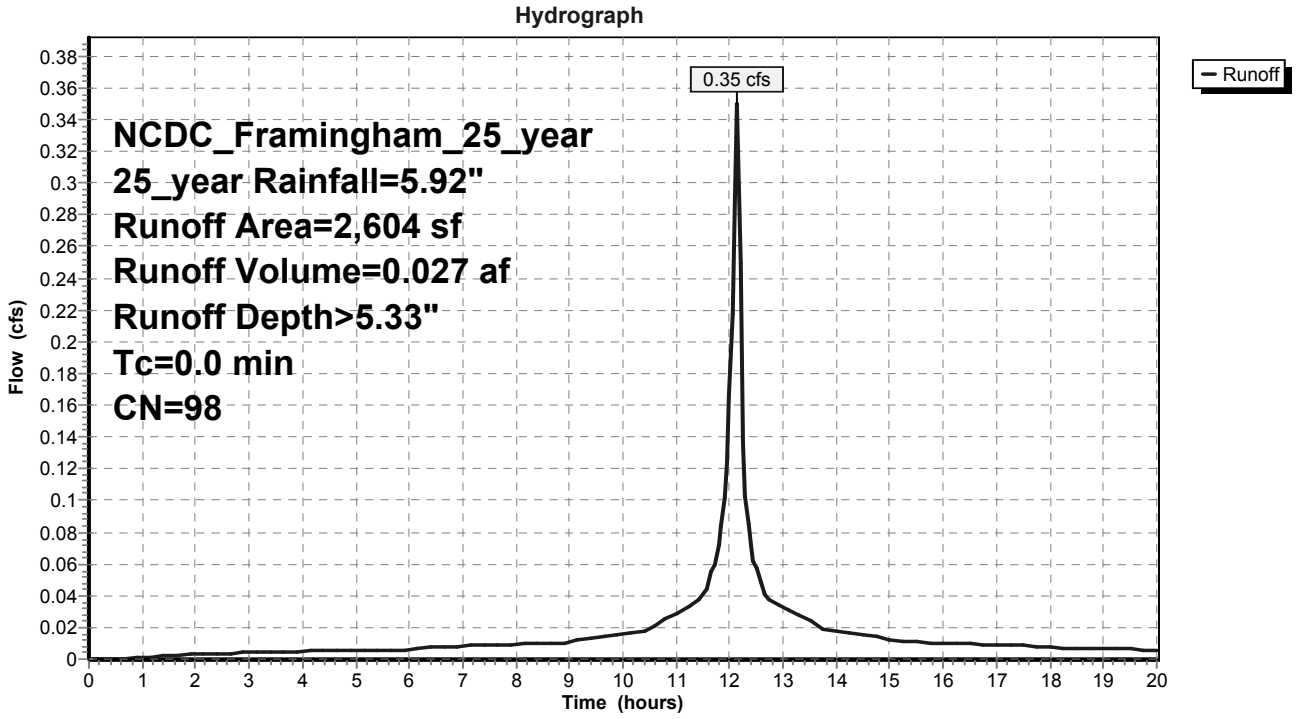
## Summary for Subcatchment ROOF-31: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-31: (blank)



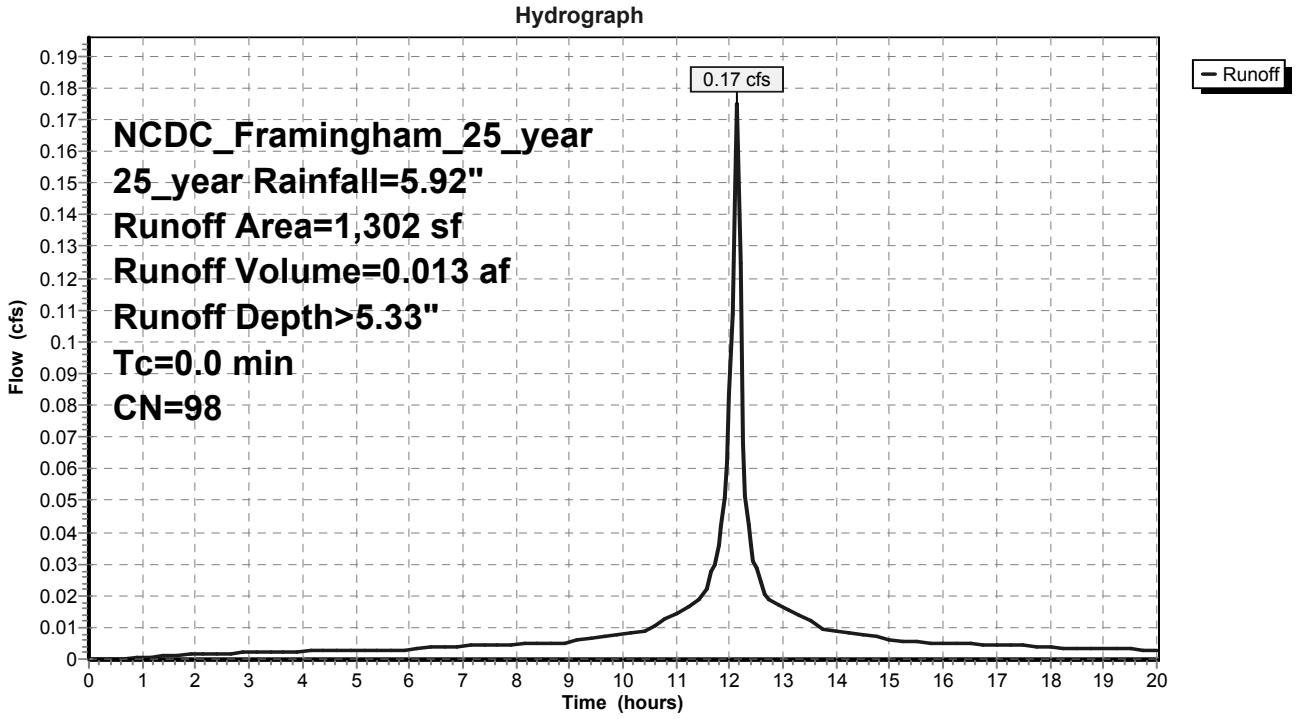
## Summary for Subcatchment ROOF-32: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-32: (blank)



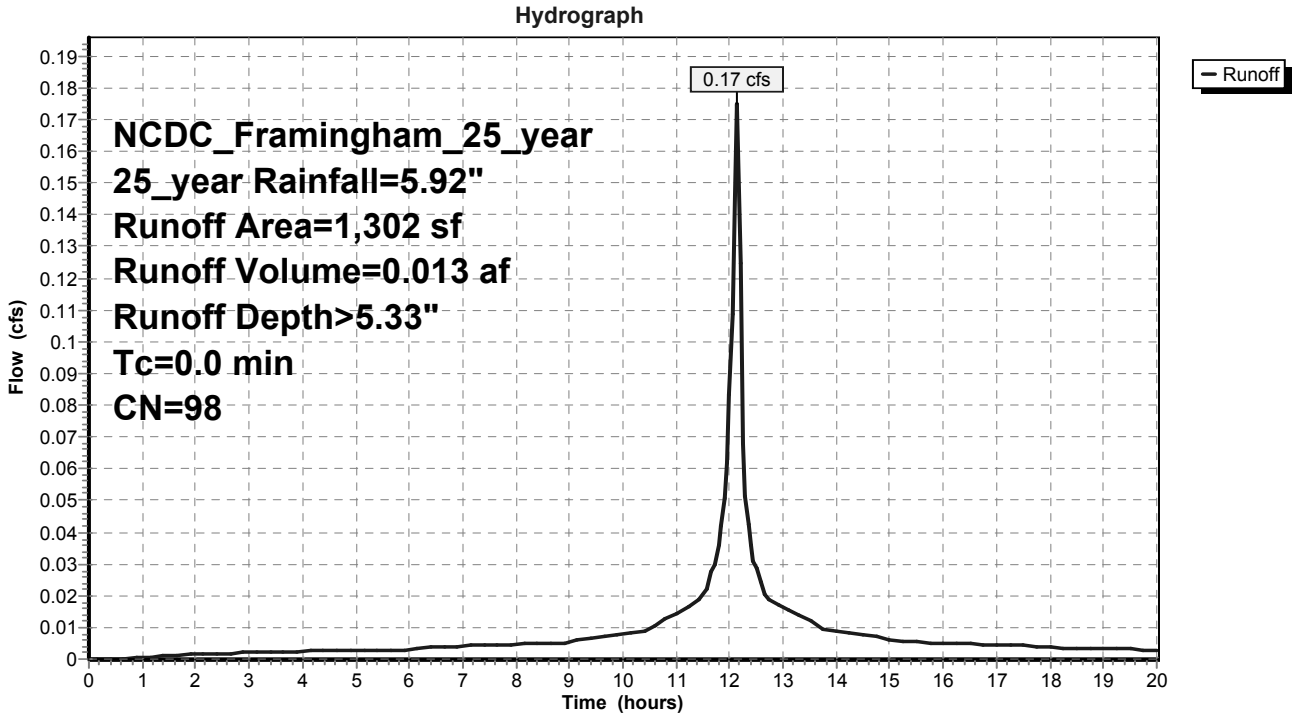
## Summary for Subcatchment ROOF-33: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-33: (blank)



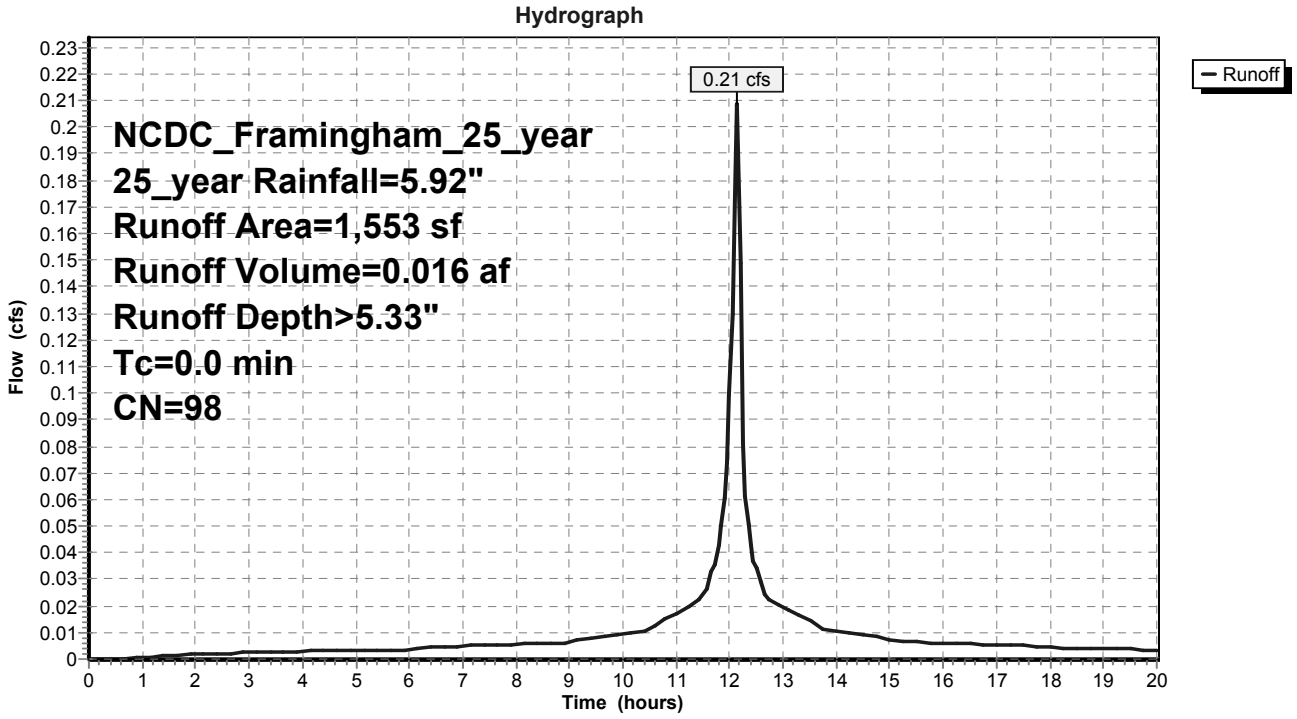
## Summary for Subcatchment ROOF-34: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-34: (blank)



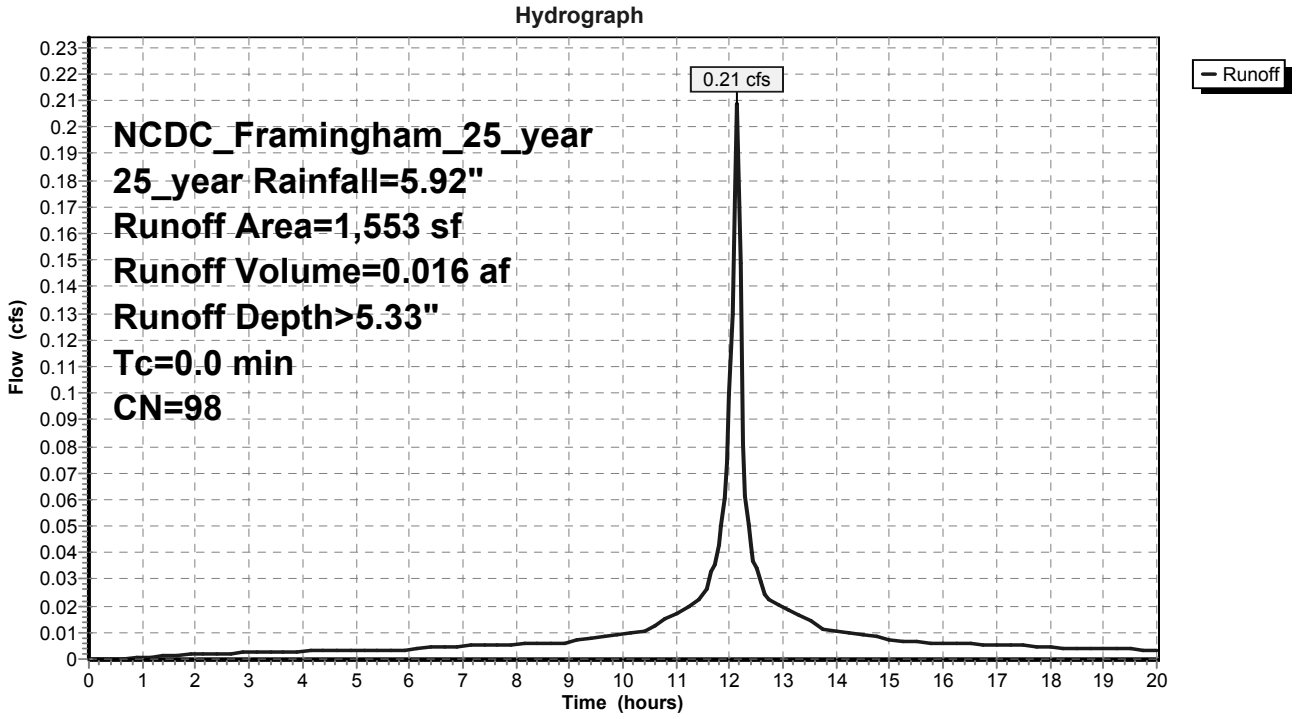
## Summary for Subcatchment ROOF-35: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-35: (blank)



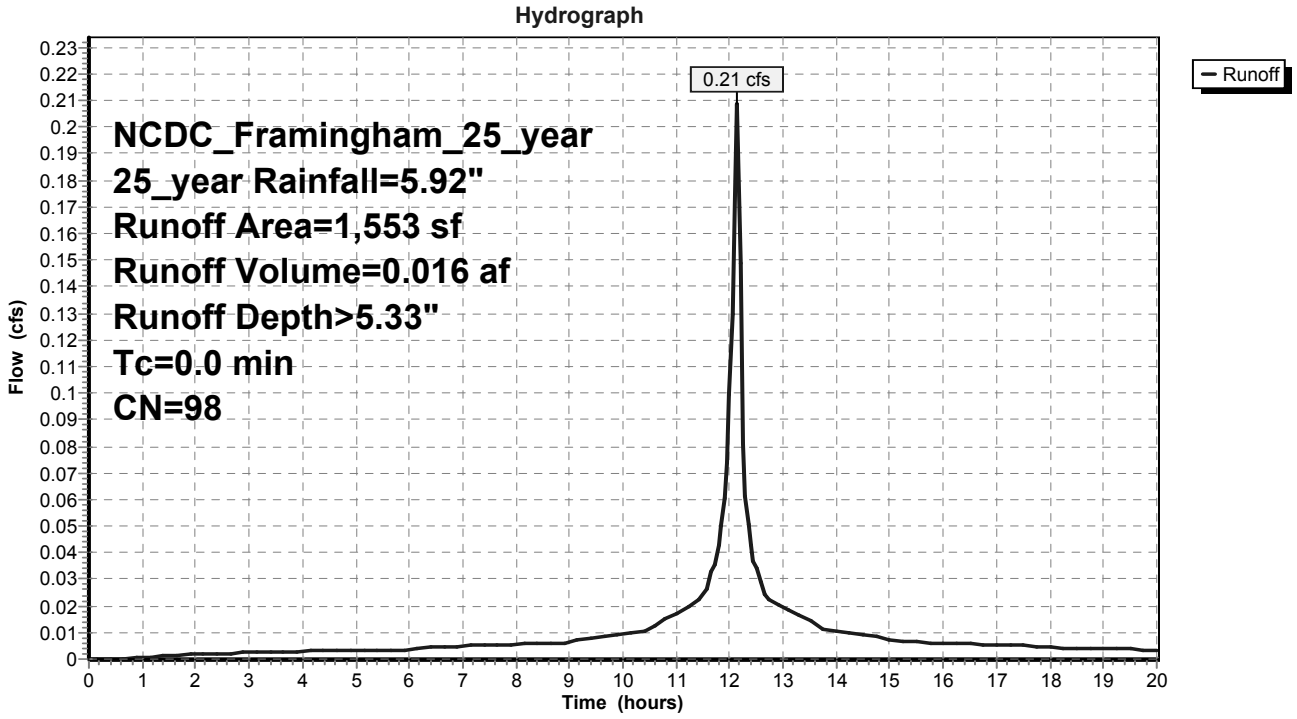
## Summary for Subcatchment ROOF-36: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-36: (blank)



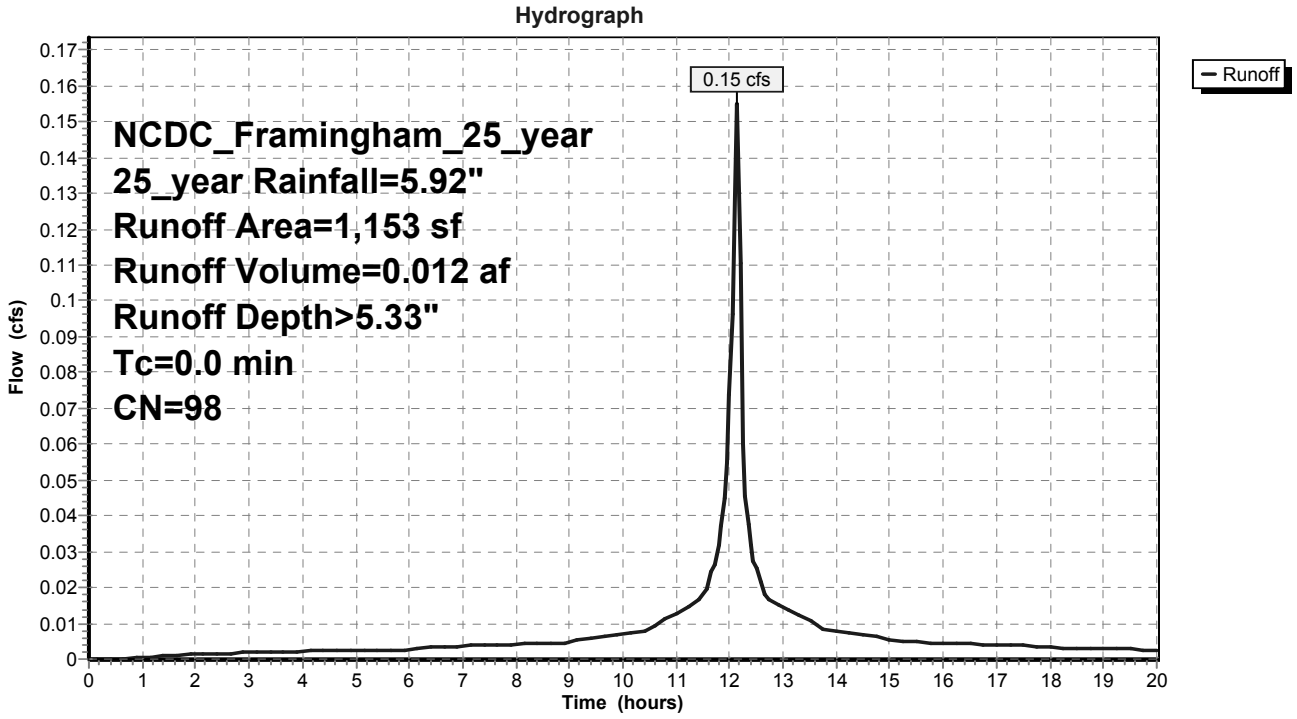
## Summary for Subcatchment ROOF-37: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,153 | 98 | ROOF, 100% imperv, HSG B |
| | 1,153 | | 100.00% Pervious Area |

## Subcatchment ROOF-37: (blank)



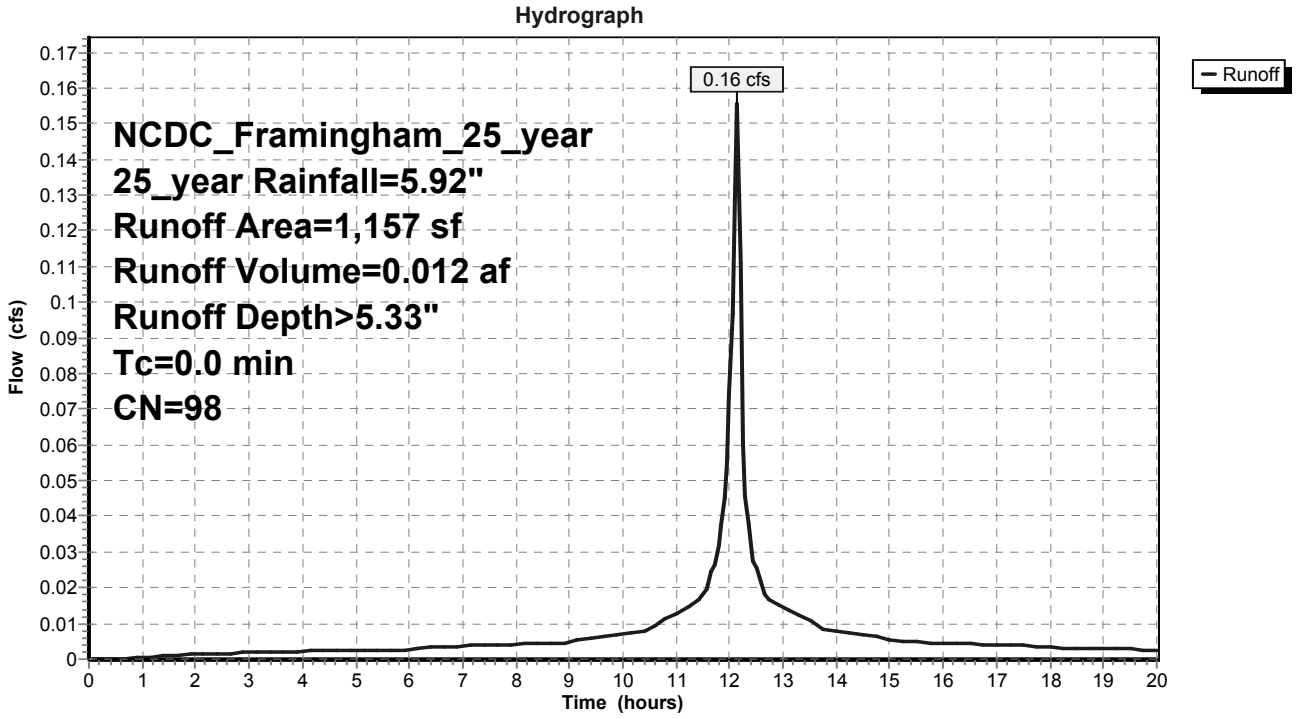
## Summary for Subcatchment ROOF-38: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-38: (blank)



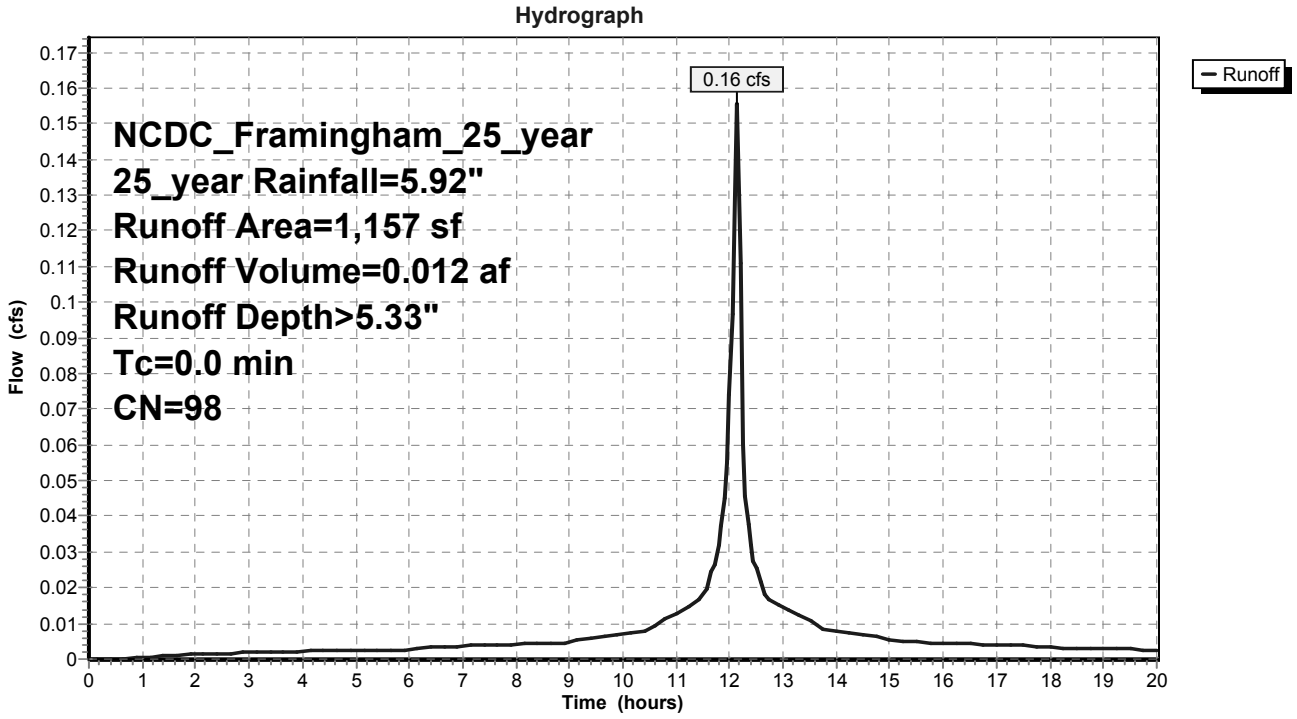
## Summary for Subcatchment ROOF-39: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-39: (blank)



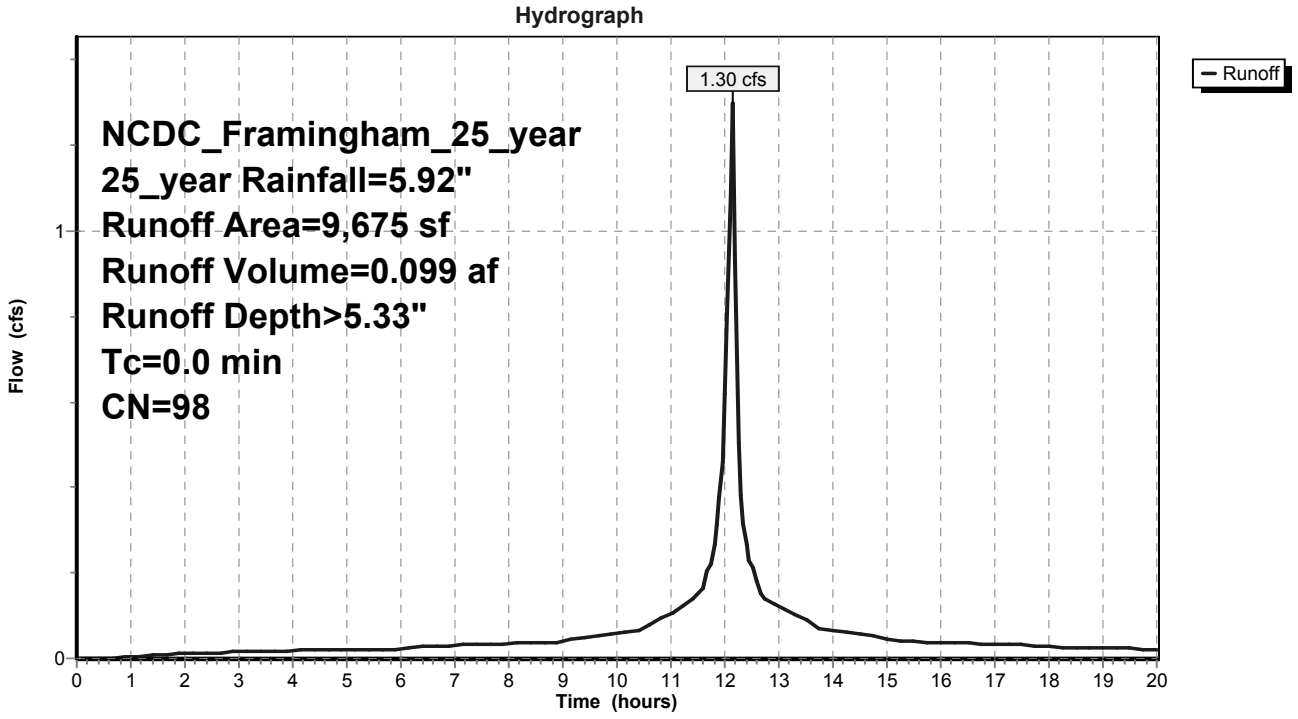
## Summary for Subcatchment ROOF-4: (blank)

Runoff = 1.30 cfs @ 12.14 hrs, Volume= 0.099 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 61 | GRASS, 0% imperv, HSG B |
| * | 72 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,675 | 98 | Weighted Average |
| | 9,675 | | 100.00% Pervious Area |

## Subcatchment ROOF-4: (blank)



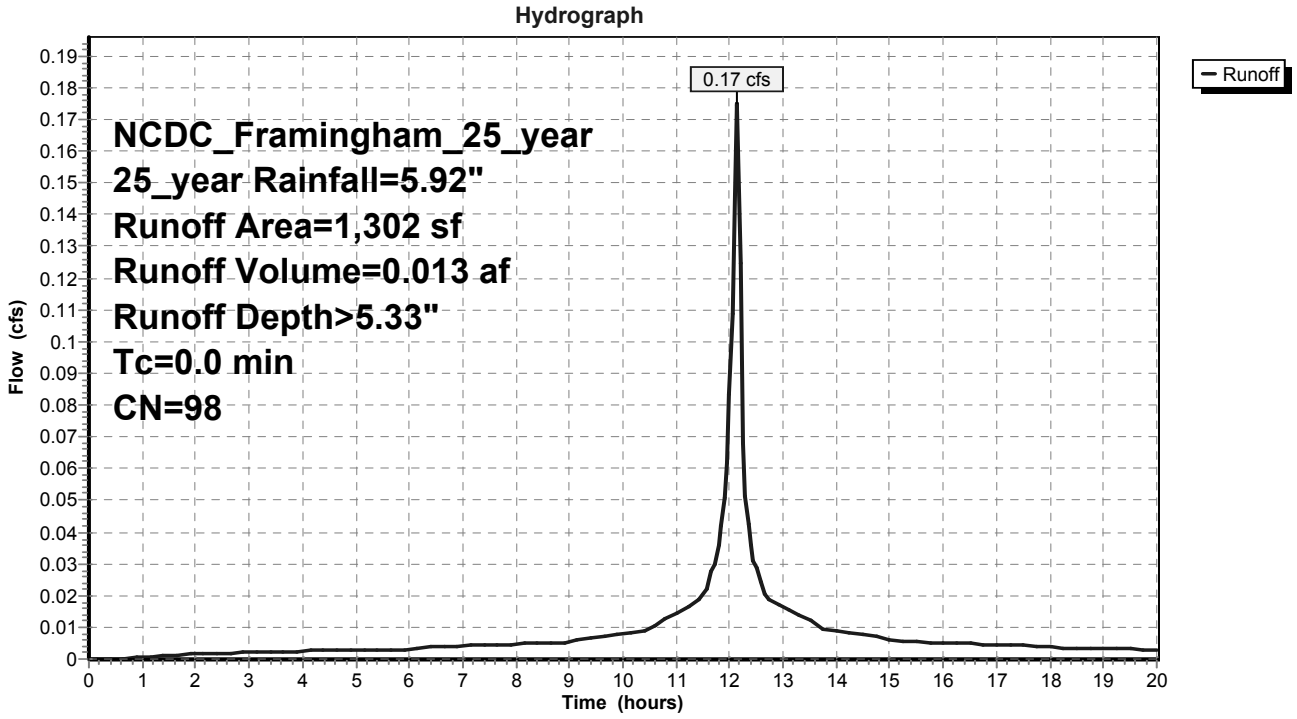
## Summary for Subcatchment ROOF-40: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 639 | 98 | ROOF, 100% imperv, HSG A |
| * | 663 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-40: (blank)



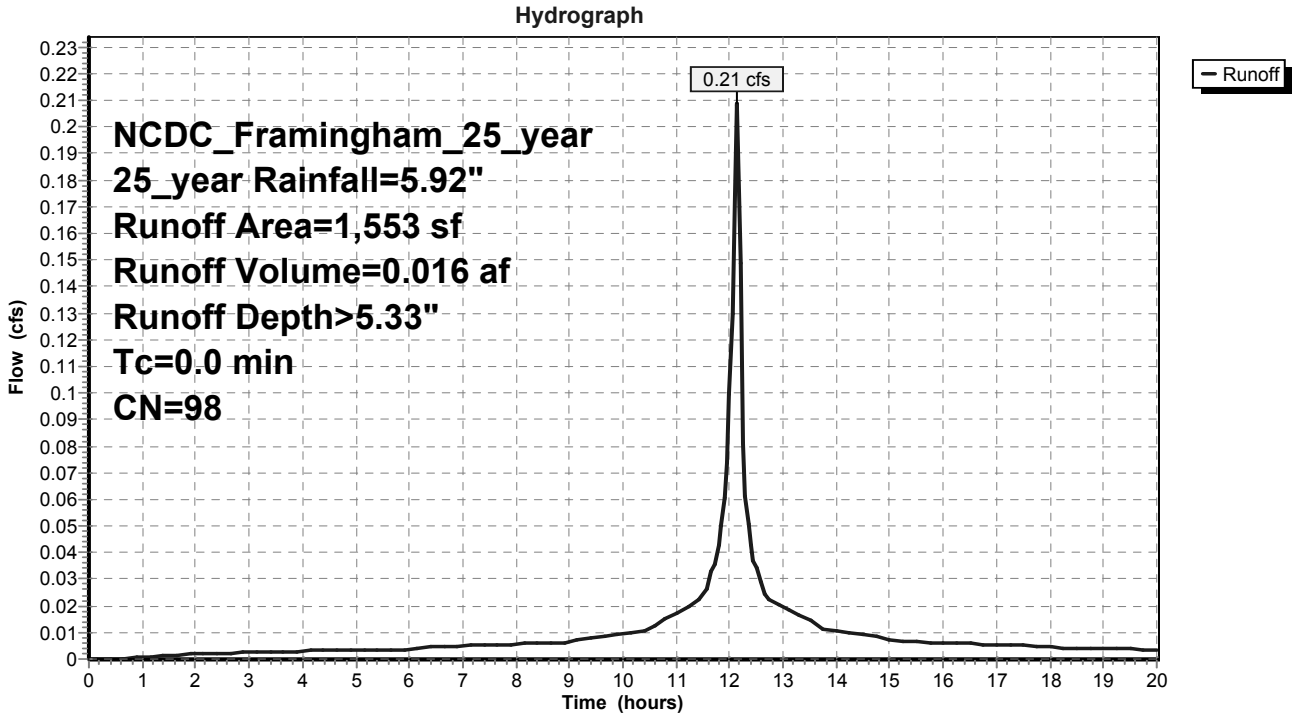
## Summary for Subcatchment ROOF-41: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,090 | 98 | ROOF, 100% imperv, HSG A |
| * | 463 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-41: (blank)



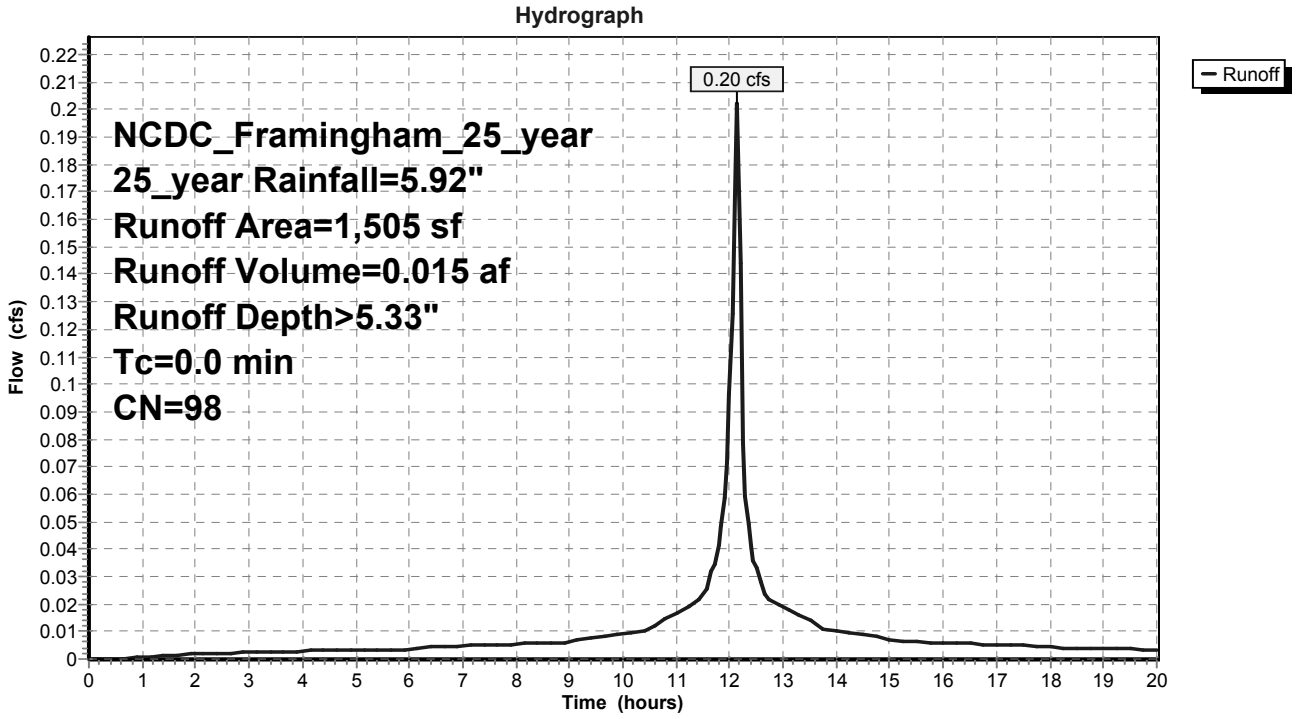
## Summary for Subcatchment ROOF-42: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 699 | 98 | ROOF, 100% imperv, HSG A |
| * | 806 | 98 | ROOF, 100% imperv, HSG B |
| | 1,505 | 98 | Weighted Average |
| | 1,505 | | 100.00% Pervious Area |

## Subcatchment ROOF-42: (blank)



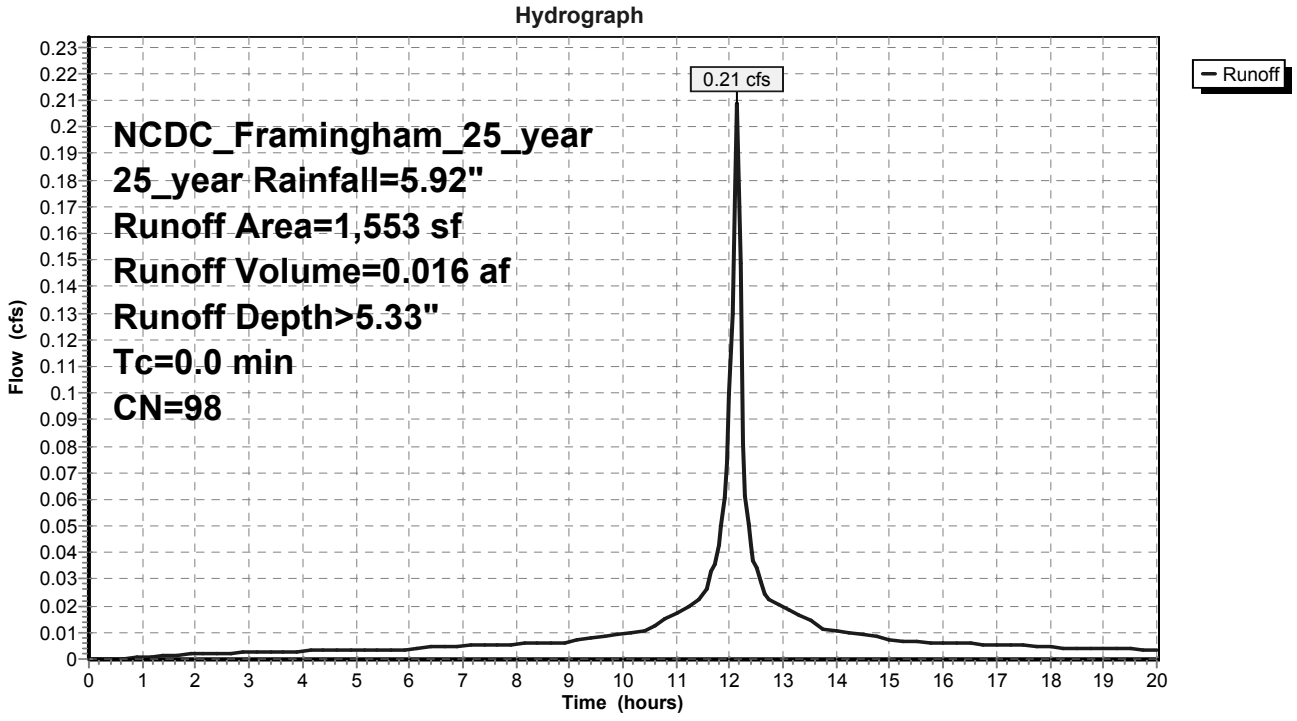
## Summary for Subcatchment ROOF-43: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 486 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,067 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-43: (blank)



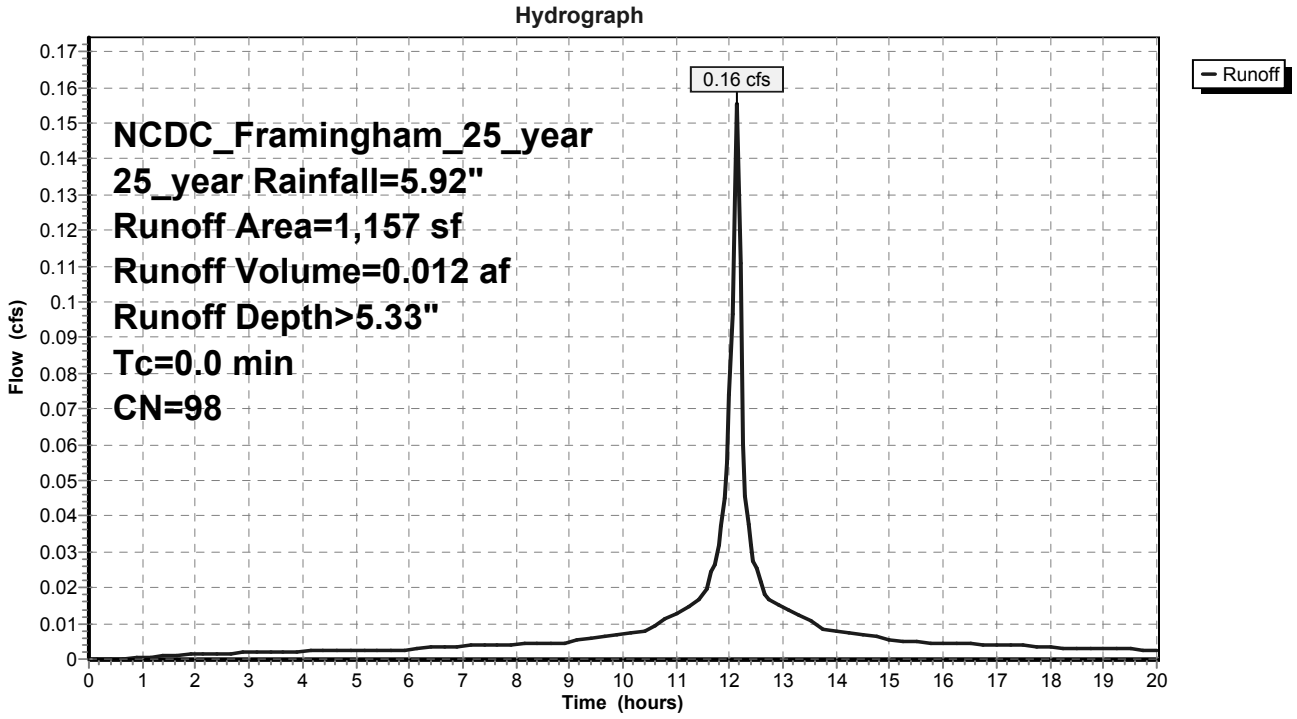
## Summary for Subcatchment ROOF-44: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-44: (blank)



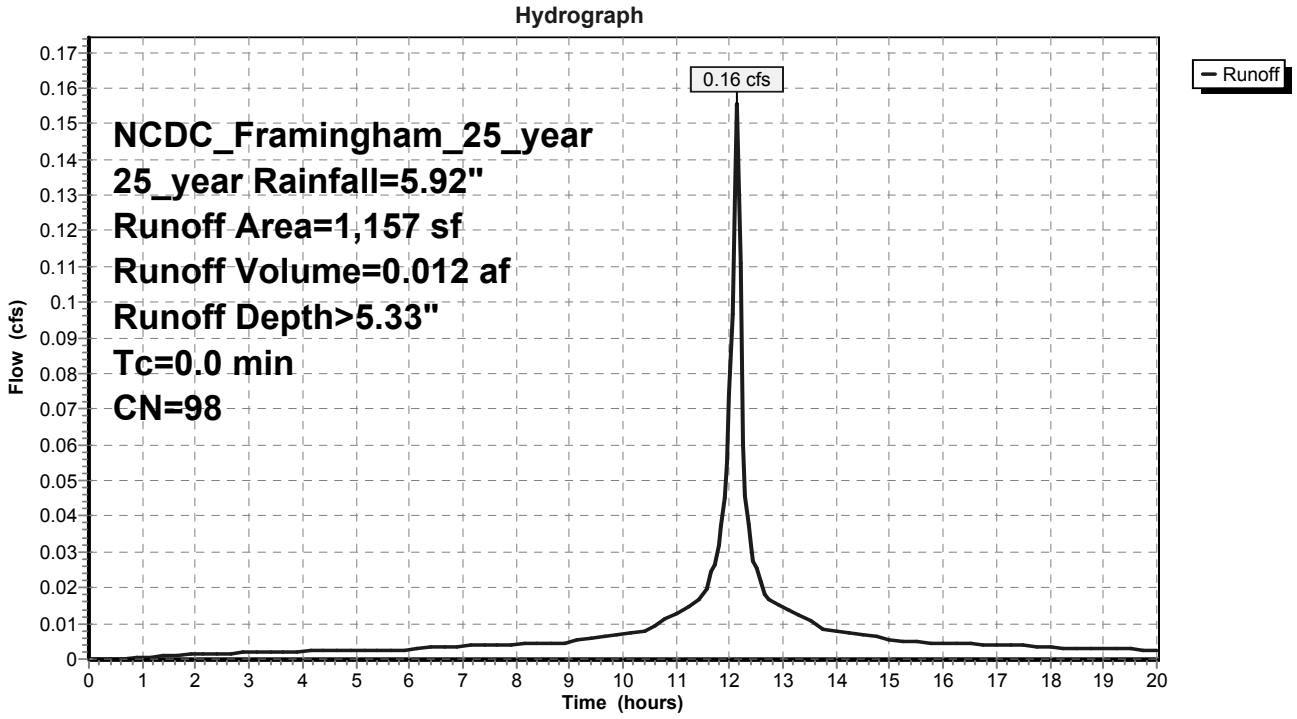
## Summary for Subcatchment ROOF-45: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-45: (blank)



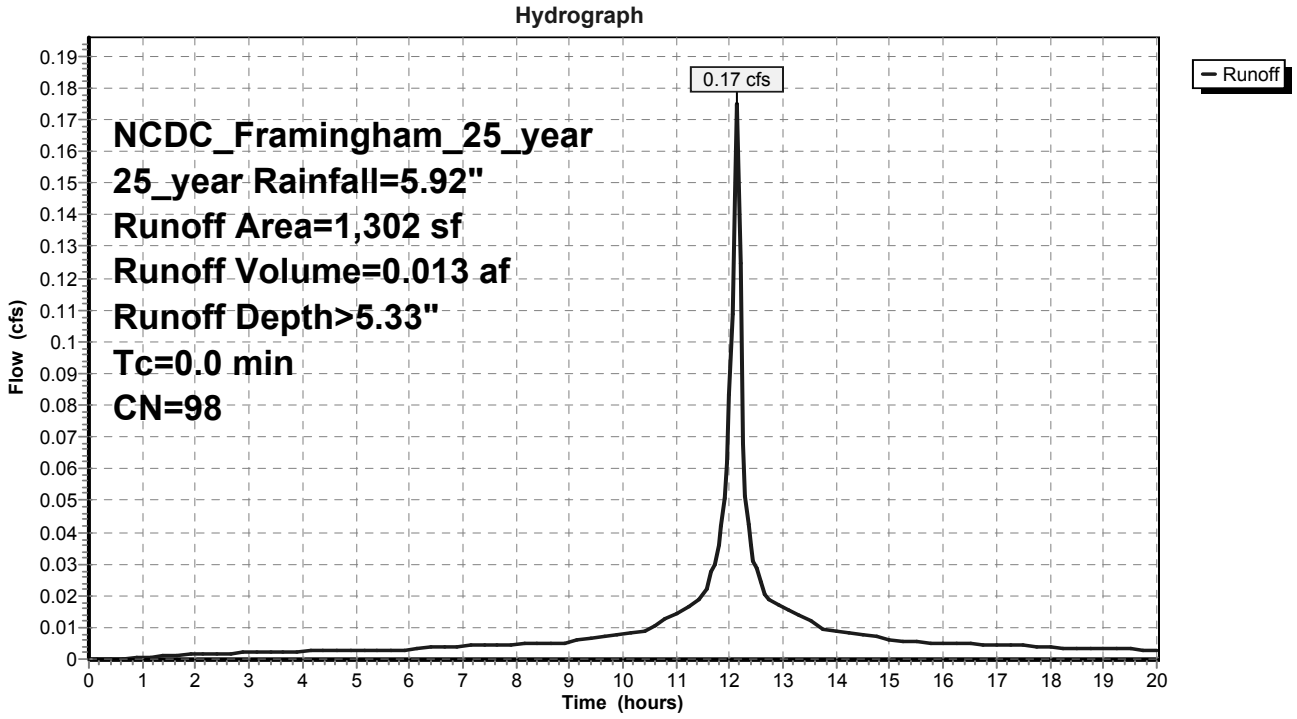
## Summary for Subcatchment ROOF-46: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-46: (blank)



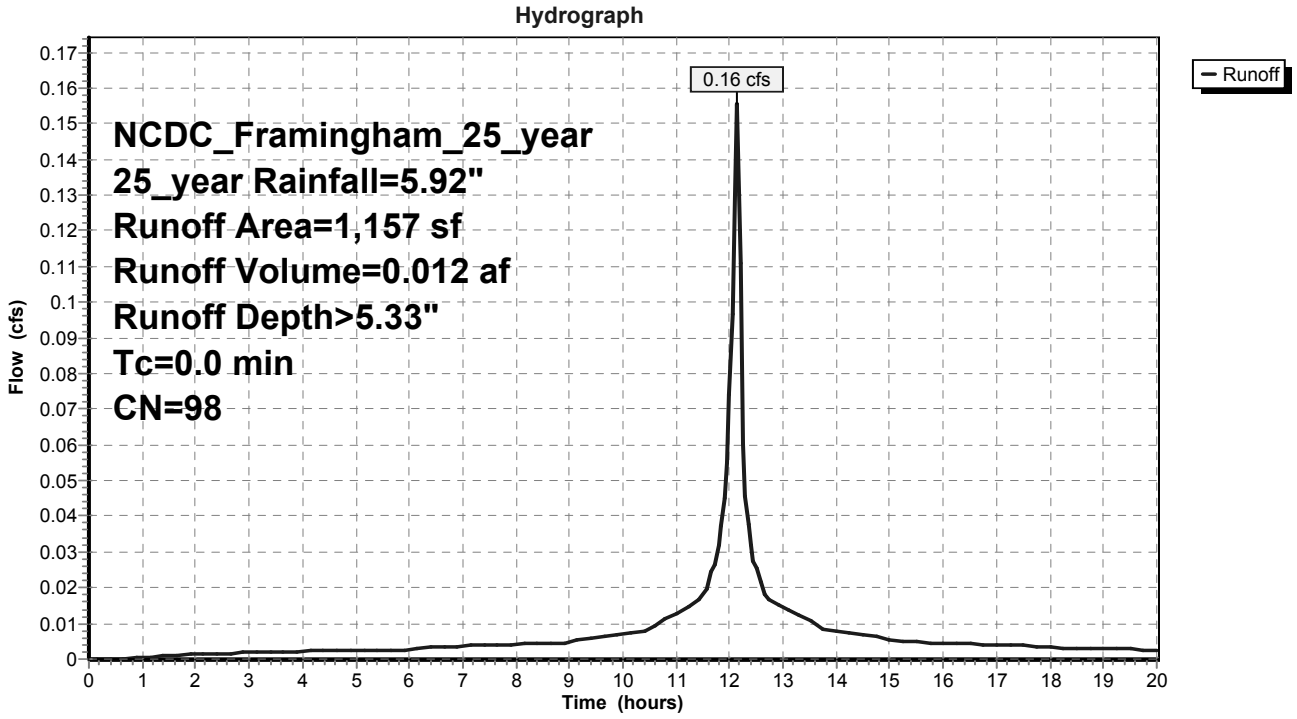
## Summary for Subcatchment ROOF-47: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-47: (blank)



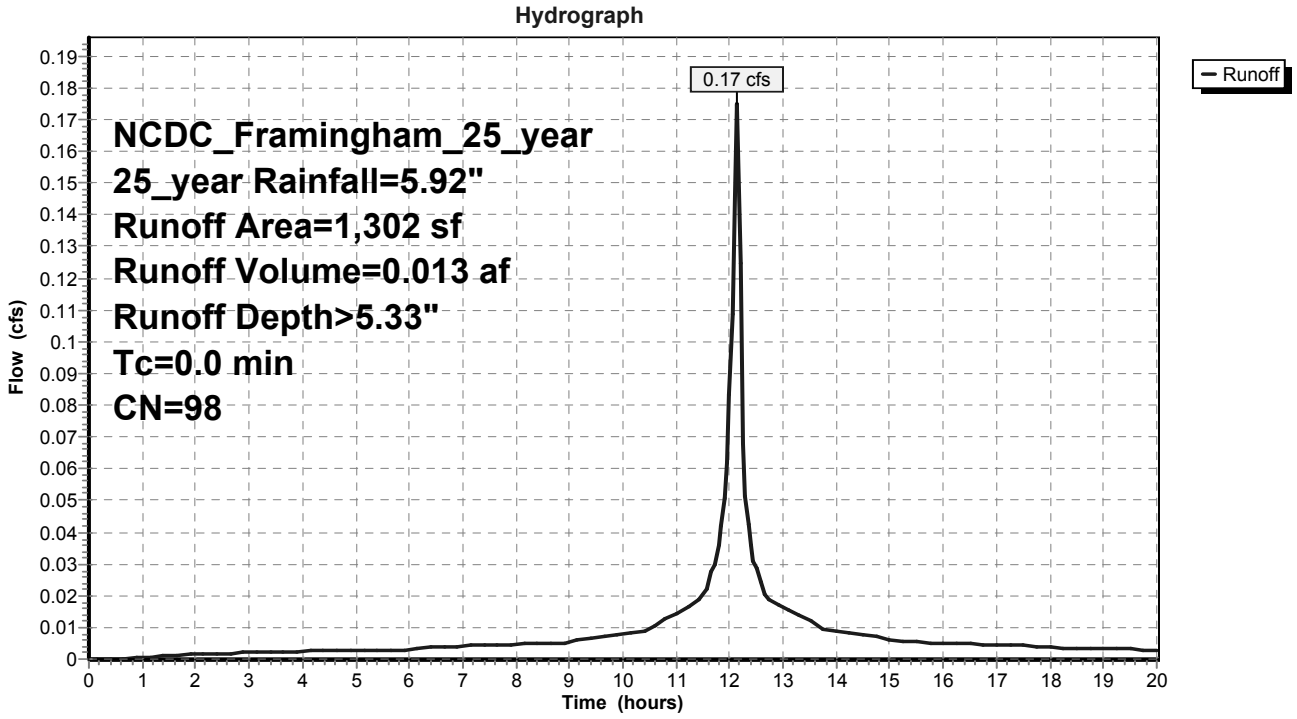
## Summary for Subcatchment ROOF-48: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-48: (blank)



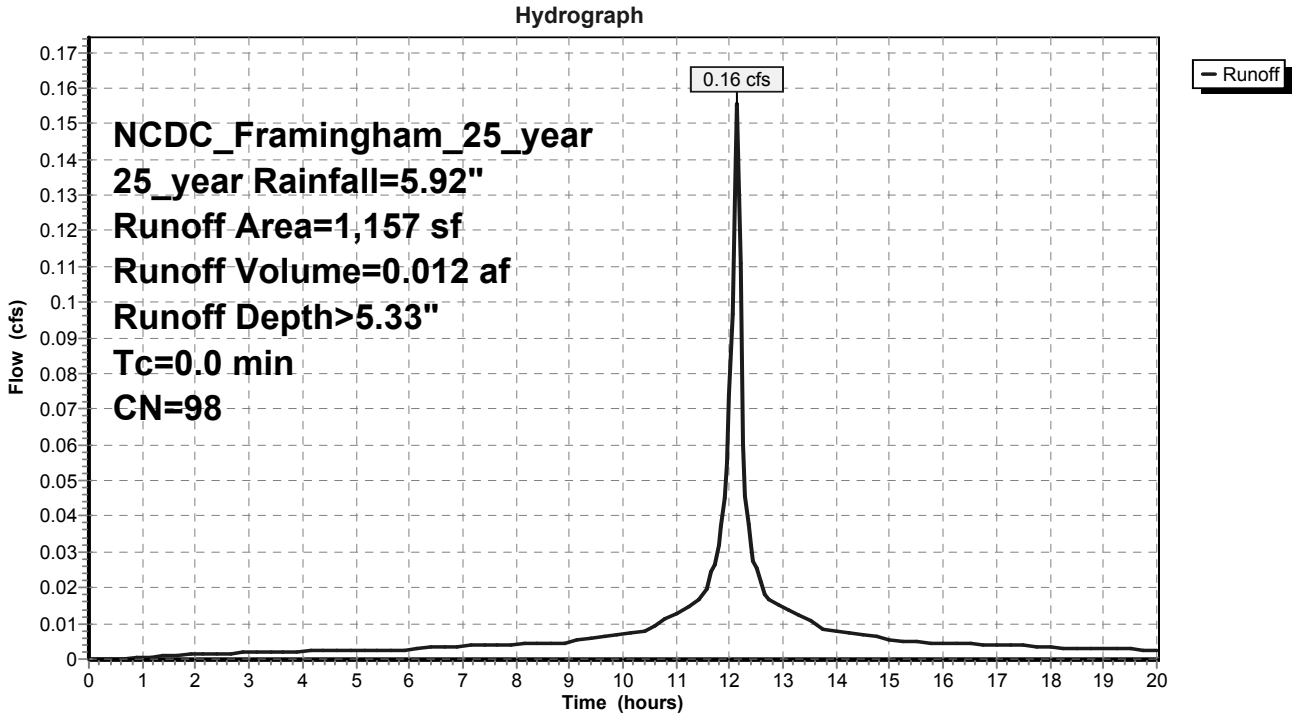
## Summary for Subcatchment ROOF-49: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-49: (blank)



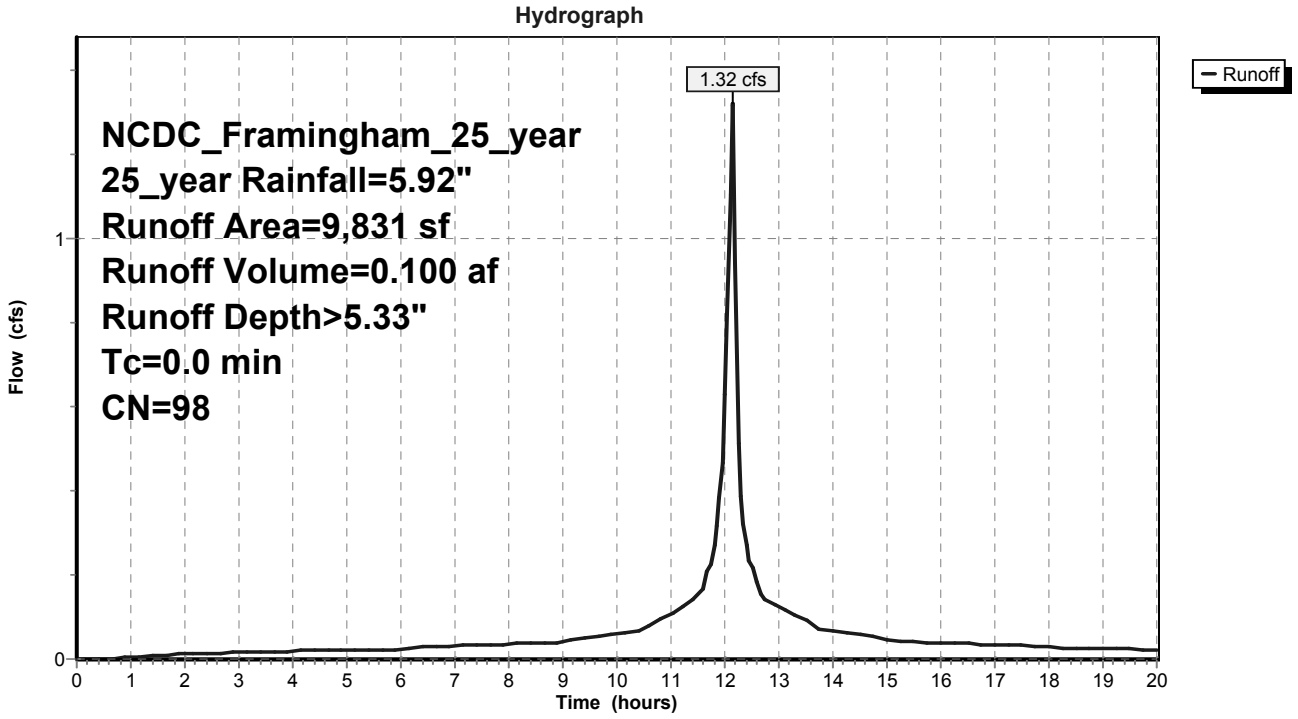
## Summary for Subcatchment ROOF-5: (blank)

Runoff = 1.32 cfs @ 12.14 hrs, Volume= 0.100 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 230 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,831 | 98 | Weighted Average |
| | 9,831 | | 100.00% Pervious Area |

## Subcatchment ROOF-5: (blank)



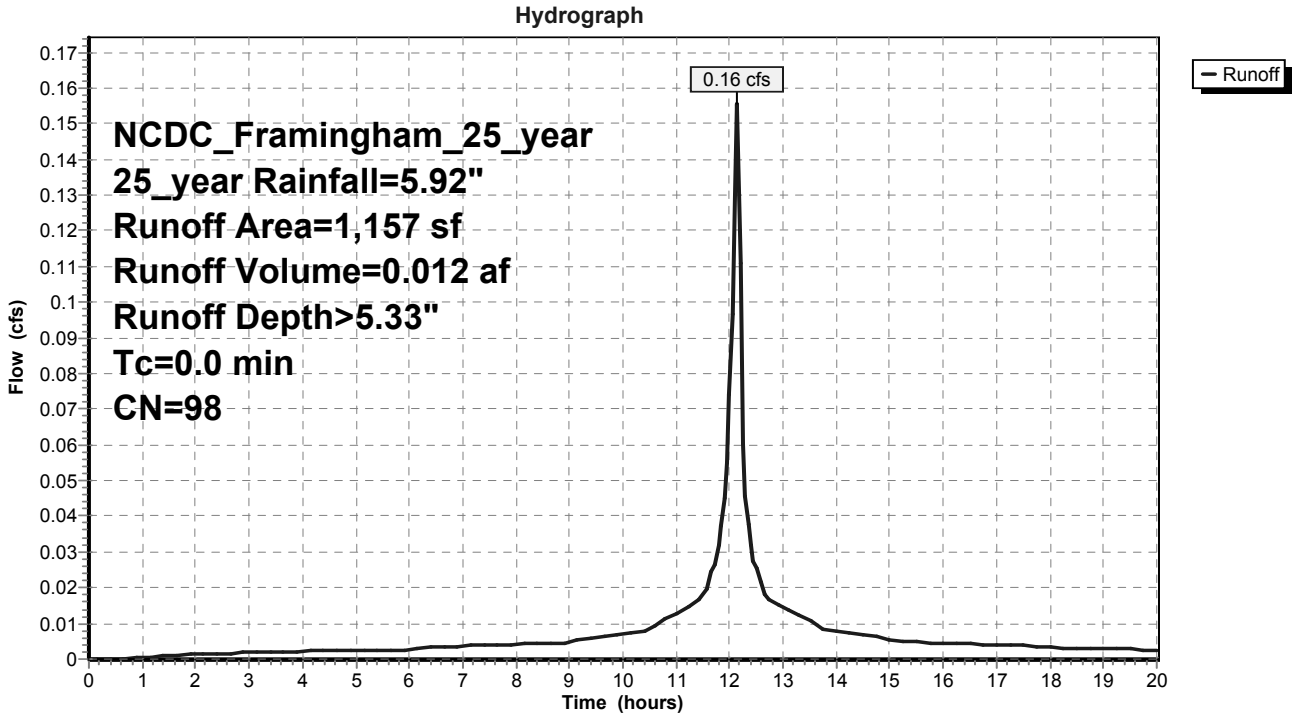
## Summary for Subcatchment ROOF-50: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-50: (blank)



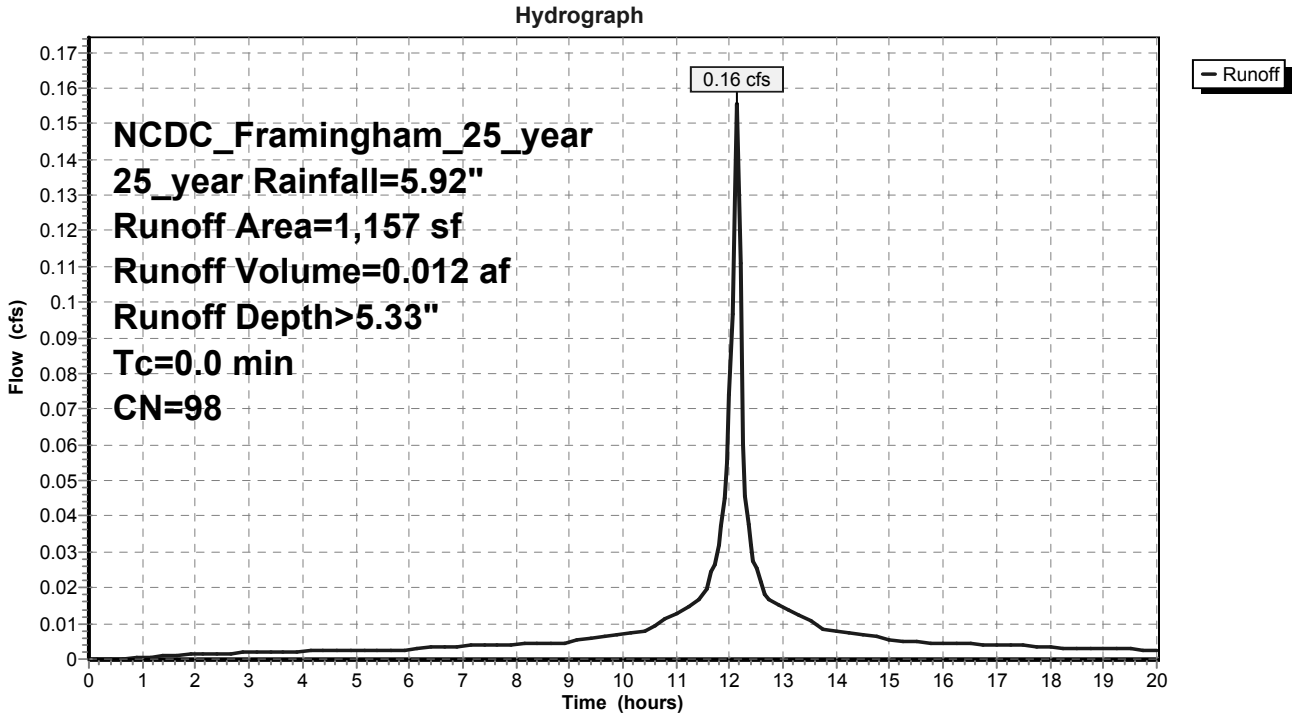
## Summary for Subcatchment ROOF-51: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-51: (blank)



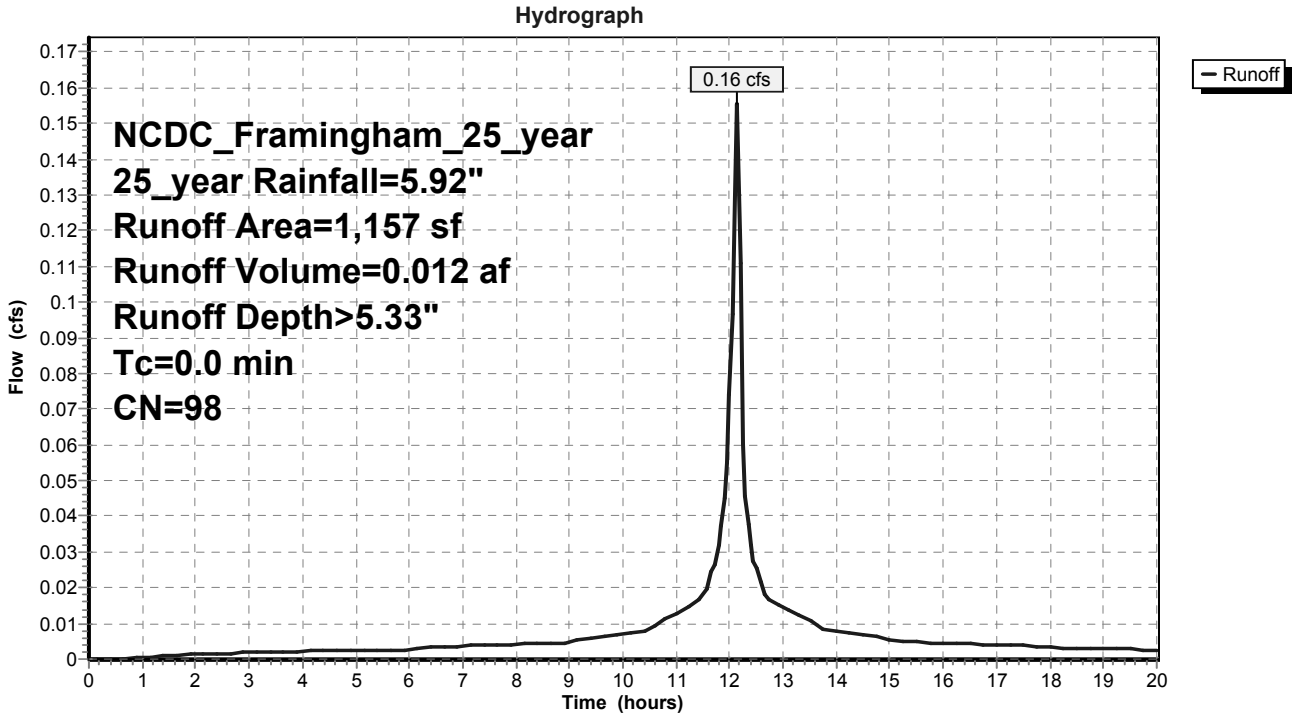
## Summary for Subcatchment ROOF-52: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-52: (blank)



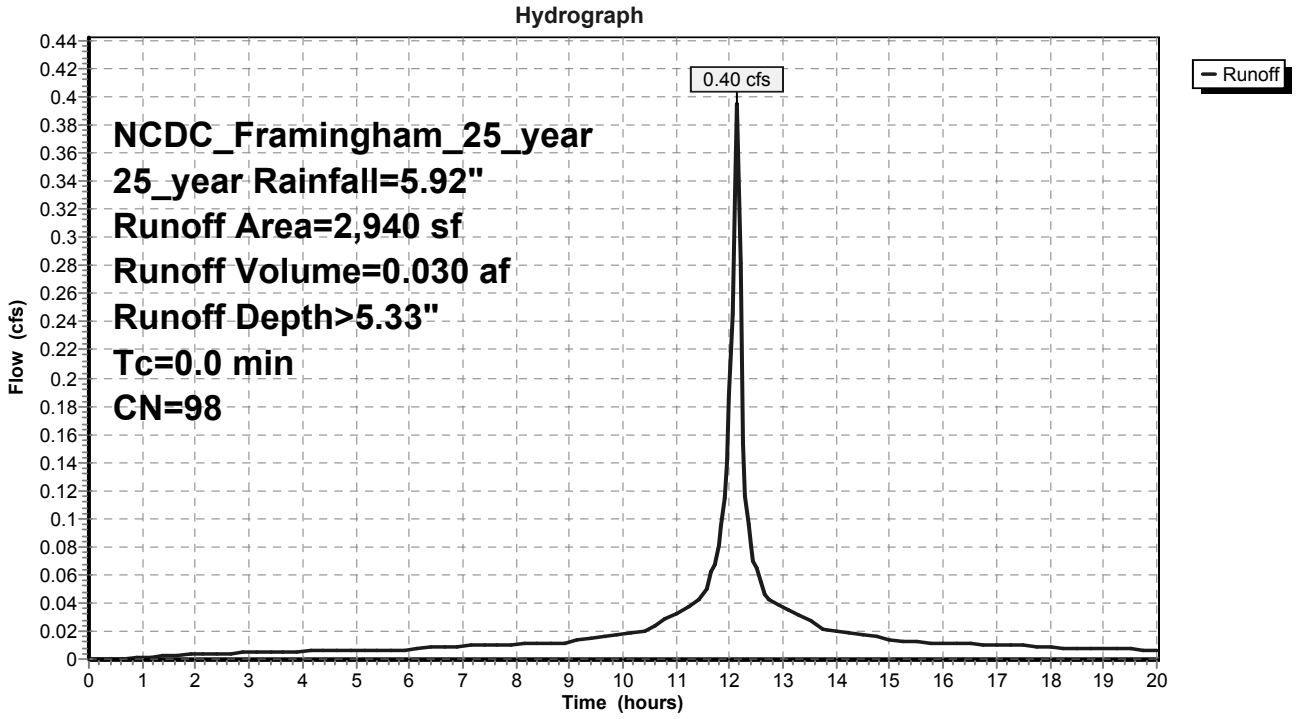
## Summary for Subcatchment ROOF-53: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-53: (blank)



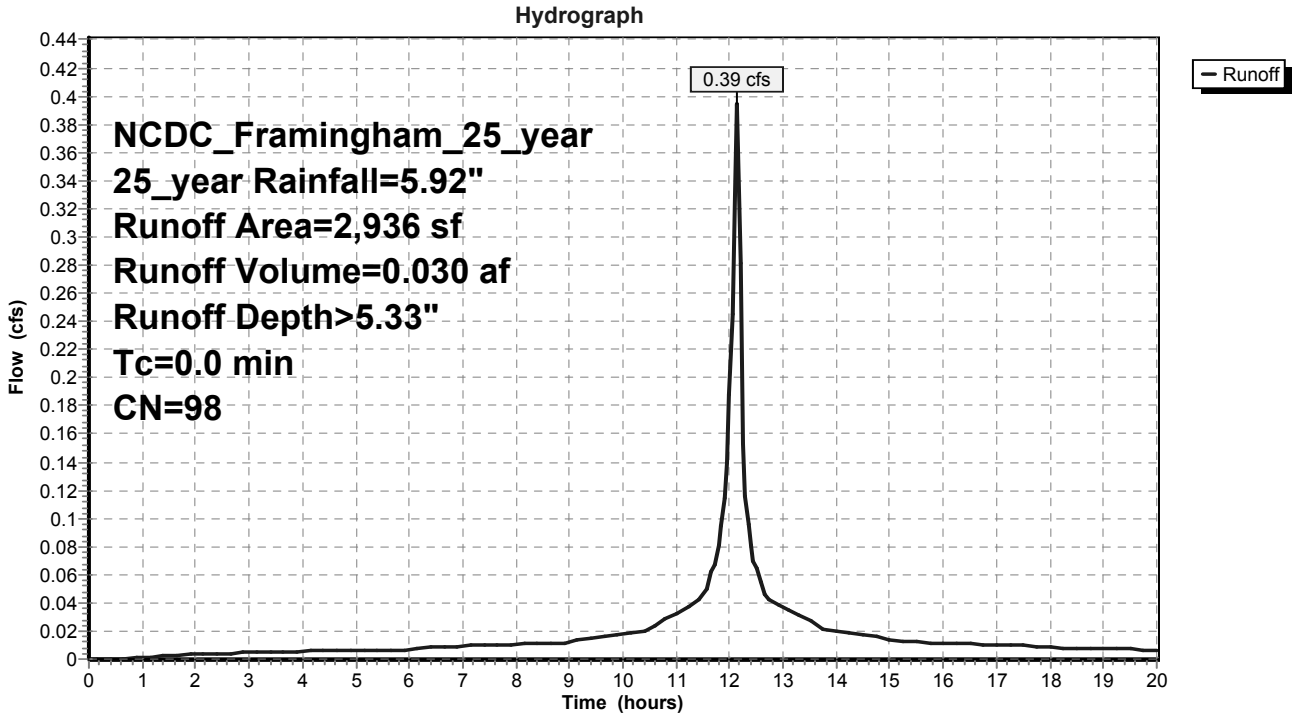
## Summary for Subcatchment ROOF-54: (blank)

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,936 | 98 | ROOF, 100% imperv, HSG A |
| | 2,936 | | 100.00% Pervious Area |

## Subcatchment ROOF-54: (blank)



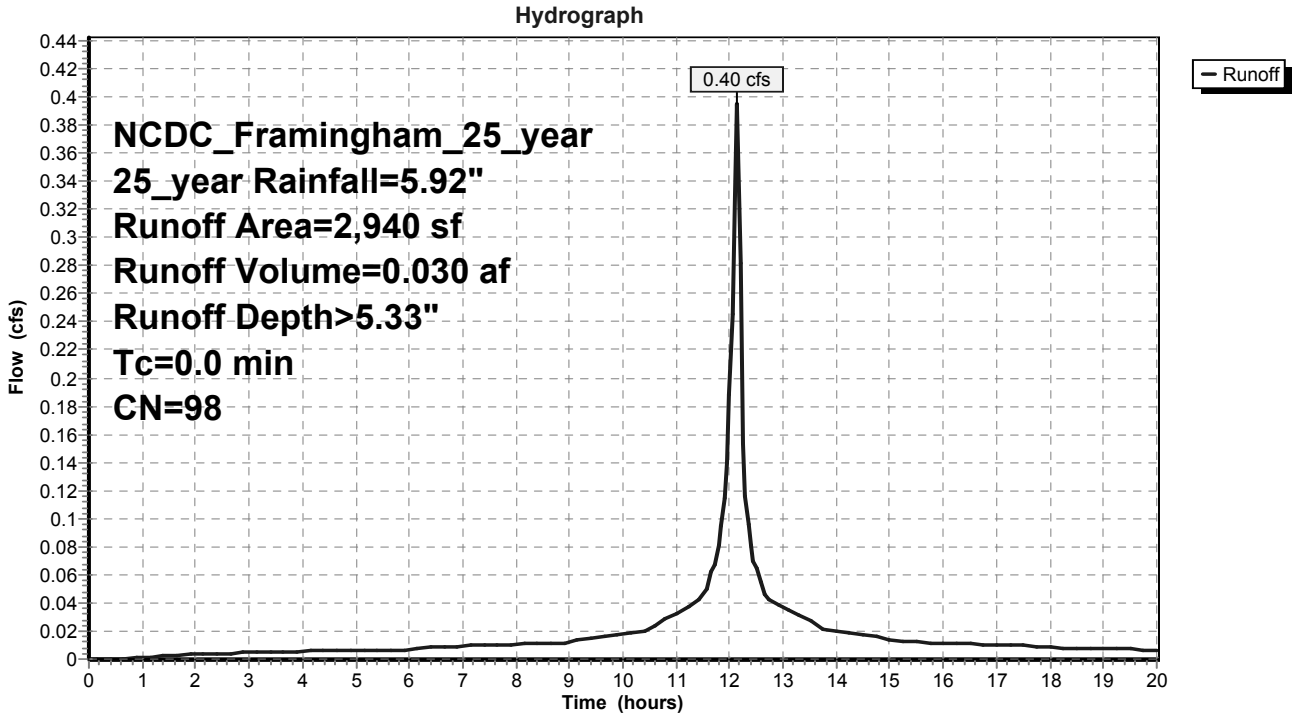
## Summary for Subcatchment ROOF-55: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-55: (blank)



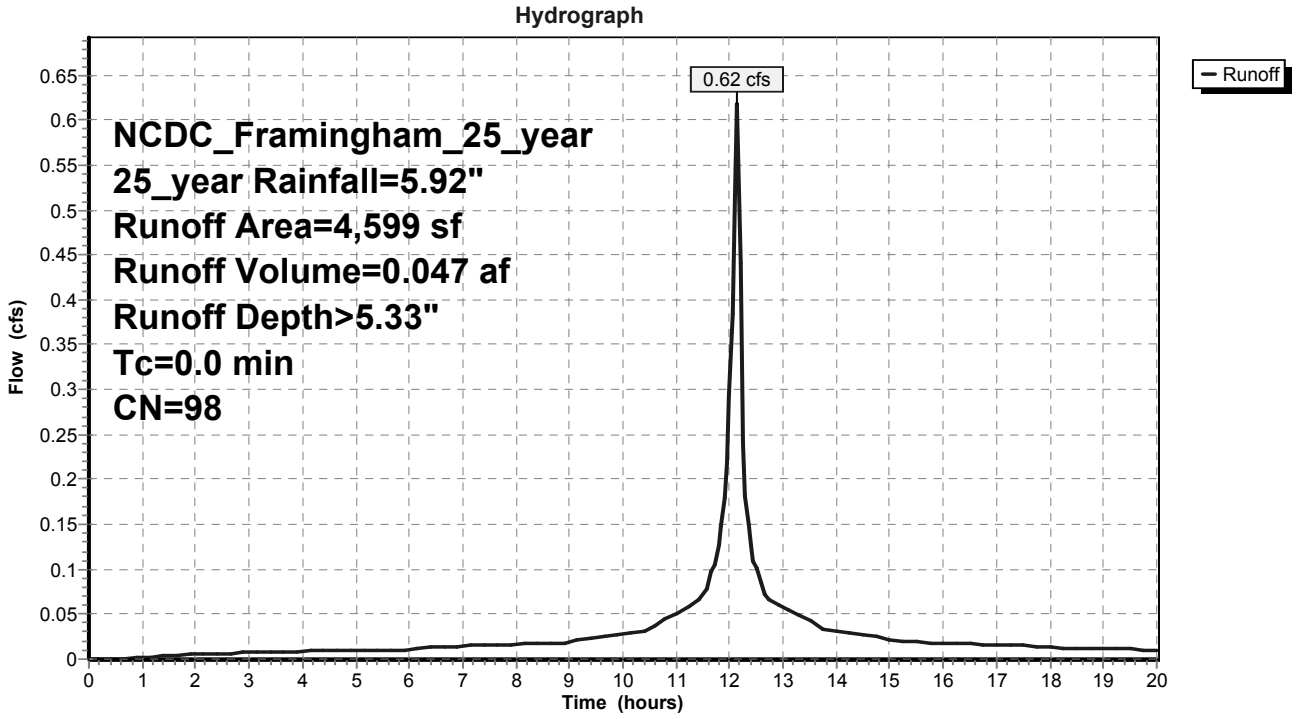
## Summary for Subcatchment ROOF-56: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG A |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-56: (blank)



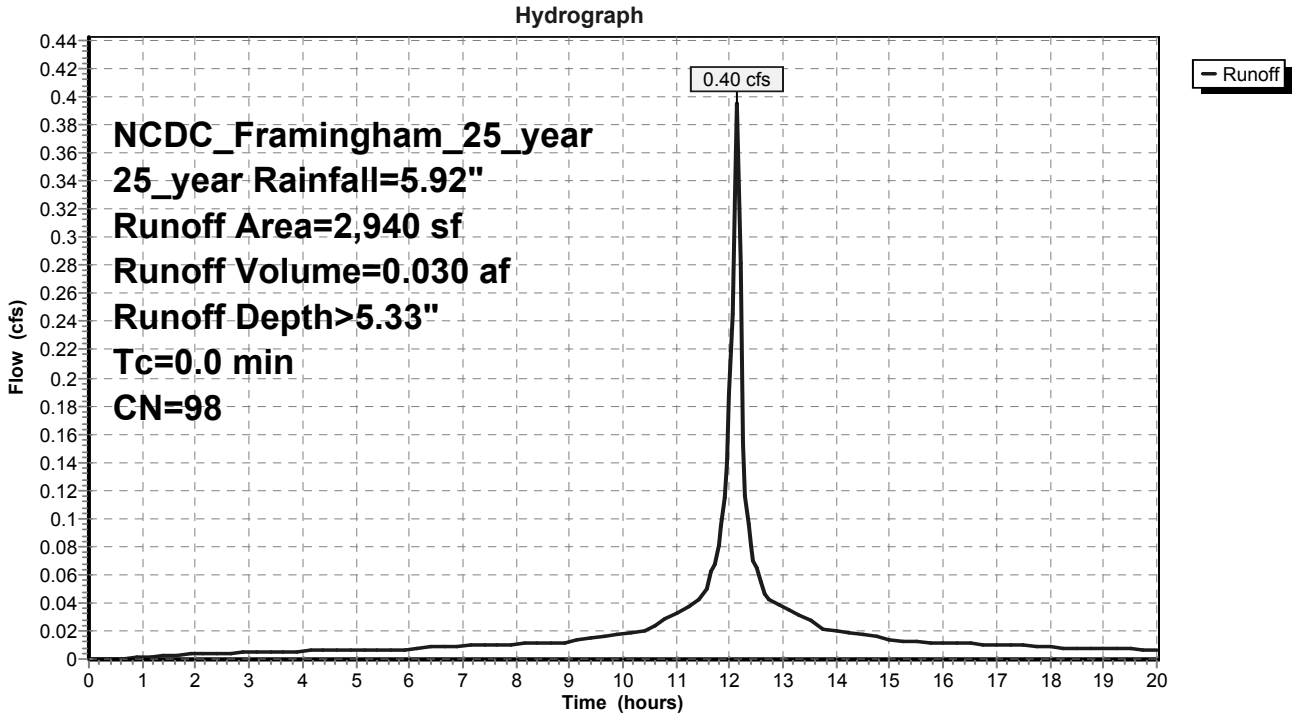
## Summary for Subcatchment ROOF-57: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,911 | 98 | ROOF, 100% imperv, HSG A |
| * | 29 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-57: (blank)



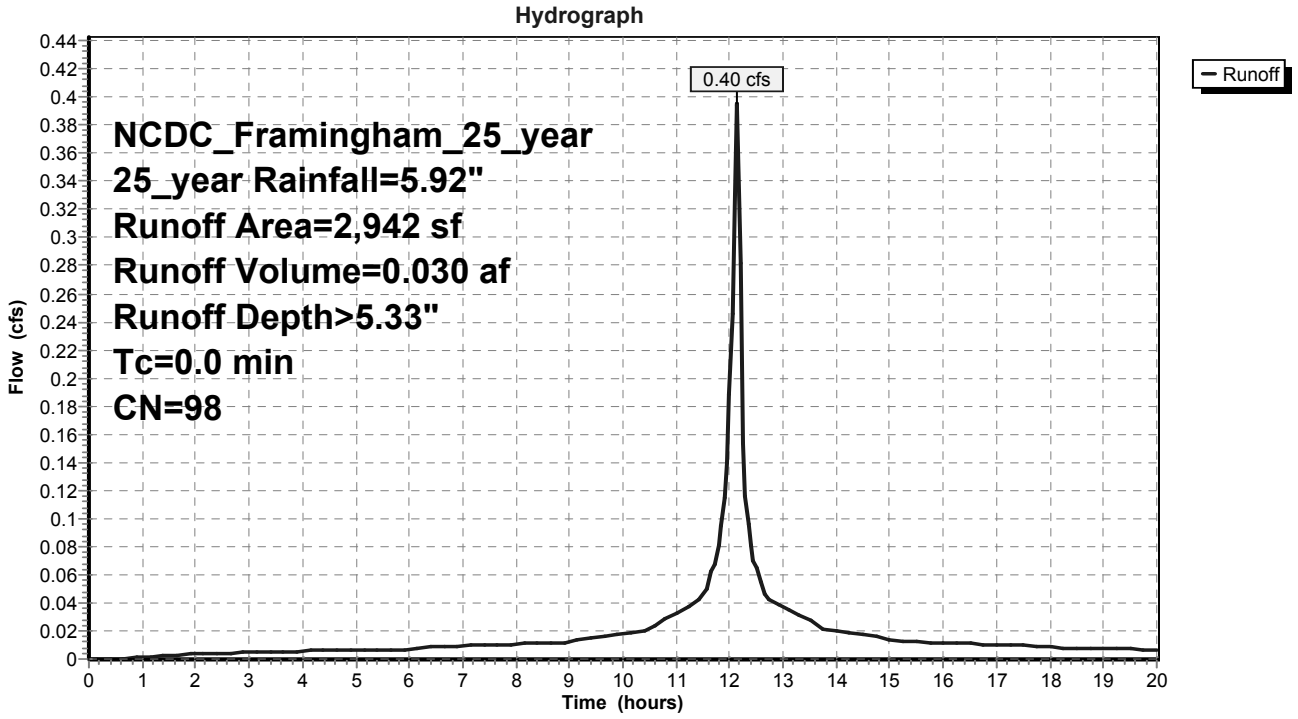
## Summary for Subcatchment ROOF-58: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22 | 98 | DECK, 100% imperv, HSG A |
| * | 2,919 | 98 | ROOF, 100% imperv, HSG A |
| | 2,942 | 98 | Weighted Average |
| | 2,942 | | 100.00% Pervious Area |

## Subcatchment ROOF-58: (blank)



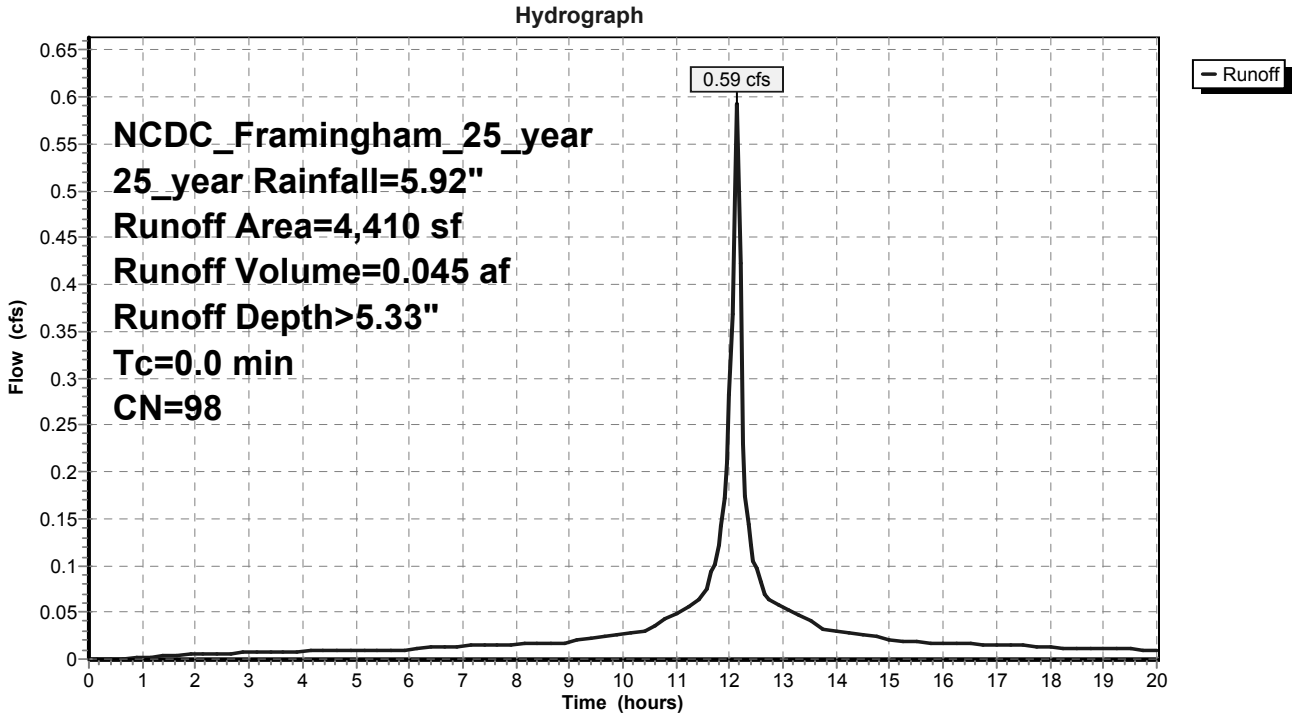
## Summary for Subcatchment ROOF-59: (blank)

Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-59: (blank)



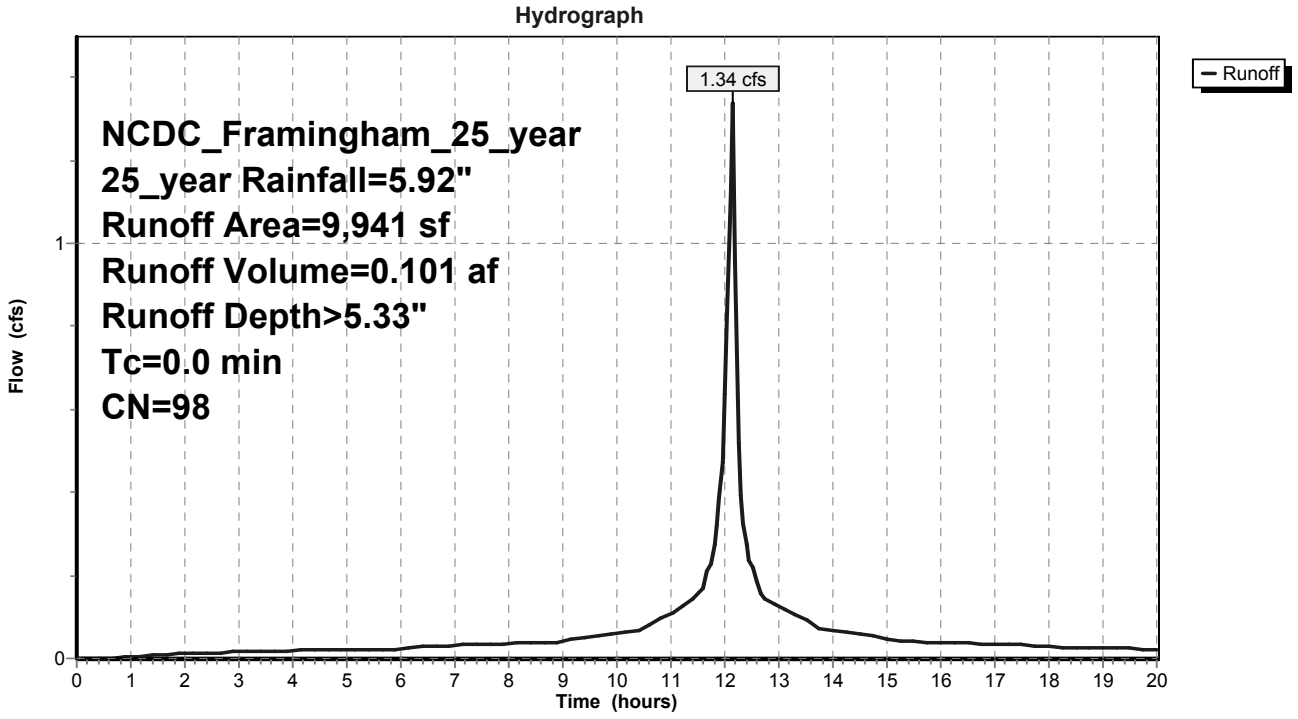
## Summary for Subcatchment ROOF-6: (blank)

Runoff = 1.34 cfs @ 12.14 hrs, Volume= 0.101 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 340 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,941 | 98 | Weighted Average |
| | 9,941 | | 100.00% Pervious Area |

## Subcatchment ROOF-6: (blank)



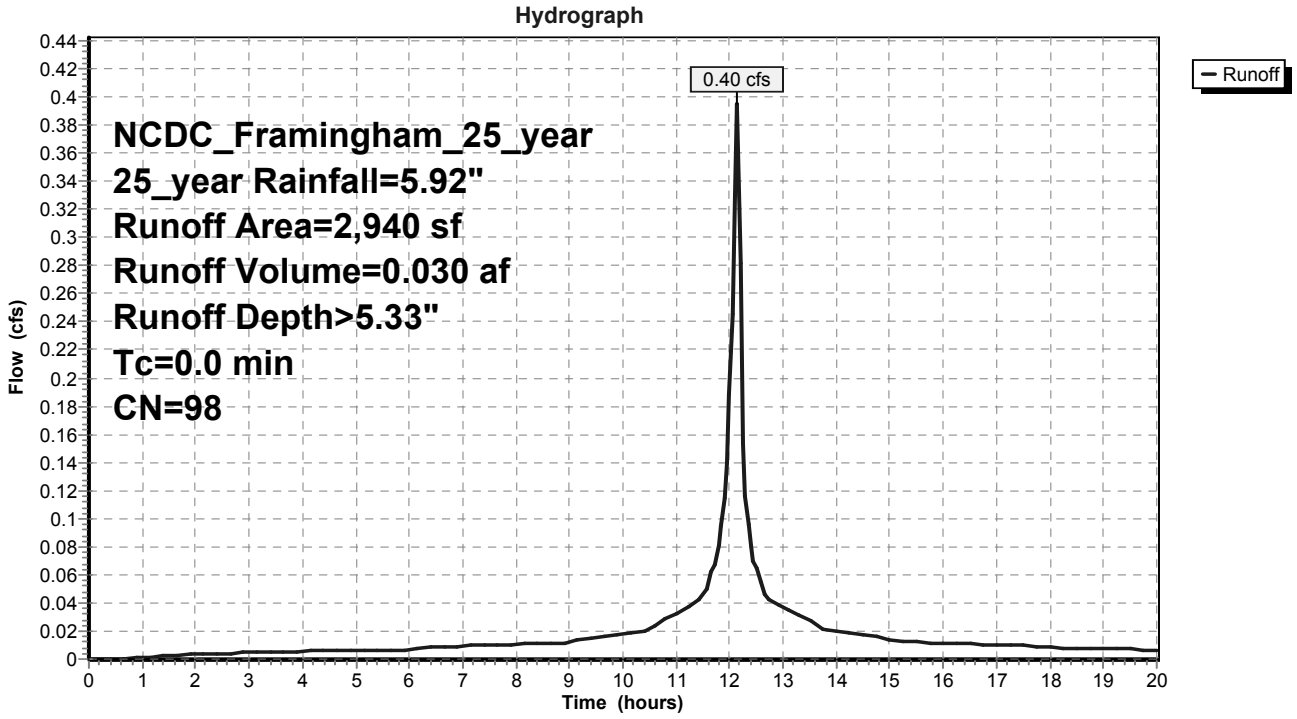
## Summary for Subcatchment ROOF-60: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-60: (blank)



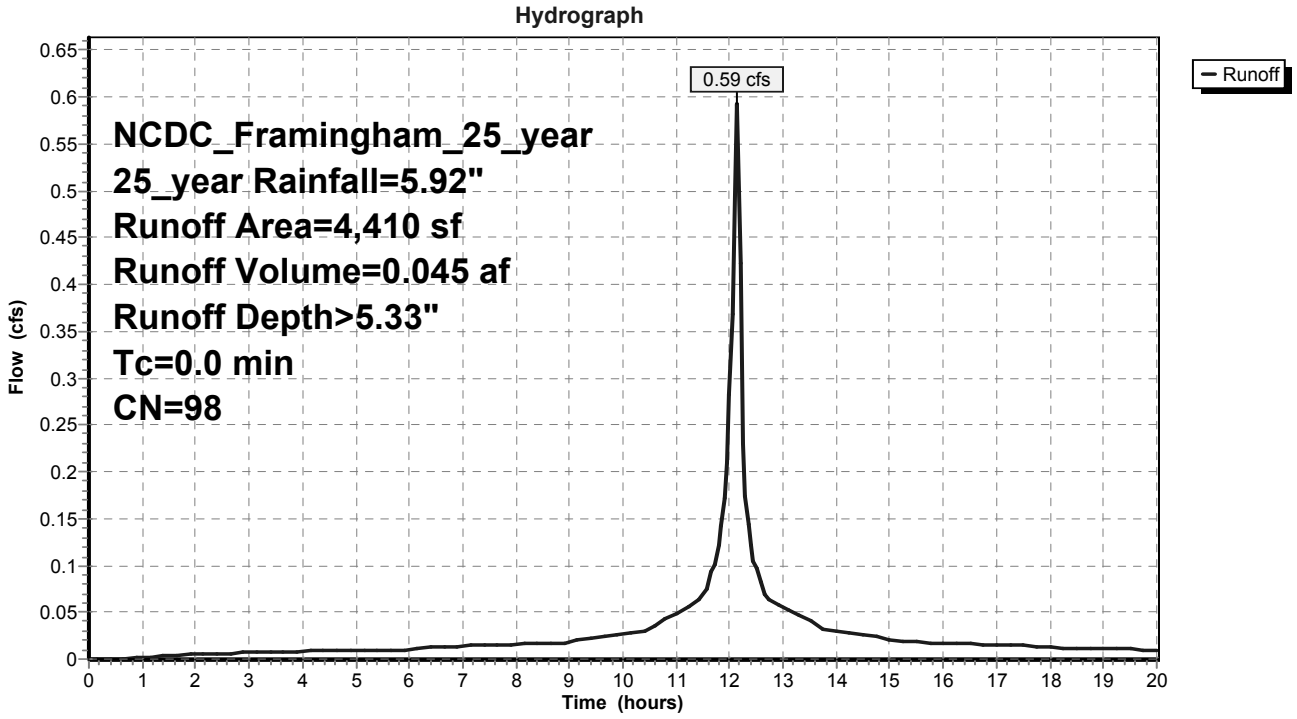
## Summary for Subcatchment ROOF-61: (blank)

Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-61: (blank)



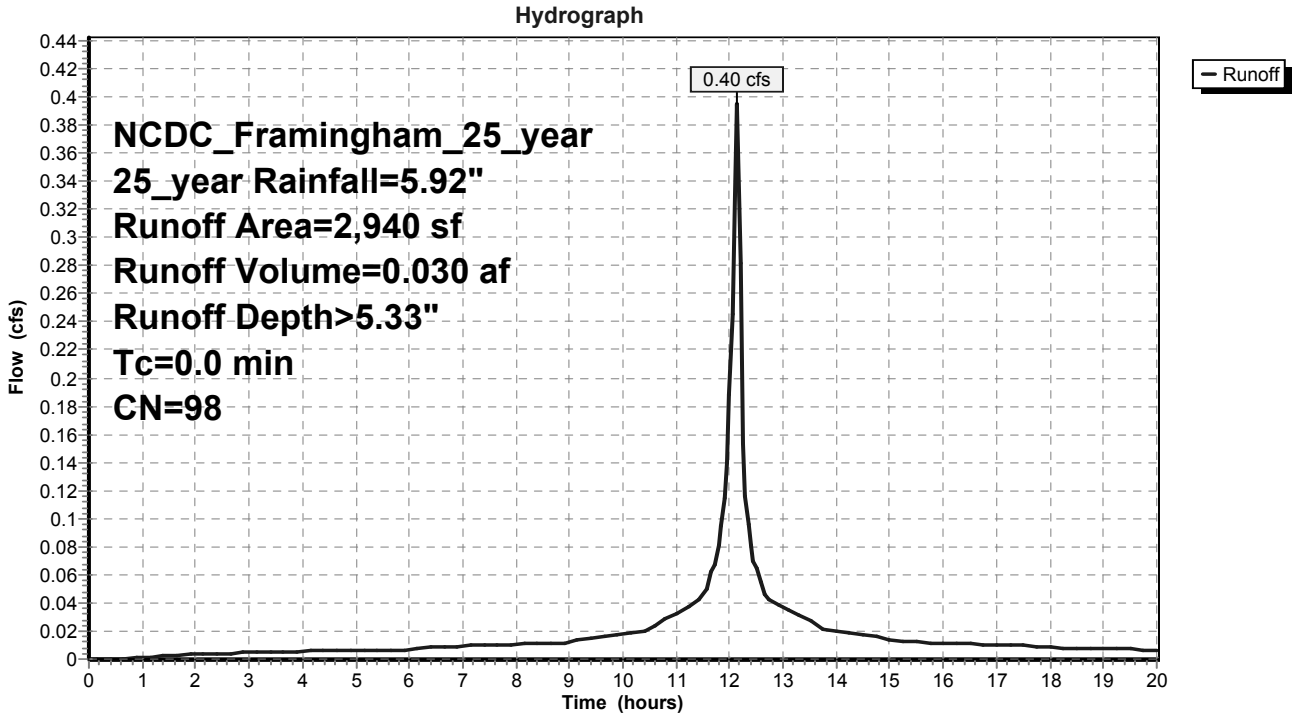
## Summary for Subcatchment ROOF-62: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-62: (blank)



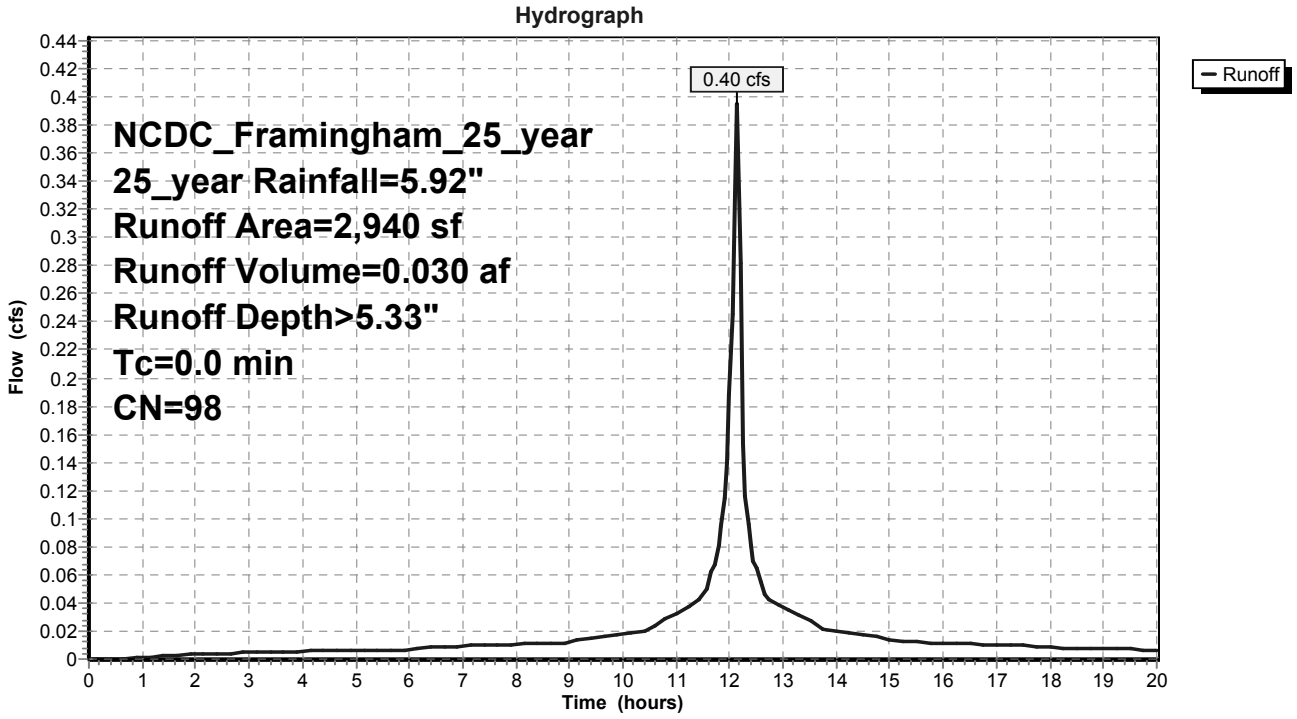
## Summary for Subcatchment ROOF-63: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-63: (blank)



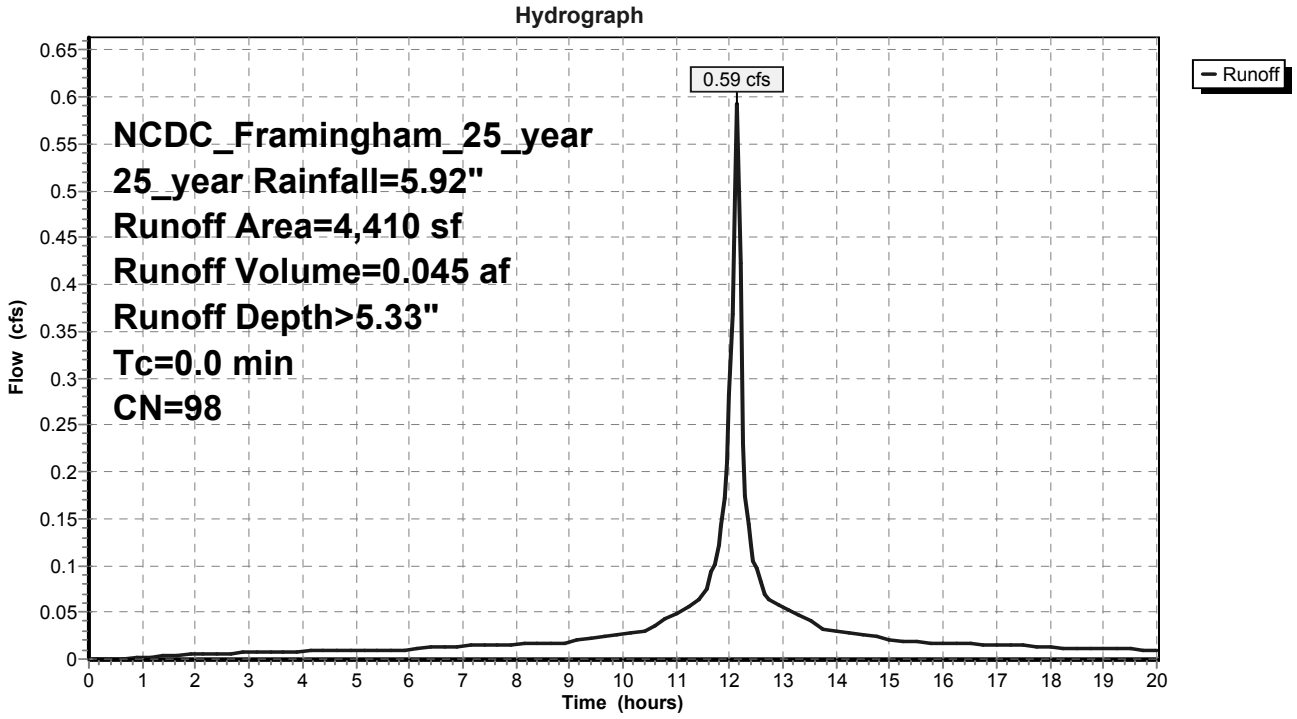
## Summary for Subcatchment ROOF-64: (blank)

Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-64: (blank)



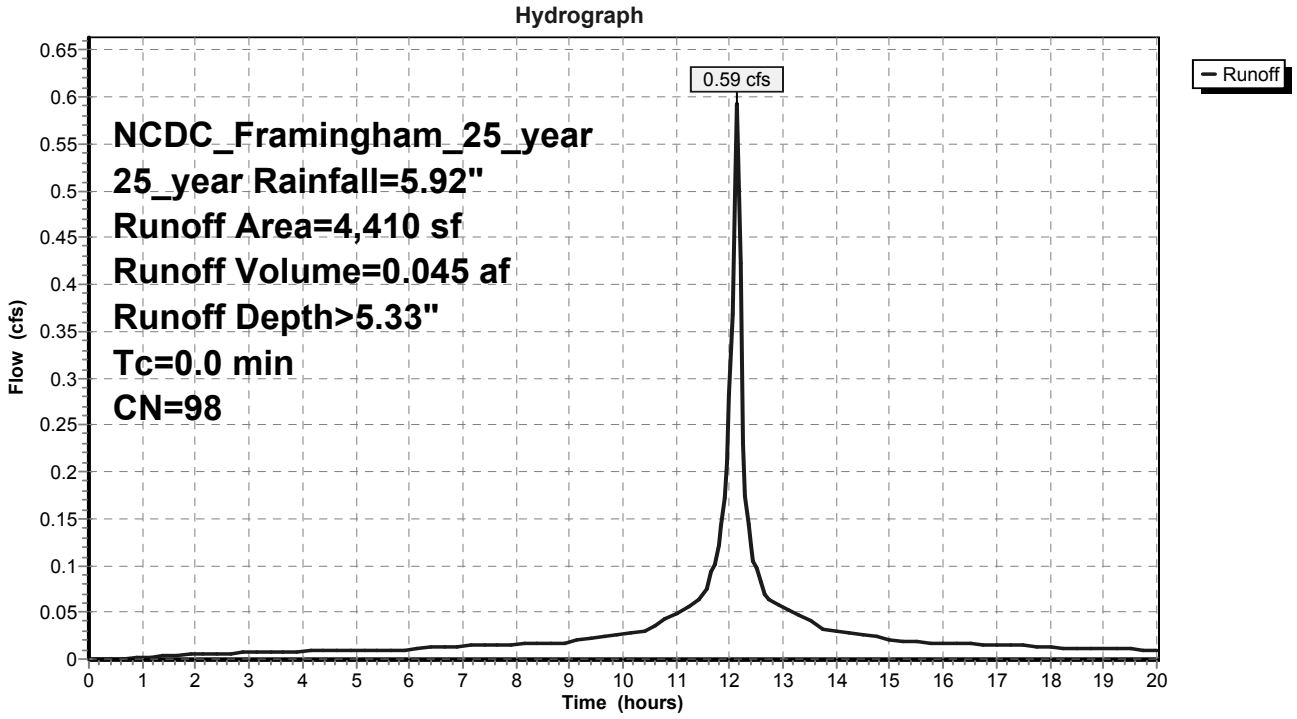
## Summary for Subcatchment ROOF-65: (blank)

Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-65: (blank)



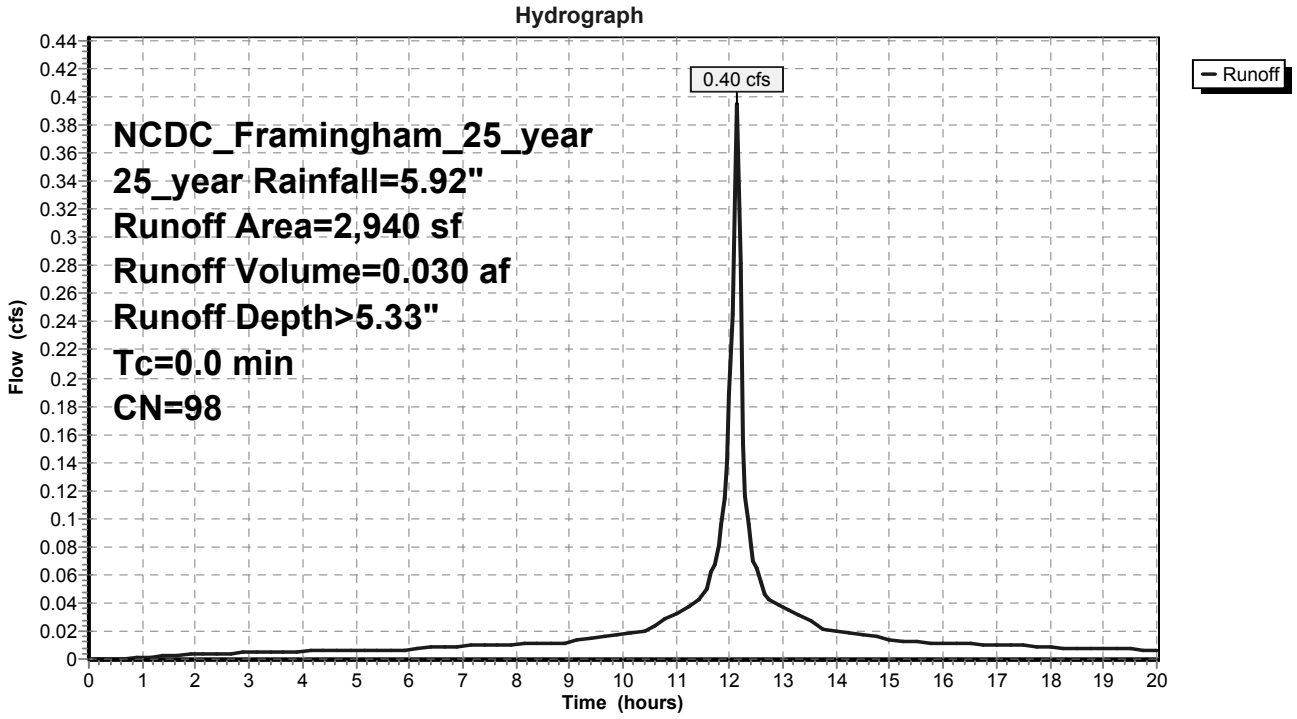
## Summary for Subcatchment ROOF-66: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-66: (blank)



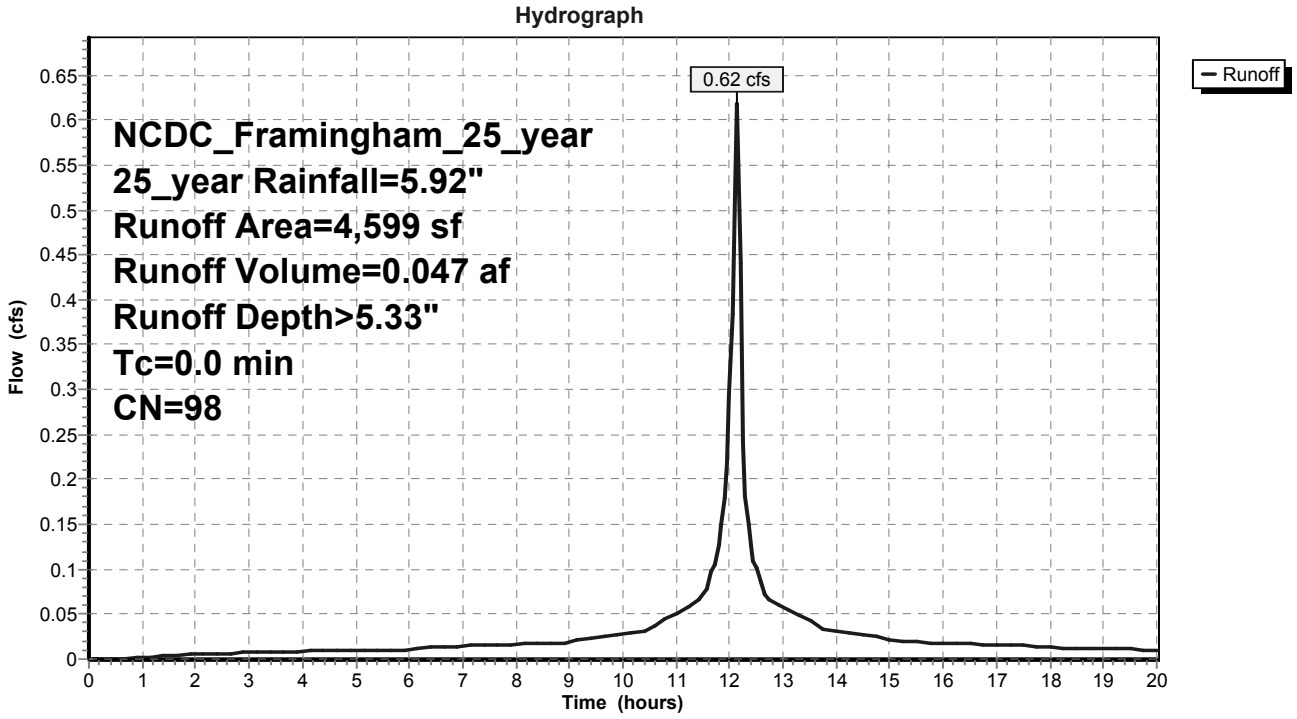
## Summary for Subcatchment ROOF-67: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-67: (blank)



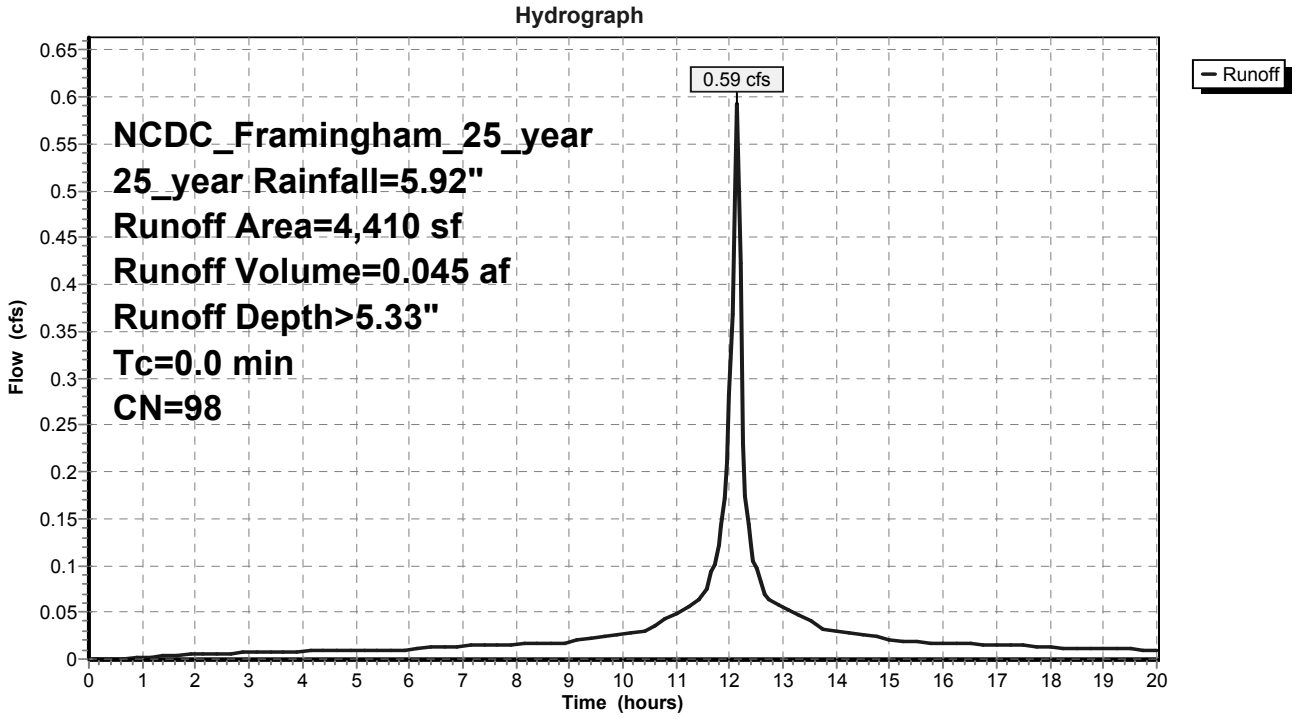
## Summary for Subcatchment ROOF-68: (blank)

Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-68: (blank)



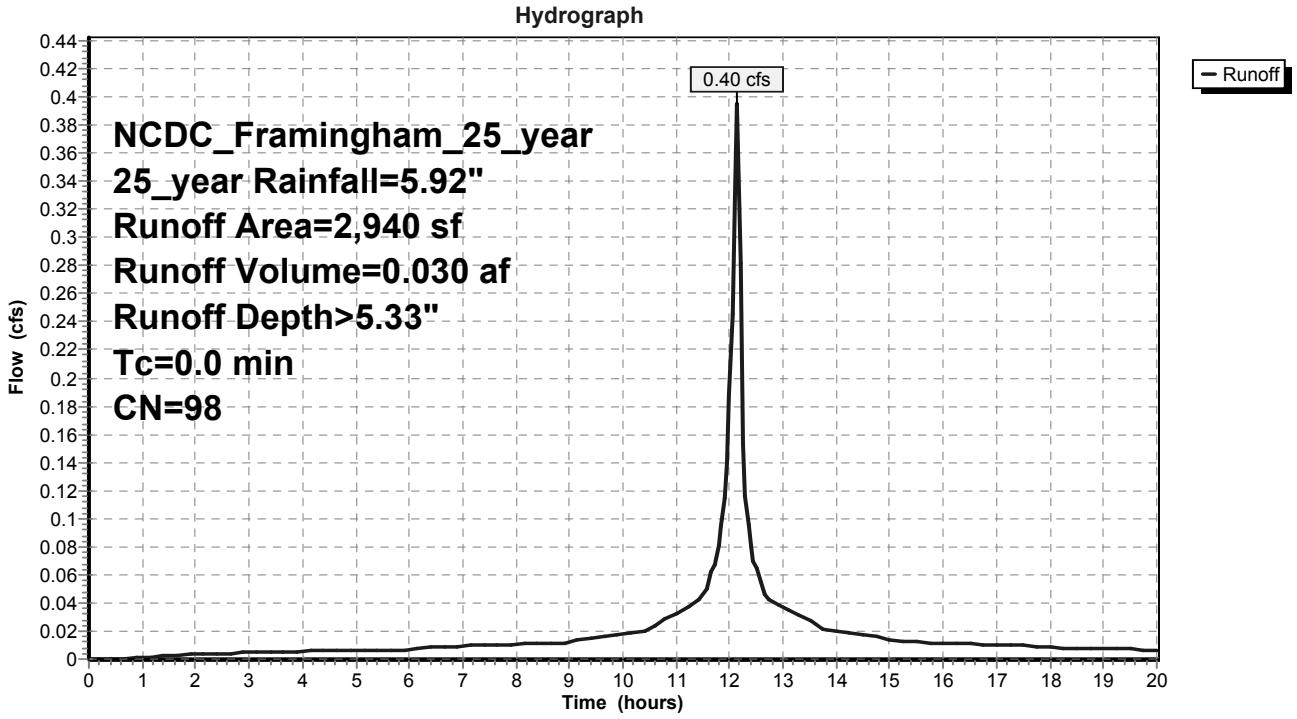
## Summary for Subcatchment ROOF-69: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-69: (blank)



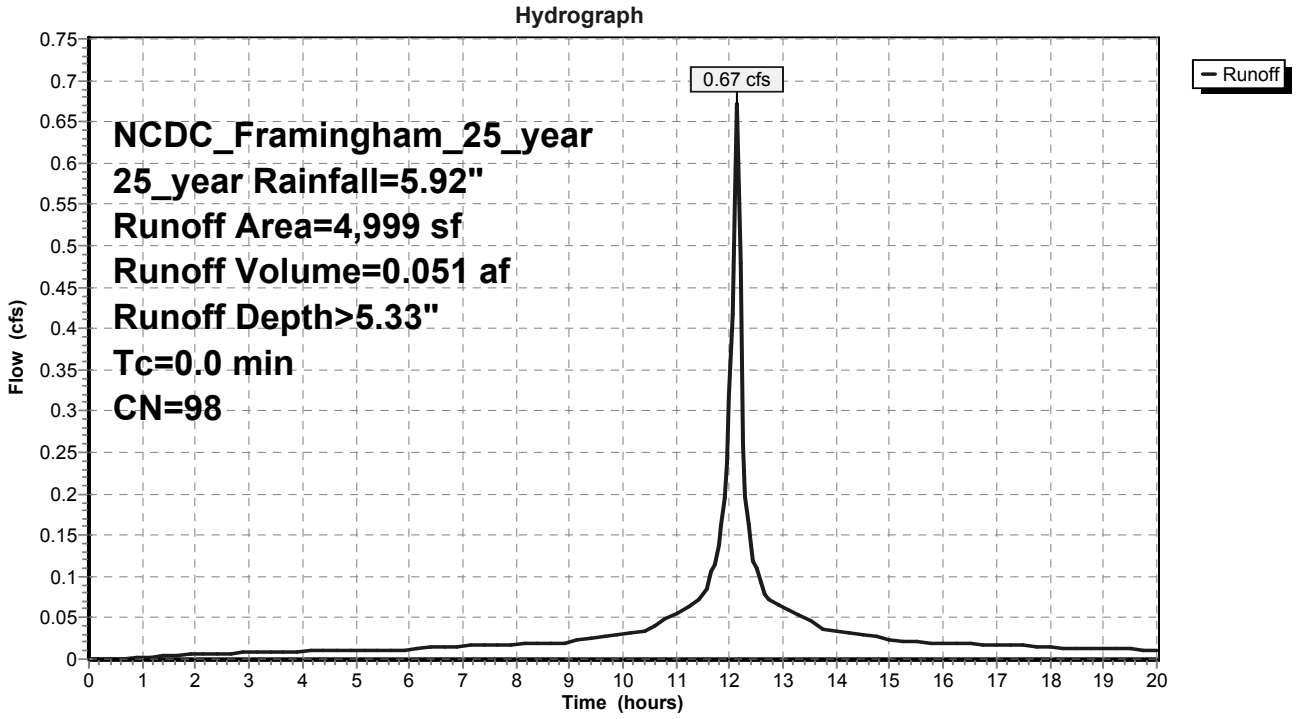
## Summary for Subcatchment ROOF-7: (blank)

Runoff = 0.67 cfs @ 12.14 hrs, Volume= 0.051 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-7: (blank)



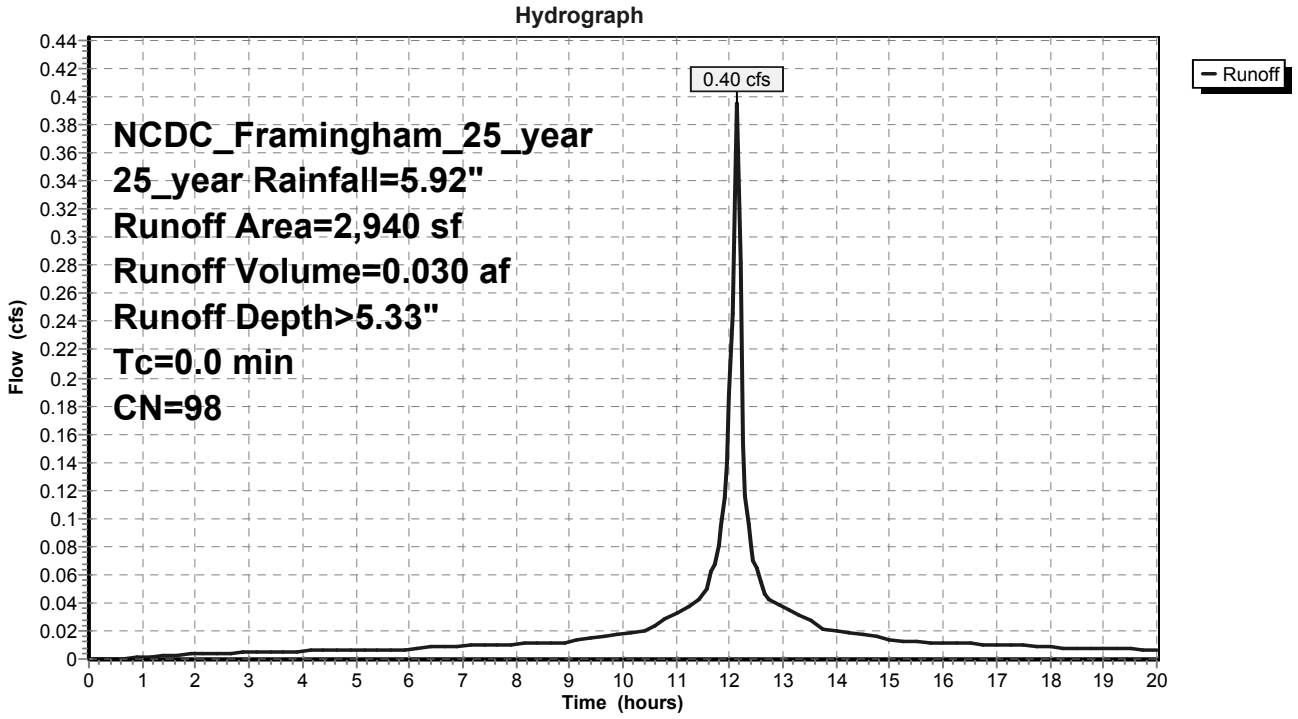
## Summary for Subcatchment ROOF-70: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,017 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,923 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-70: (blank)



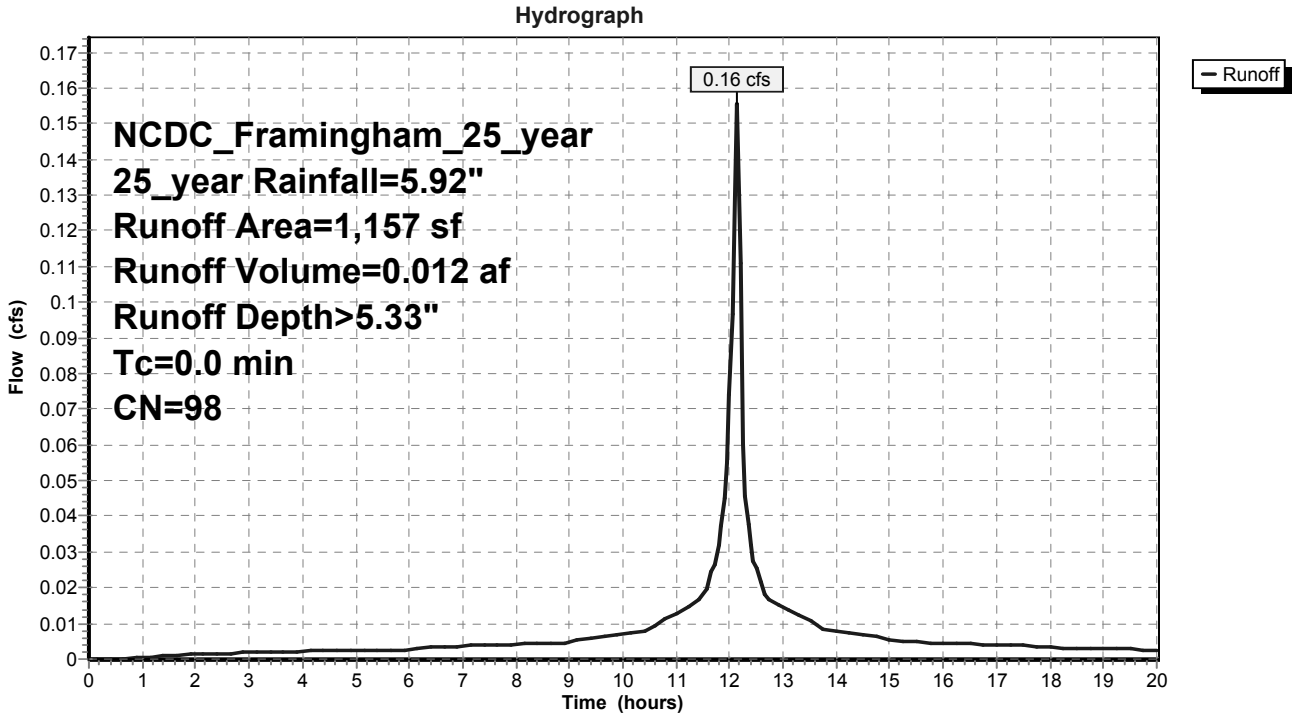
## Summary for Subcatchment ROOF-71: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-71: (blank)



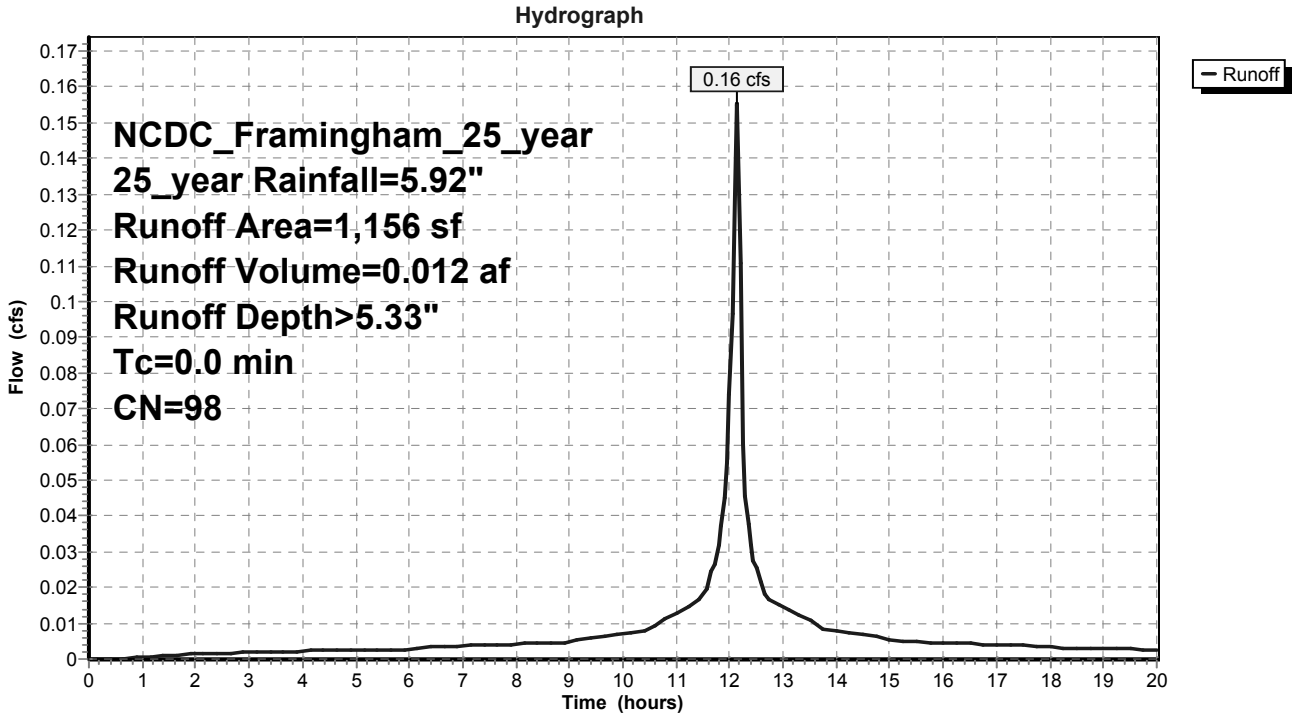
## Summary for Subcatchment ROOF-72: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 106 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,050 | 98 | ROOF, 100% imperv, HSG B |
| | 1,156 | 98 | Weighted Average |
| | 1,156 | | 100.00% Pervious Area |

## Subcatchment ROOF-72: (blank)



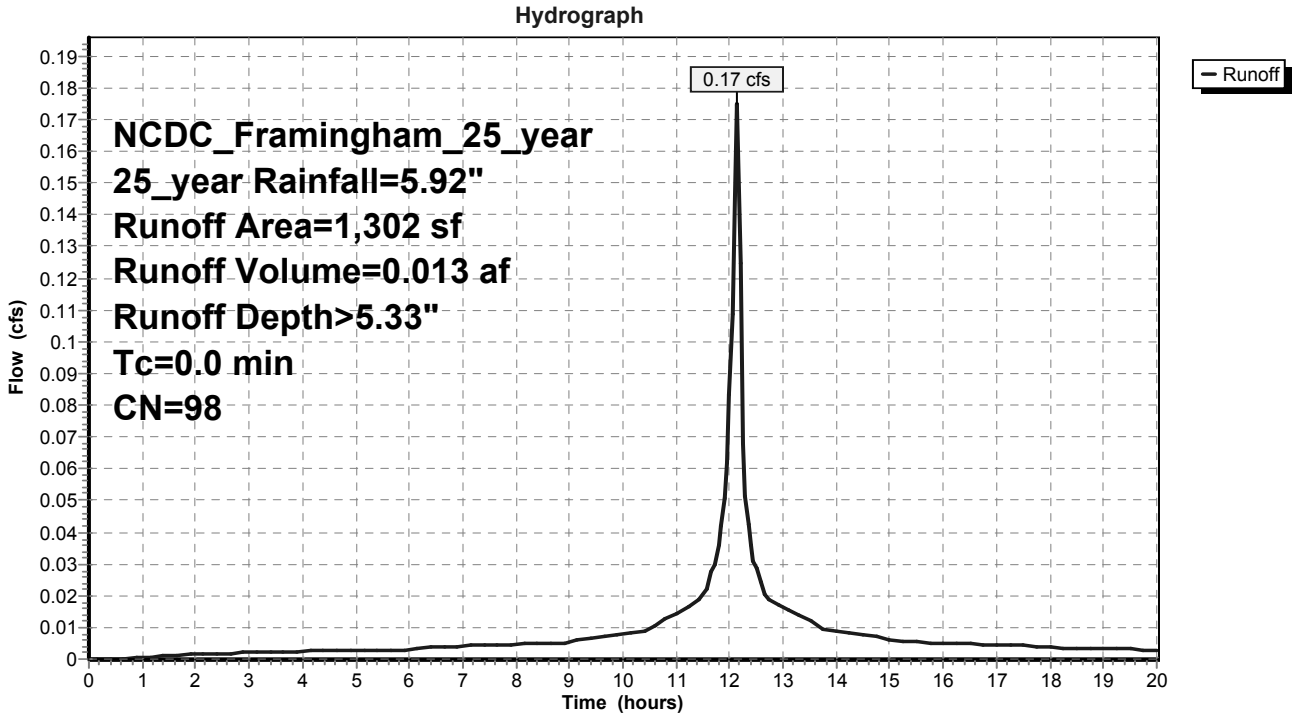
## Summary for Subcatchment ROOF-73: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-73: (blank)



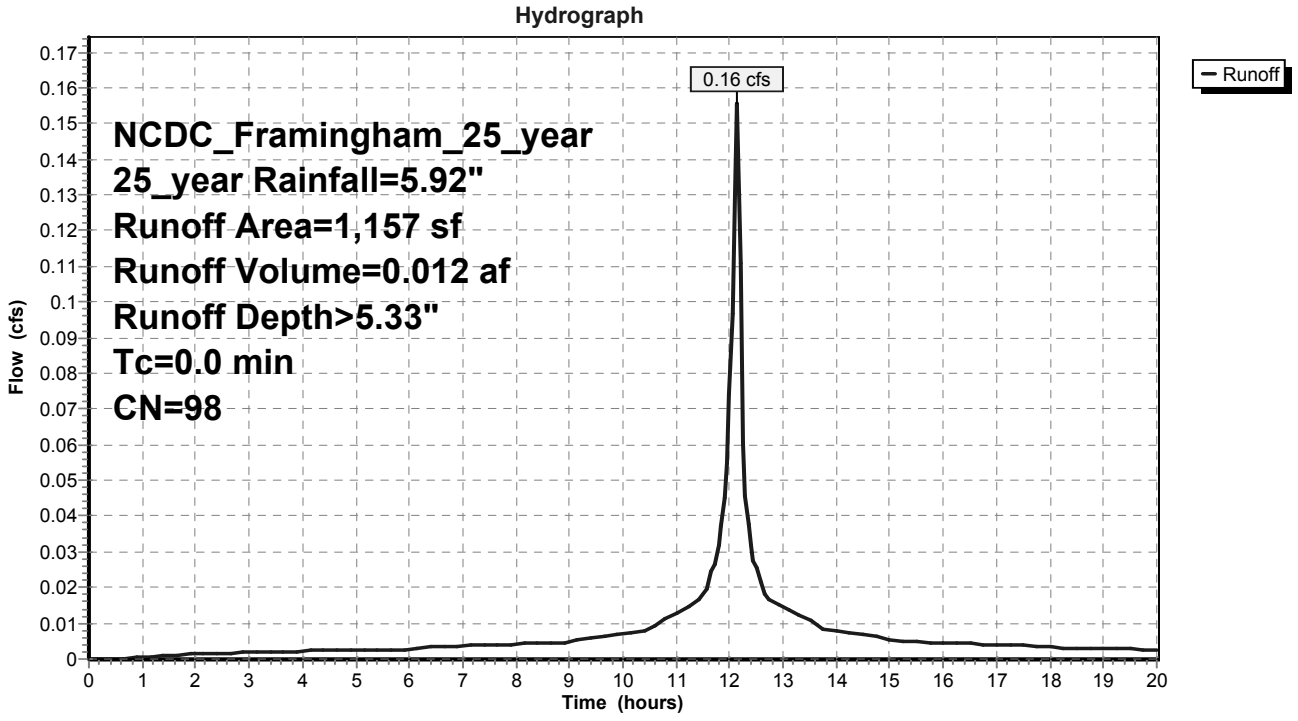
## Summary for Subcatchment ROOF-74: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 465 | 98 | ROOF, 100% imperv, HSG A |
| * | 693 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-74: (blank)



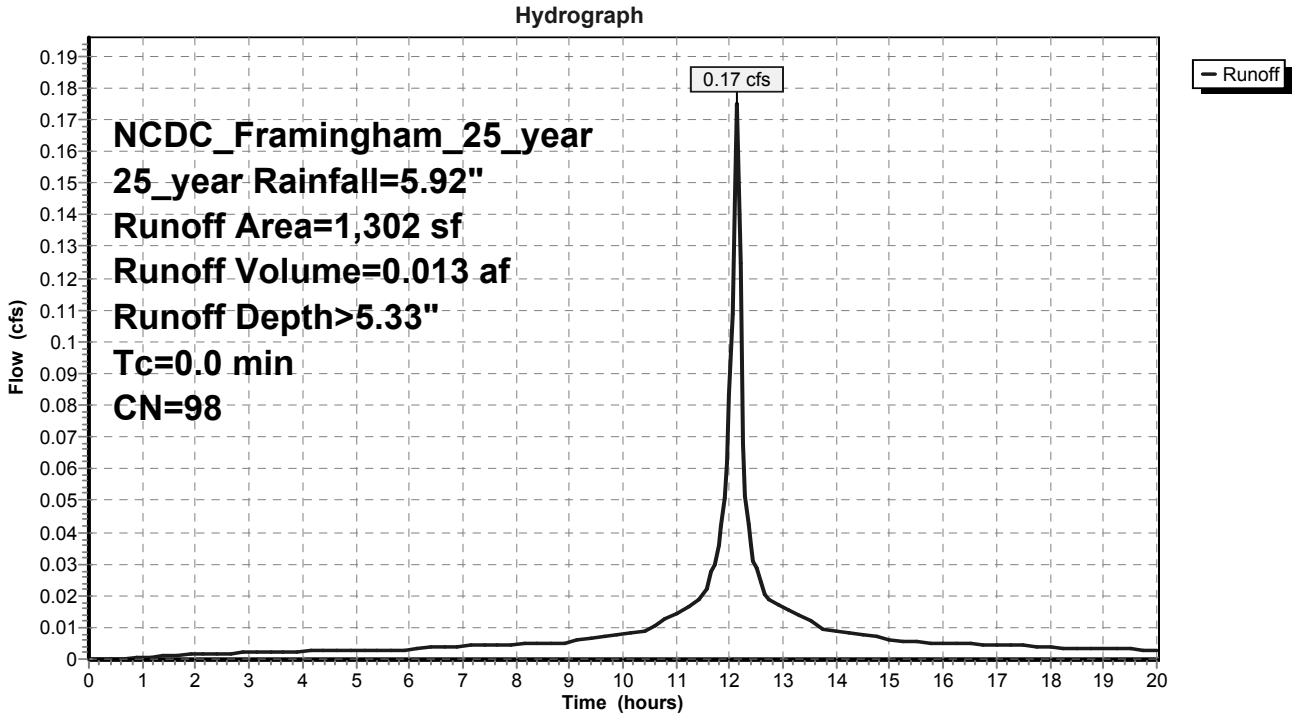
## Summary for Subcatchment ROOF-75: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-75: (blank)



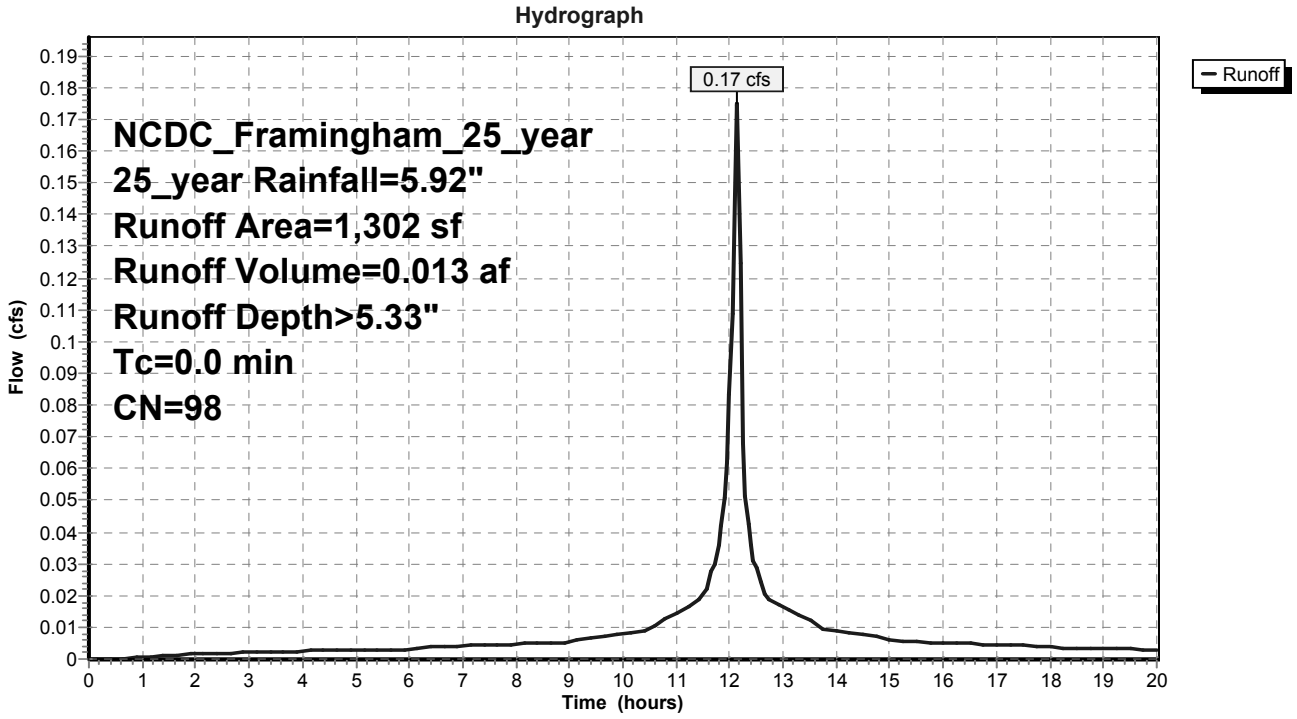
## Summary for Subcatchment ROOF-76: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 643 | 98 | ROOF, 100% imperv, HSG A |
| * | 659 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-76: (blank)



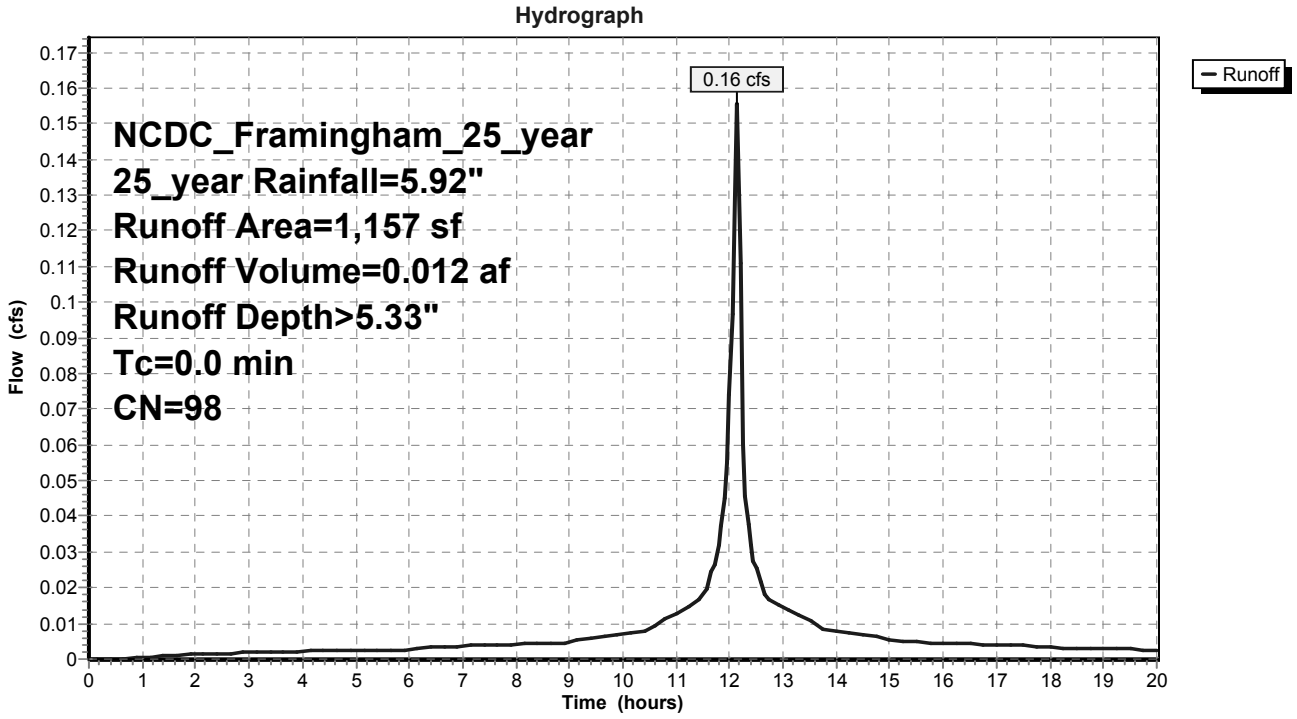
## Summary for Subcatchment ROOF-77: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-77: (blank)



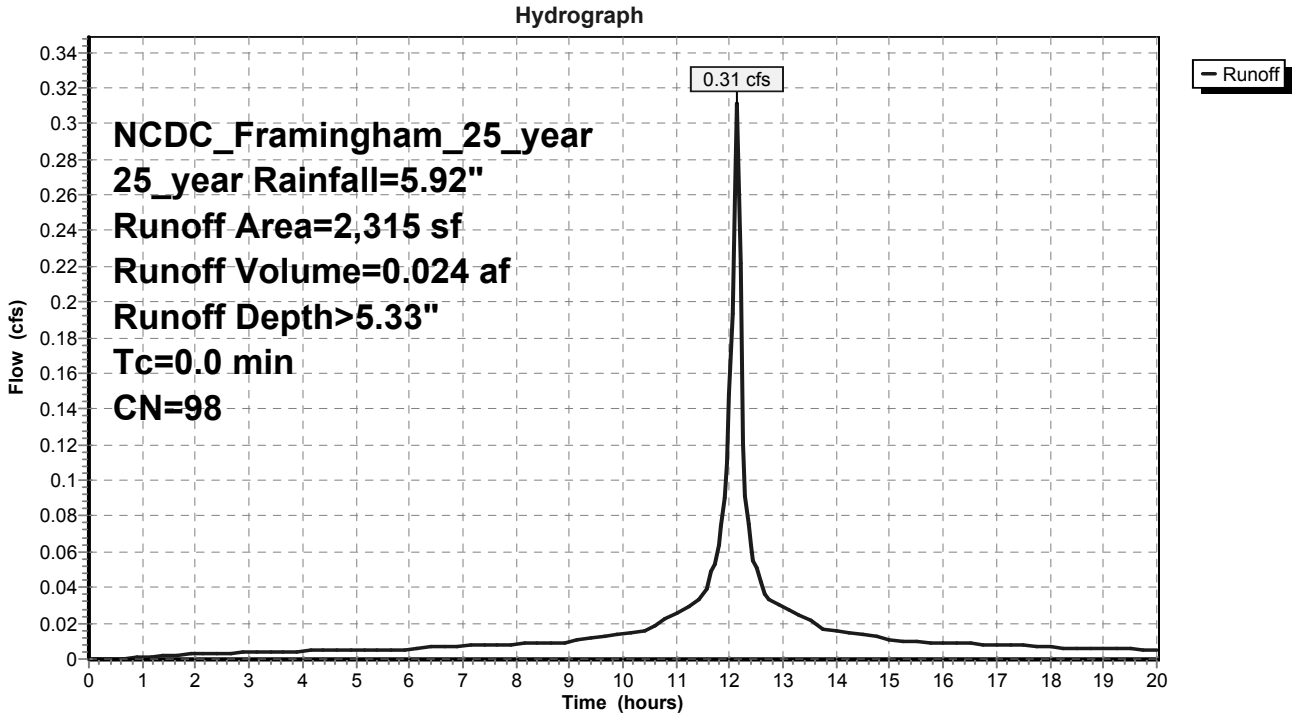
## Summary for Subcatchment ROOF-78: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,443 | 98 | ROOF, 100% imperv, HSG A |
| * | 872 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | 98 | Weighted Average |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-78: (blank)



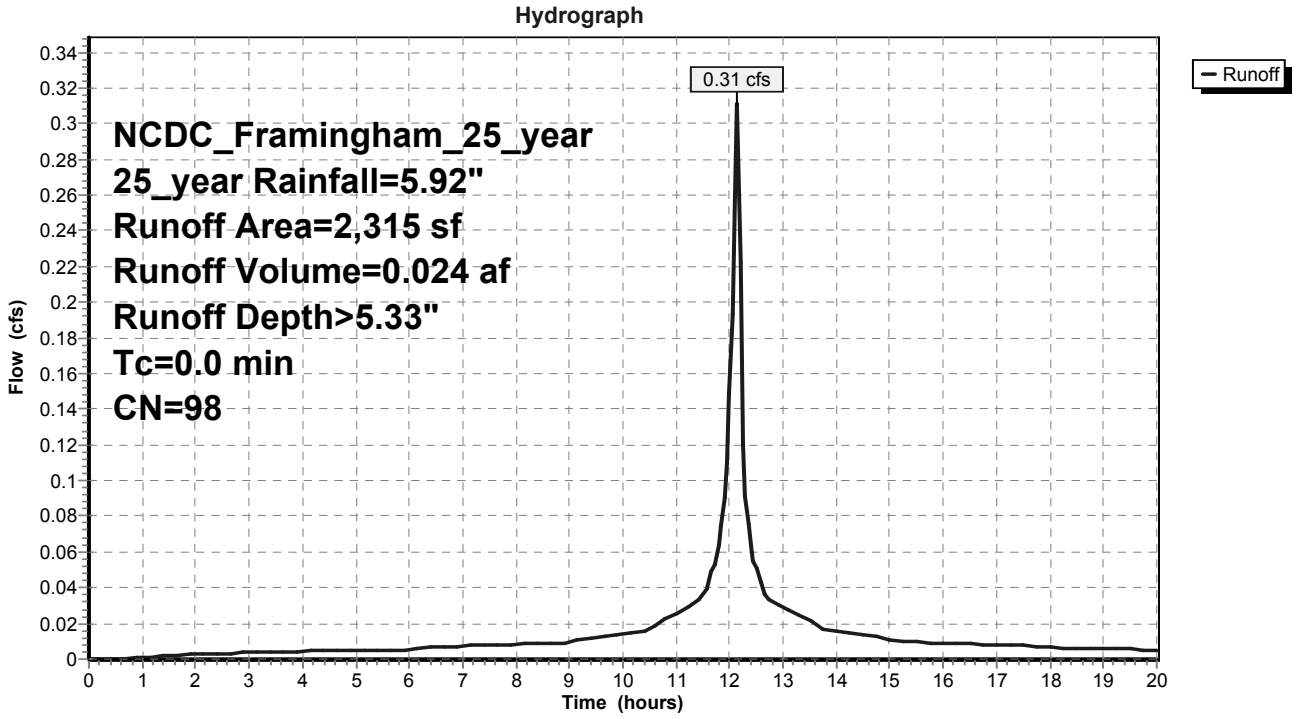
## Summary for Subcatchment ROOF-79: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG A |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-79: (blank)



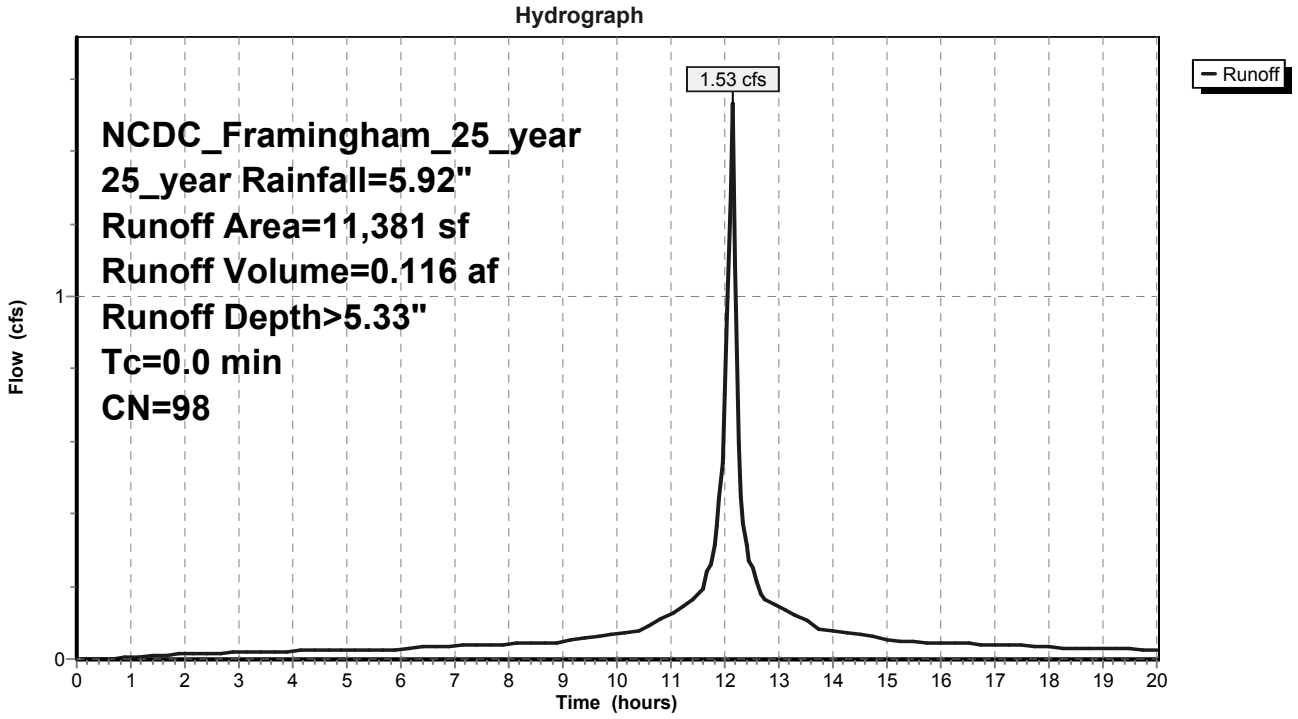
## Summary for Subcatchment ROOF-8: (blank)

Runoff = 1.53 cfs @ 12.14 hrs, Volume= 0.116 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 376 | 98 | DECK, 100% imperv, HSG B |
| * | 11,005 | 98 | ROOF, 100% imperv, HSG B |
| | 11,381 | 98 | Weighted Average |
| | 11,381 | | 100.00% Pervious Area |

## Subcatchment ROOF-8: (blank)



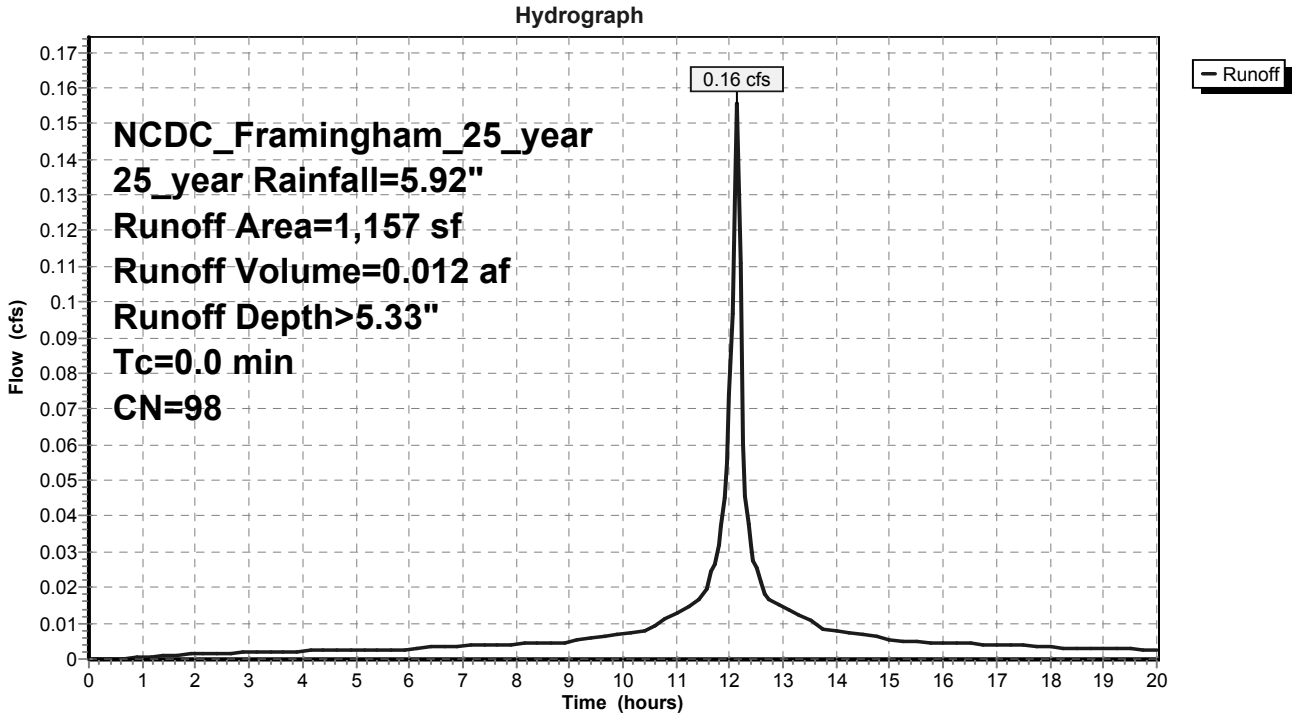
## Summary for Subcatchment ROOF-80: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 548 | 98 | ROOF, 100% imperv, HSG A |
| * | 609 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-80: (blank)



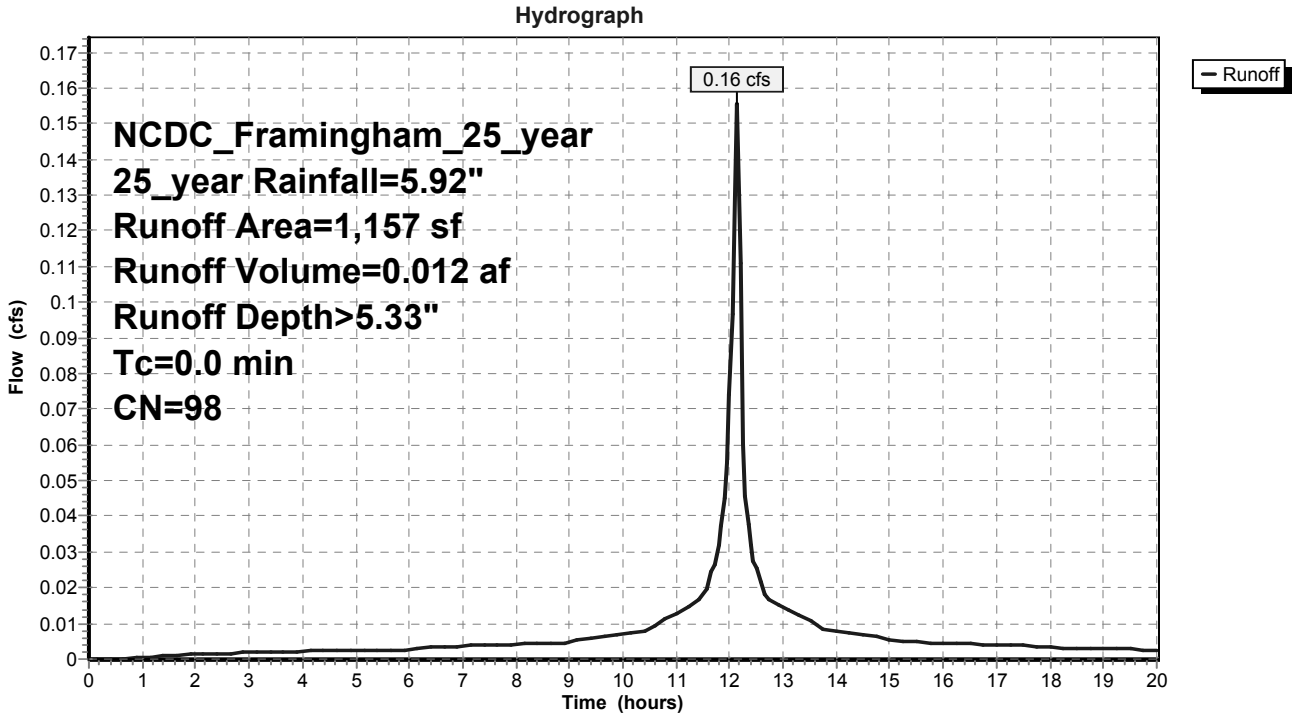
## Summary for Subcatchment ROOF-81: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-81: (blank)



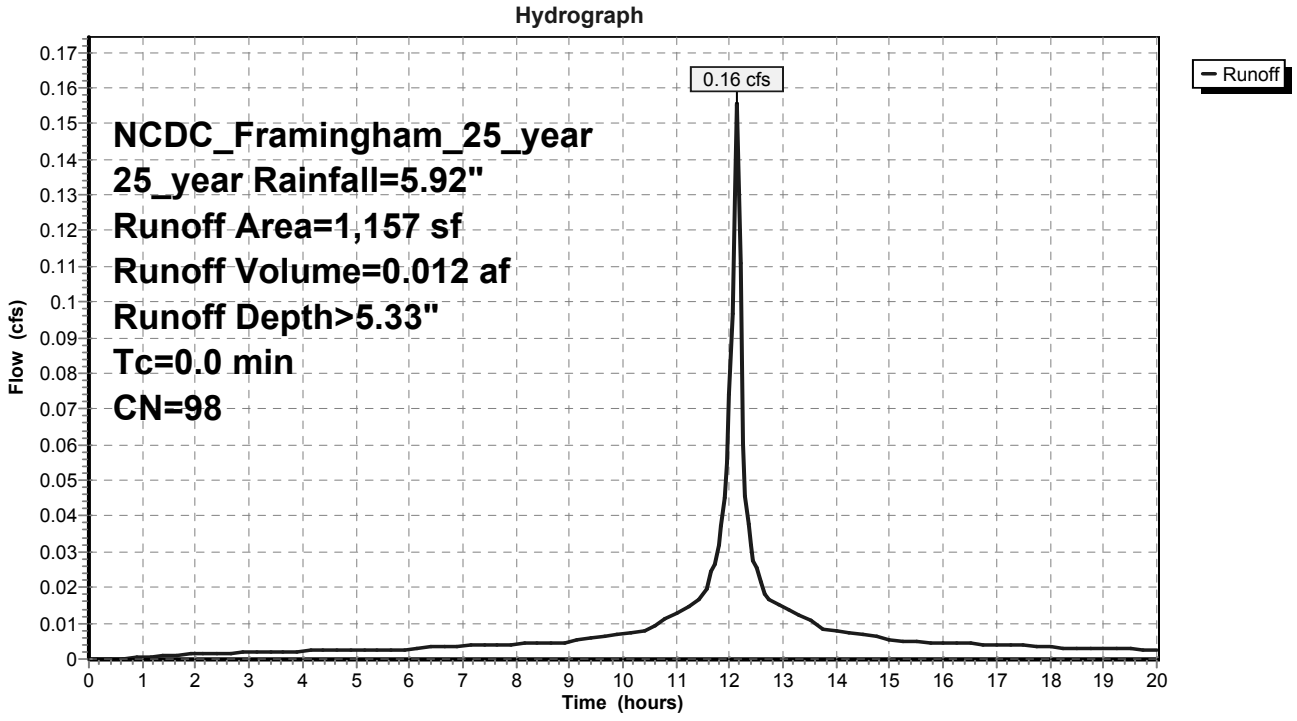
## Summary for Subcatchment ROOF-82: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 234 | 98 | ROOF, 100% imperv, HSG A |
| * | 924 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-82: (blank)



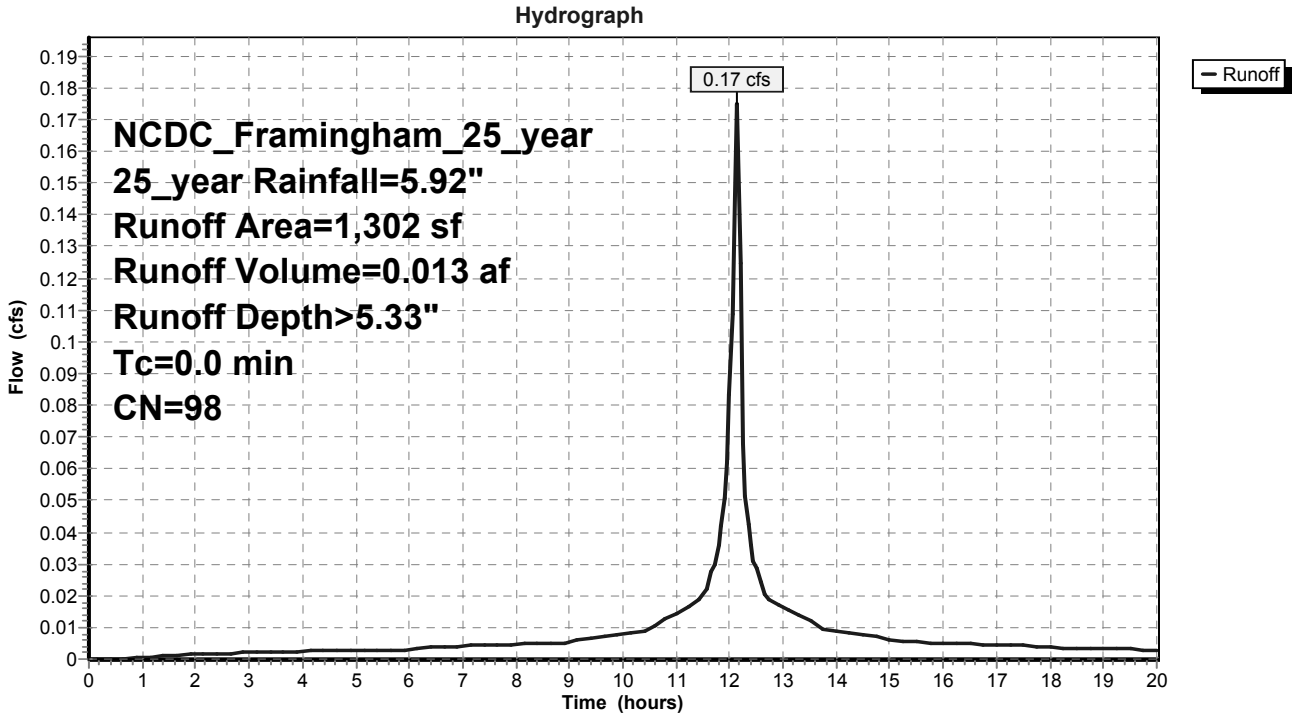
## Summary for Subcatchment ROOF-83: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-83: (blank)



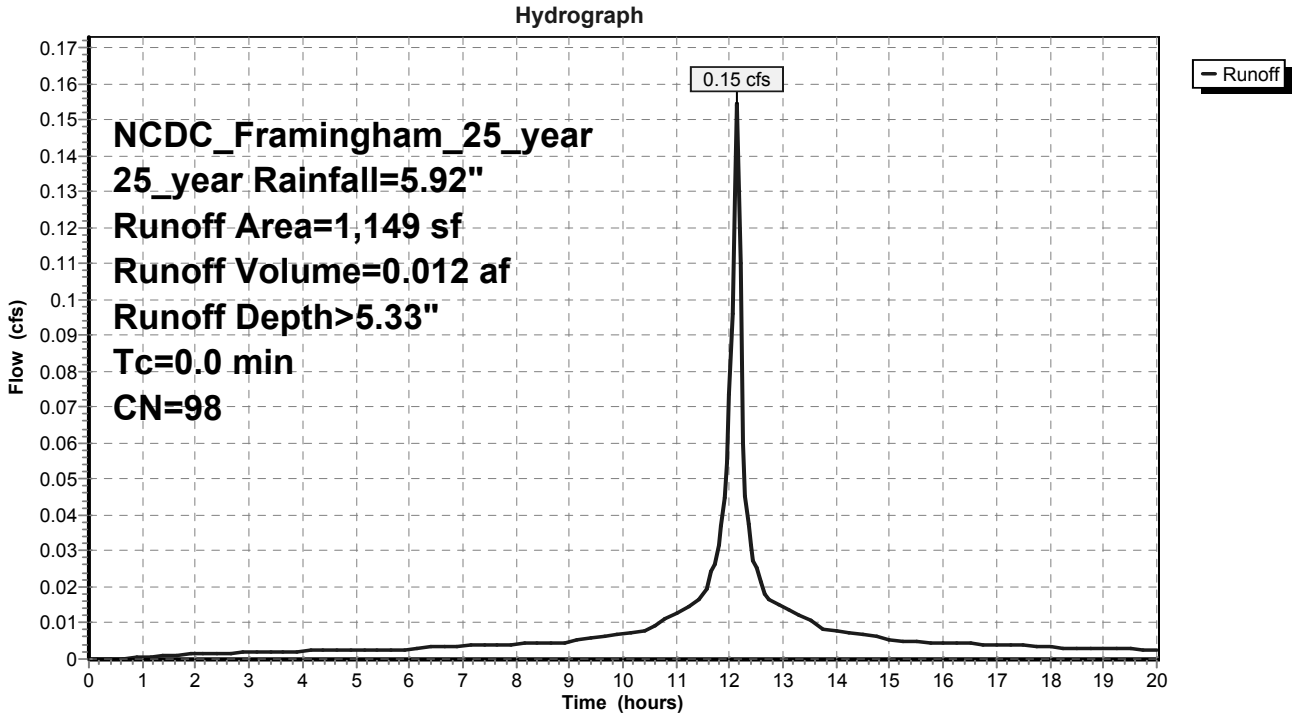
## Summary for Subcatchment ROOF-84: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,143 | 98 | ROOF, 100% imperv, HSG B |
| | 1,149 | 98 | Weighted Average |
| | 1,149 | | 100.00% Pervious Area |

## Subcatchment ROOF-84: (blank)



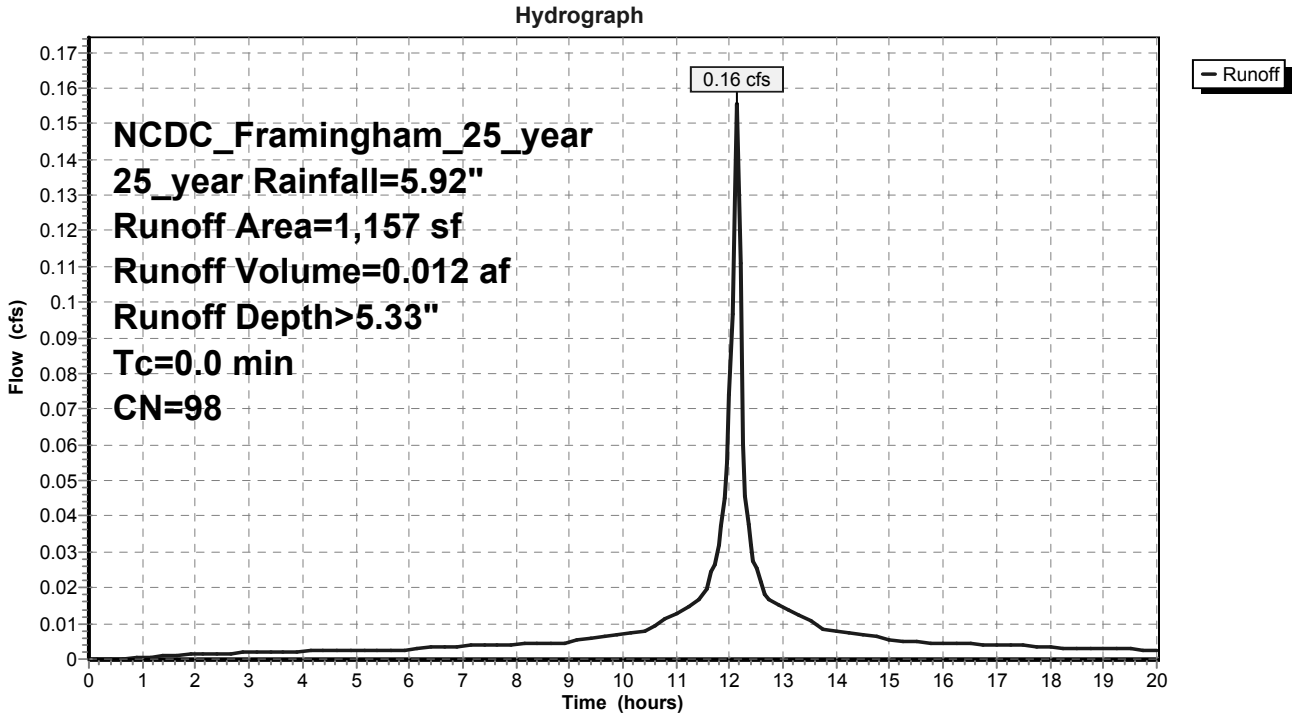
## Summary for Subcatchment ROOF-85: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-85: (blank)



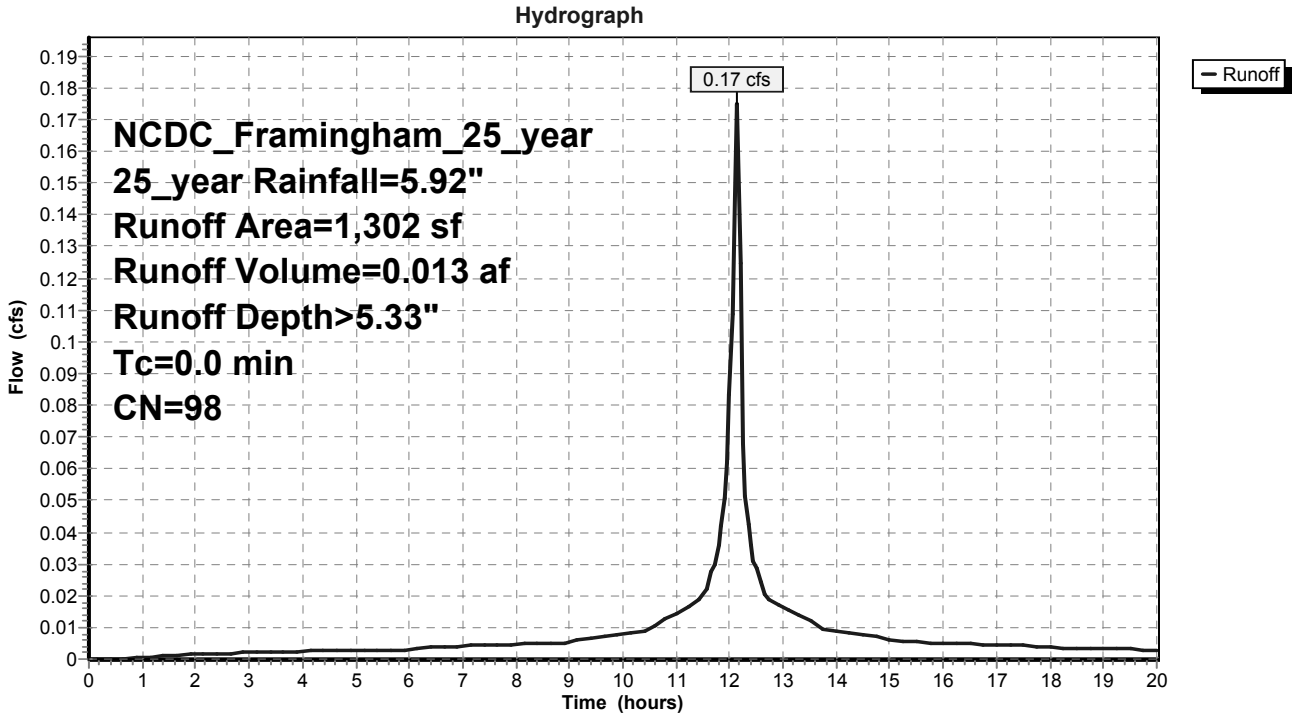
## Summary for Subcatchment ROOF-86: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-86: (blank)



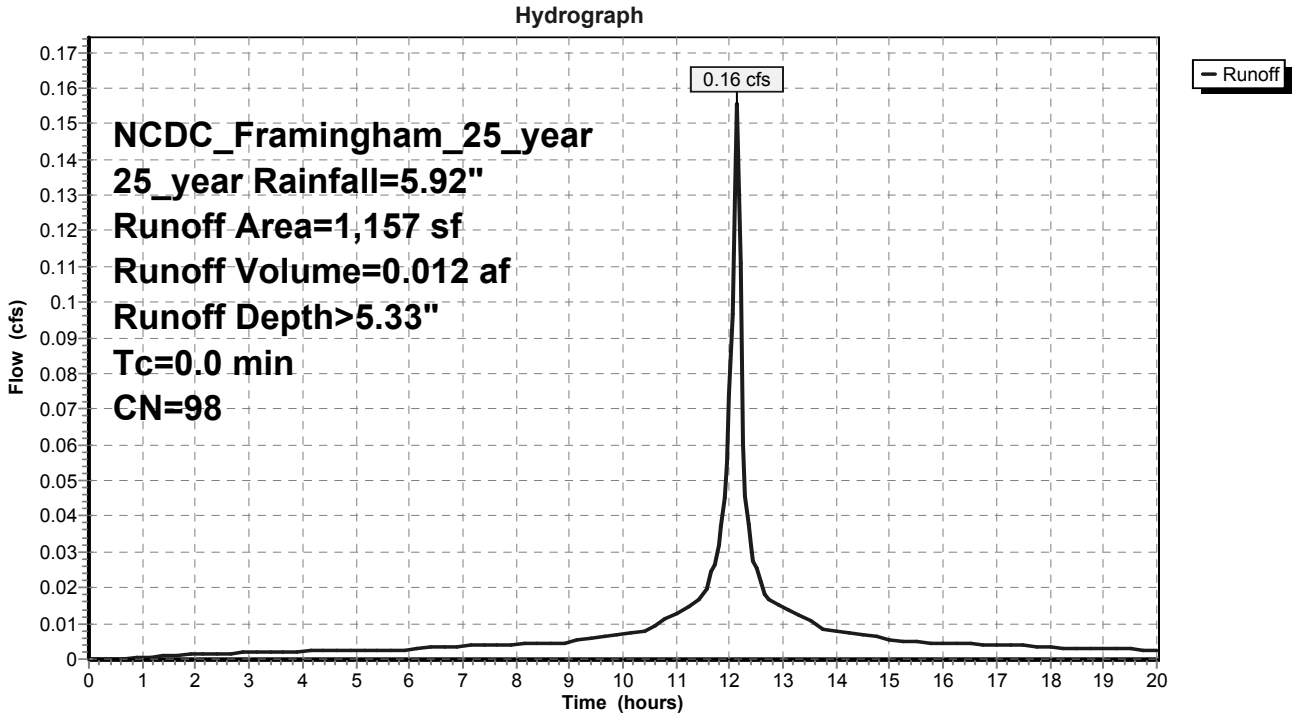
## Summary for Subcatchment ROOF-87: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-87: (blank)



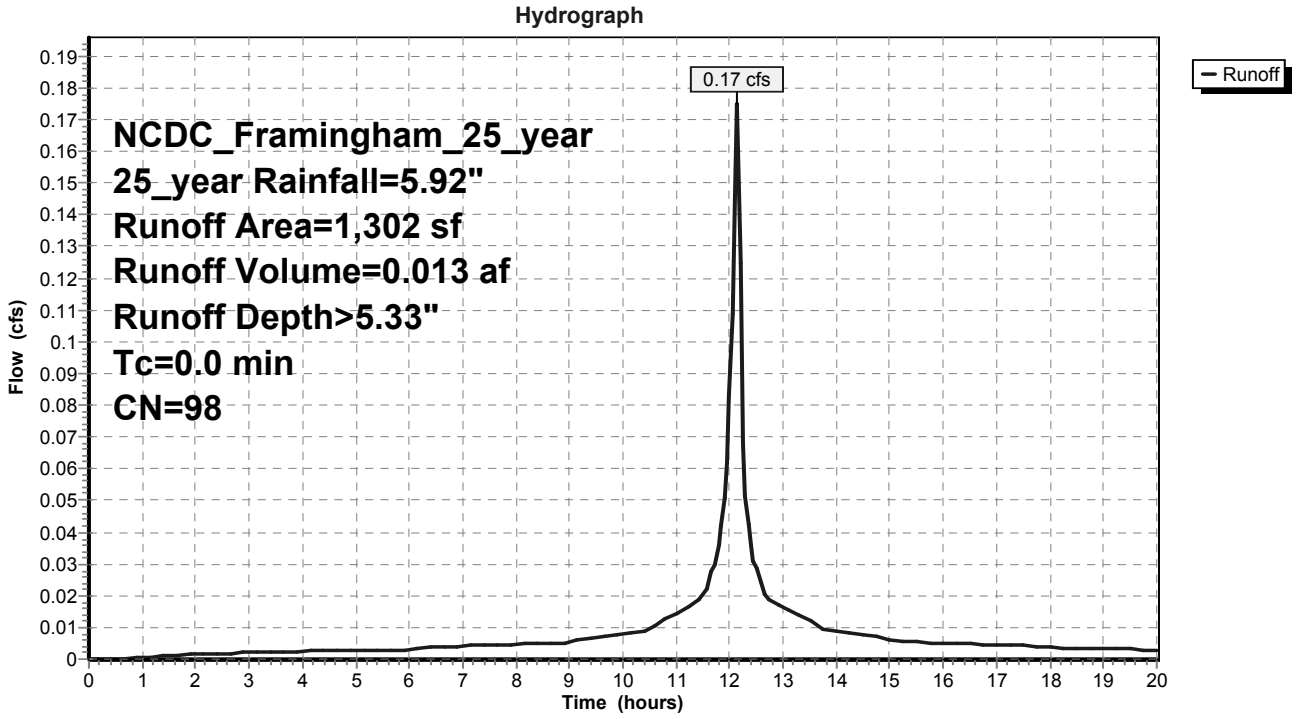
## Summary for Subcatchment ROOF-88: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-88: (blank)



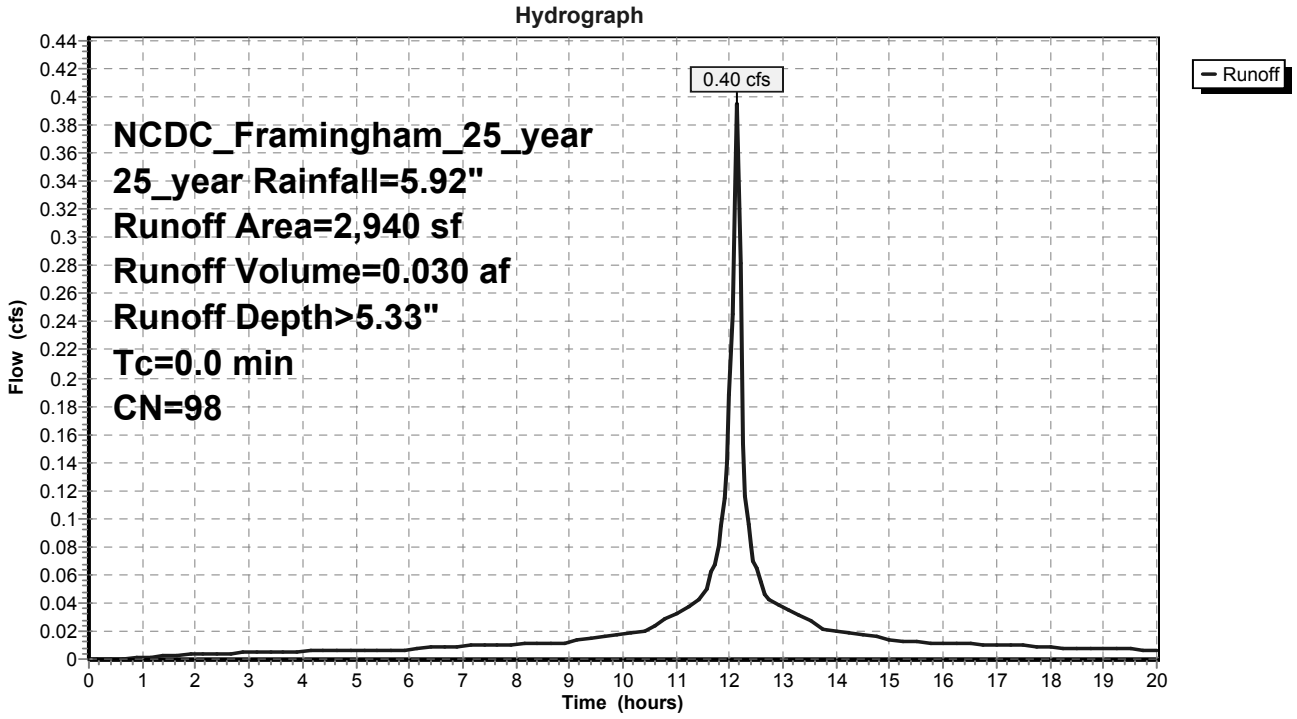
## Summary for Subcatchment ROOF-89: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-89: (blank)



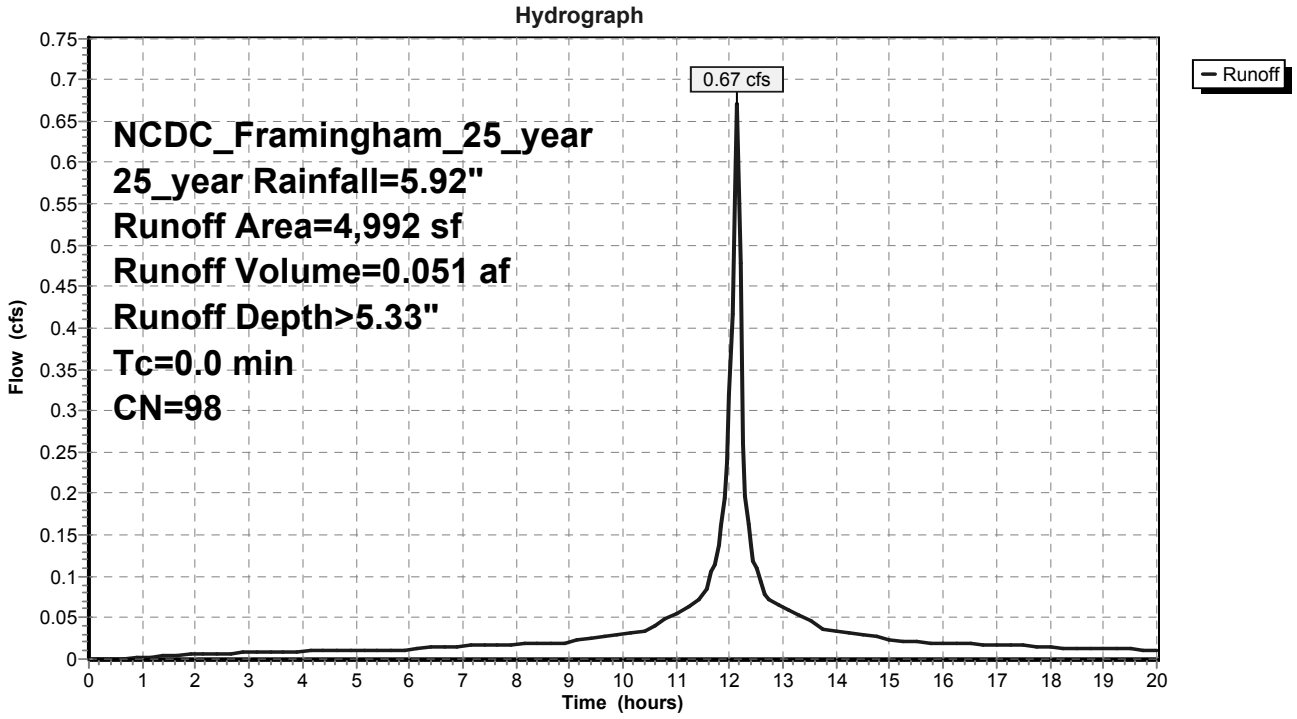
## Summary for Subcatchment ROOF-9: (blank)

Runoff = 0.67 cfs @ 12.14 hrs, Volume= 0.051 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,992 | 98 | ROOF, 100% imperv, HSG B |
| | 4,992 | | 100.00% Pervious Area |

## Subcatchment ROOF-9: (blank)



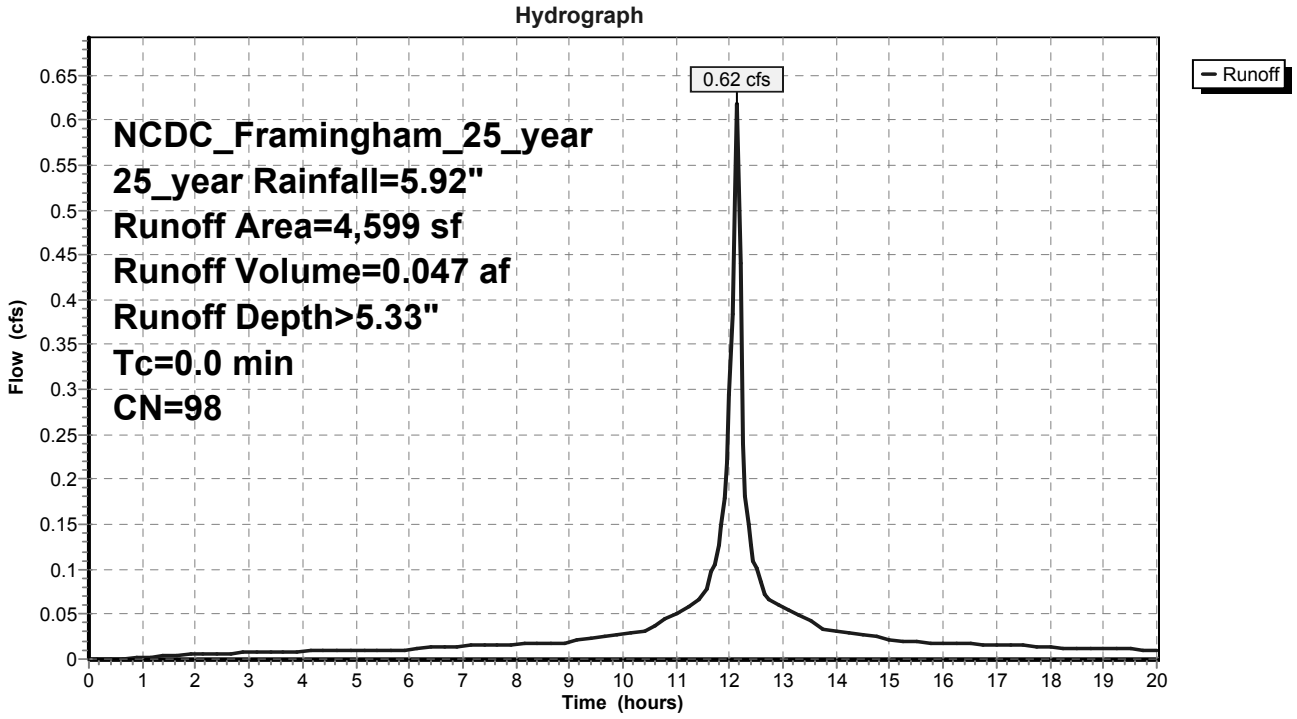
## Summary for Subcatchment ROOF-90: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-90: (blank)



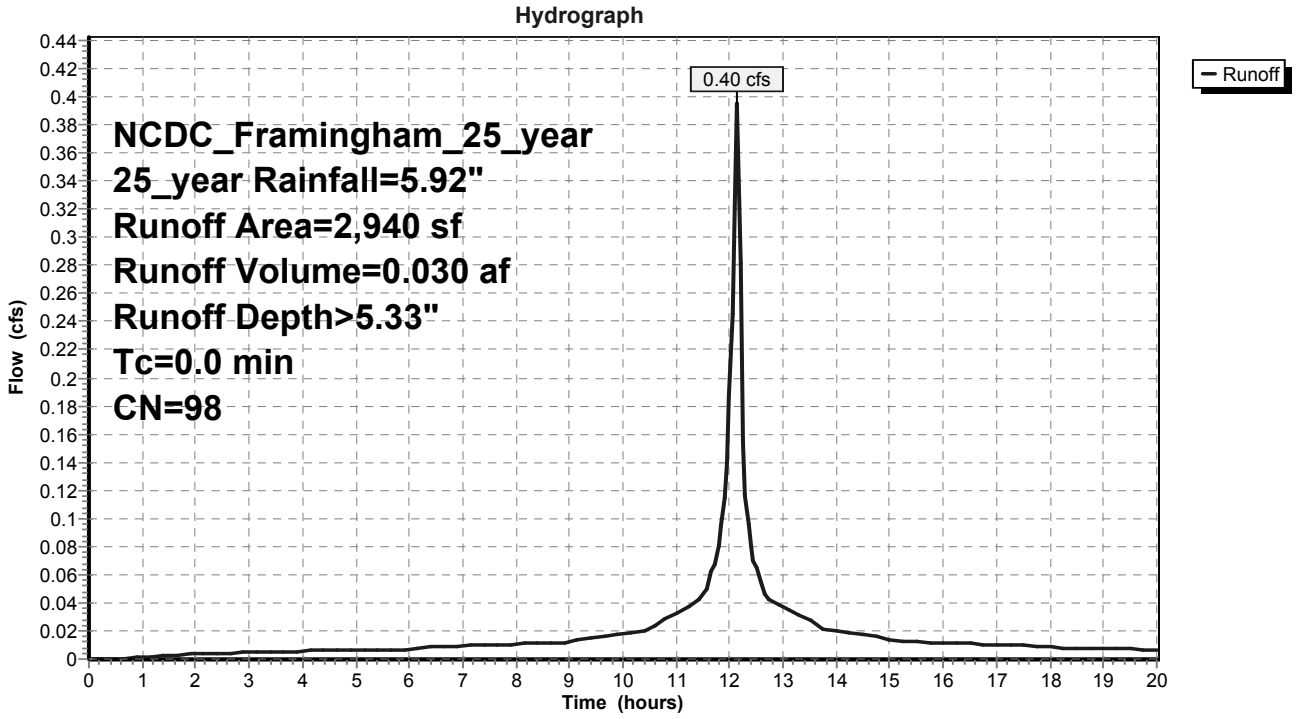
## Summary for Subcatchment ROOF-91: (blank)

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.030 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,215 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,725 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-91: (blank)



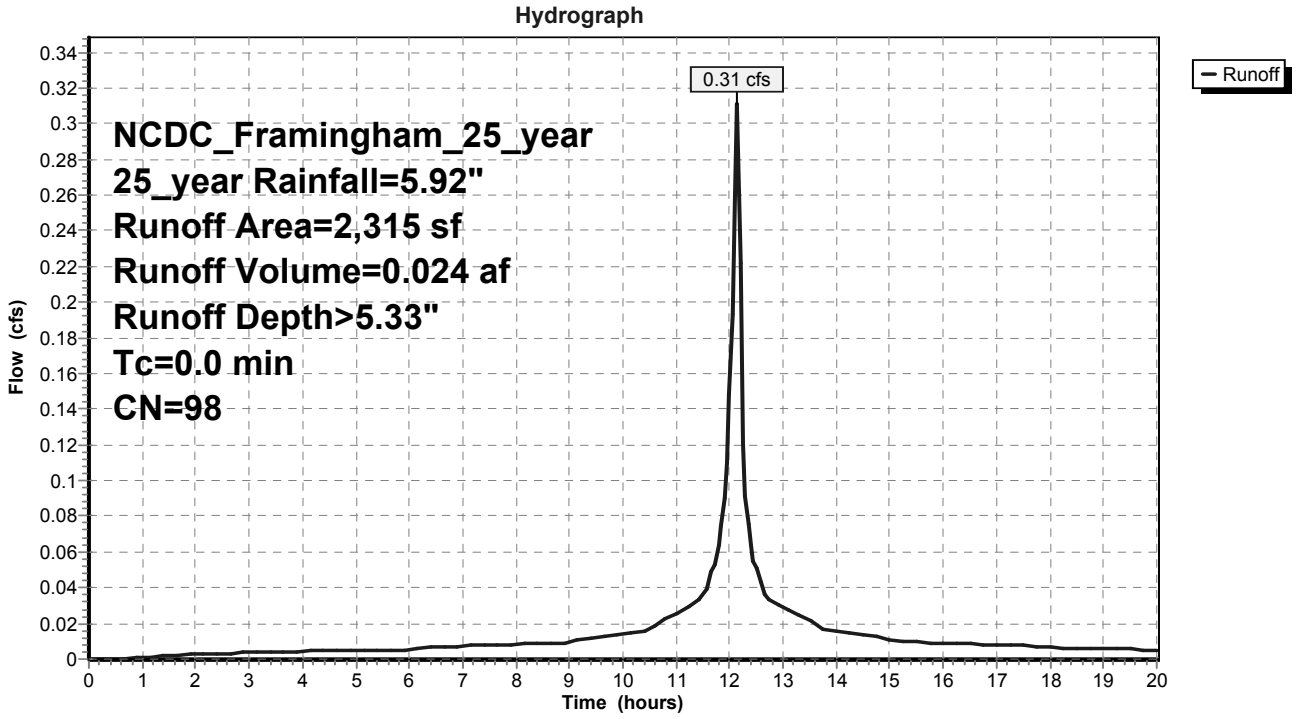
## Summary for Subcatchment ROOF-92: (blank)

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 0.024 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-92: (blank)



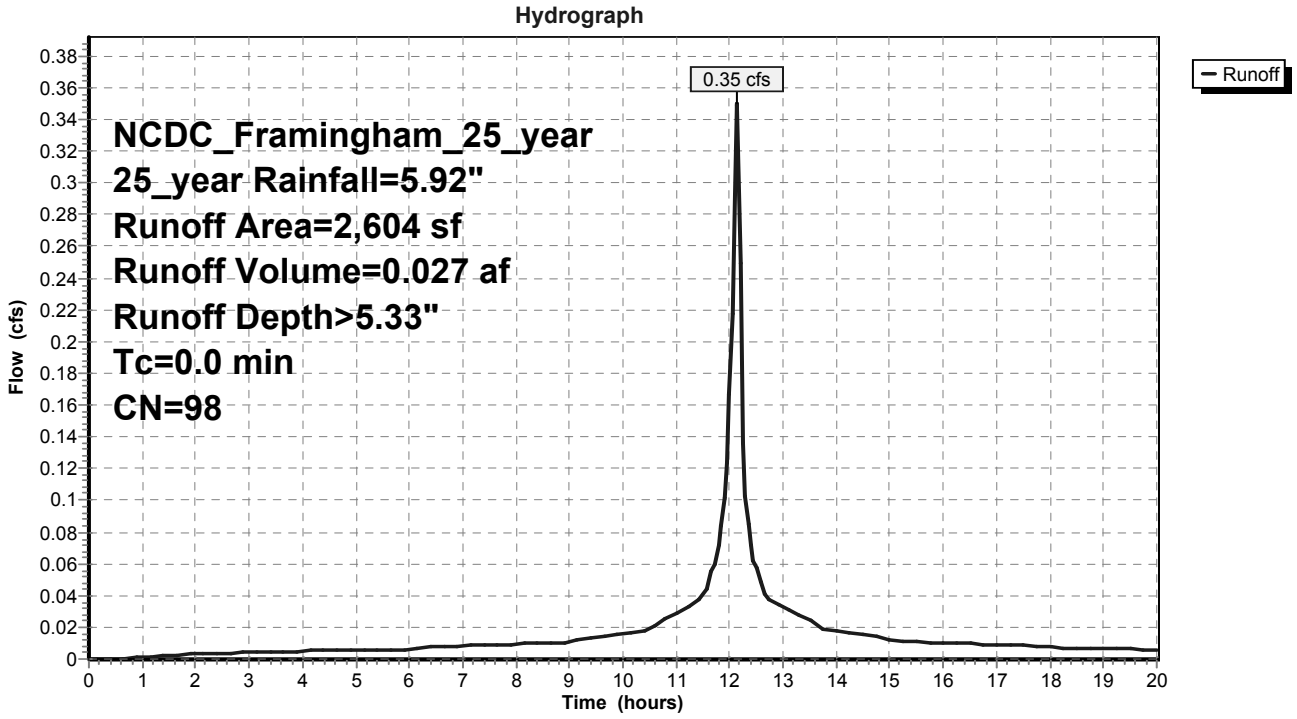
## Summary for Subcatchment ROOF-93: (blank)

Runoff = 0.35 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,102 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,502 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-93: (blank)



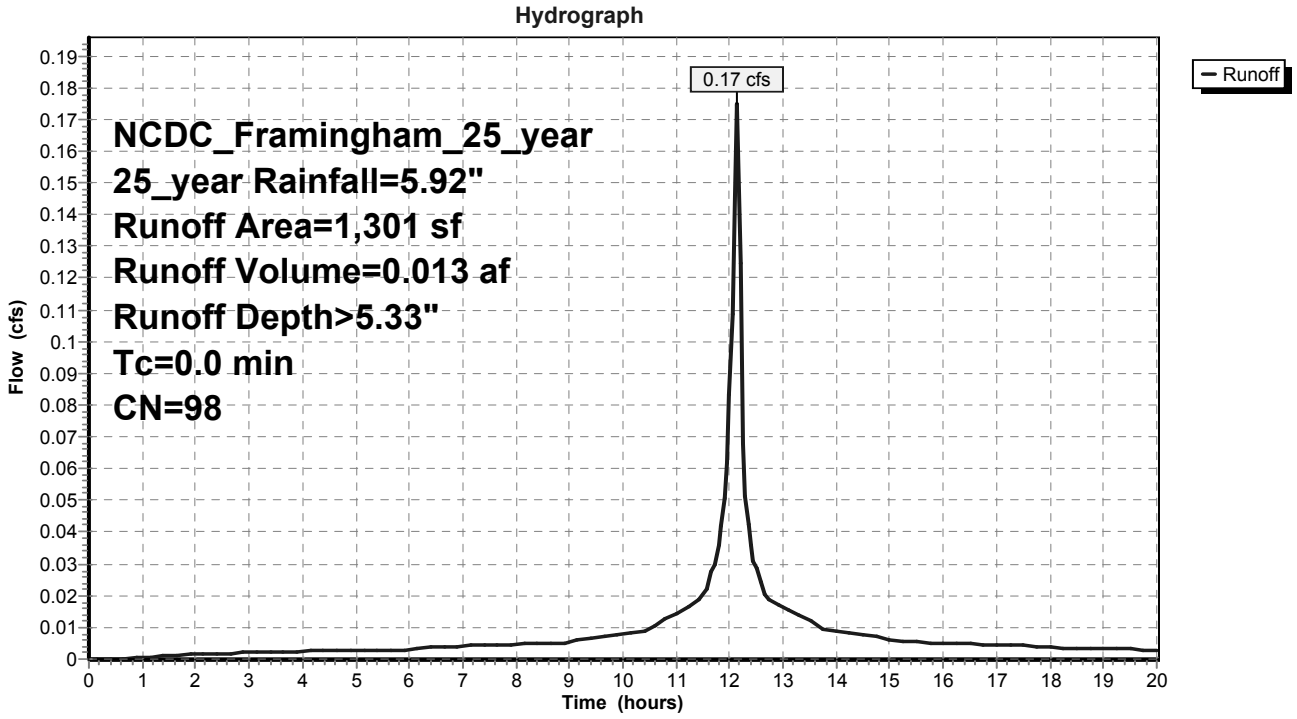
## Summary for Subcatchment ROOF-94: (blank)

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,301 | 98 | ROOF, 100% imperv, HSG B |
| | 1,301 | | 100.00% Pervious Area |

## Subcatchment ROOF-94: (blank)



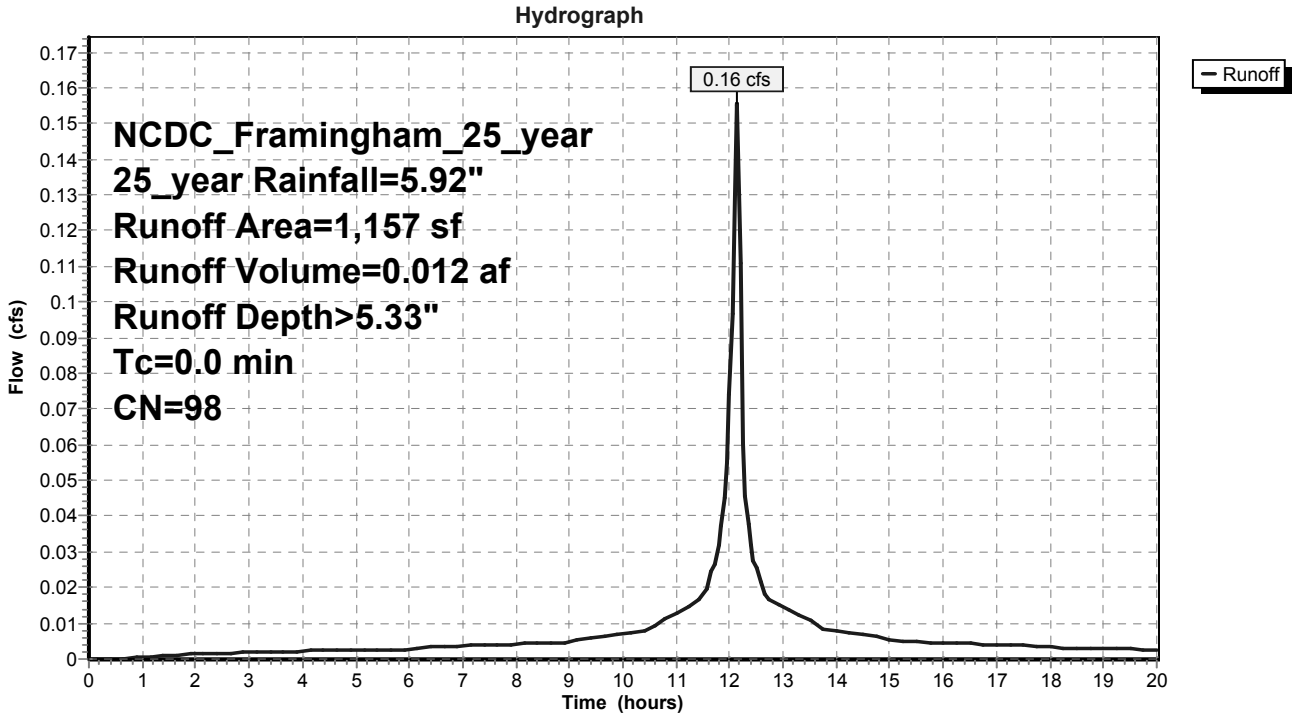
## Summary for Subcatchment ROOF-95: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 986 | 98 | ROOF, 100% imperv, HSG A |
| * | 171 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-95: (blank)



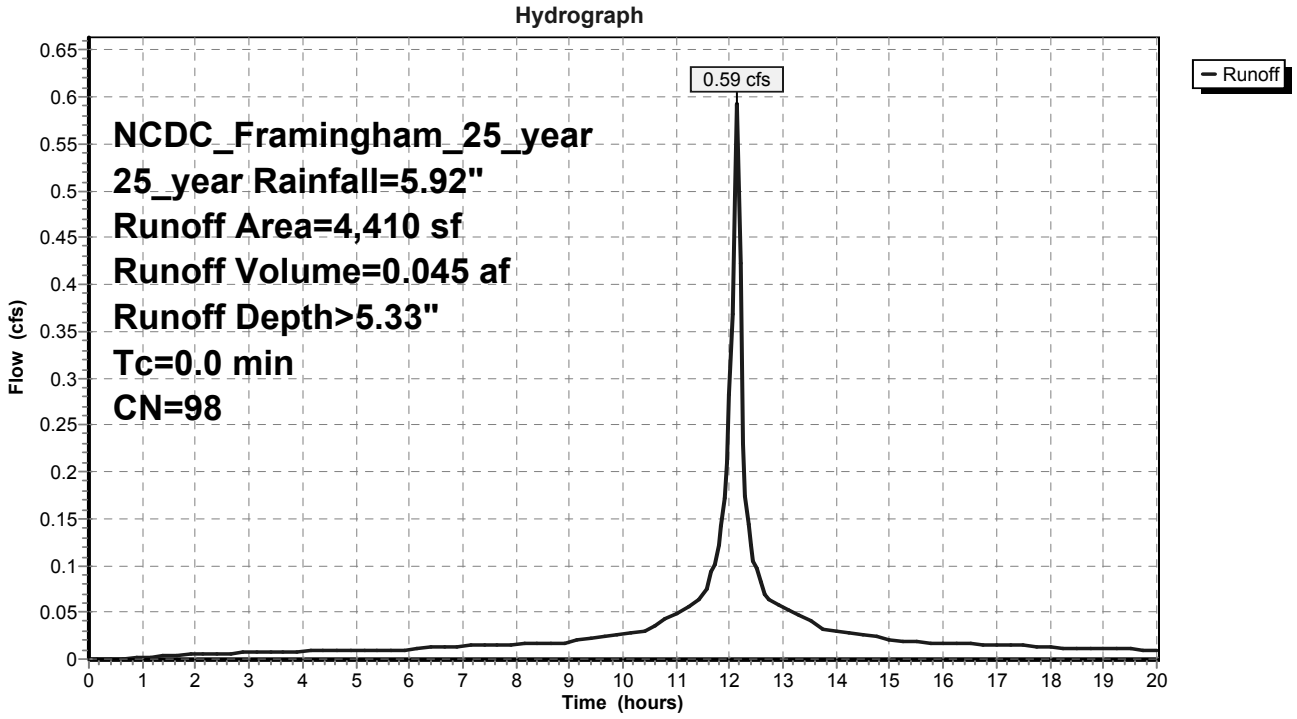
## Summary for Subcatchment ROOF-96: (blank)

Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.045 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-96: (blank)



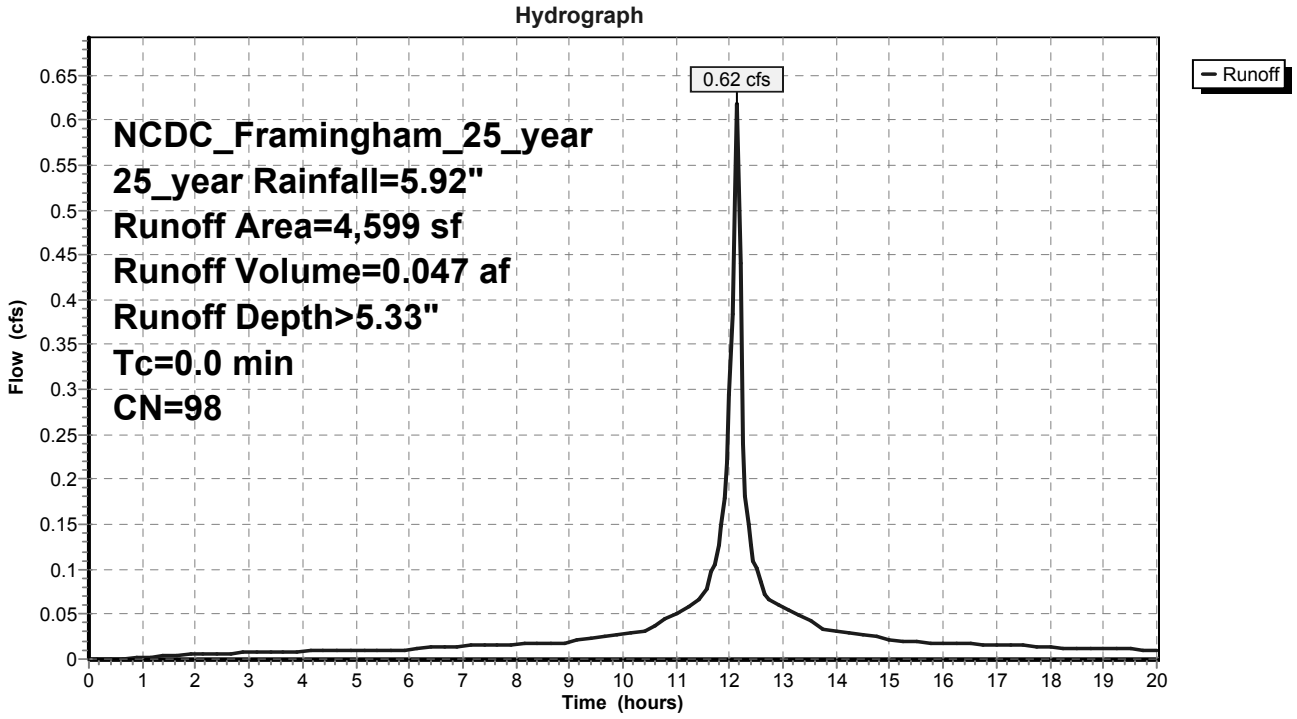
## Summary for Subcatchment ROOF-97: (blank)

Runoff = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-97: (blank)



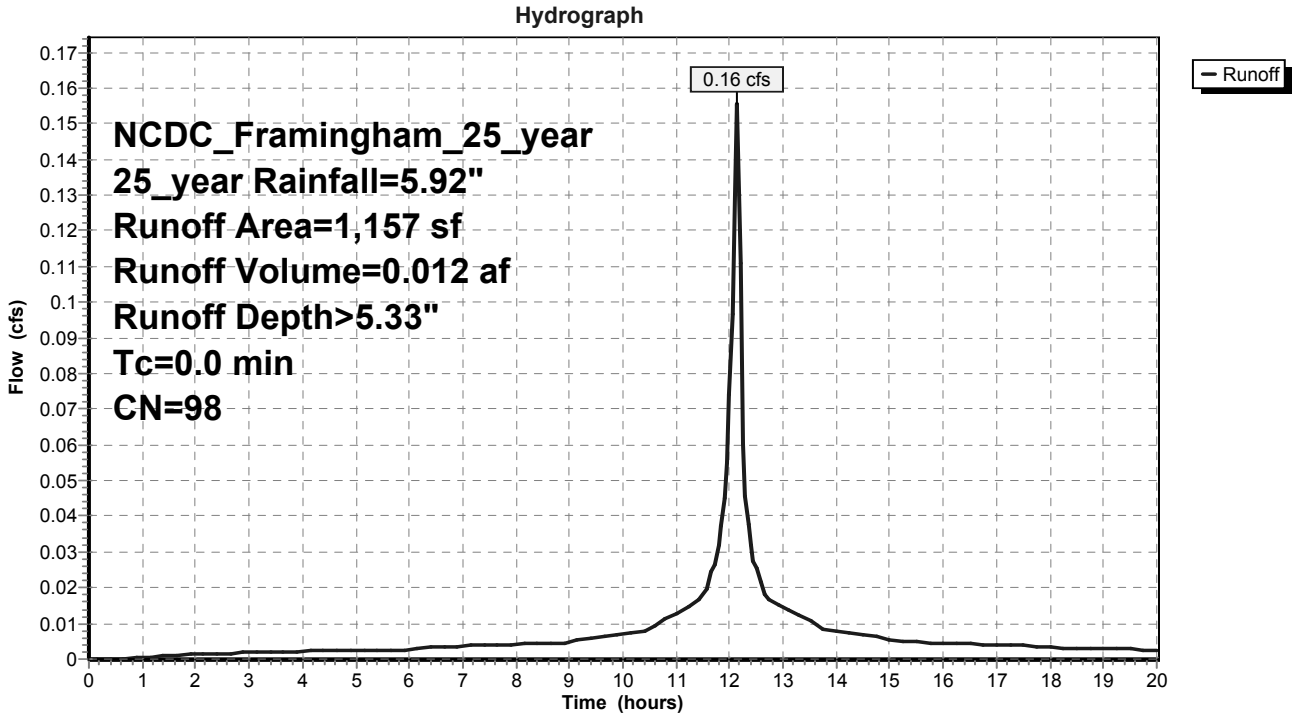
## Summary for Subcatchment ROOF-98: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-98: (blank)



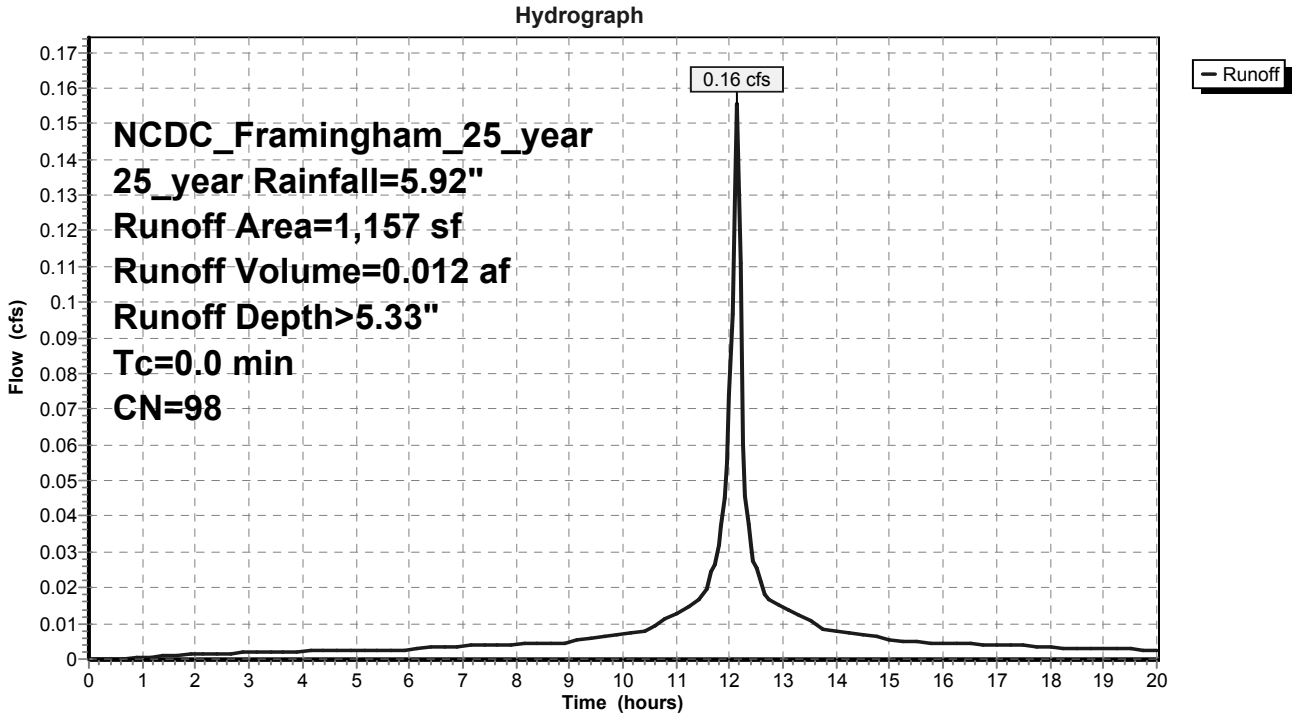
## Summary for Subcatchment ROOF-99: (blank)

Runoff = 0.16 cfs @ 12.14 hrs, Volume= 0.012 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-99: (blank)



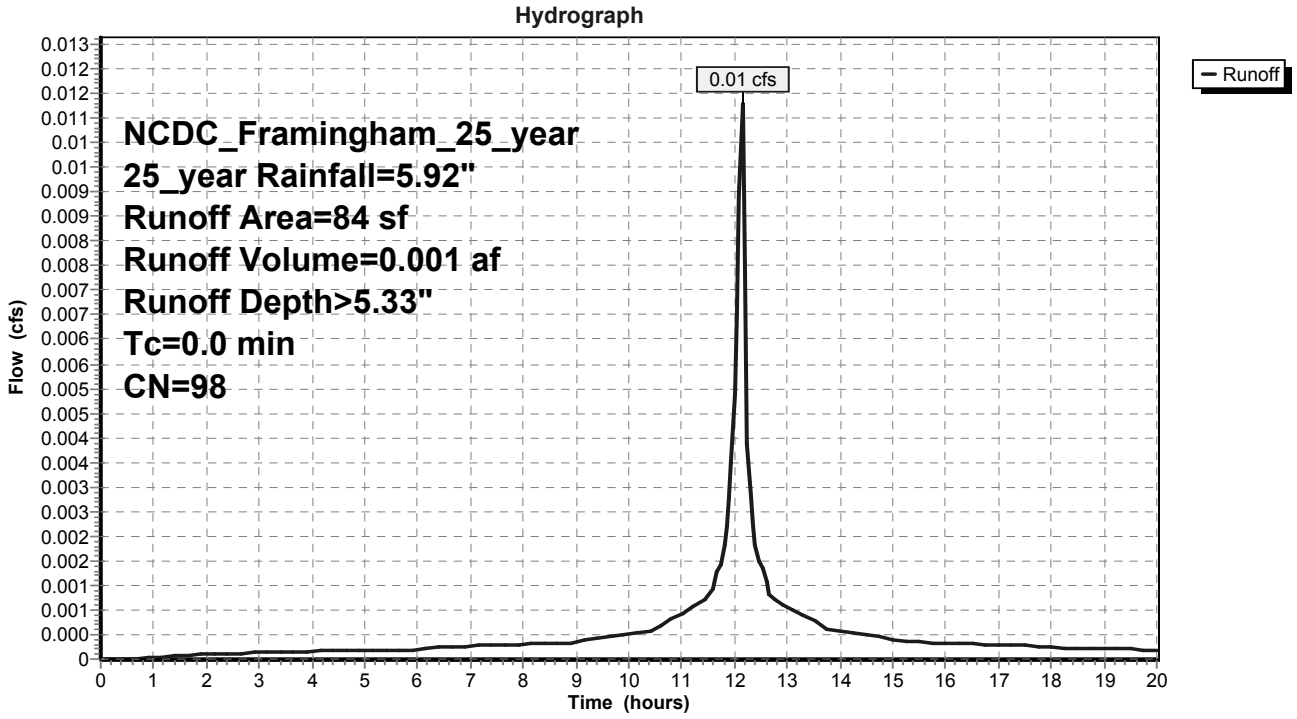
## Summary for Subcatchment ROOF-BS1: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 84 | 98 | ROOF, 100% imperv, HSG B |
| | 84 | | 100.00% Pervious Area |

## Subcatchment ROOF-BS1: (blank)



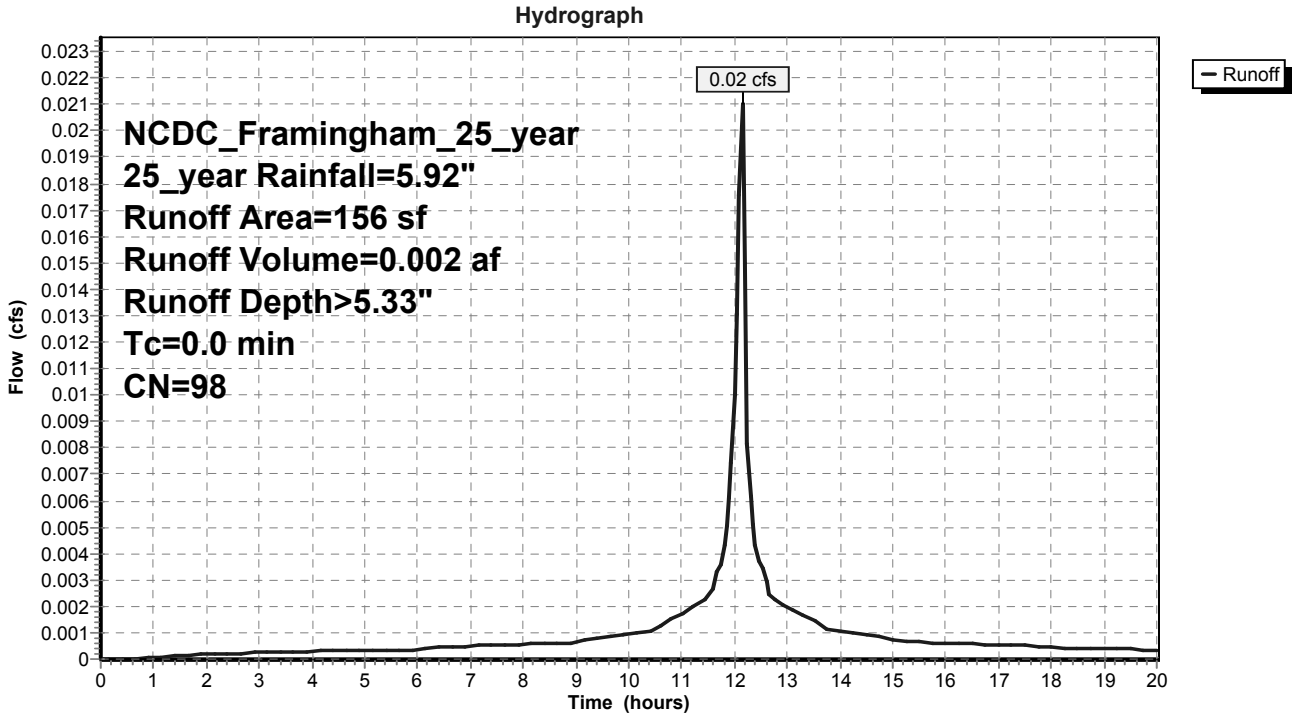
## Summary for Subcatchment ROOF-MAIL20: (blank)

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL20: (blank)



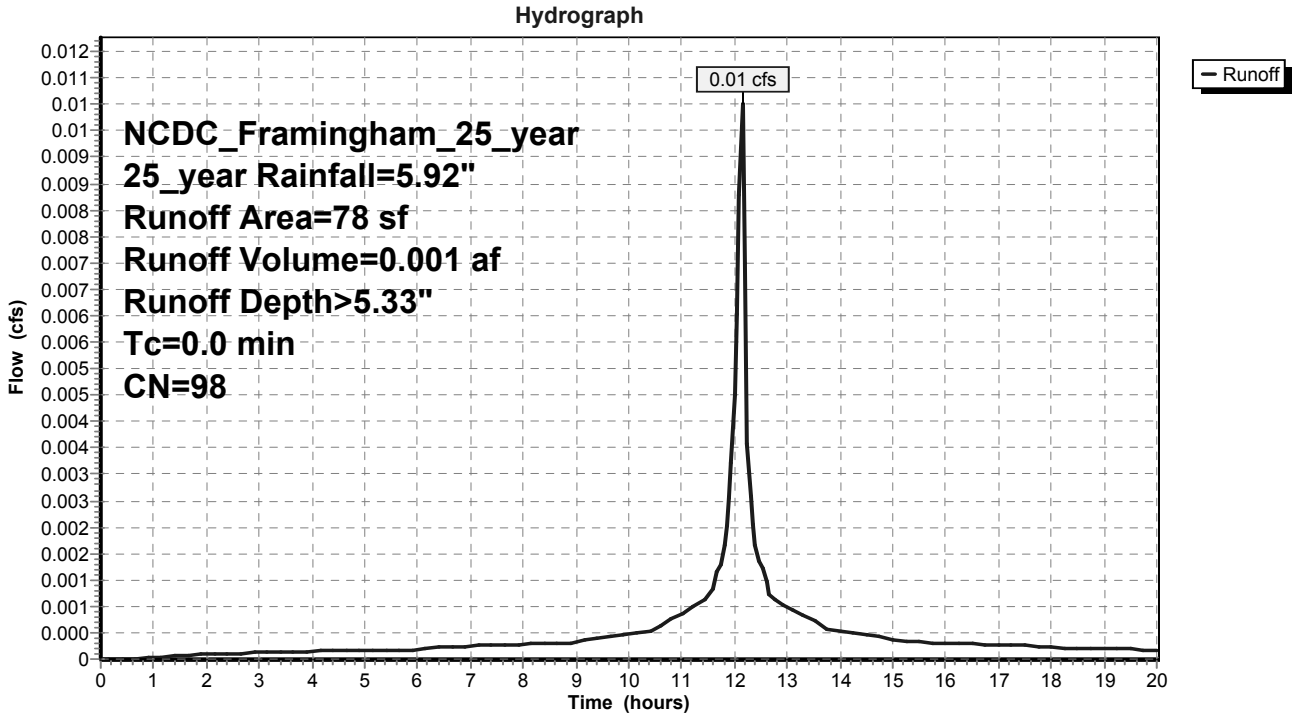
## Summary for Subcatchment ROOF-MAIL29: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL29: (blank)



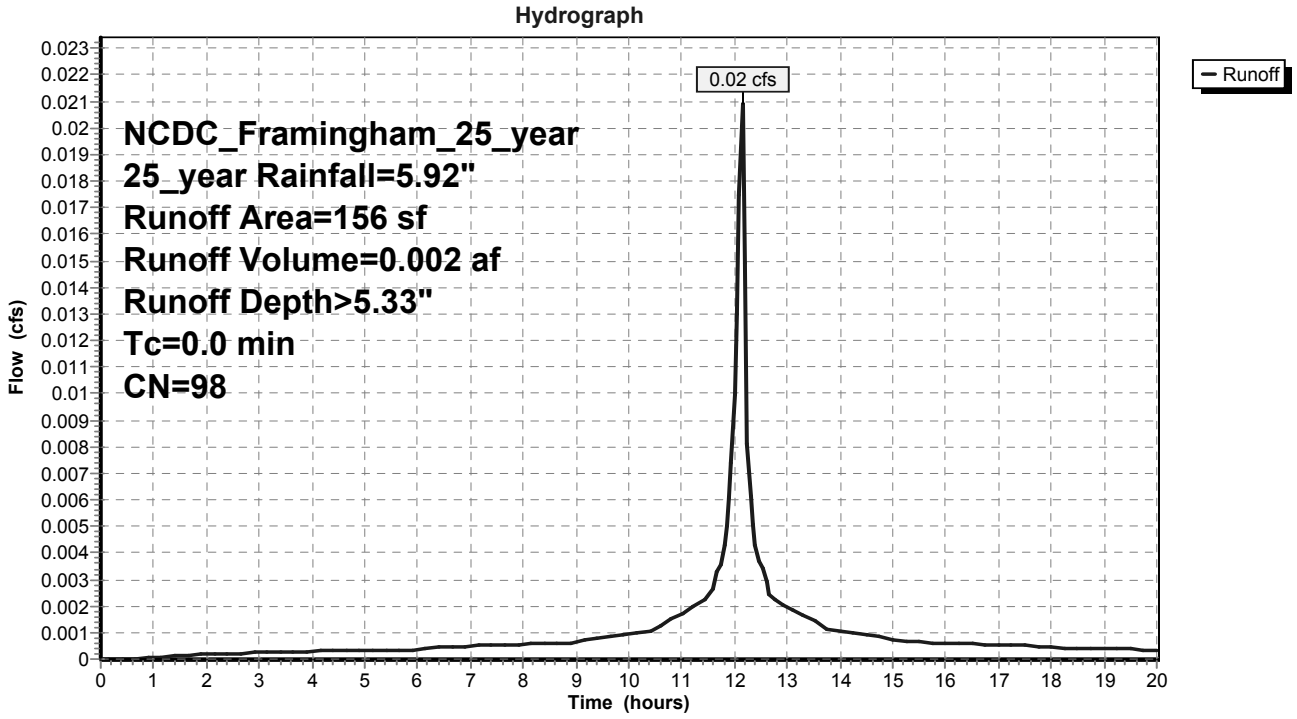
## Summary for Subcatchment ROOF-MAIL5: (blank)

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL5: (blank)



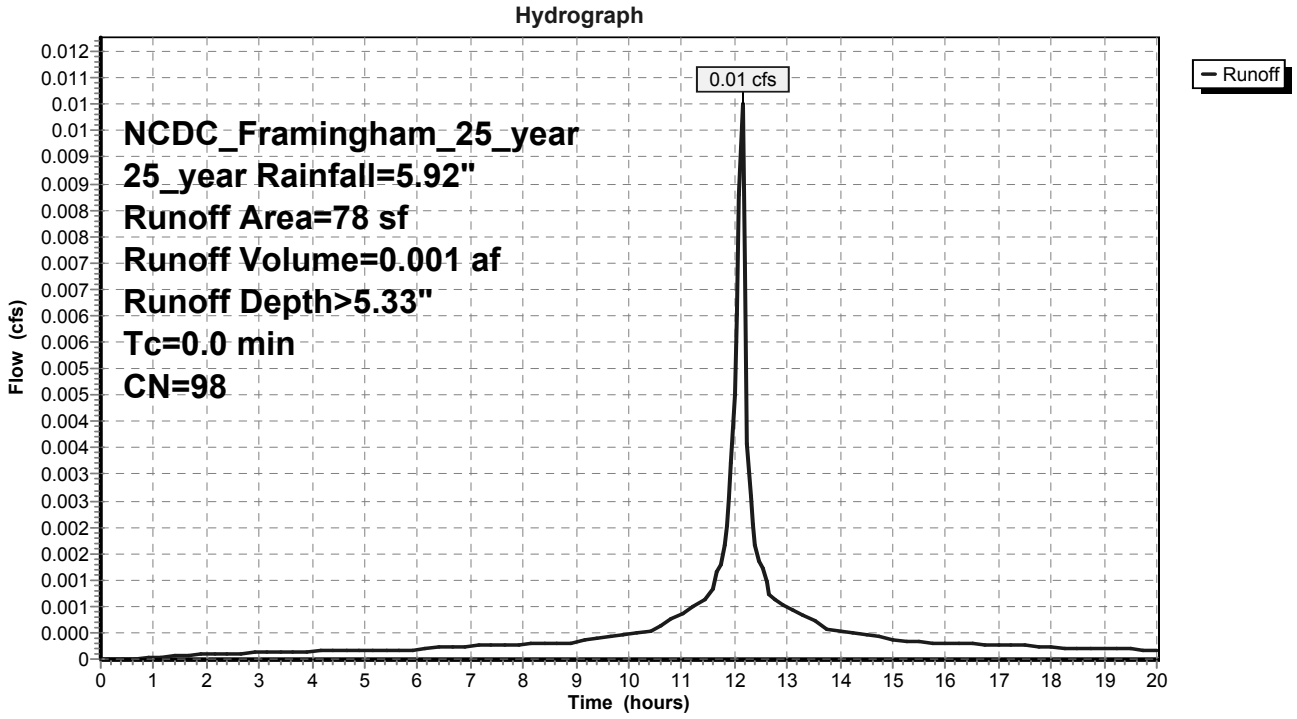
## Summary for Subcatchment ROOF-MAIL64: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL64: (blank)



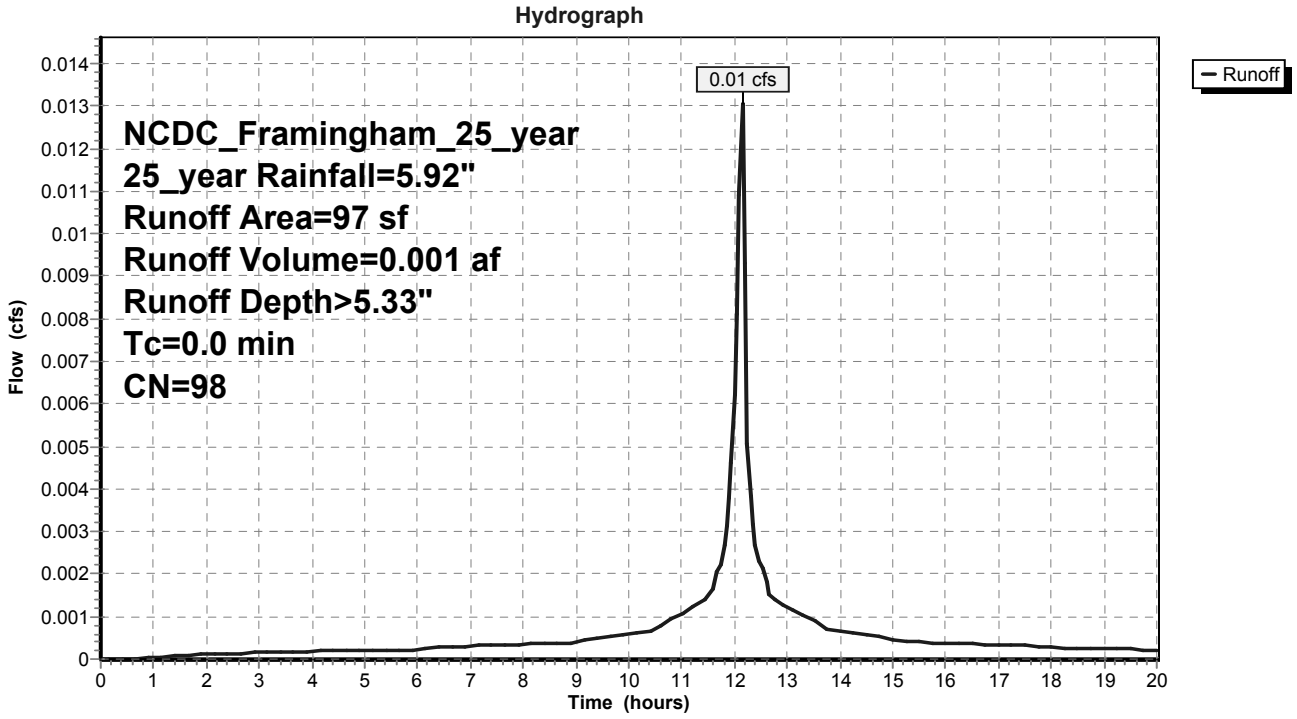
## Summary for Subcatchment ROOF-MAIL8: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 97 | 98 | ROOF, 100% imperv, HSG B |
| | 97 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL8: (blank)



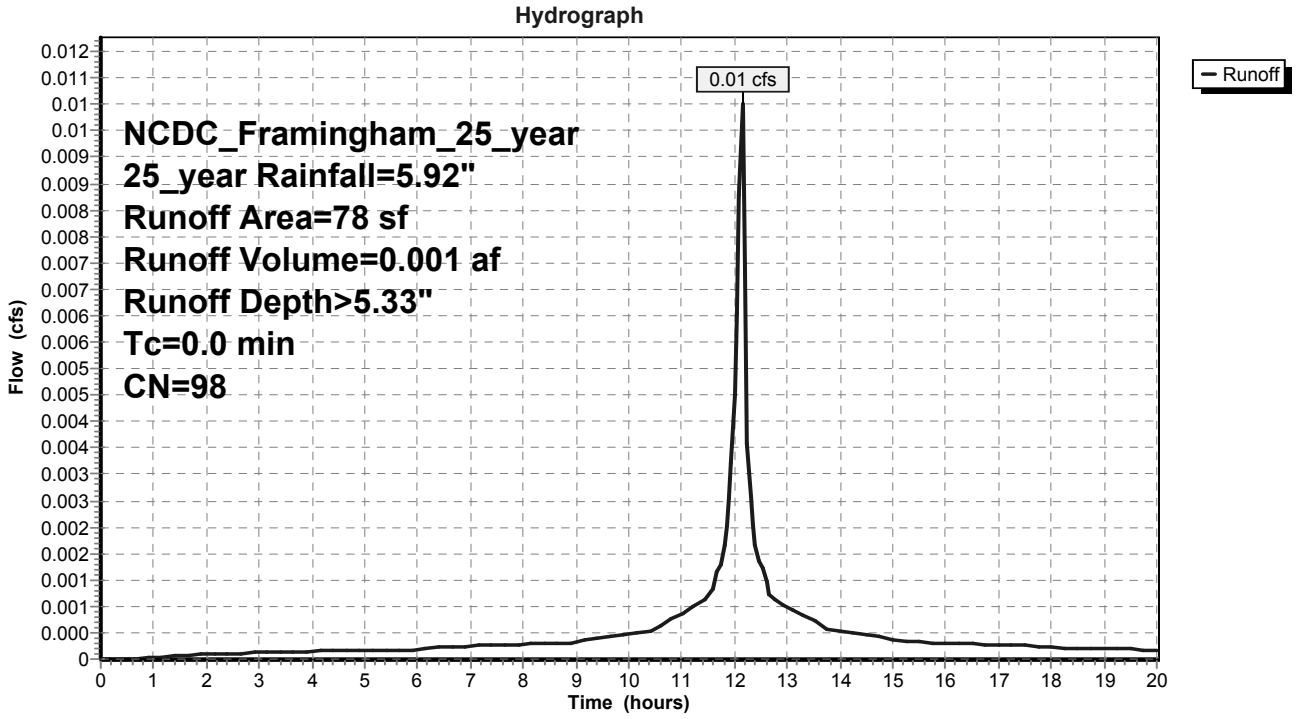
## Summary for Subcatchment ROOF-MAIL91: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL91: (blank)



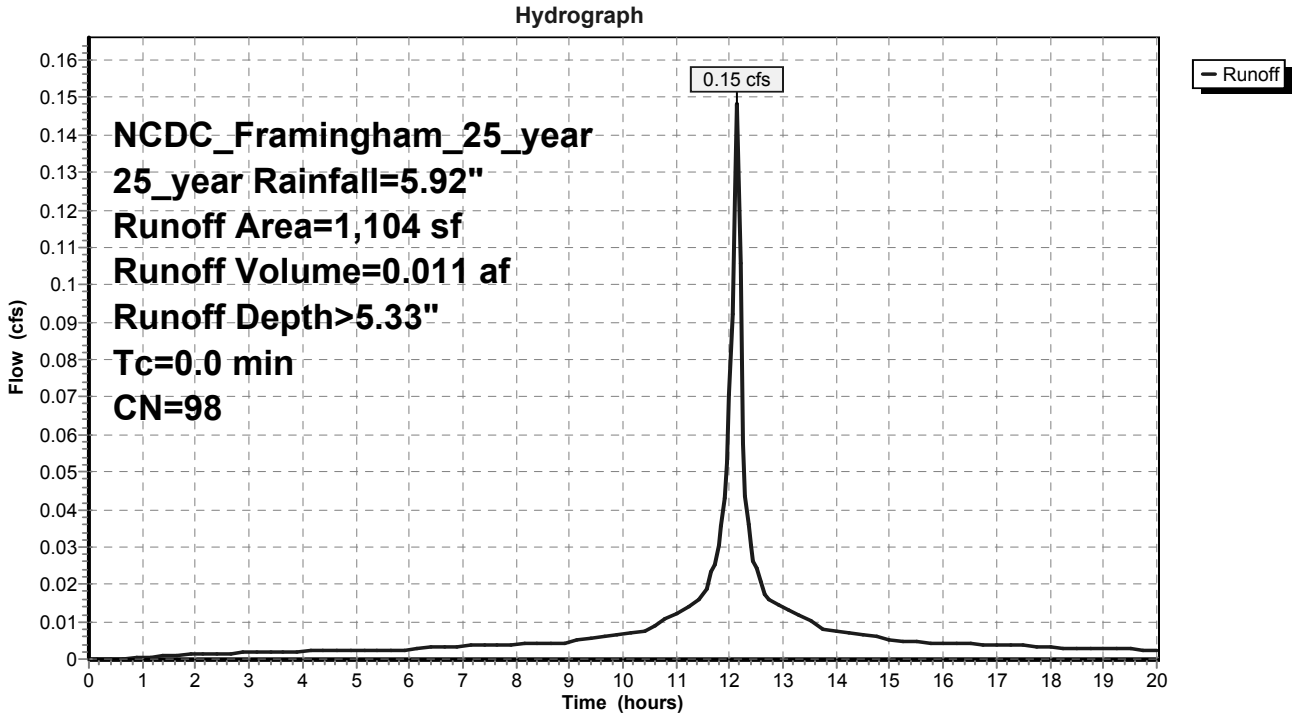
## Summary for Subcatchment ROOF-MAINT11: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.011 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,104 | 98 | ROOF, 100% imperv, HSG B |
| | 1,104 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAINT11: (blank)



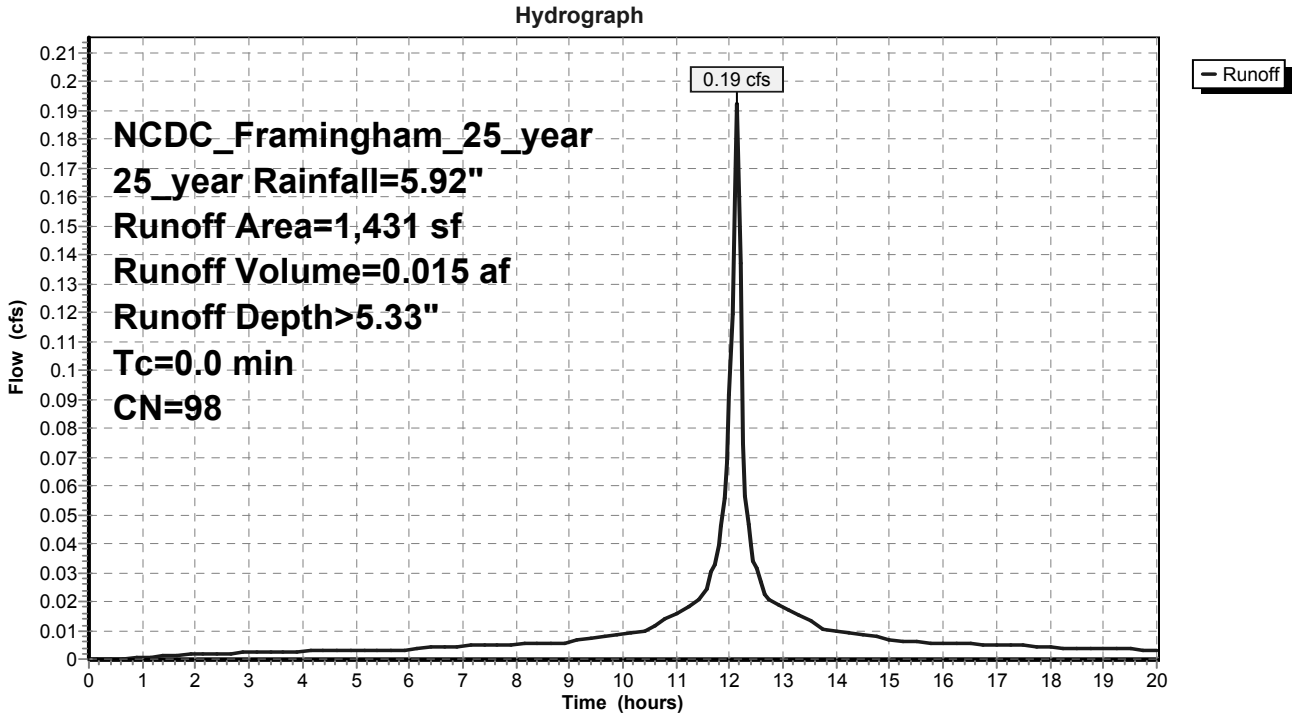
## Summary for Subcatchment ROOF-PL11: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,431 | 98 | ROOF, 100% imperv, HSG B |
| | 1,431 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL11: (blank)



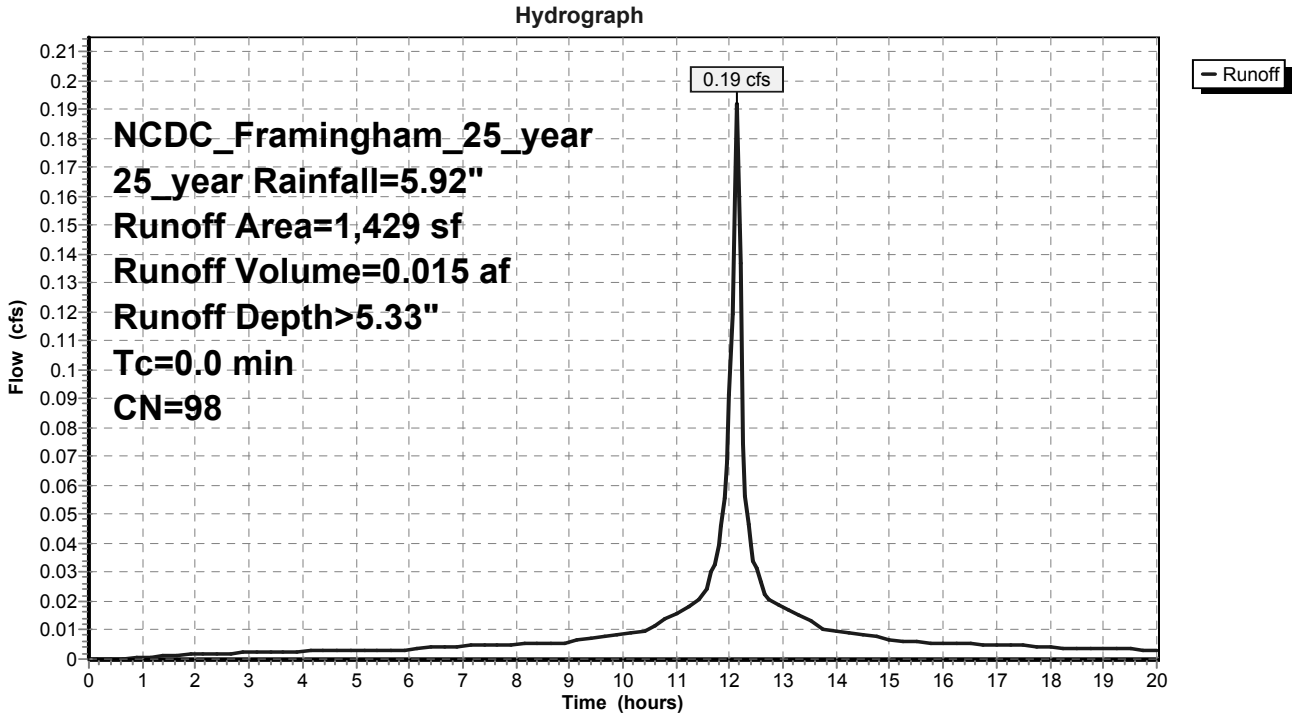
## Summary for Subcatchment ROOF-PL6: (blank)

Runoff = 0.19 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,429 | 98 | ROOF, 100% imperv, HSG B |
| | 1,429 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL6: (blank)



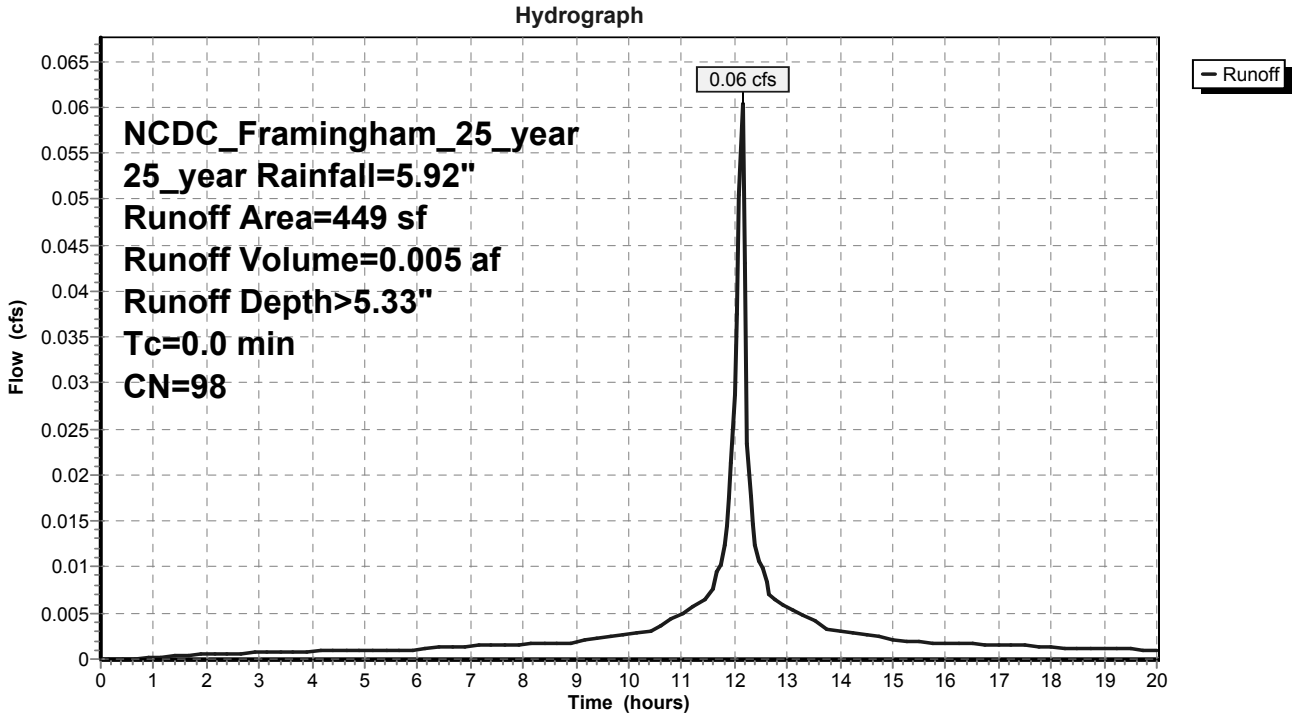
## Summary for Subcatchment ROOF-POOL: (blank)

Runoff = 0.06 cfs @ 12.14 hrs, Volume= 0.005 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 449 | 98 | ROOF, 100% imperv, HSG B |
| | 449 | | 100.00% Pervious Area |

## Subcatchment ROOF-POOL: (blank)



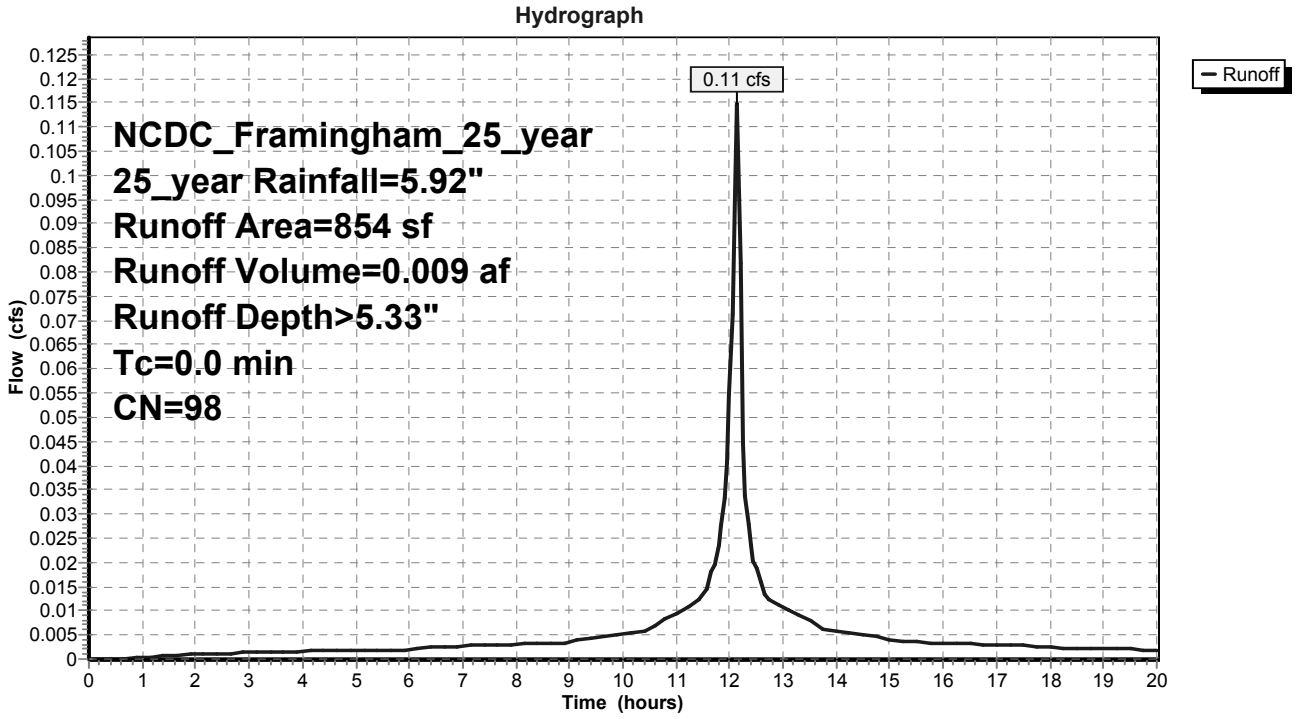
## Summary for Subcatchment ROOF-RECY: (blank)

Runoff = 0.11 cfs @ 12.14 hrs, Volume= 0.009 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 854 | 98 | ROOF, 100% imperv, HSG B |
| | 854 | | 100.00% Pervious Area |

## Subcatchment ROOF-RECY: (blank)



## Summary for Subcatchment S-CB-E-1: (blank)

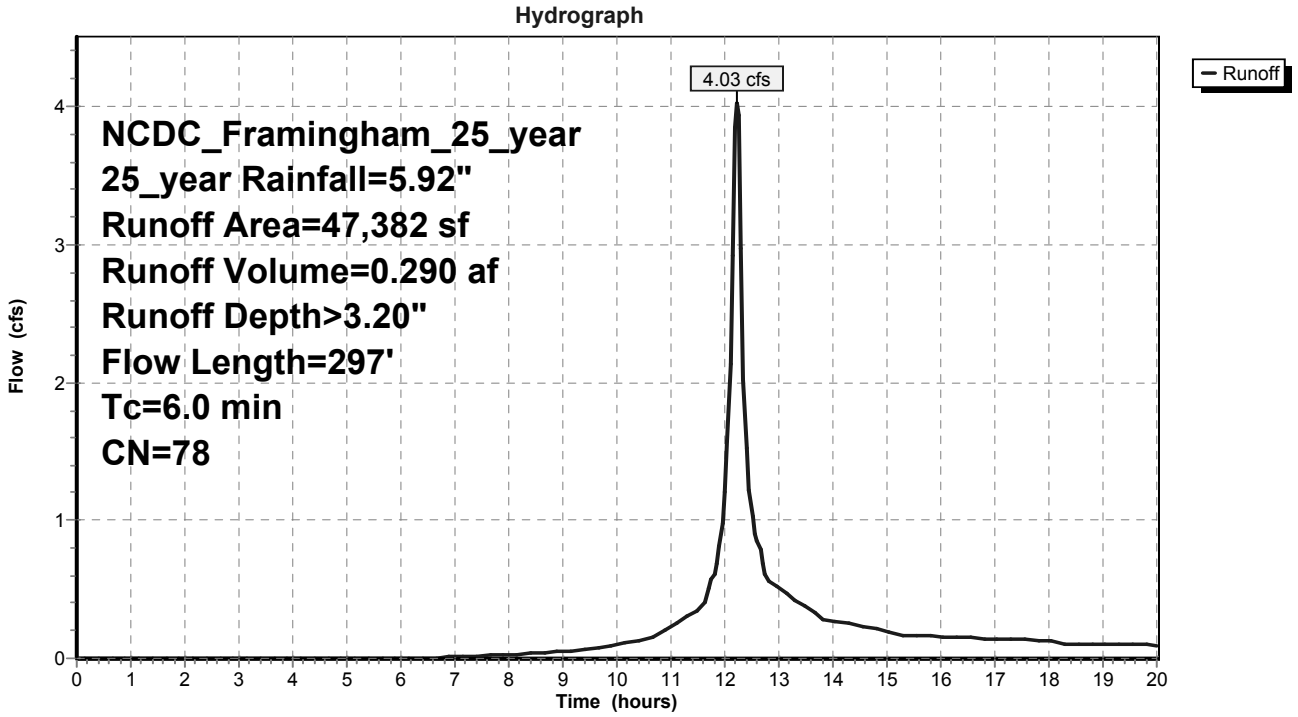
Runoff = 4.03 cfs @ 12.23 hrs, Volume= 0.290 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 25,031 | 61 | GRASS, 0% imperv, HSG B |
| * | 416 | 98 | DECK, 100% imperv, HSG B |
| * | 19,714 | 98 | IMP, 100% imperv, HSG B |
| * | 5 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,215 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 47,382 | 78 | Weighted Average |
| | 47,382 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0437 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.7 | 91 | 0.0903 | 2.10 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 68 | 0.0186 | 2.77 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0363 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0791 | 5.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 7 | 0.0208 | 1.01 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 4 | 0.0200 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 29 | 0.0291 | 3.46 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0216 | 1.03 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.0 | 297 | Total | | | |

## Subcatchment S-CB-E-1: (blank)



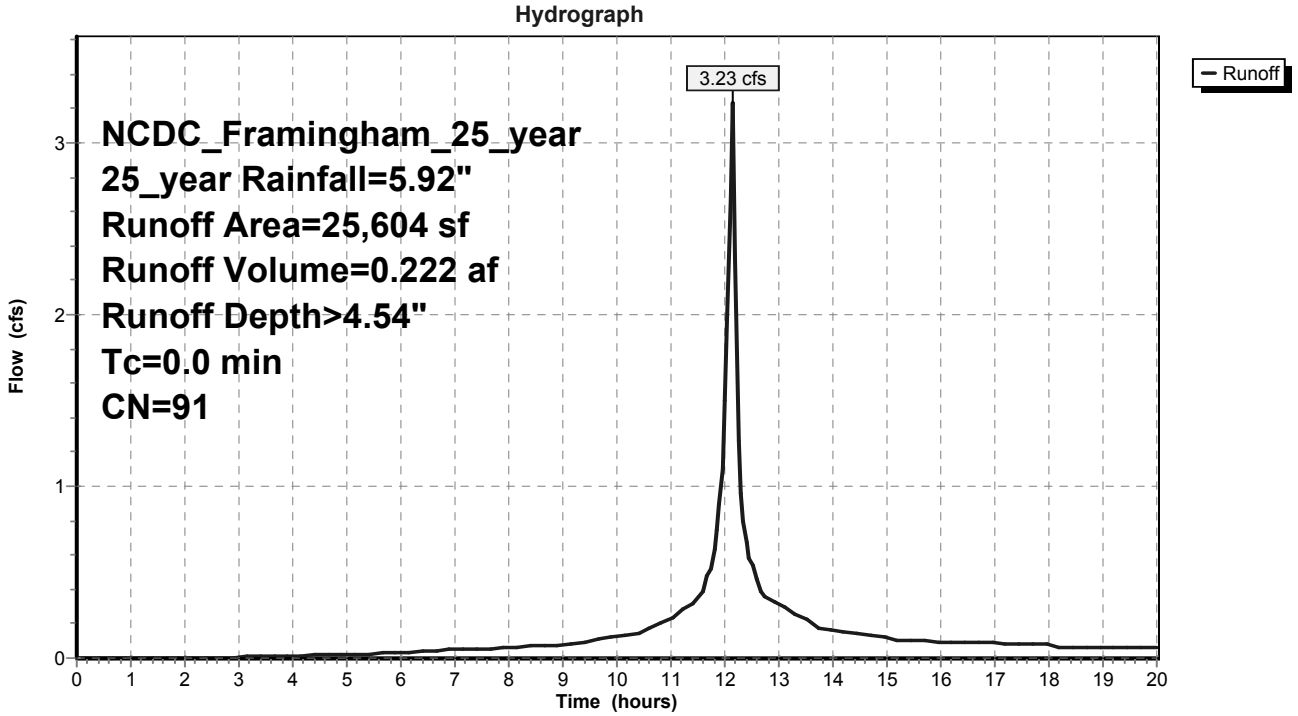
## Summary for Subcatchment S-CB-INF-E-3: (blank)

Runoff = 3.23 cfs @ 12.14 hrs, Volume= 0.222 af, Depth> 4.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,743 | 61 | GRASS, 0% imperv, HSG B |
| * | 437 | 98 | DECK, 100% imperv, HSG B |
| * | 18,687 | 98 | IMP, 100% imperv, HSG B |
| * | 1,737 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,604 | 91 | Weighted Average |
| | 25,604 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-3: (blank)



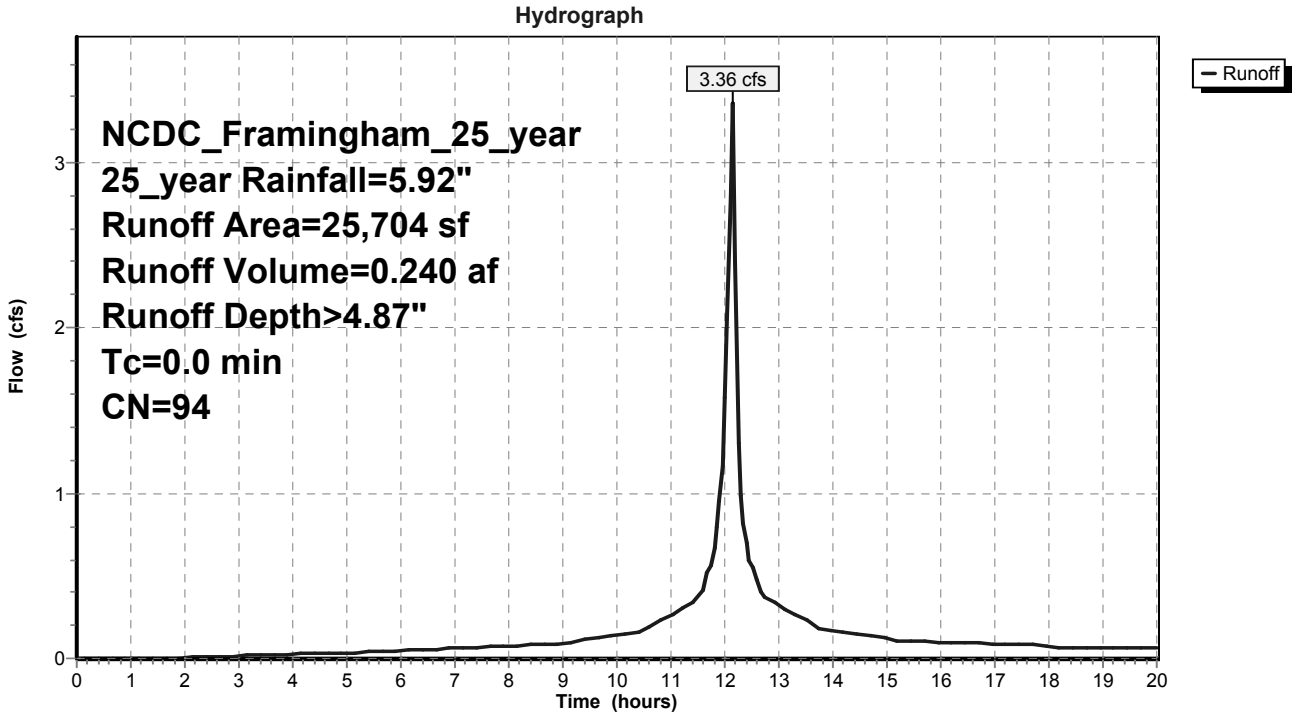
## Summary for Subcatchment S-CB-INF-E-4A: (blank)

Runoff = 3.36 cfs @ 12.14 hrs, Volume= 0.240 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,473 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,055 | 98 | IMP, 100% imperv, HSG B |
| * | 175 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,704 | 94 | Weighted Average |
| | 25,704 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-4A: (blank)



## Summary for Subcatchment S-DET-1: (blank)

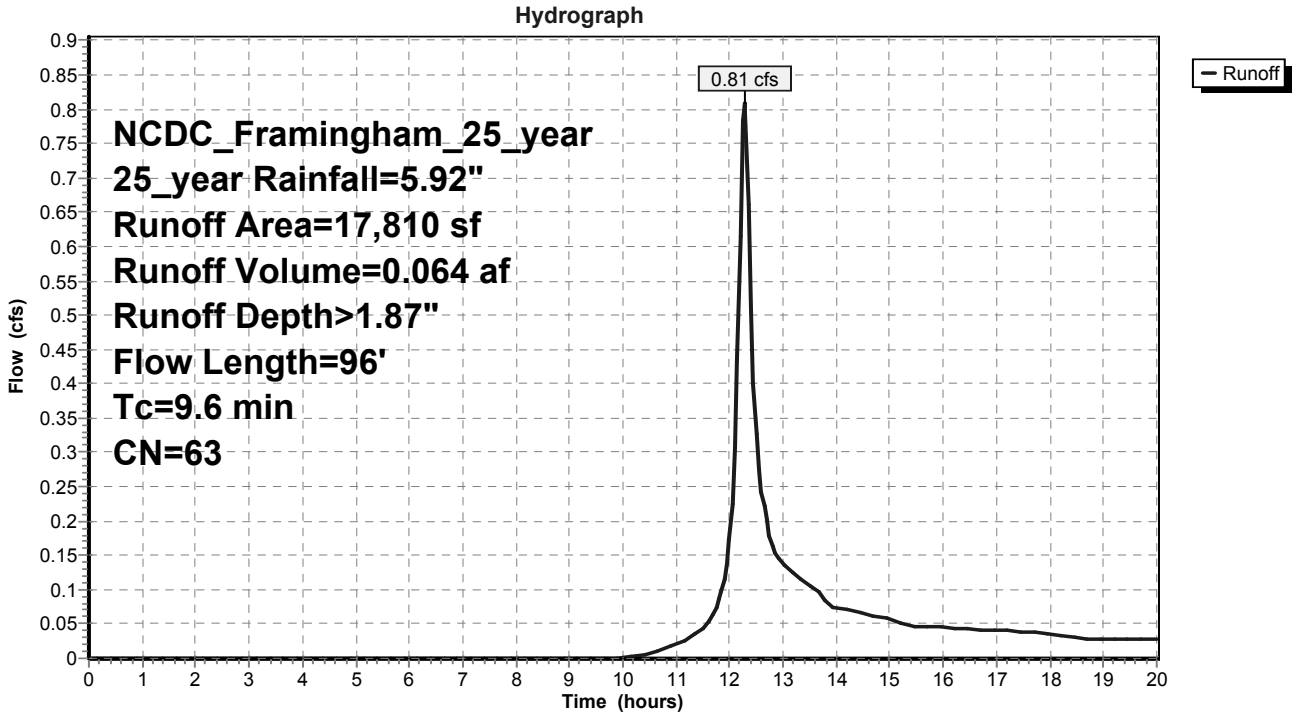
Runoff = 0.81 cfs @ 12.28 hrs, Volume= 0.064 af, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,881 | 61 | GRASS, 0% imperv, HSG B |
| * | 49 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 111 | 98 | DECK, 100% imperv, HSG B |
| * | 769 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,810 | 63 | Weighted Average |
| | 17,778 | | 99.82% Pervious Area |
| | 32 | | 0.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.4 | 11 | 0.0021 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 9 | 0.0010 | 0.25 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 4.1 | 29 | 0.0169 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 46 | 0.0536 | 1.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 9.6 | 96 | Total | | | |

## Subcatchment S-DET-1: (blank)



## Summary for Subcatchment S-DET-3: (blank)

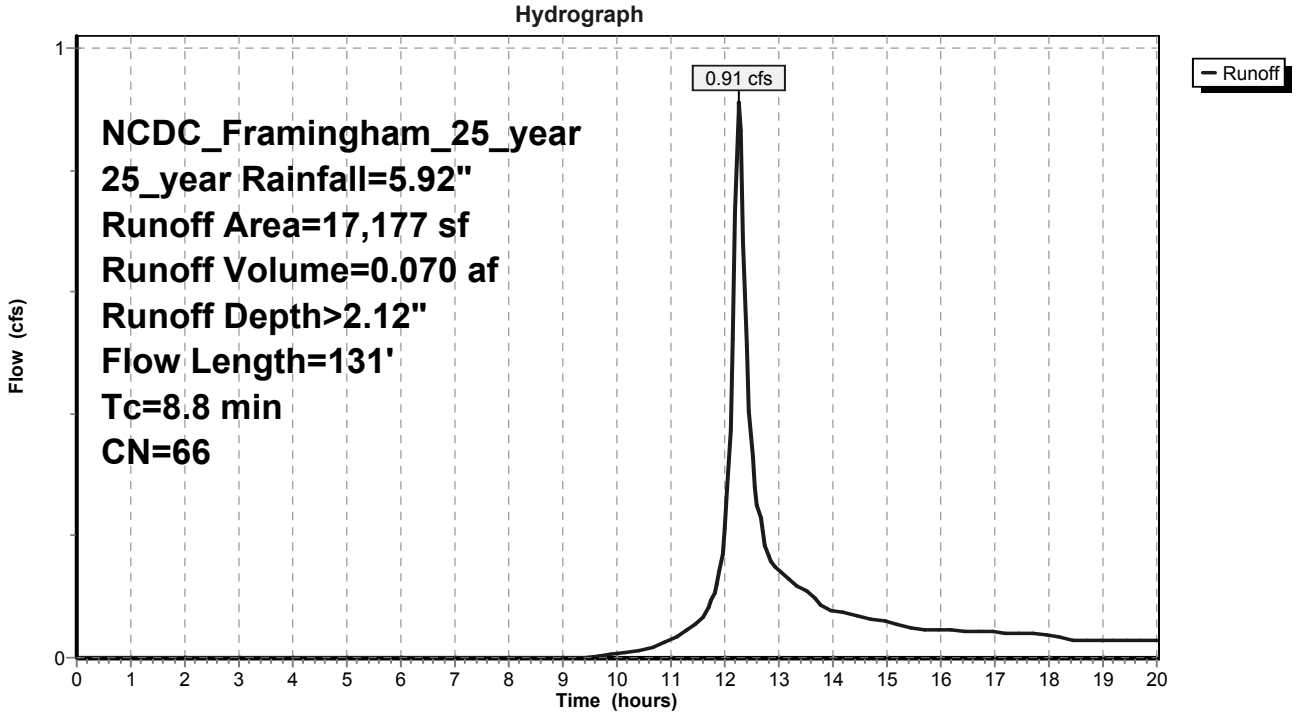
Runoff = 0.91 cfs @ 12.27 hrs, Volume= 0.070 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,639 | 61 | GRASS, 0% imperv, HSG B |
| * | 579 | 98 | DECK, 100% imperv, HSG B |
| * | 56 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,177 | 66 | Weighted Average |
| | 17,177 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.1 | 81 | 0.0332 | 1.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 8.8 | 131 | Total | | | |

## Subcatchment S-DET-3: (blank)



## Summary for Subcatchment S-INF-E-1: (blank)

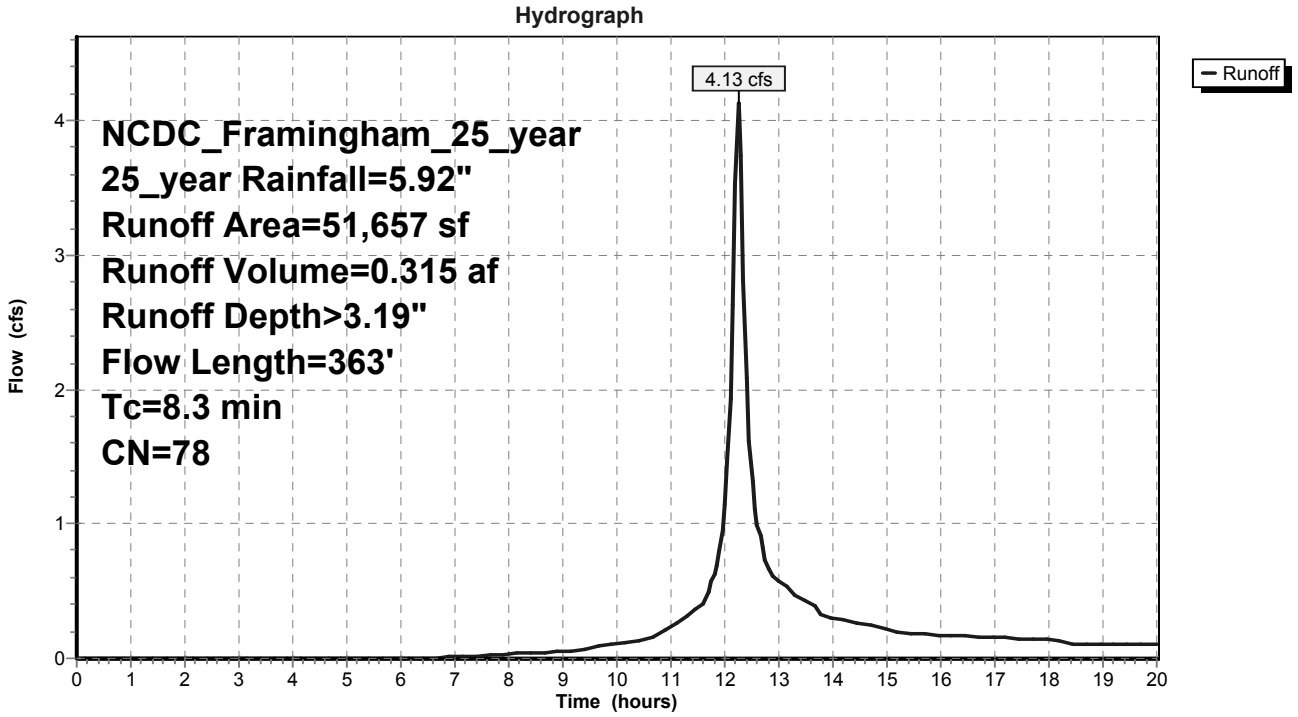
Runoff = 4.13 cfs @ 12.26 hrs, Volume= 0.315 af, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,205 | 61 | GRASS, 0% imperv, HSG B |
| * | 40 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,150 | 98 | DECK, 100% imperv, HSG B |
| * | 21,115 | 98 | IMP, 100% imperv, HSG B |
| * | 2,147 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 51,657 | 78 | Weighted Average |
| | 51,657 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 29 | 0.0280 | 0.15 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 21 | 0.0091 | 0.71 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 107 | 0.0148 | 2.47 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0347 | 1.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 15 | 0.0087 | 1.90 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 25 | 0.0062 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0234 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 30 | 0.0213 | 2.96 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.4 | 86 | 0.0074 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 8 | 0.0161 | 2.58 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 29 | 0.0113 | 2.16 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.3 | 363 | Total | | | |

## Subcatchment S-INF-E-1: (blank)



## Summary for Subcatchment S-INF-E-2: (blank)

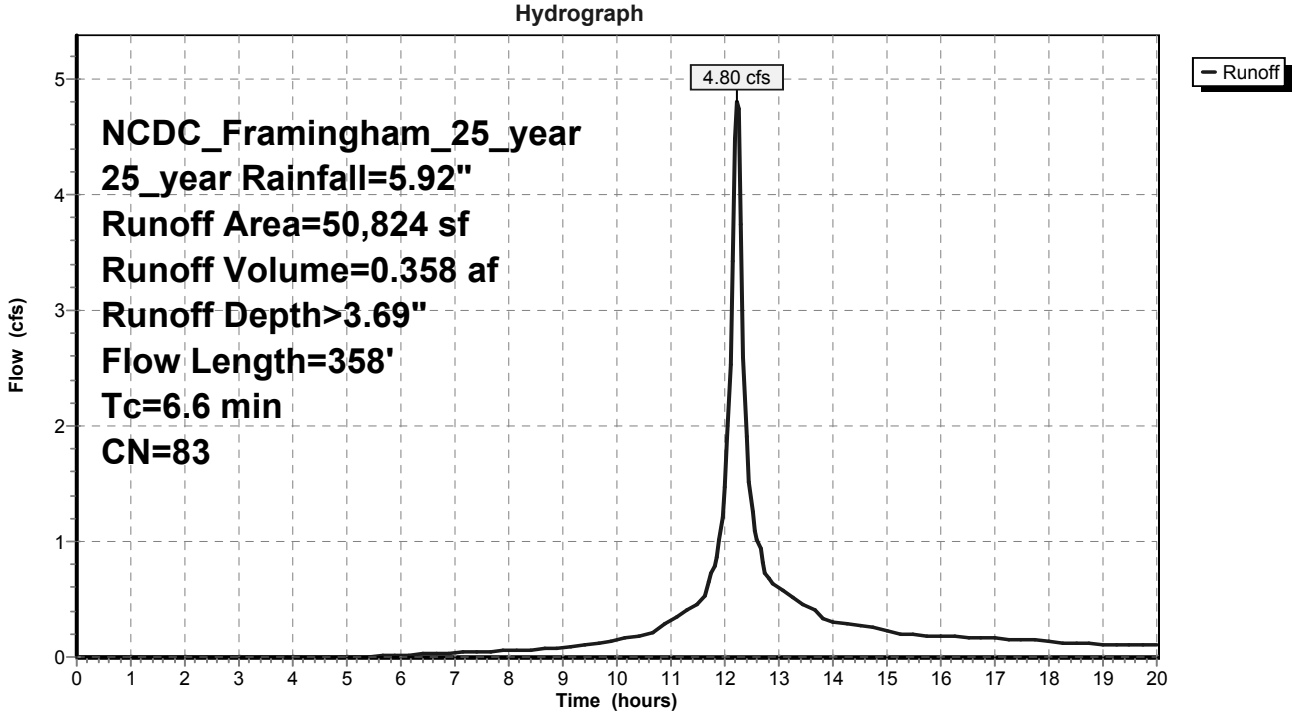
Runoff = 4.80 cfs @ 12.24 hrs, Volume= 0.358 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,826 | 61 | GRASS, 0% imperv, HSG B |
| * | 902 | 98 | DECK, 100% imperv, HSG B |
| * | 23,637 | 98 | IMP, 100% imperv, HSG B |
| * | 5,459 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 50,824 | 83 | Weighted Average |
| | 50,824 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 33 | 0.0259 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.3 | 17 | 0.0222 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 114 | 0.0156 | 0.87 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 194 | 0.0103 | 2.06 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.6 | 358 | Total | | | |

## Subcatchment S-INF-E-2: (blank)



## Summary for Subcatchment S-INF-E-3: (blank)

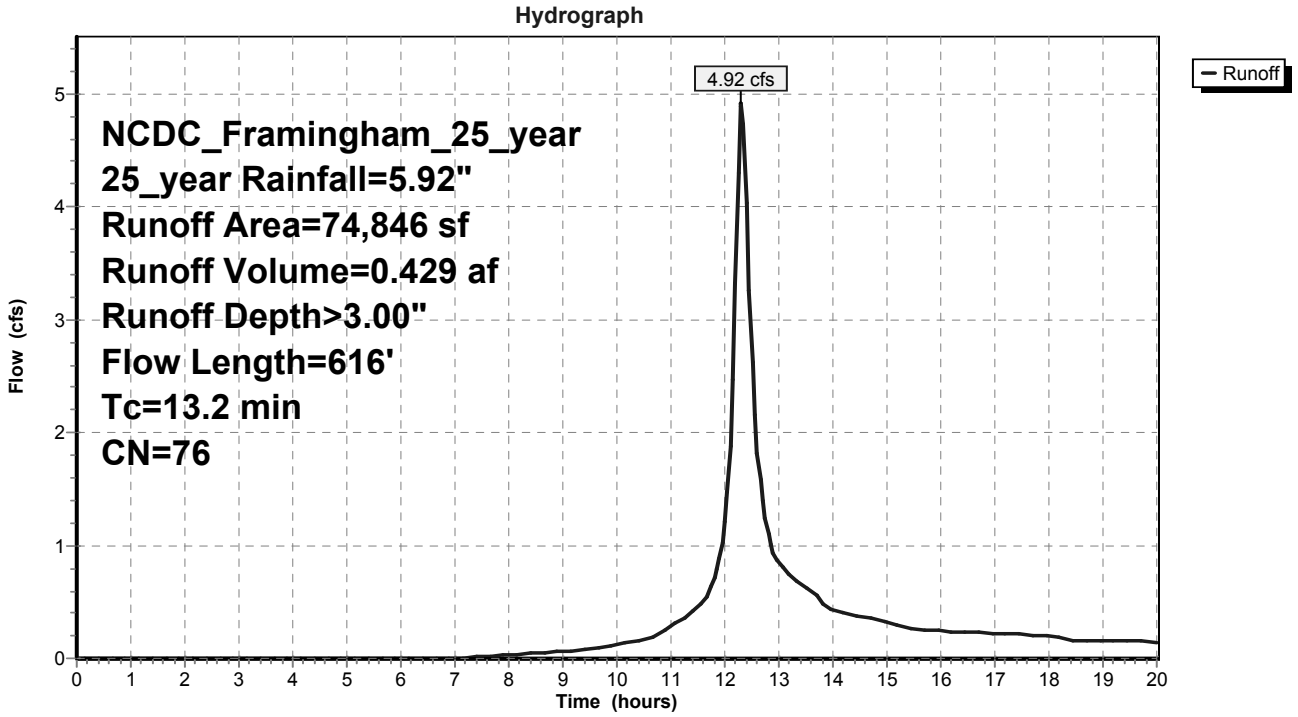
Runoff = 4.92 cfs @ 12.31 hrs, Volume= 0.429 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 43,506 | 61 | GRASS, 0% imperv, HSG B |
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 28,089 | 98 | IMP, 100% imperv, HSG B |
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,680 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,846 | 76 | Weighted Average |
| | 74,846 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 50 | 0.0660 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 91 | 0.0499 | 1.56 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0303 | 3.53 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0301 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 12 | 0.0280 | 3.40 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 57 | 0.0360 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 42 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0100 | 2.03 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 12 | 0.0013 | 0.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 48 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 32 | 0.0235 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 18 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 5 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 34 | 0.0100 | 0.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 162 | 0.0071 | 0.59 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 13.2 | 616 | Total | | | |

## Subcatchment S-INF-E-3: (blank)



## Summary for Subcatchment S-LD-1: (blank)

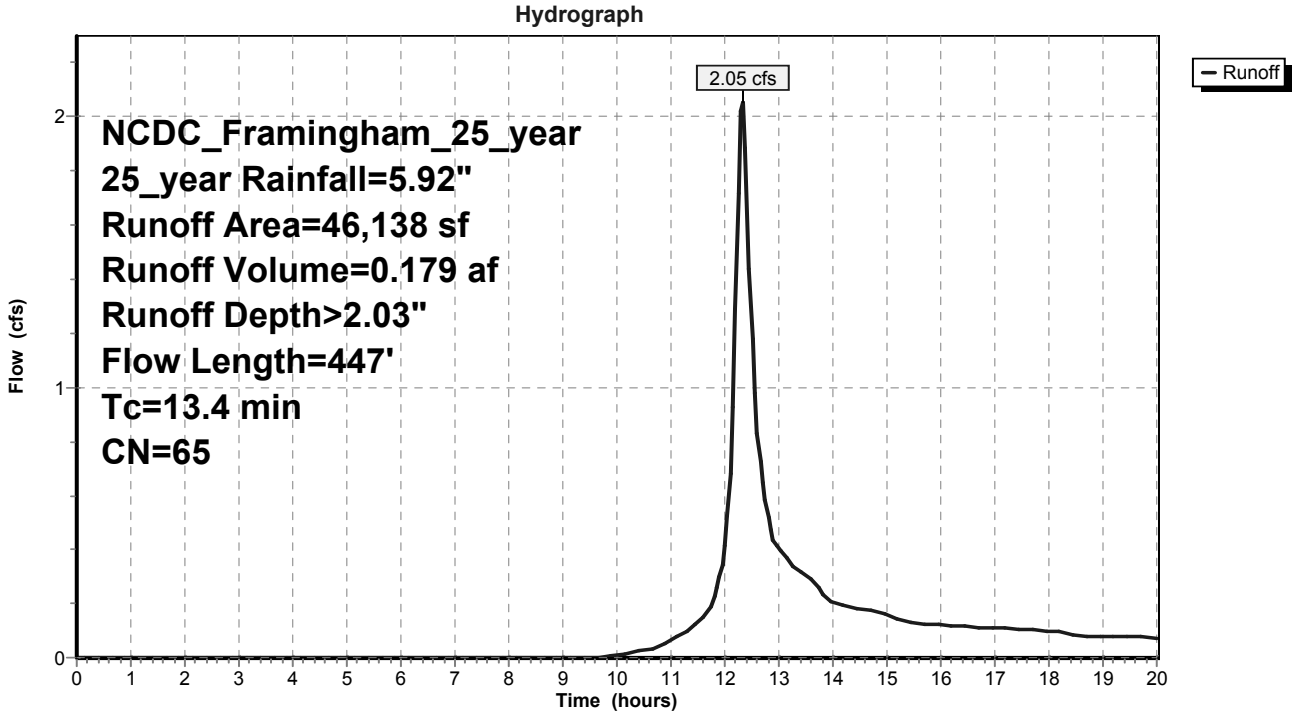
Runoff = 2.05 cfs @ 12.32 hrs, Volume= 0.179 af, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 38,137 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,396 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,015 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,228 | 98 | DECK, 100% imperv, HSG B |
| * | 1,712 | 98 | IMP, 100% imperv, HSG B |
| * | 650 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 46,138 | 65 | Weighted Average |
| | 44,178 | | 95.75% Pervious Area |
| | 1,960 | | 4.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 50 | 0.0135 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 6.6 | 397 | 0.0205 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 13.4 | 447 | Total | | | |

## Subcatchment S-LD-1: (blank)



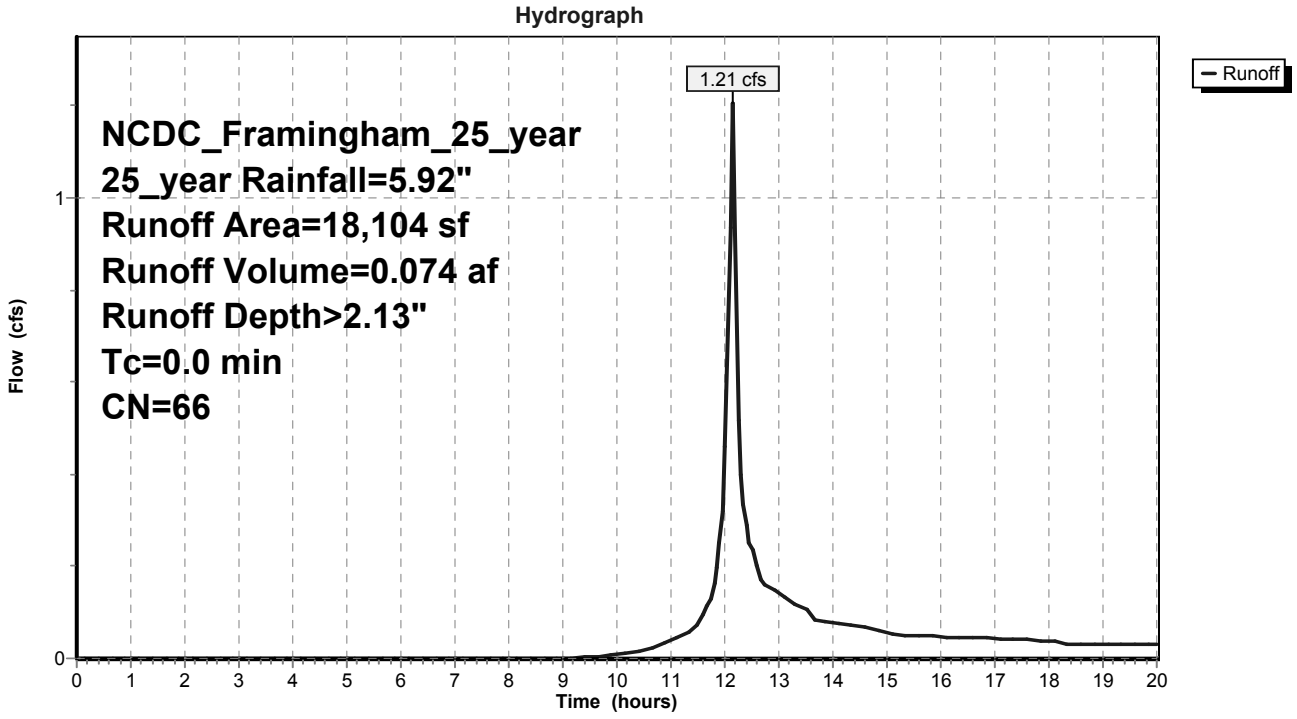
## Summary for Subcatchment S-LD-11: (blank)

Runoff = 1.21 cfs @ 12.15 hrs, Volume= 0.074 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,426 | 61 | GRASS, 0% imperv, HSG B |
| * | 439 | 98 | DECK, 100% imperv, HSG B |
| * | 2,239 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 18,104 | 66 | Weighted Average |
| | 18,104 | | 100.00% Pervious Area |

## Subcatchment S-LD-11: (blank)



## Summary for Subcatchment S-LD-2: (blank)

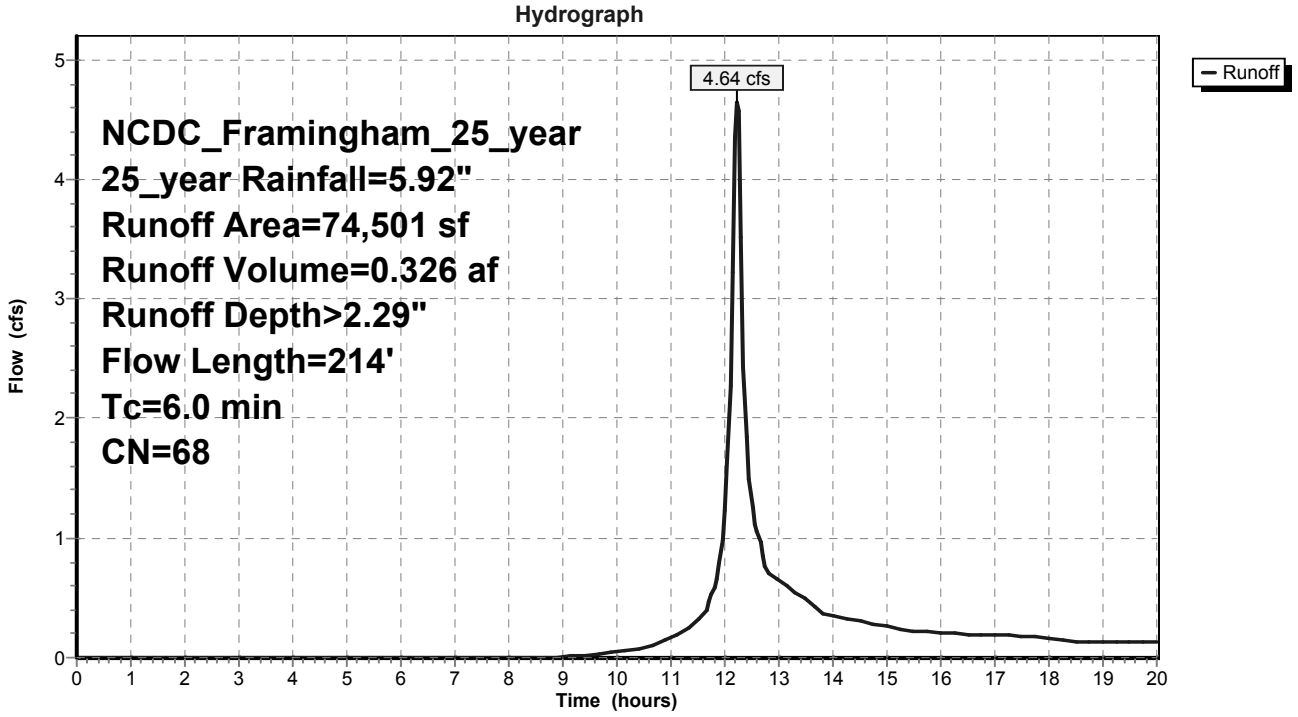
Runoff = 4.64 cfs @ 12.23 hrs, Volume= 0.326 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 57,181 | 61 | GRASS, 0% imperv, HSG B |
| * | 396 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,542 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 803 | 98 | DECK, 100% imperv, HSG B |
| * | 4,508 | 98 | IMP, 100% imperv, HSG B |
| * | 1,071 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,501 | 68 | Weighted Average |
| | 67,649 | | 90.80% Pervious Area |
| | 6,852 | | 9.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2134 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 164 | 0.0313 | 1.24 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.5 | 214 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment S-LD-2: (blank)



## Summary for Subcatchment S-LD-4: (blank)

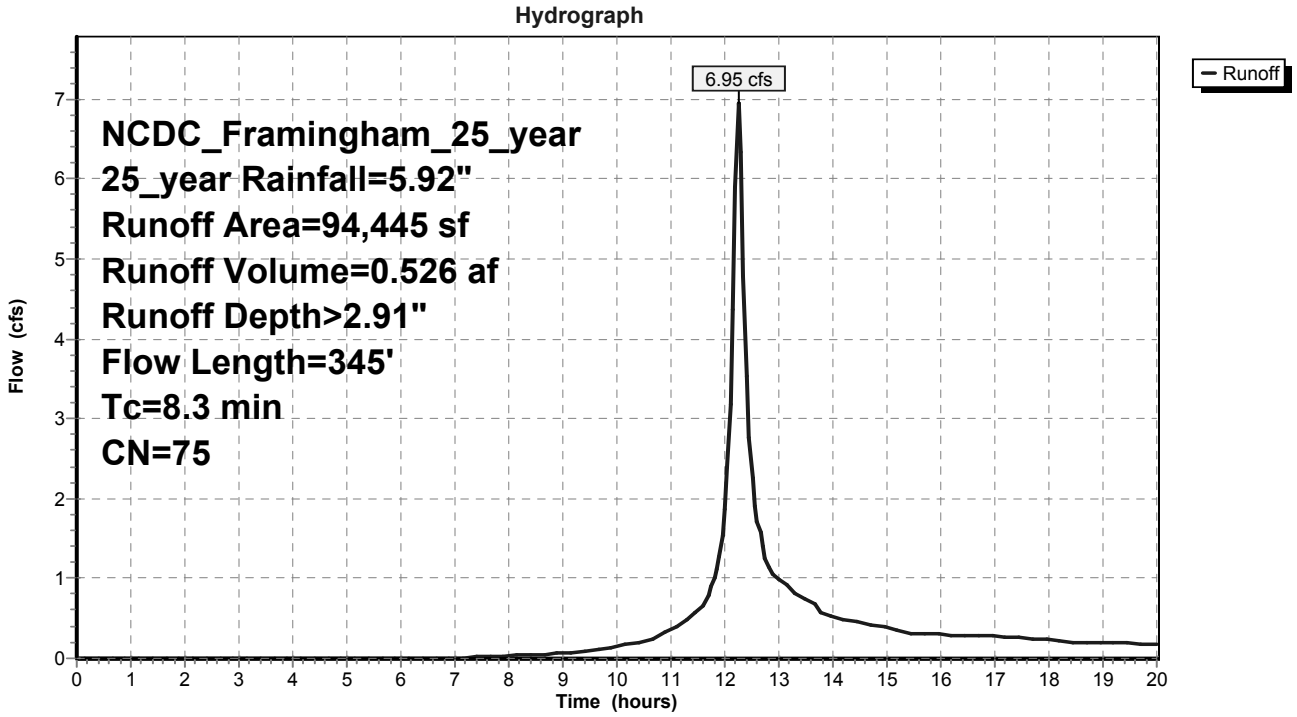
Runoff = 6.95 cfs @ 12.26 hrs, Volume= 0.526 af, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 53,813 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,316 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 486 | 98 | DECK, 100% imperv, HSG B |
| * | 25,119 | 98 | IMP, 100% imperv, HSG B |
| * | 710 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 94,445 | 75 | Weighted Average |
| | 85,139 | | 90.15% Pervious Area |
| | 9,306 | | 9.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.9 | 50 | 0.0309 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.4 | 288 | 0.0398 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0194 | 2.83 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0182 | 0.94 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 345 | Total | | | |

## Subcatchment S-LD-4: (blank)



## Summary for Subcatchment W 10.0: (blank)

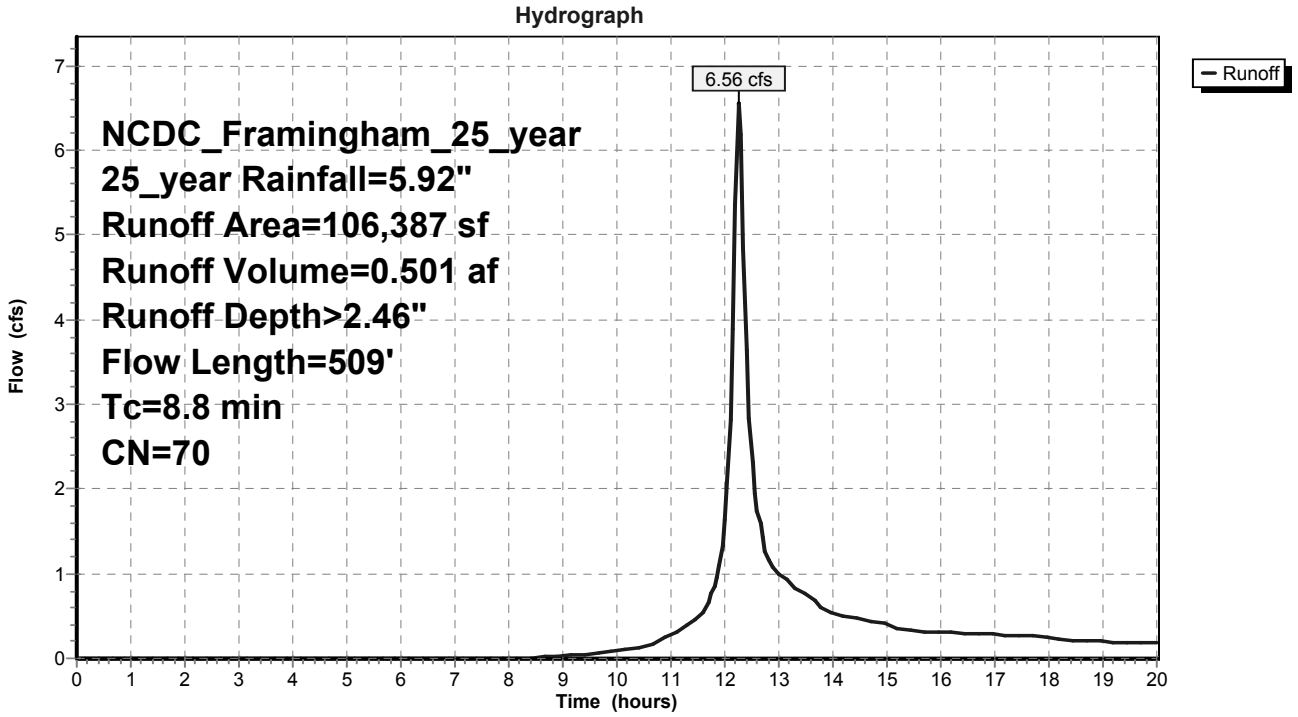
Runoff = 6.56 cfs @ 12.26 hrs, Volume= 0.501 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 100% imperv, HSG C |
| * | 6,541 | 98 | Water, 100% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.8 | 41 | 0.0223 | 0.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 11 | 0.2240 | 1.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.8 | 509 | Total | | | |

## Subcatchment W 10.0: (blank)



## Summary for Subcatchment W 2.0: (blank)

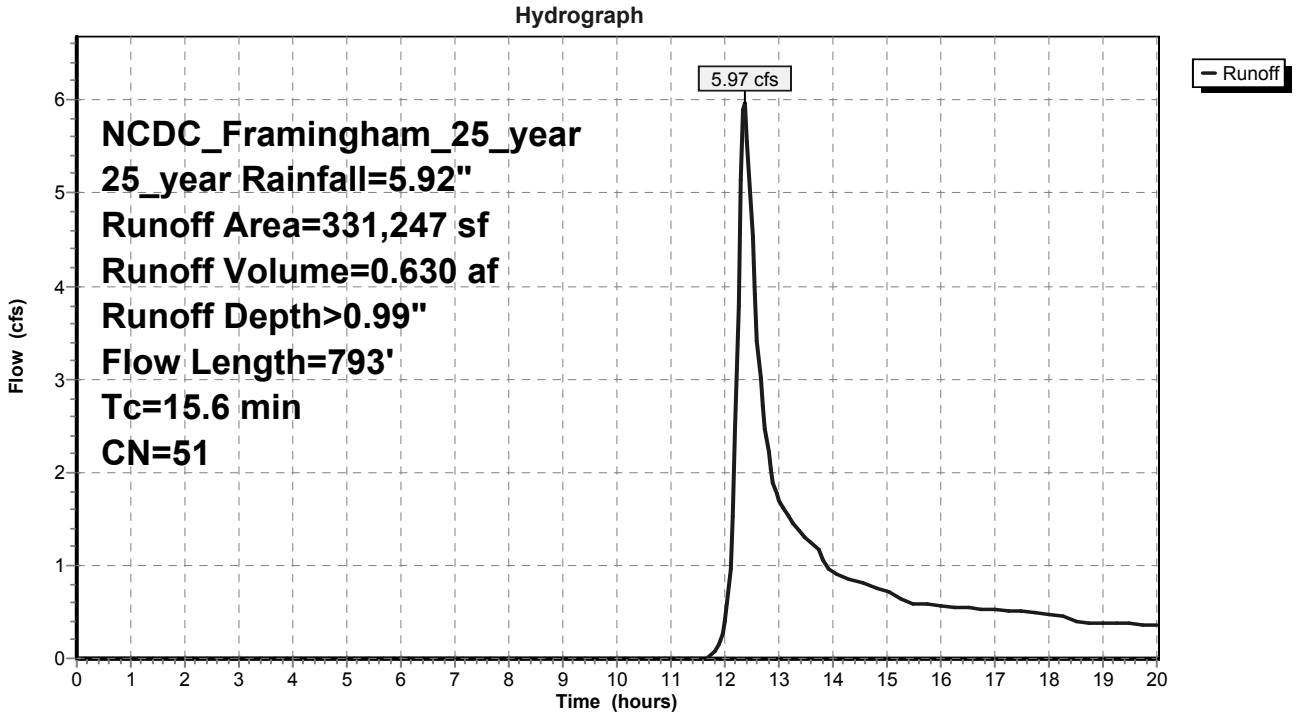
Runoff = 5.97 cfs @ 12.37 hrs, Volume= 0.630 af, Depth> 0.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 40,834 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,020 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 158,571 | 30 | WOODS, 0% imperv, HSG A |
| * | 15 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 17,208 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 2,472 | 98 | DECK, 100% imperv, HSG A |
| * | 54 | 98 | DECK, 100% imperv, HSG B |
| * | 19,292 | 98 | Water, 100% imperv, HSG D |
| * | 1,268 | 98 | Water, 100% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 331,247 | 51 | Weighted Average |
| | 320,062 | | 96.62% Pervious Area |
| | 11,185 | | 3.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: (blank)



## Summary for Subcatchment W 3.1: (blank)

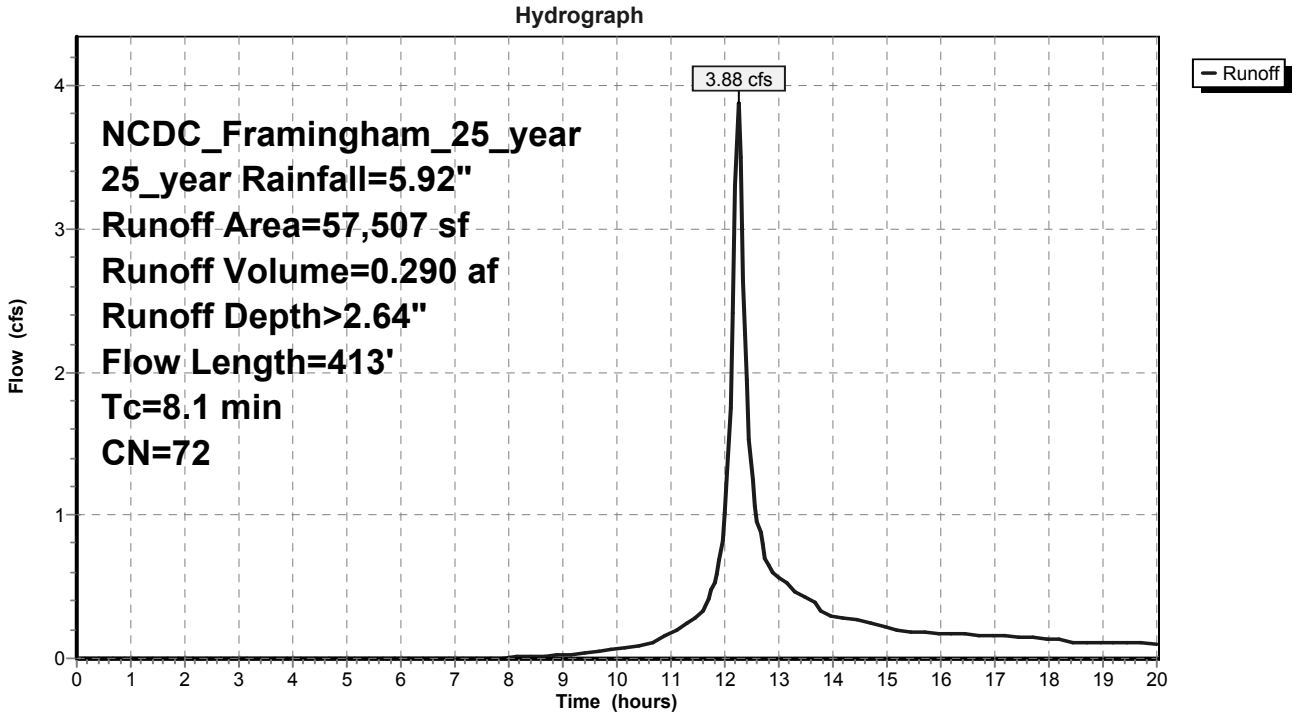
Runoff = 3.88 cfs @ 12.26 hrs, Volume= 0.290 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,850 | 39 | GRASS, 0% imperv, HSG A |
| * | 26,567 | 61 | GRASS, 0% imperv, HSG B |
| * | 112 | 30 | WOODS, 0% imperv, HSG A |
| * | 408 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,113 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 15,113 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12 | 98 | DECK, 100% imperv, HSG A |
| * | 1,574 | 98 | DECK, 100% imperv, HSG B |
| * | 3,090 | 98 | IMP, 100% imperv, HSG A |
| * | 4,669 | 98 | IMP, 100% imperv, HSG B |
| | 57,507 | 72 | Weighted Average |
| | 46,310 | | 80.53% Pervious Area |
| | 11,197 | | 19.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2132 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.8 | 363 | 0.0223 | 1.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.1 | 413 | Total | | | |

## Subcatchment W 3.1: (blank)



## Summary for Subcatchment W 3.2: (blank)

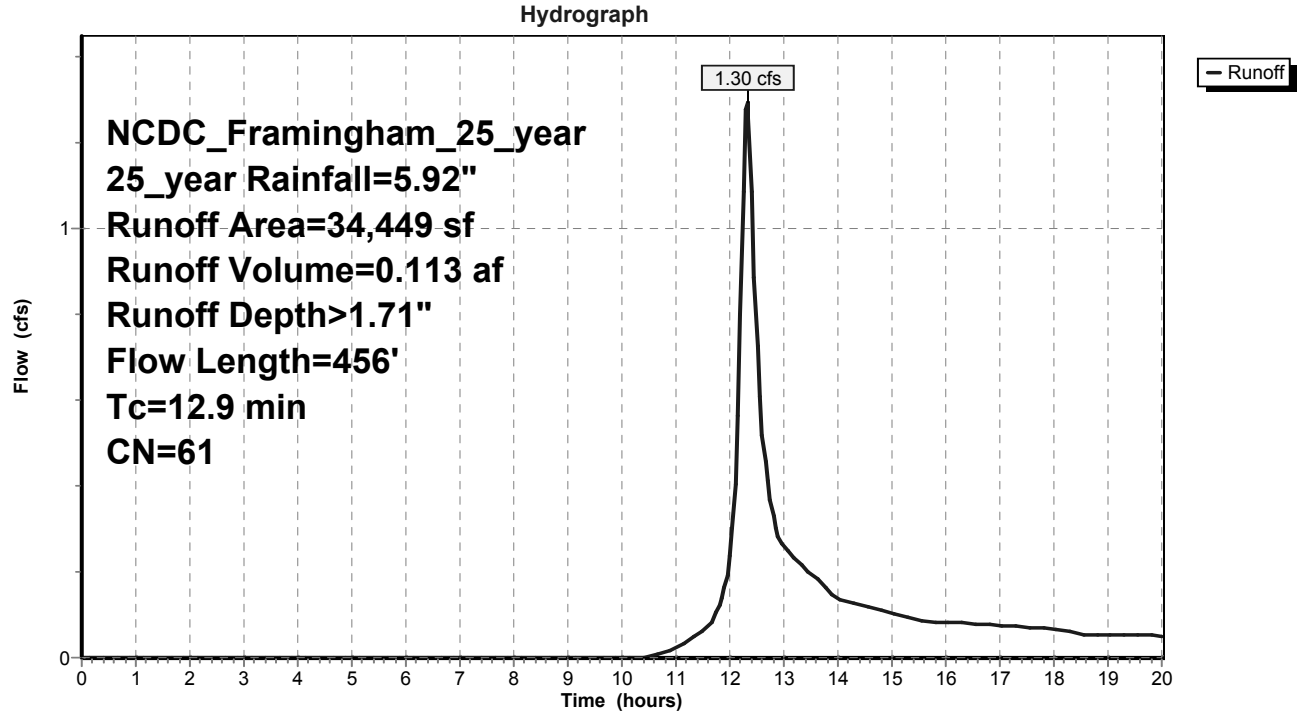
Runoff = 1.30 cfs @ 12.32 hrs, Volume= 0.113 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,379 | 39 | GRASS, 0% imperv, HSG A |
| * | 30,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 8 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 459 | 98 | DECK, 100% imperv, HSG B |
| * | 15 | 98 | IMP, 100% imperv, HSG A |
| * | 621 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 34,449 | 61 | Weighted Average |
| | 34,444 | | 99.99% Pervious Area |
| | 5 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 406 | 0.0128 | 0.79 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 12.9 | 456 | Total | | | |

## Subcatchment W 3.2: (blank)



## Summary for Subcatchment W 3.3: (blank)

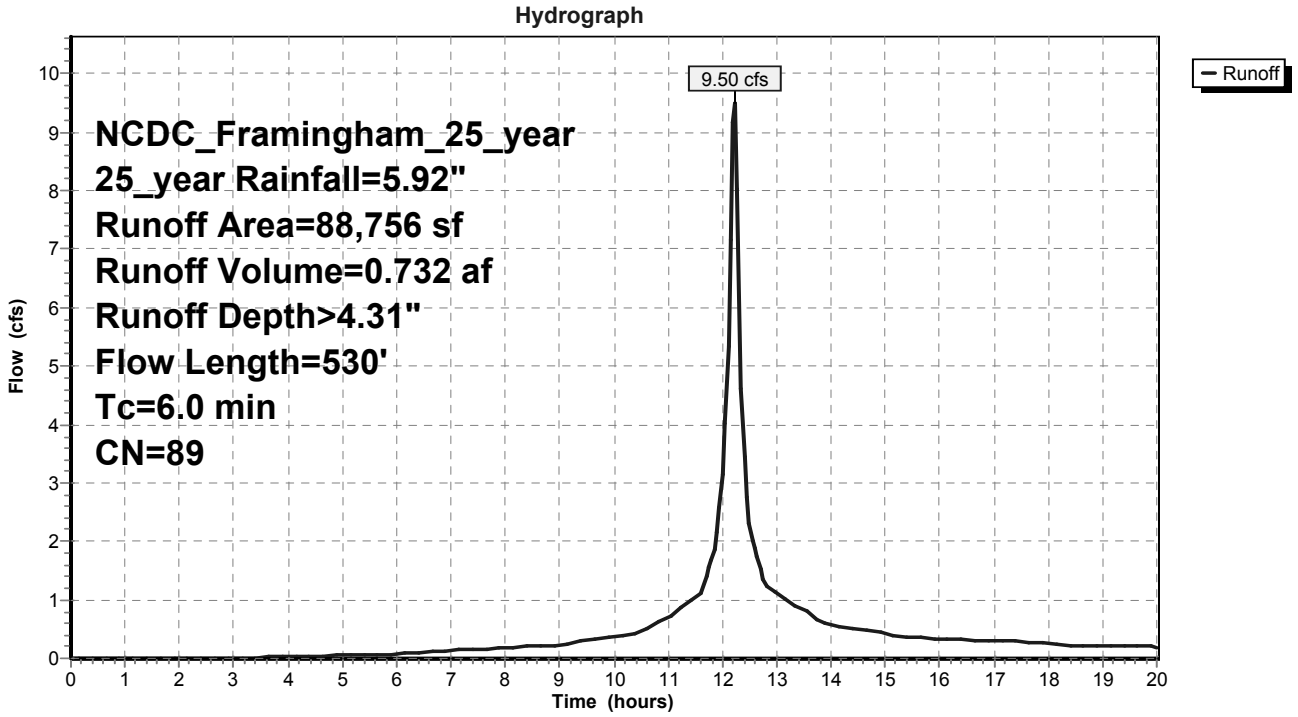
Runoff = 9.50 cfs @ 12.23 hrs, Volume= 0.732 af, Depth> 4.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 285 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,658 | 30 | WOODS, 0% imperv, HSG A |
| * | 3,726 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,454 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,698 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,852 | 98 | IMP, 100% imperv, HSG A |
| * | 45,884 | 98 | IMP, 100% imperv, HSG B |
| | 88,756 | 89 | Weighted Average |
| | 79,557 | | 89.64% Pervious Area |
| | 9,199 | | 10.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 530 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.3: (blank)



## Summary for Subcatchment W 3.4: (blank)

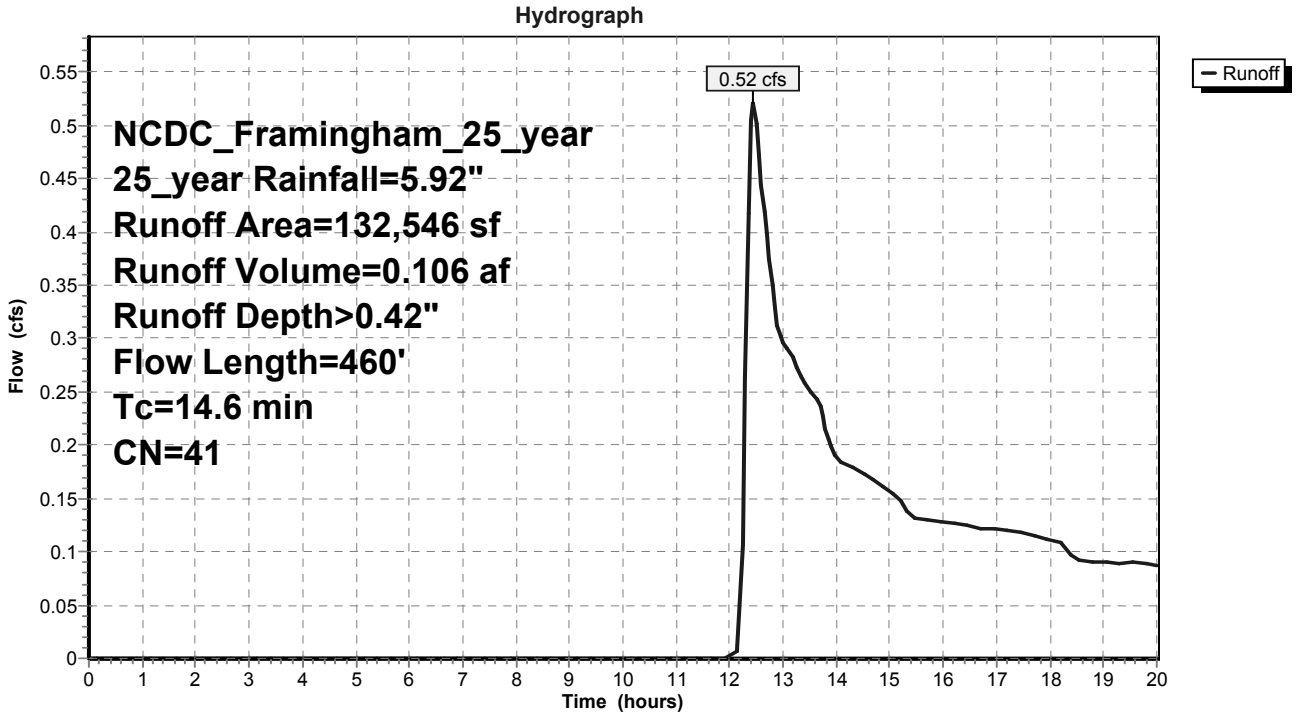
Runoff = 0.52 cfs @ 12.45 hrs, Volume= 0.106 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 34,402 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,152 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,242 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 132,546 | 41 | Weighted Average |
| | 125,888 | | 94.98% Pervious Area |
| | 6,658 | | 5.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: (blank)



## Summary for Subcatchment W 9.1A: (blank)

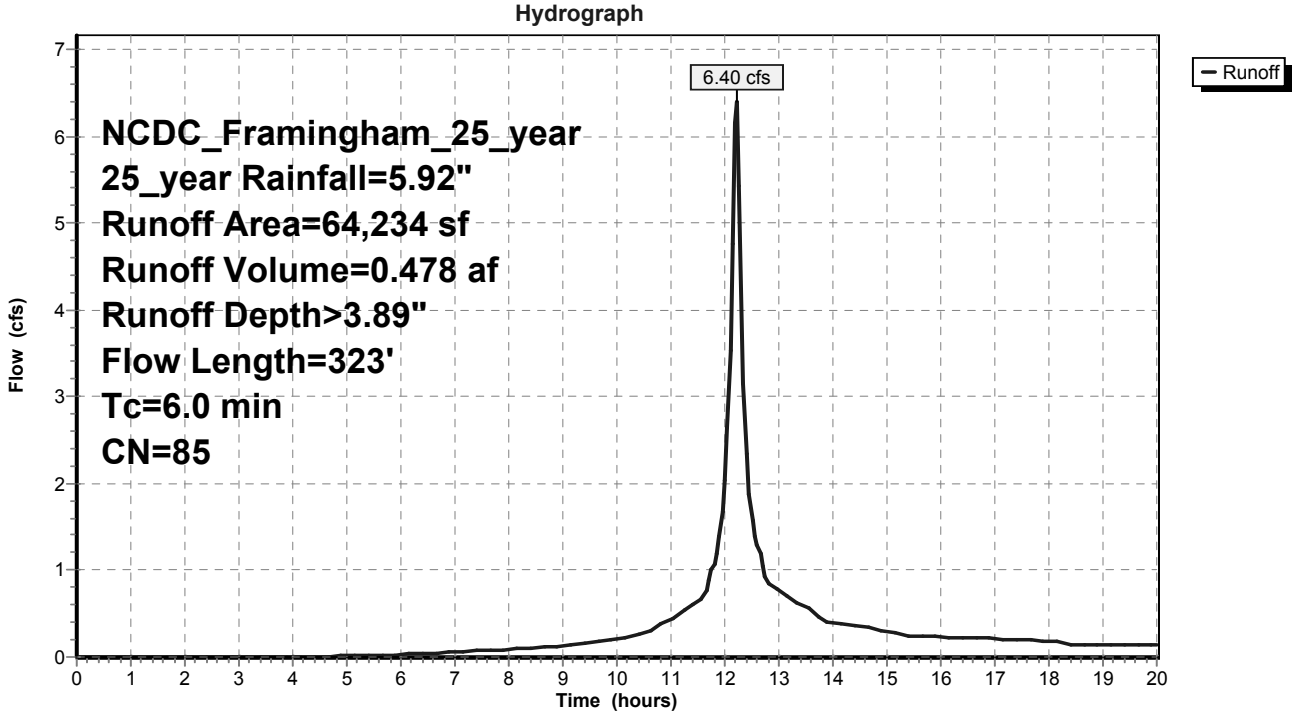
Runoff = 6.40 cfs @ 12.23 hrs, Volume= 0.478 af, Depth> 3.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,121 | 55 | WOODS, 0% imperv, HSG B |
| * | 60,291 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 2,821 | 98 | IMP, 100% imperv, HSG B |
| | 64,234 | 85 | Weighted Average |
| | 25,044 | | 38.99% Pervious Area |
| | 39,189 | | 61.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.5 | 323 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1A: (blank)



## Summary for Subcatchment W 9.1B: (blank)

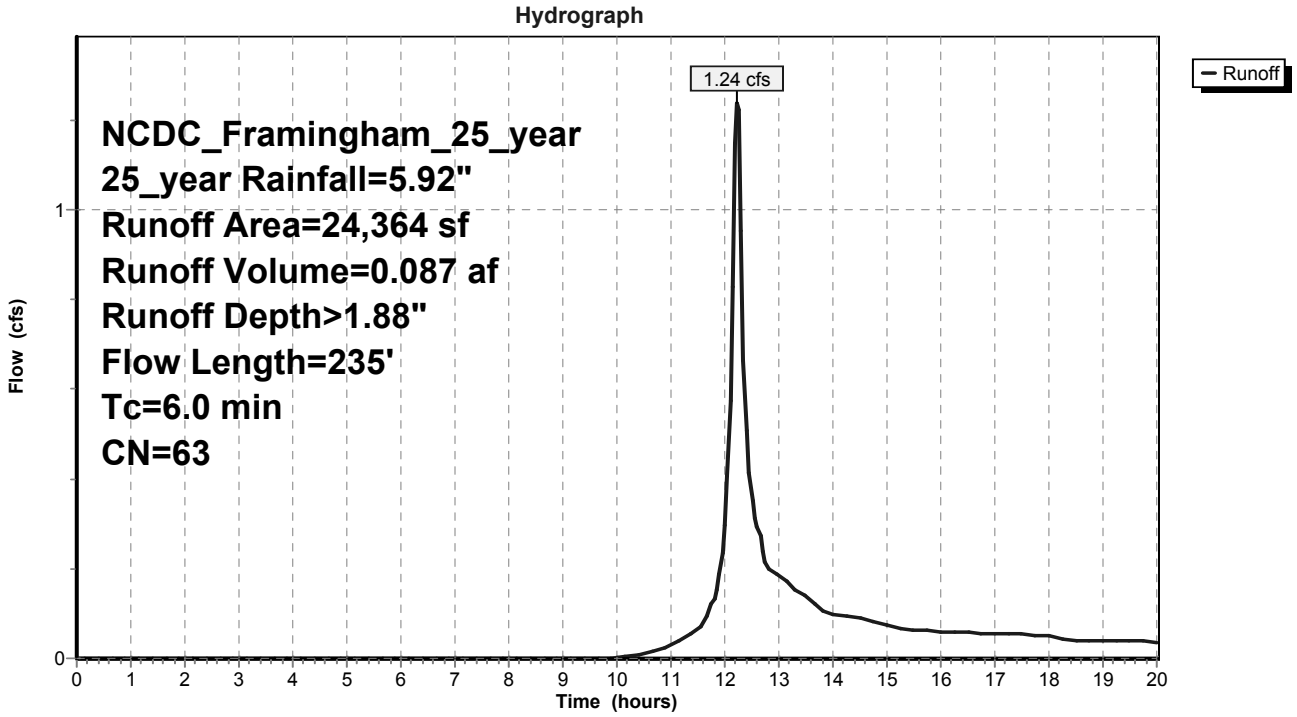
Runoff = 1.24 cfs @ 12.24 hrs, Volume= 0.087 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 12 | 61 | GRASS, 0% imperv, HSG B |
| * | 116 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 676 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,461 | | 83.98% Pervious Area |
| | 3,902 | | 16.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: (blank)



## Summary for Subcatchment W-CULV-N: (blank)

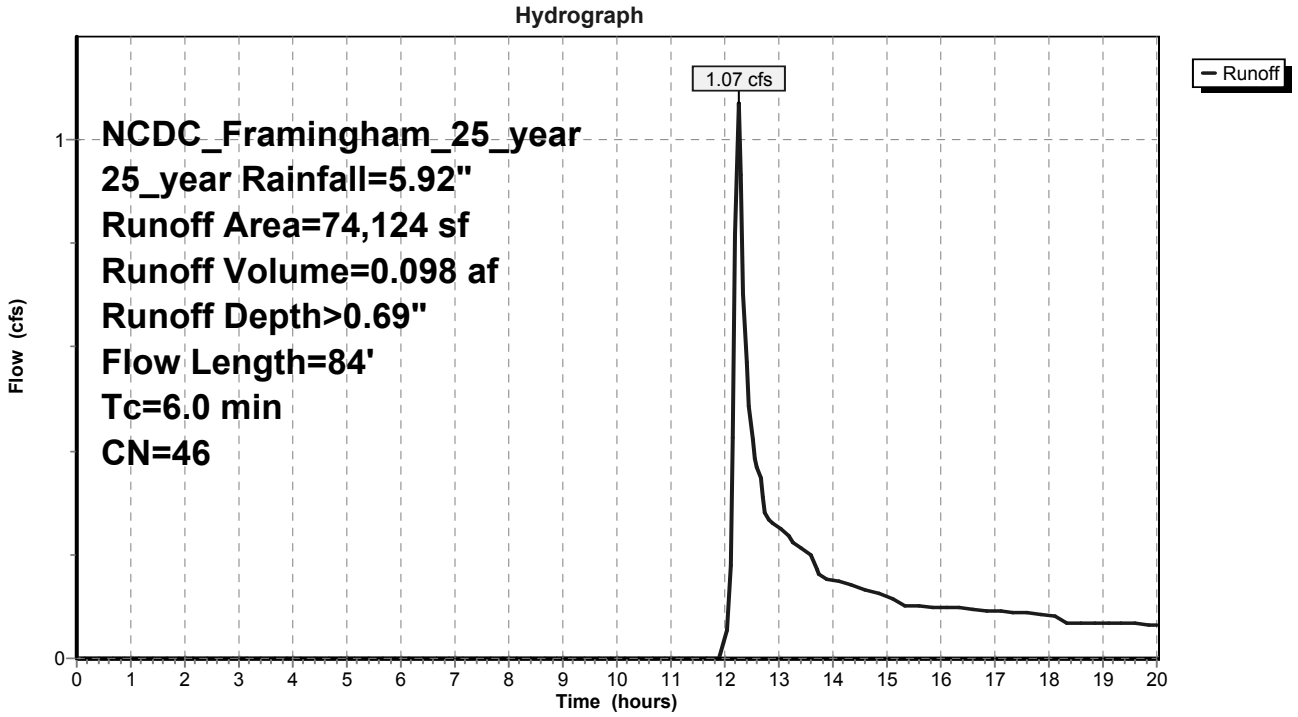
Runoff = 1.07 cfs @ 12.26 hrs, Volume= 0.098 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 49,219 | 39 | GRASS, 0% imperv, HSG A |
| * | 878 | 61 | GRASS, 0% imperv, HSG B |
| * | 11,450 | 30 | WOODS, 0% imperv, HSG A |
| * | 6,537 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 3 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 458 | 98 | DECK, 100% imperv, HSG A |
| * | 70 | 98 | DECK, 100% imperv, HSG B |
| * | 4,994 | 98 | IMP, 100% imperv, HSG A |
| * | 515 | 98 | IMP, 100% imperv, HSG B |
| | 74,124 | 46 | Weighted Average |
| | 69,873 | | 94.27% Pervious Area |
| | 4,251 | | 5.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2138 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 34 | 0.2186 | 3.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 84 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-CULV-N: (blank)



## Summary for Subcatchment W-D-1: (blank)

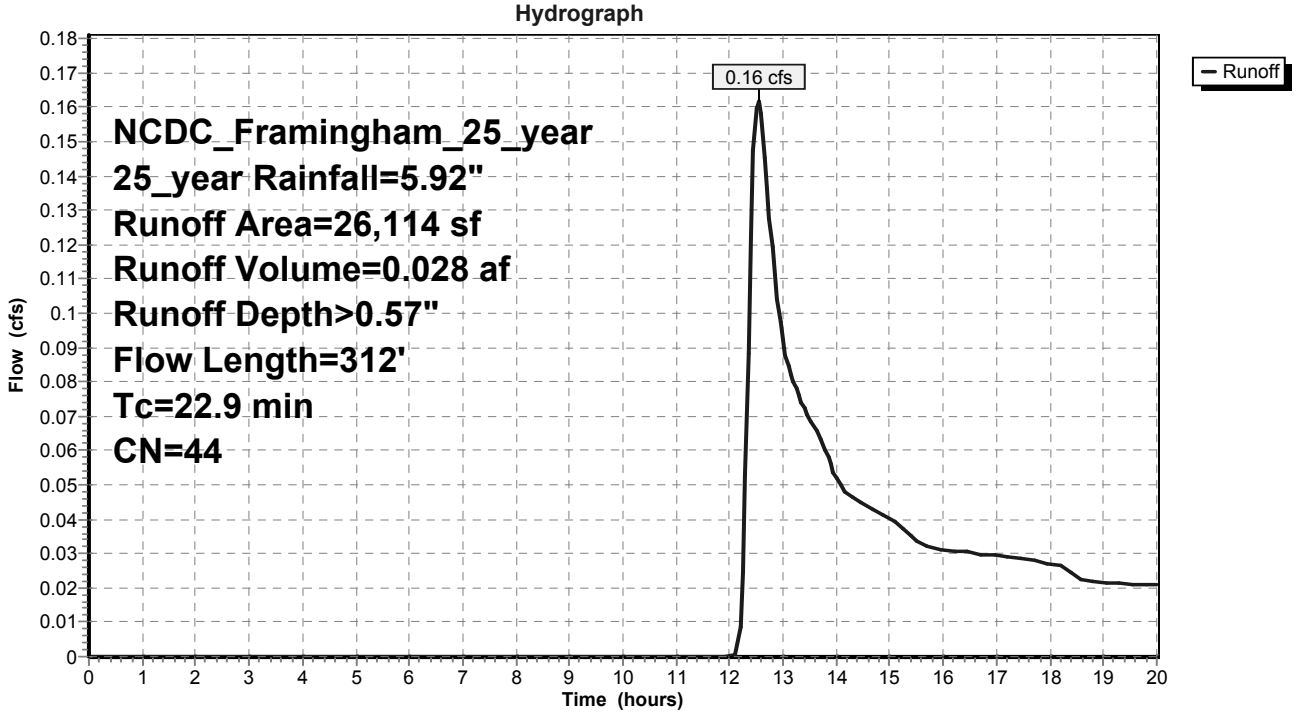
Runoff = 0.16 cfs @ 12.53 hrs, Volume= 0.028 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,996 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,258 | 61 | GRASS, 0% imperv, HSG B |
| * | 535 | 98 | DECK, 100% imperv, HSG A |
| * | 1 | 98 | IMP, 100% imperv, HSG A |
| * | 47 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,136 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 141 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 26,114 | 44 | Weighted Average |
| | 26,114 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 50 | 0.0010 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.6 | 262 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 22.9 | 312 | Total | | | |

## Subcatchment W-D-1: (blank)



## Summary for Subcatchment W-D-3: (blank)

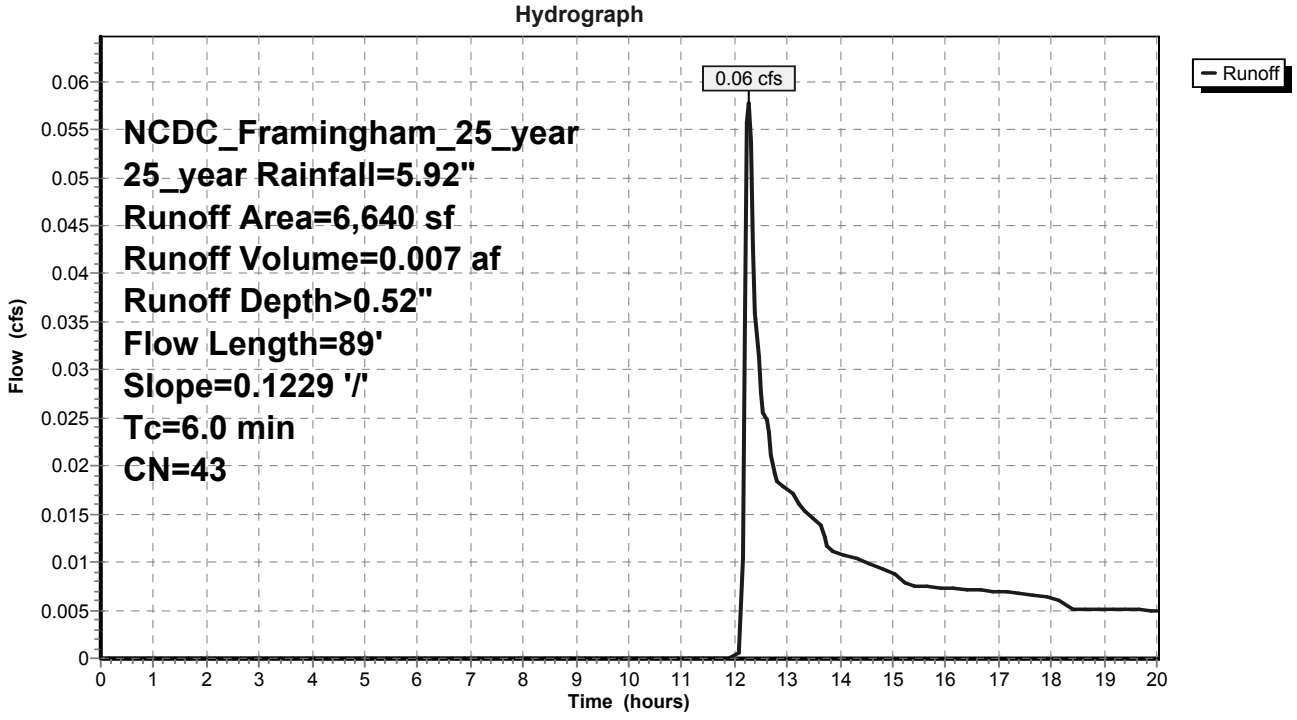
Runoff = 0.06 cfs @ 12.27 hrs, Volume= 0.007 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_25_year 25_year Rainfall=5.92"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,198 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,421 | 30 | WOODS, 0% imperv, HSG A |
| * | 1,021 | 77 | GRAVEL, 65% imperv, HSG A |
| | 6,640 | 43 | Weighted Average |
| | 5,977 | | 90.01% Pervious Area |
| | 664 | | 9.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 89 | 0.1229 | 0.33 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 4.5 | 89 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-D-3: (blank)



## Summary for Reach R-SWALE1: (new Reach)

Inflow Area = 0.663 ac, 2.32% Impervious, Inflow Depth > 1.80" for 25_year event
Inflow = 1.32 cfs @ 12.26 hrs, Volume= 0.099 af
Outflow = 1.06 cfs @ 12.33 hrs, Volume= 0.098 af, Atten= 20%, Lag= 4.2 min

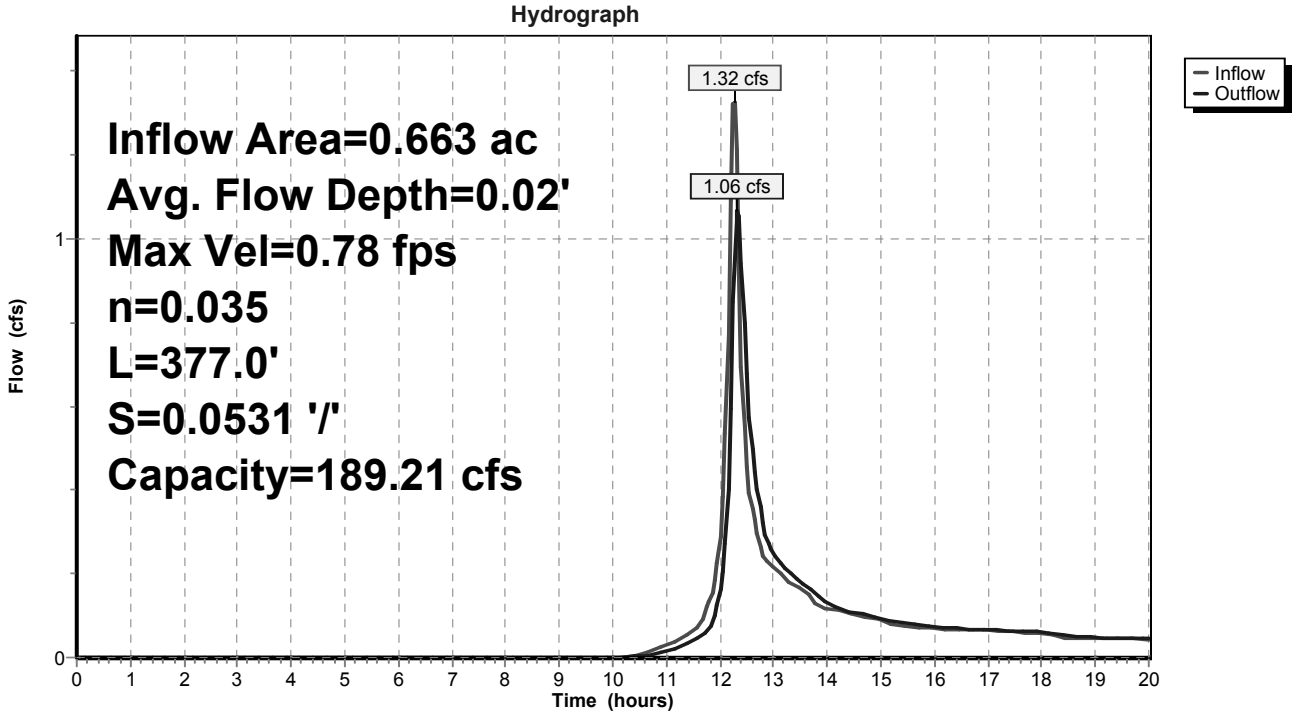
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.78 fps, Min. Travel Time= 8.0 min
Avg. Velocity = 0.33 fps, Avg. Travel Time= 19.0 min

Peak Storage= 512 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 189.21 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 377.0' Slope= 0.0531 '/'
Inlet Invert= 165.00', Outlet Invert= 145.00'

‡

## Reach R-SWALE1: (new Reach)



## Summary for Reach R-SWALE2: (new Reach)

Inflow Area = 4.722 ac, 23.76% Impervious, Inflow Depth > 2.87" for 25_year event
Inflow = 14.99 cfs @ 12.23 hrs, Volume= 1.128 af
Outflow = 14.74 cfs @ 12.25 hrs, Volume= 1.123 af, Atten= 2%, Lag= 1.1 min

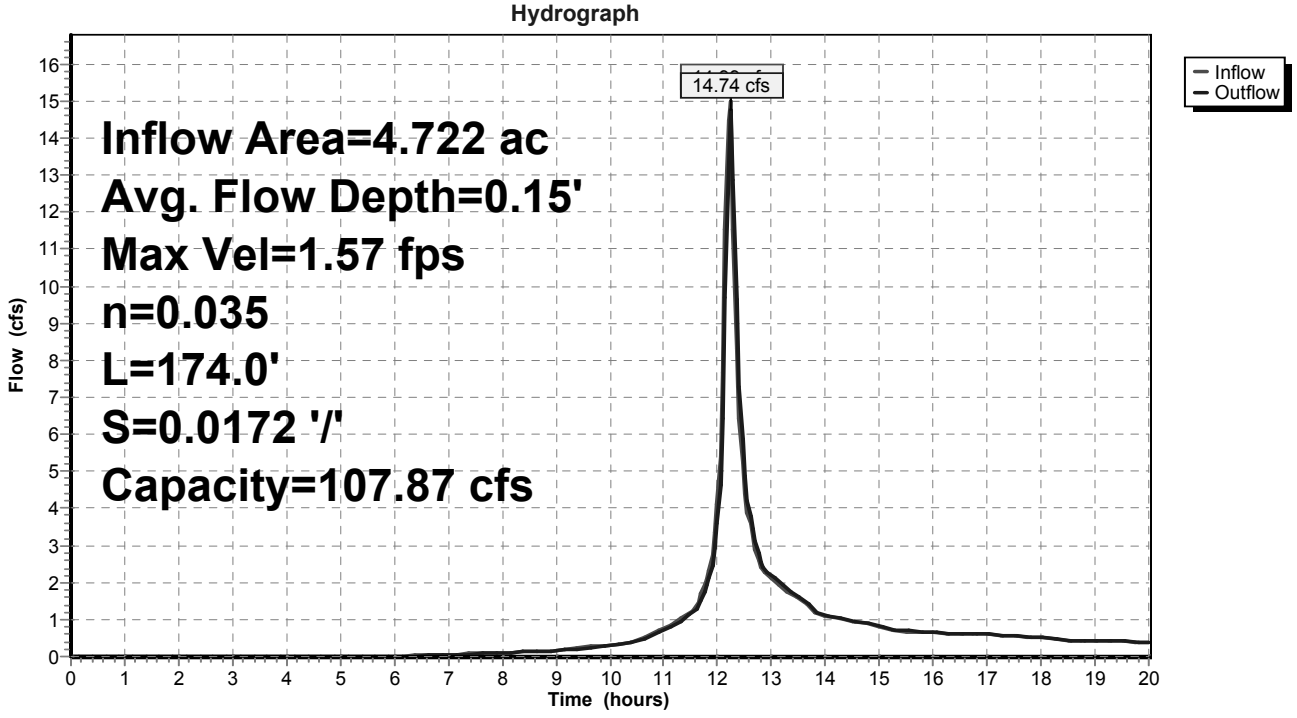
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 1.57 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 6.7 min

Peak Storage= 1,630 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 107.87 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 174.0' Slope= 0.0172 '/'
Inlet Invert= 145.00', Outlet Invert= 142.00'

‡

## Reach R-SWALE2: (new Reach)



## Summary for Reach R-SWALE3: (new Reach)

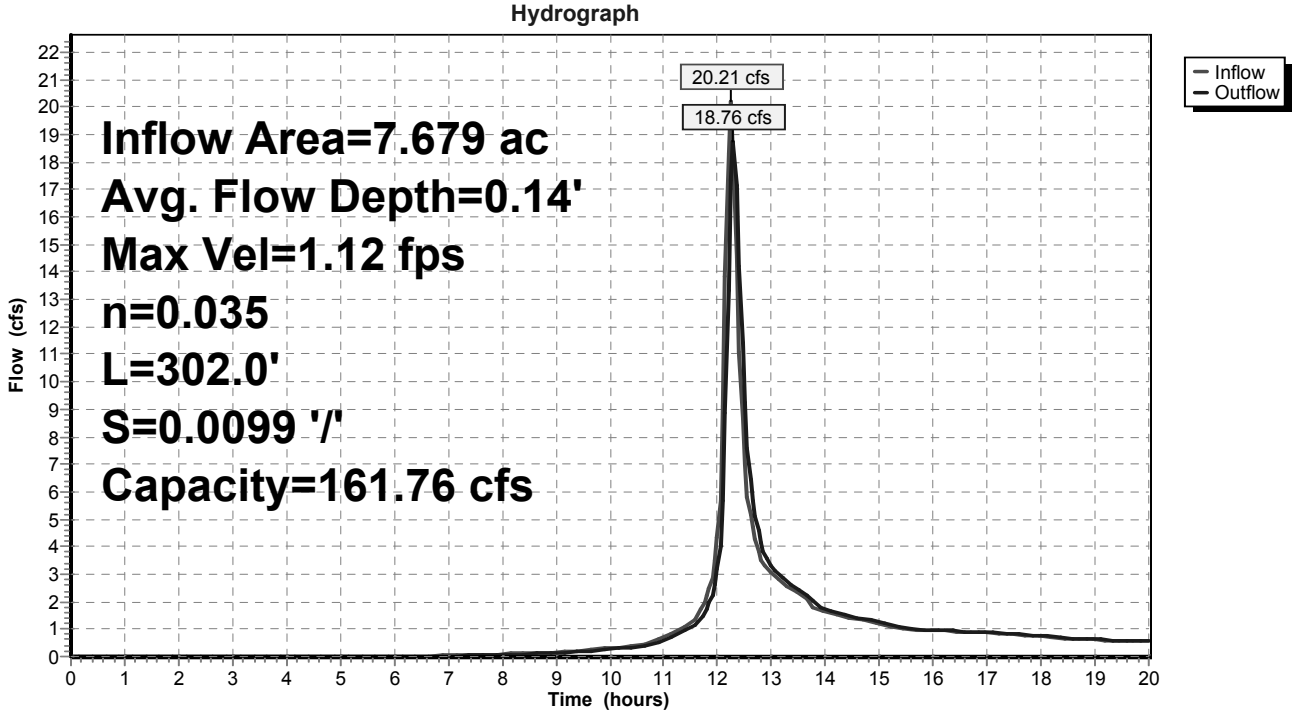
Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 2.40" for 25_year event
Inflow = 20.21 cfs @ 12.25 hrs, Volume= 1.533 af
Outflow = 18.76 cfs @ 12.30 hrs, Volume= 1.519 af, Atten= 7%, Lag= 2.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 1.12 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 16.3 min

Peak Storage= 5,046 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 0.50' Flow Area= 62.0 sf, Capacity= 161.76 cfs

120.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 128.00'
Length= 302.0' Slope= 0.0099 '/'
Inlet Invert= 142.00', Outlet Invert= 139.00'

## Reach R-SWALE3: (new Reach)



## Summary for Pond DET-1: 387

Inflow Area = 0.908 ac, 0.08% Impervious, Inflow Depth > 3.78" for 25_year event
Inflow = 3.34 cfs @ 12.15 hrs, Volume= 0.286 af
Outflow = 1.61 cfs @ 12.31 hrs, Volume= 0.159 af, Atten= 52%, Lag= 9.8 min
Primary = 1.61 cfs @ 12.31 hrs, Volume= 0.159 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.48' @ 12.31 hrs Surf.Area= 4,886 sf Storage= 6,302 cf
Flood Elev= 170.00' Surf.Area= 5,344 sf Storage= 8,945 cf

Plug-Flow detention time= 229.3 min calculated for 0.158 af (55% of inflow)
Center-of-Mass det. time= 118.8 min ( 854.7 - 735.9 )

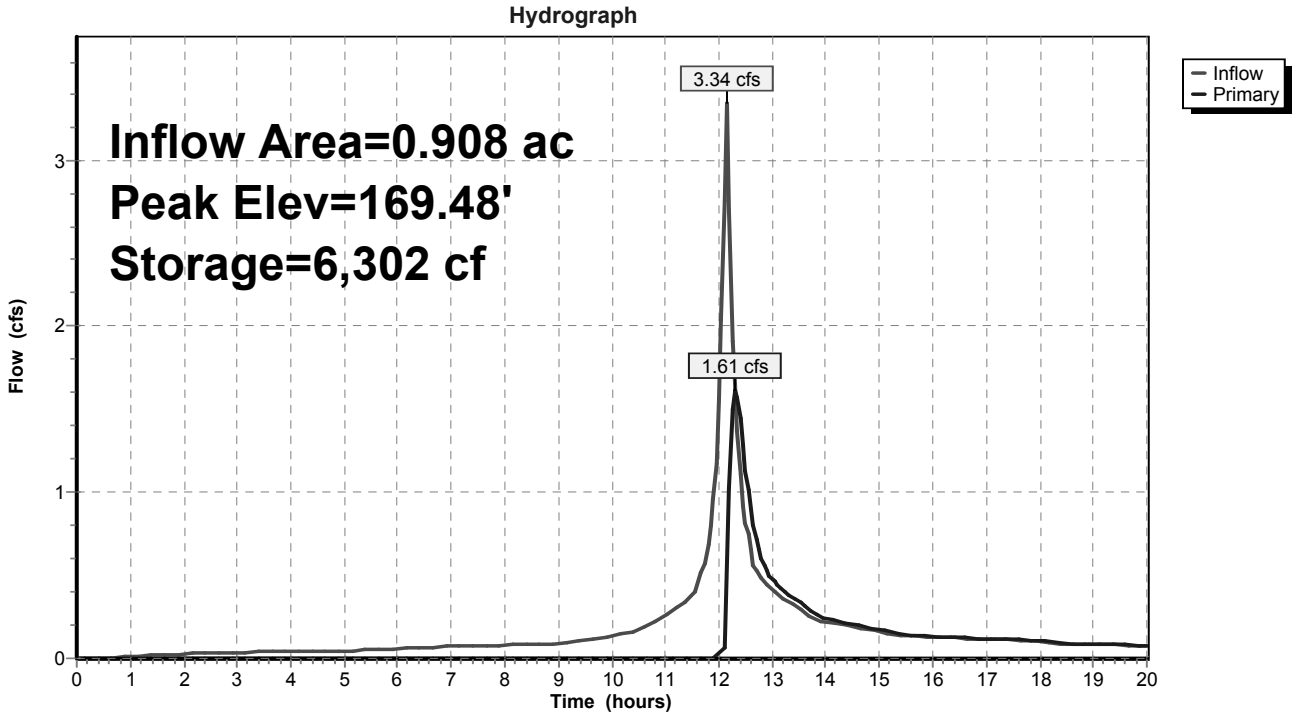
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 8,945 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 3,630 | 0 | 0 |
| 169.00 | 4,458 | 4,044 | 4,044 |
| 170.00 | 5,344 | 4,901 | 8,945 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 15.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.80' S= 0.0133 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.30' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=1.60 cfs @ 12.31 hrs HW=169.48' TW=153.33' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.60 cfs of 23.14 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 1.60 cfs @ 1.40 fps)

## Pond DET-1: 387



## Summary for Pond DET-2: 391

Inflow Area = 0.988 ac, 0.00% Impervious, Inflow Depth > 3.99" for 25_year event
Inflow = 4.55 cfs @ 12.14 hrs, Volume= 0.328 af
Outflow = 1.81 cfs @ 12.26 hrs, Volume= 0.288 af, Atten= 60%, Lag= 7.2 min
Primary = 1.81 cfs @ 12.26 hrs, Volume= 0.288 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 165.36' @ 12.26 hrs Surf.Area= 2,285 sf Storage= 3,914 cf
Flood Elev= 166.00' Surf.Area= 2,656 sf Storage= 5,490 cf

Plug-Flow detention time= 104.7 min calculated for 0.288 af (88% of inflow)
Center-of-Mass det. time= 60.4 min ( 793.5 - 733.0 )

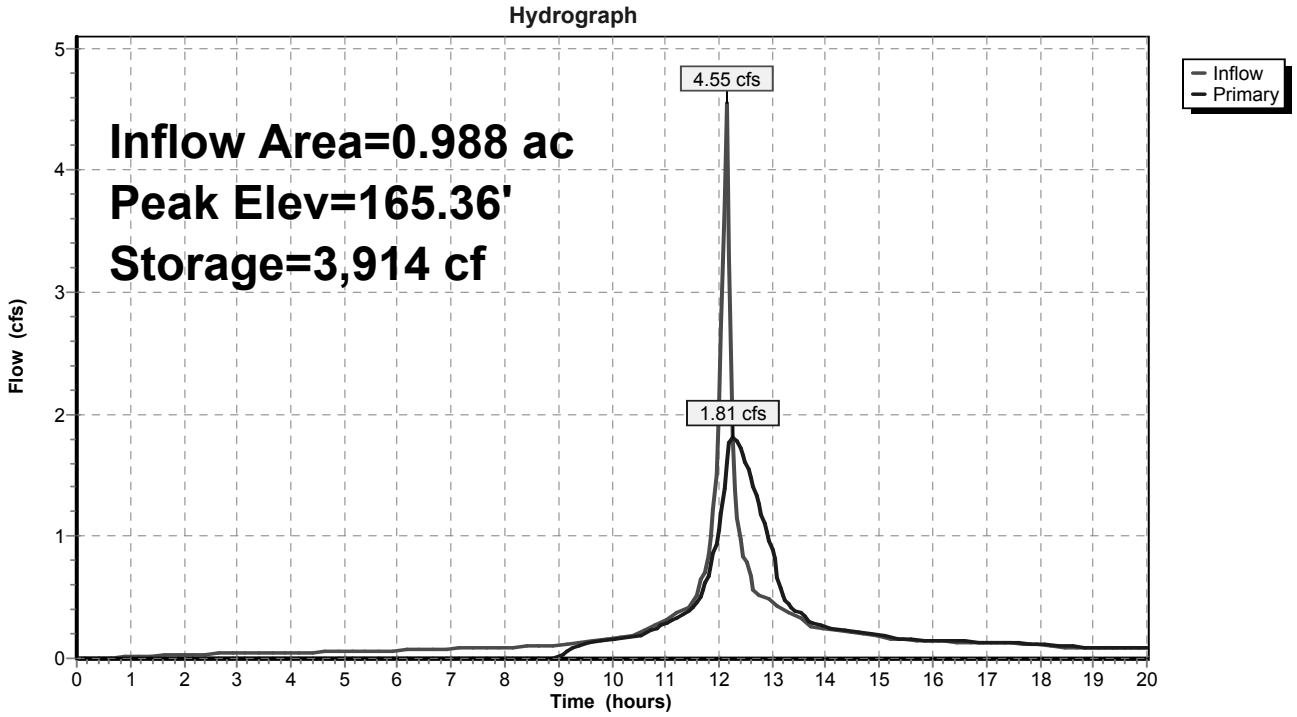
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 5,490 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 1,079 | 0 | 0 |
| 164.00 | 1,548 | 1,314 | 1,314 |
| 165.00 | 2,074 | 1,811 | 3,125 |
| 166.00 | 2,656 | 2,365 | 5,490 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 25.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.80' S= 0.0080 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 164.20' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.81 cfs @ 12.26 hrs HW=165.35' TW=160.61' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.81 cfs of 15.79 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.81 cfs @ 5.17 fps)

## Pond DET-2: 391



## Summary for Pond DET-3: 395

Inflow Area = 0.995 ac, 0.00% Impervious, Inflow Depth > 4.06" for 25_year event
Inflow = 4.03 cfs @ 12.15 hrs, Volume= 0.337 af
Outflow = 1.68 cfs @ 12.33 hrs, Volume= 0.281 af, Atten= 58%, Lag= 11.0 min
Primary = 1.68 cfs @ 12.33 hrs, Volume= 0.281 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 175.29' @ 12.33 hrs Surf.Area= 2,631 sf Storage= 4,638 cf
Flood Elev= 176.00' Surf.Area= 3,044 sf Storage= 6,640 cf

Plug-Flow detention time= 129.1 min calculated for 0.281 af (83% of inflow)
Center-of-Mass det. time= 73.6 min ( 806.0 - 732.4 )

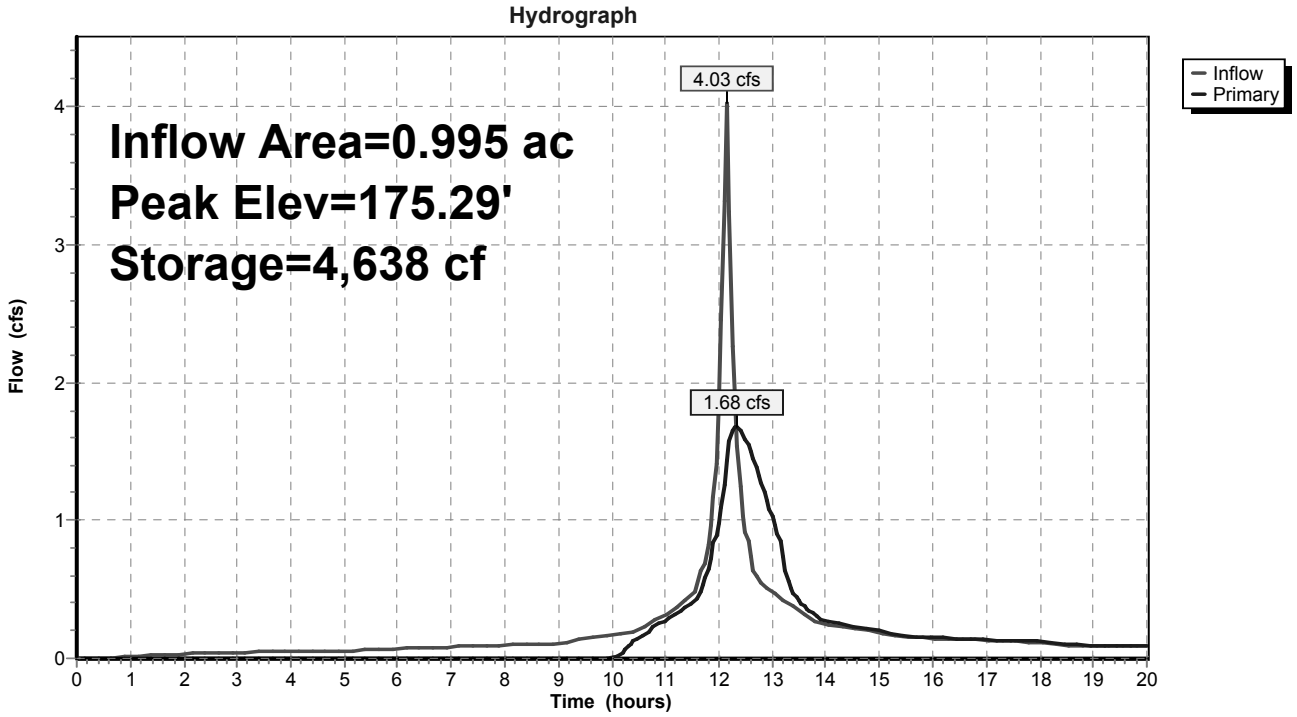
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 6,640 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 1,458 | 0 | 0 |
| 174.00 | 1,930 | 1,694 | 1,694 |
| 175.00 | 2,459 | 2,195 | 3,889 |
| 176.00 | 3,044 | 2,752 | 6,640 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 169.00' | **18.0" Round RCP_Round 18"**<br>L= 48.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.00' / 168.40' S= 0.0125 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 174.30' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.67 cfs @ 12.33 hrs HW=175.29' TW=162.75' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 1.67 cfs of 22.84 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.67 cfs @ 4.80 fps)

## Pond DET-3: 395



## Summary for Pond INF-ROOF-100: 368

Inflow Area = 0.166 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.97 cfs @ 12.14 hrs, Volume= 0.074 af
Outflow = 0.03 cfs @ 16.96 hrs, Volume= 0.006 af, Atten= 97%, Lag= 289.1 min
Primary = 0.03 cfs @ 16.96 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.53' @ 16.96 hrs Surf.Area= 471 sf Storage= 2,969 cf

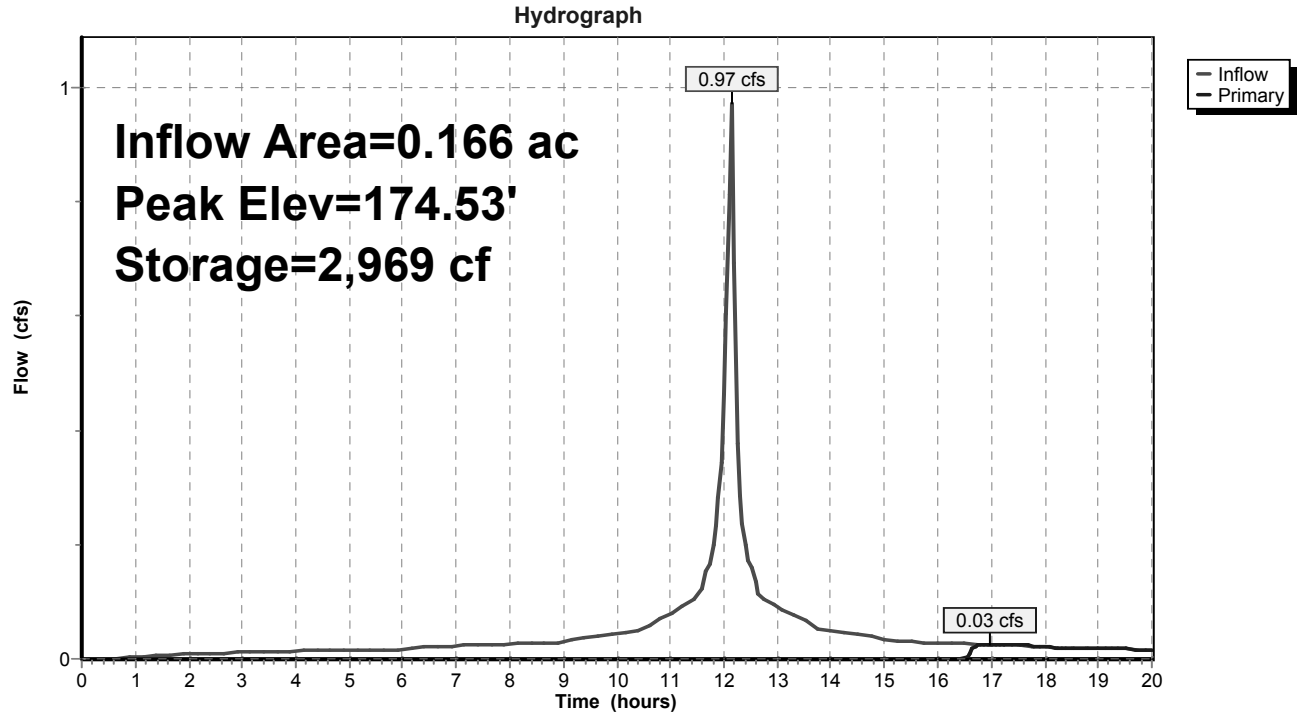
Plug-Flow detention time= 839.2 min calculated for 0.006 af (8% of inflow)
Center-of-Mass det. time= 381.1 min ( 1,090.1 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.03 cfs @ 16.96 hrs HW=174.53' TW=165.16' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.51 fps)

## Pond INF-ROOF-100: 368



## Summary for Pond INF-ROOF-110: 299

Inflow Area = 0.159 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.93 cfs @ 12.14 hrs, Volume= 0.071 af
Outflow = 0.91 cfs @ 12.15 hrs, Volume= 0.069 af, Atten= 2%, Lag= 0.5 min
Primary = 0.91 cfs @ 12.15 hrs, Volume= 0.069 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.77' @ 12.15 hrs Surf.Area= 393 sf Storage= 121 cf
Flood Elev= 176.00' Surf.Area= 393 sf Storage= 2,620 cf

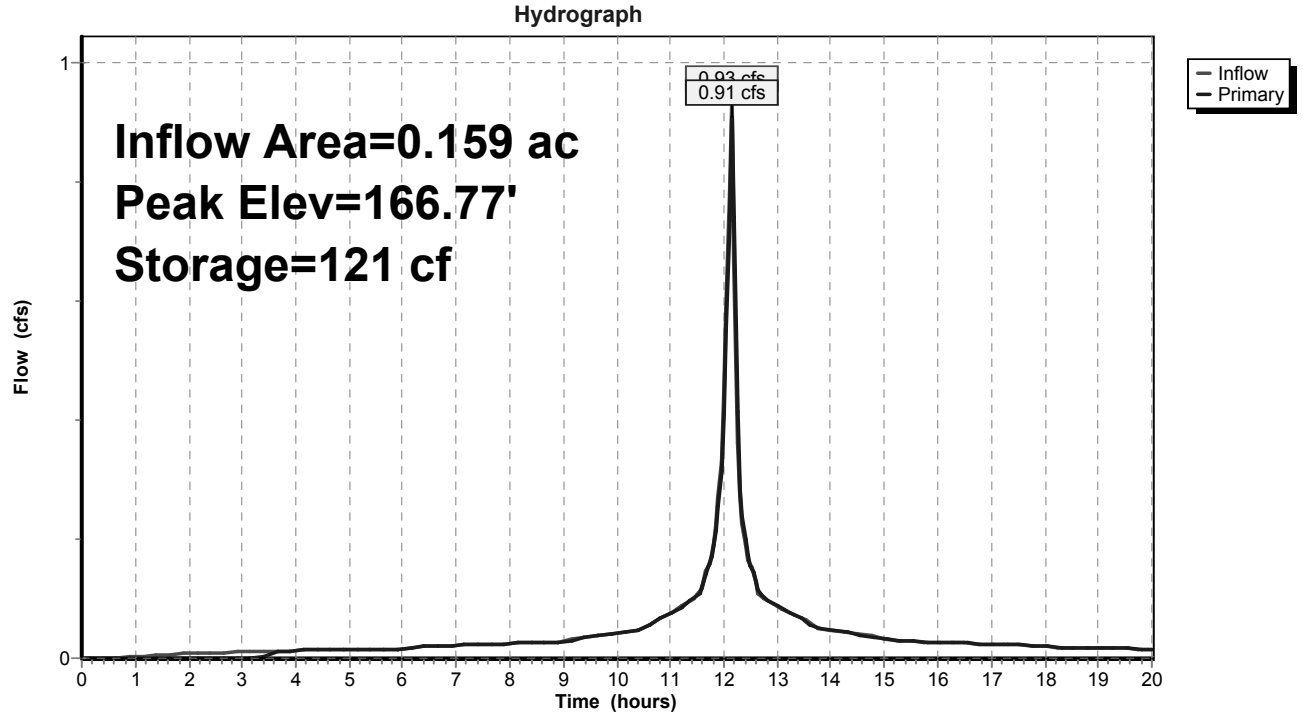
Plug-Flow detention time= 28.2 min calculated for 0.069 af (97% of inflow)
Center-of-Mass det. time= 16.2 min ( 725.1 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.91 cfs @ 12.15 hrs HW=166.77' TW=141.81' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.91 cfs @ 1.67 fps)

## Pond INF-ROOF-110: 299



## Summary for Pond INF-ROOF-114: 297

Inflow Area = 0.250 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.46 cfs @ 12.14 hrs, Volume= 0.111 af
Outflow = 1.57 cfs @ 12.16 hrs, Volume= 0.058 af, Atten= 0%, Lag= 1.2 min
Primary = 1.57 cfs @ 12.16 hrs, Volume= 0.058 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.39' @ 12.16 hrs Surf.Area= 393 sf Storage= 2,434 cf
Flood Elev= 164.00' Surf.Area= 393 sf Storage= 2,312 cf

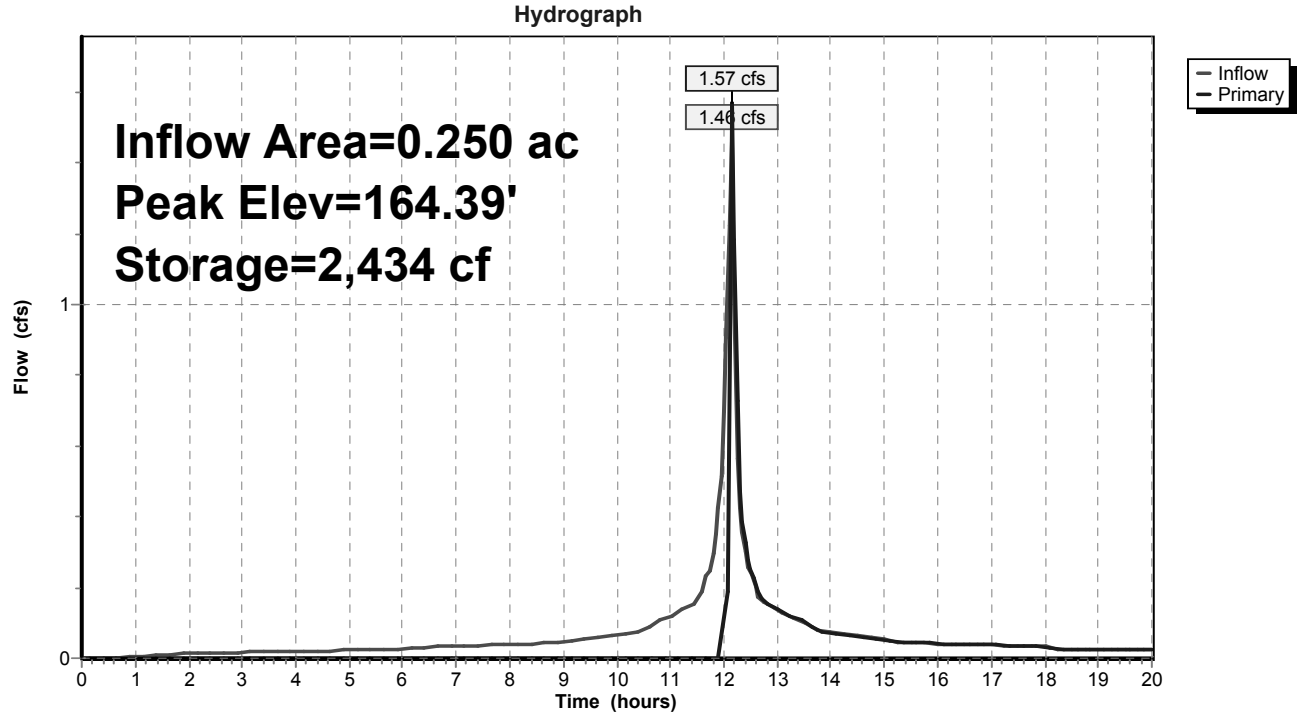
Plug-Flow detention time= 248.9 min calculated for 0.058 af (52% of inflow)
Center-of-Mass det. time= 126.3 min ( 835.2 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.42 cfs @ 12.16 hrs HW=164.37' TW=145.13' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 1.42 cfs @ 1.94 fps)

## Pond INF-ROOF-114: 297



## Summary for Pond INF-ROOF-117: 295

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.66 cfs @ 12.14 hrs, Volume= 0.050 af
Outflow = 0.19 cfs @ 12.36 hrs, Volume= 0.018 af, Atten= 71%, Lag= 13.2 min
Primary = 0.19 cfs @ 12.36 hrs, Volume= 0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.10' @ 12.36 hrs Surf.Area= 236 sf Storage= 1,405 cf
Flood Elev= 168.00' Surf.Area= 236 sf Storage= 1,572 cf

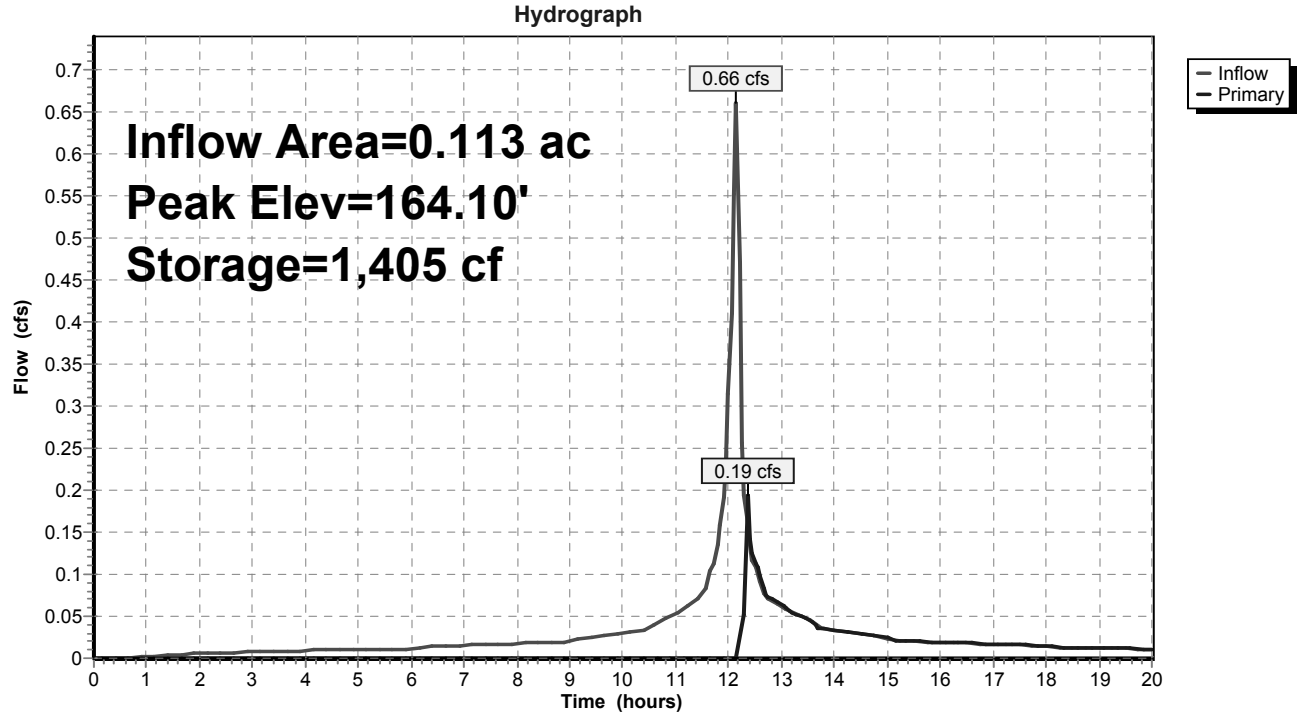
Plug-Flow detention time= 350.2 min calculated for 0.018 af (36% of inflow)
Center-of-Mass det. time= 170.2 min ( 879.2 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.18 cfs @ 12.36 hrs HW=164.09' TW=142.13' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.18 cfs @ 0.97 fps)

## Pond INF-ROOF-117: 295



## Summary for Pond INF-ROOF-123: 119

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.83 cfs @ 12.14 hrs, Volume= 0.139 af
Outflow = 1.79 cfs @ 12.16 hrs, Volume= 0.075 af, Atten= 2%, Lag= 1.1 min
Primary = 1.79 cfs @ 12.16 hrs, Volume= 0.075 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 148.93' @ 12.16 hrs Surf.Area= 471 sf Storage= 2,933 cf
Flood Elev= 150.00' Surf.Area= 471 sf Storage= 3,144 cf

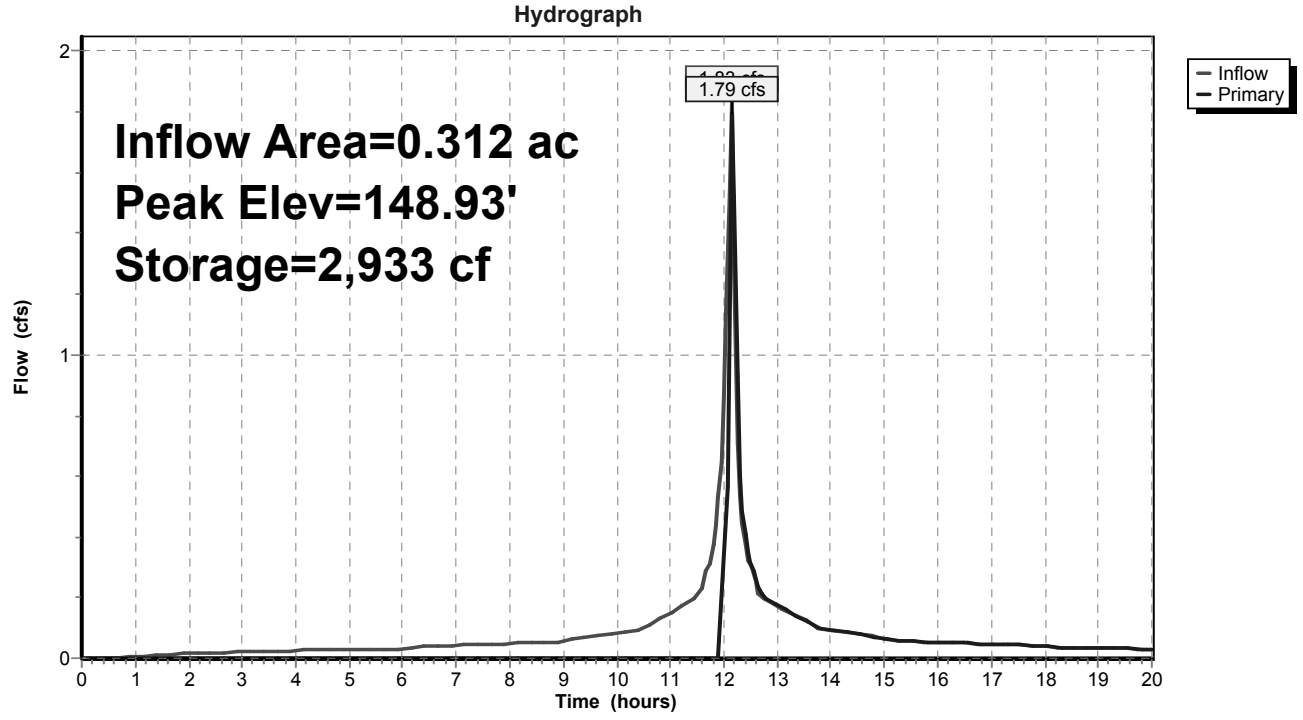
Plug-Flow detention time= 240.1 min calculated for 0.075 af (54% of inflow)
Center-of-Mass det. time= 122.5 min ( 831.5 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.50' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 141.50' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.71 cfs @ 12.16 hrs HW=148.91' TW=142.09' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 1.71 cfs @ 2.07 fps)

## Pond INF-ROOF-123: 119



## Summary for Pond INF-ROOF-13: 384

Inflow Area = 0.083 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.49 cfs @ 12.14 hrs, Volume= 0.037 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 183.01' @ 20.00 hrs Surf.Area= 314 sf Storage= 1,605 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

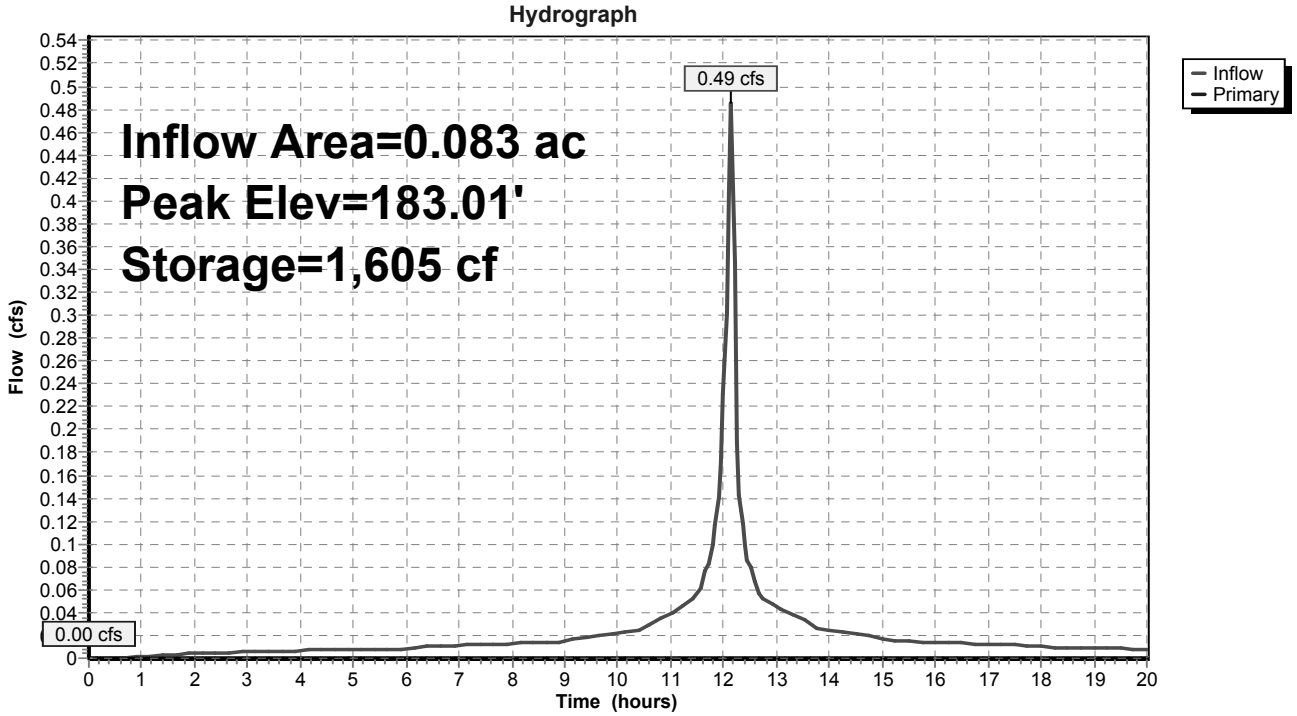
Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=176.00' TW=171.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond INF-ROOF-13: 384



## Summary for Pond INF-ROOF-16: 375

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.66 cfs @ 12.14 hrs, Volume= 0.050 af
Outflow = 0.02 cfs @ 16.26 hrs, Volume= 0.005 af, Atten= 97%, Lag= 247.1 min
Primary = 0.02 cfs @ 16.26 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 184.52' @ 16.26 hrs Surf.Area= 314 sf Storage= 1,978 cf
Flood Elev= 188.00' Surf.Area= 314 sf Storage= 2,096 cf

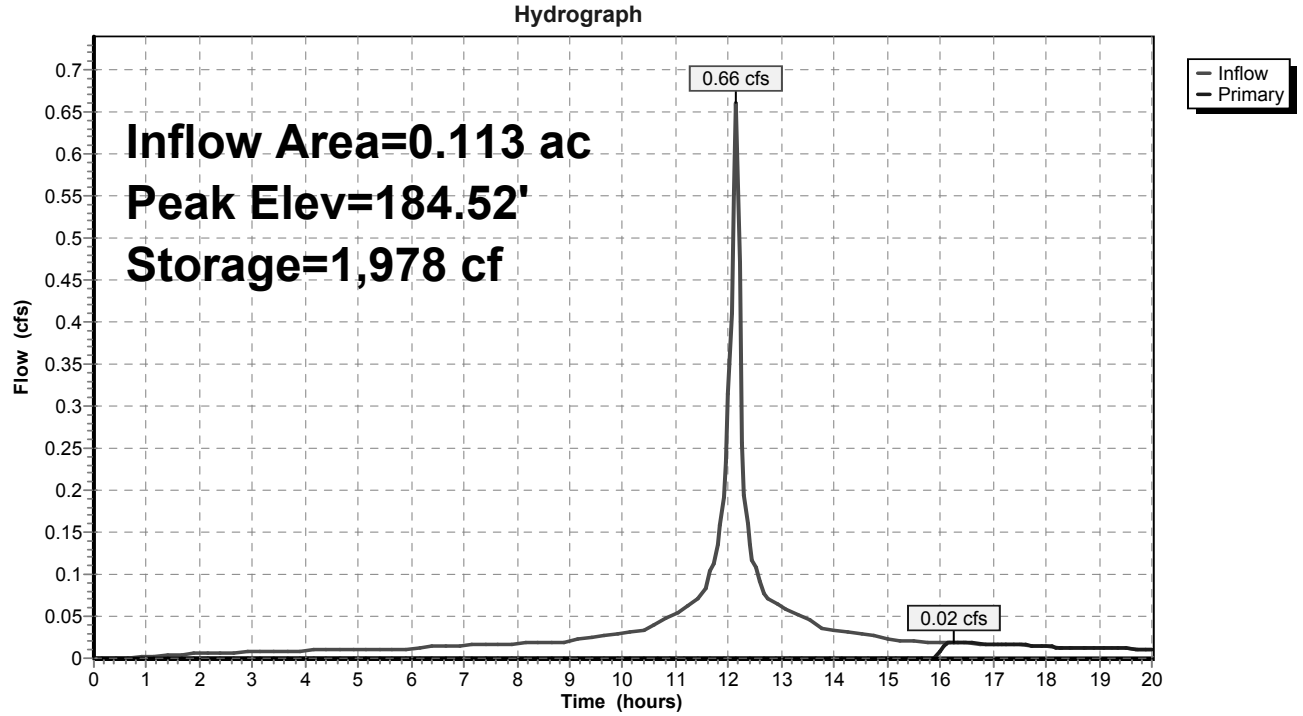
Plug-Flow detention time= 786.8 min calculated for 0.005 af (10% of inflow)
Center-of-Mass det. time= 359.5 min ( 1,068.5 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.02 cfs @ 16.26 hrs HW=184.52' TW=171.54' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.46 fps)

## Pond INF-ROOF-16: 375



## Summary for Pond INF-ROOF-19: 377

Inflow Area = 0.138 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.81 cfs @ 12.14 hrs, Volume= 0.061 af
Outflow = 0.76 cfs @ 12.21 hrs, Volume= 0.027 af, Atten= 5%, Lag= 3.8 min
Primary = 0.76 cfs @ 12.21 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 178.70' @ 12.21 hrs Surf.Area= 236 sf Storage= 1,516 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

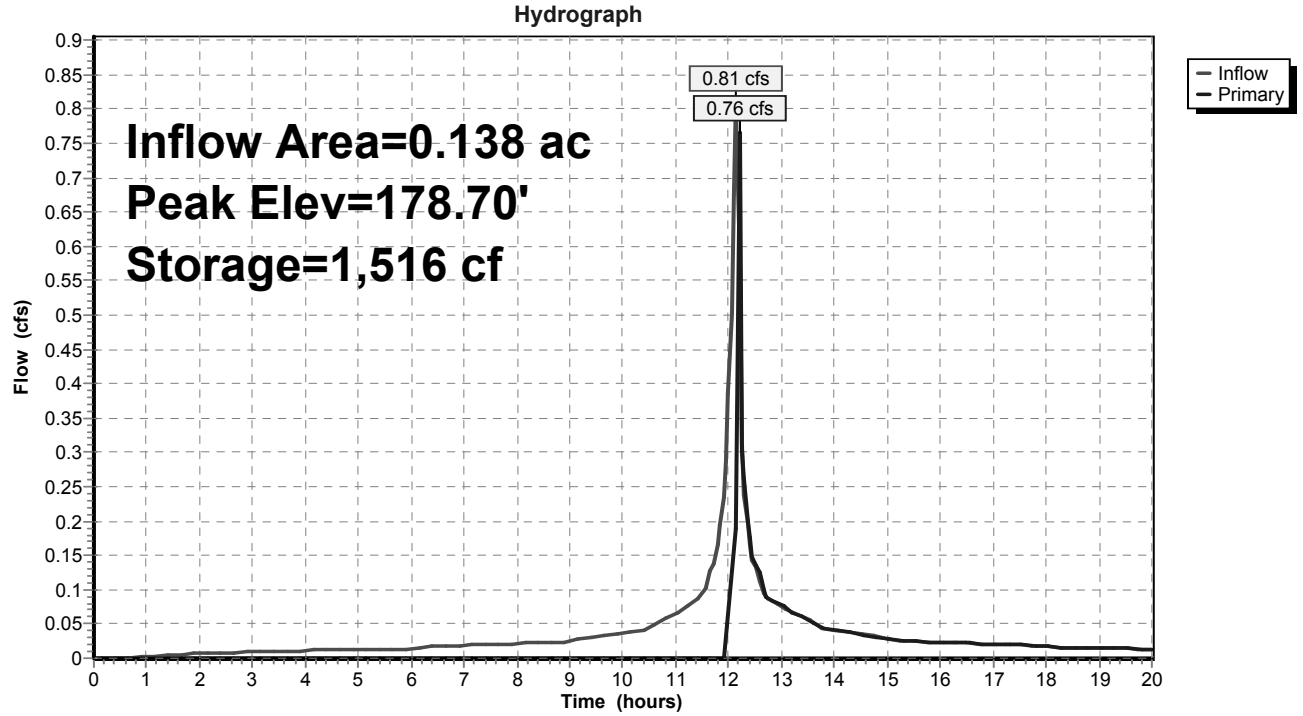
Plug-Flow detention time= 288.7 min calculated for 0.027 af (44% of inflow)
Center-of-Mass det. time= 143.4 min ( 852.3 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 171.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 178.50' | **36.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.69 cfs @ 12.21 hrs HW=178.67' TW=172.13' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.69 cfs @ 1.33 fps)

## Pond INF-ROOF-19: 377



## Summary for Pond INF-ROOF-23: 372

Inflow Area = 0.134 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.78 cfs @ 12.14 hrs, Volume= 0.059 af
Outflow = 0.06 cfs @ 13.28 hrs, Volume= 0.014 af, Atten= 92%, Lag= 68.3 min
Primary = 0.06 cfs @ 13.28 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 184.55' @ 13.28 hrs Surf.Area= 314 sf Storage= 1,984 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

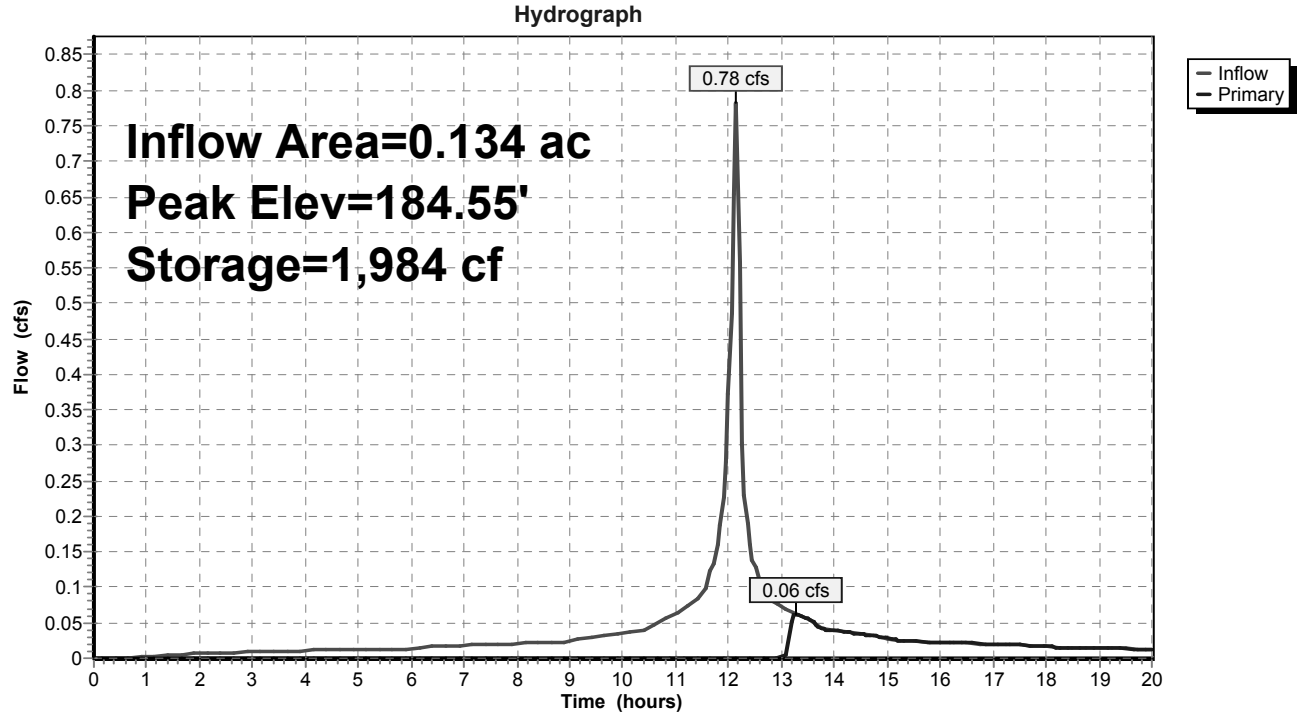
Plug-Flow detention time= 500.9 min calculated for 0.014 af (24% of inflow)
Center-of-Mass det. time= 236.1 min ( 945.1 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.06 cfs @ 13.28 hrs HW=184.54' TW=171.82' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 0.68 fps)

## Pond INF-ROOF-23: 372



## Summary for Pond INF-ROOF-25: 382

Inflow Area = 0.107 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.63 cfs @ 12.14 hrs, Volume= 0.048 af
Outflow = 0.11 cfs @ 12.52 hrs, Volume= 0.016 af, Atten= 82%, Lag= 22.5 min
Primary = 0.11 cfs @ 12.52 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 176.07' @ 12.52 hrs Surf.Area= 236 sf Storage= 1,400 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

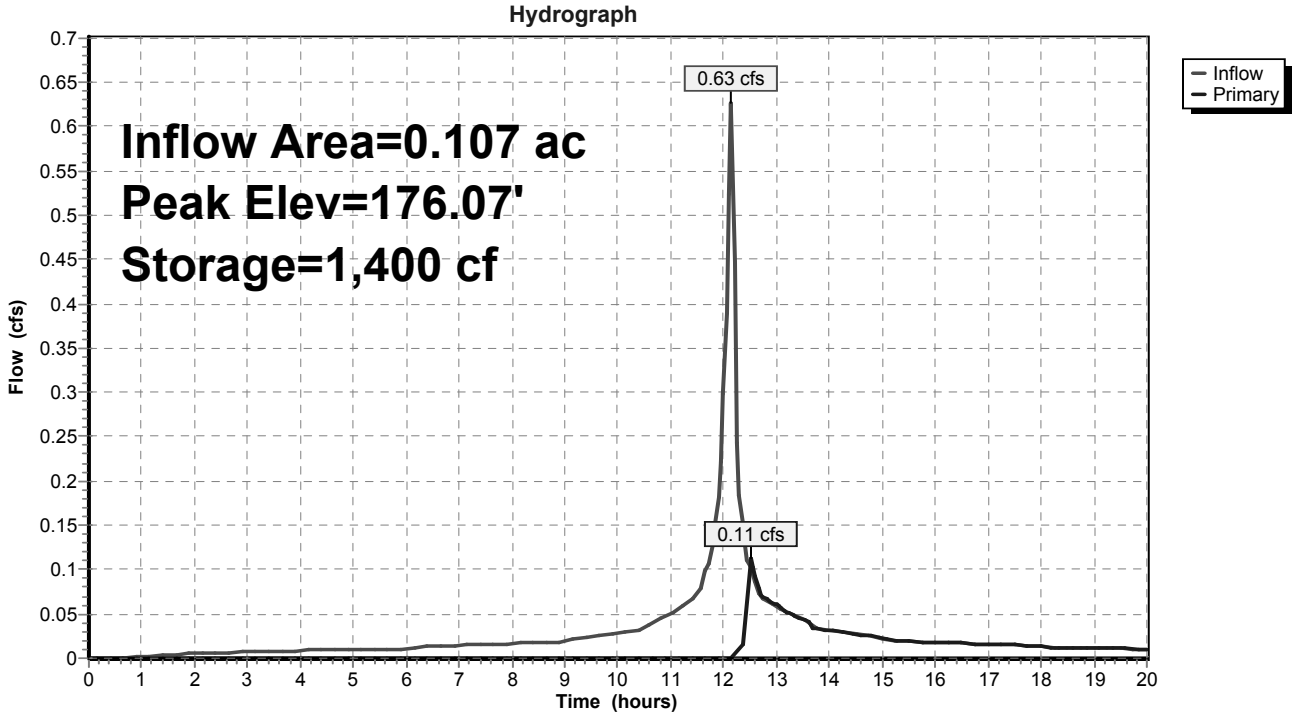
Plug-Flow detention time= 384.4 min calculated for 0.016 af (33% of inflow)
Center-of-Mass det. time= 185.0 min ( 894.0 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 176.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.11 cfs @ 12.52 hrs HW=176.07' TW=172.03' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 0.82 fps)

## Pond INF-ROOF-25: 382



## Summary for Pond INF-ROOF-28:

Inflow Area = 0.274 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.61 cfs @ 12.14 hrs, Volume= 0.122 af
Outflow = 1.57 cfs @ 12.15 hrs, Volume= 0.096 af, Atten= 2%, Lag= 0.4 min
Primary = 1.57 cfs @ 12.15 hrs, Volume= 0.096 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.89' @ 12.15 hrs Surf.Area= 236 sf Storage= 1,182 cf
Flood Elev= 177.00' Surf.Area= 236 sf Storage= 1,572 cf

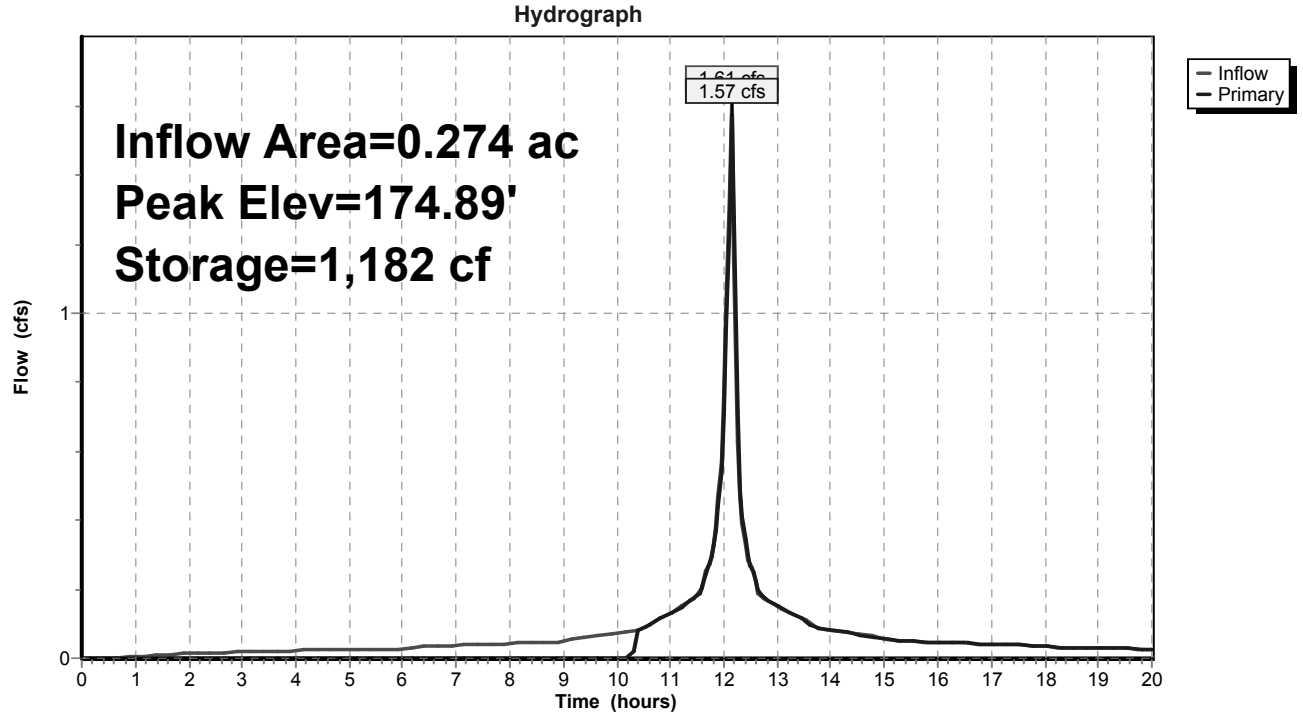
Plug-Flow detention time= 143.6 min calculated for 0.096 af (79% of inflow)
Center-of-Mass det. time= 77.7 min ( 786.7 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.57 cfs @ 12.15 hrs HW=174.89' TW=156.52' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 1.57 cfs @ 2.01 fps)

## Pond INF-ROOF-28:



## Summary for Pond INF-ROOF-3: 370

Inflow Area = 0.361 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 2.11 cfs @ 12.14 hrs, Volume= 0.161 af
Outflow = 0.53 cfs @ 12.50 hrs, Volume= 0.052 af, Atten= 75%, Lag= 21.4 min
Primary = 0.53 cfs @ 12.50 hrs, Volume= 0.052 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 190.19' @ 12.50 hrs Surf.Area= 707 sf Storage= 4,716 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

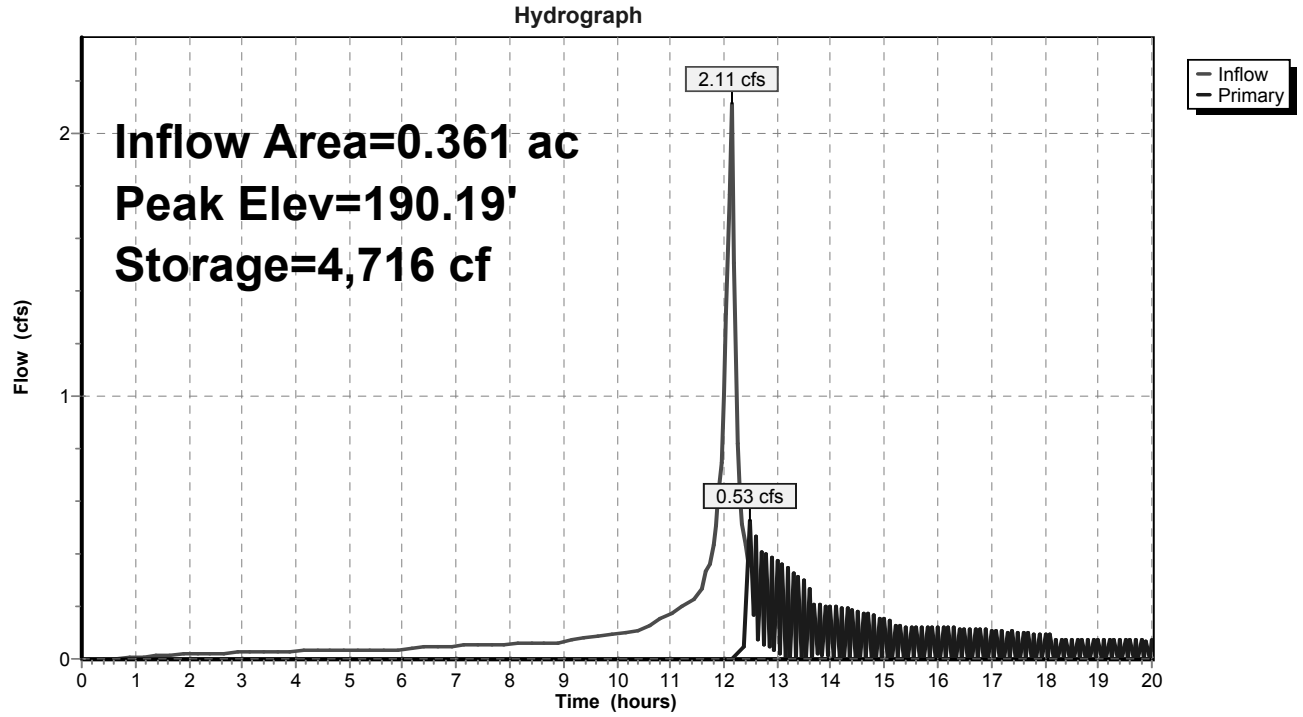
Plug-Flow detention time= 386.8 min calculated for 0.052 af (33% of inflow)
Center-of-Mass det. time= 185.8 min ( 894.7 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.52 cfs @ 12.50 hrs HW=190.19' TW=169.56' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.52 cfs @ 1.39 fps)

### Pond INF-ROOF-3: 370



## Summary for Pond INF-ROOF-36: 366

Inflow Area = 0.213 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.24 cfs @ 12.14 hrs, Volume= 0.094 af
Outflow = 1.64 cfs @ 12.15 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.7 min
Primary = 1.64 cfs @ 12.15 hrs, Volume= 0.046 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 314 sf Storage= 0 cf
Peak Elev= 190.40' @ 12.15 hrs Surf.Area= 314 sf Storage= 2,096 cf
Flood Elev= 157.00' Surf.Area= 314 sf Storage= 126 cf

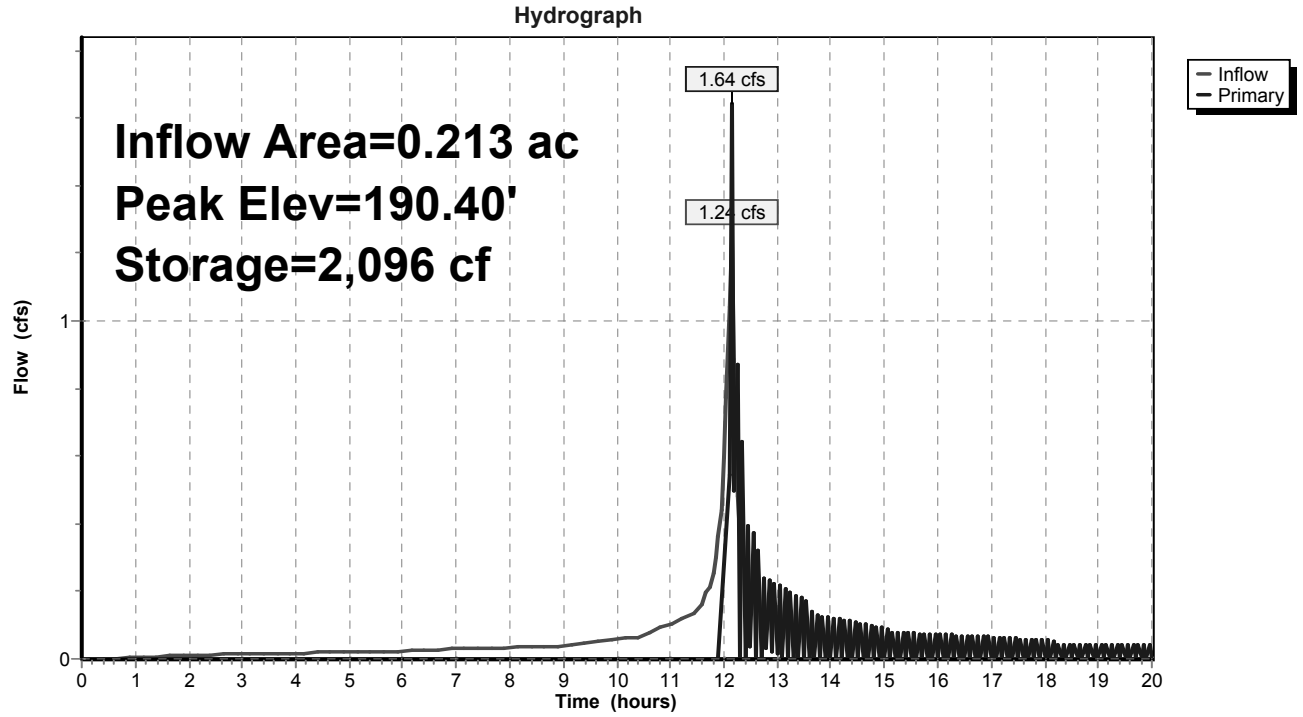
Plug-Flow detention time= 262.1 min calculated for 0.046 af (49% of inflow)
Center-of-Mass det. time= 130.9 min ( 839.9 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.51 cfs @ 12.15 hrs HW=190.38' TW=168.69' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.51 cfs @ 1.98 fps)

## Pond INF-ROOF-36: 366



## Summary for Pond INF-ROOF-43: 364

Inflow Area = 0.106 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.62 cfs @ 12.14 hrs, Volume= 0.047 af
Outflow = 0.05 cfs @ 13.20 hrs, Volume= 0.011 af, Atten= 91%, Lag= 63.4 min
Primary = 0.05 cfs @ 13.20 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.04' @ 13.20 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

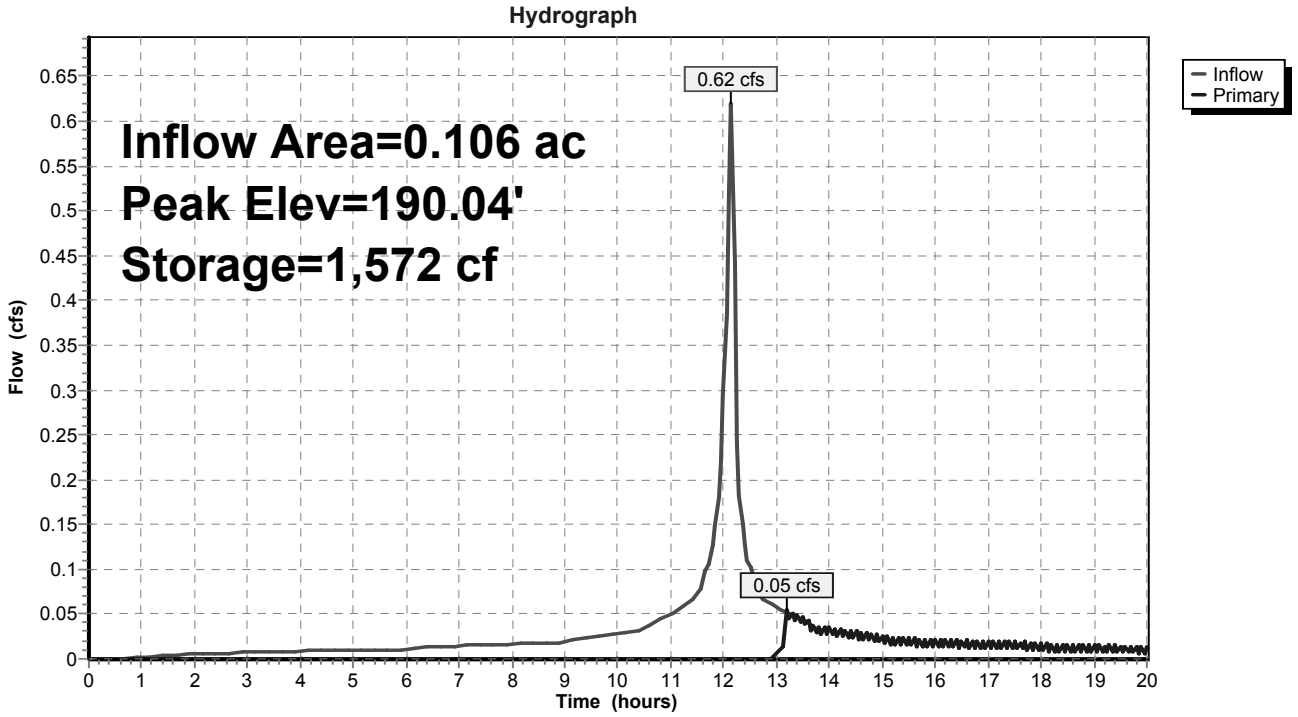
Plug-Flow detention time= 503.7 min calculated for 0.011 af (23% of inflow)
Center-of-Mass det. time= 236.7 min ( 945.7 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.05 cfs @ 13.20 hrs HW=190.04' TW=170.03' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 0.65 fps)

## Pond INF-ROOF-43: 364



## Summary for Pond INF-ROOF-53: 362

Inflow Area = 0.174 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.02 cfs @ 12.14 hrs, Volume= 0.077 af
Outflow = 0.13 cfs @ 13.35 hrs, Volume= 0.017 af, Atten= 87%, Lag= 72.4 min
Primary = 0.13 cfs @ 13.35 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.07' @ 13.35 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

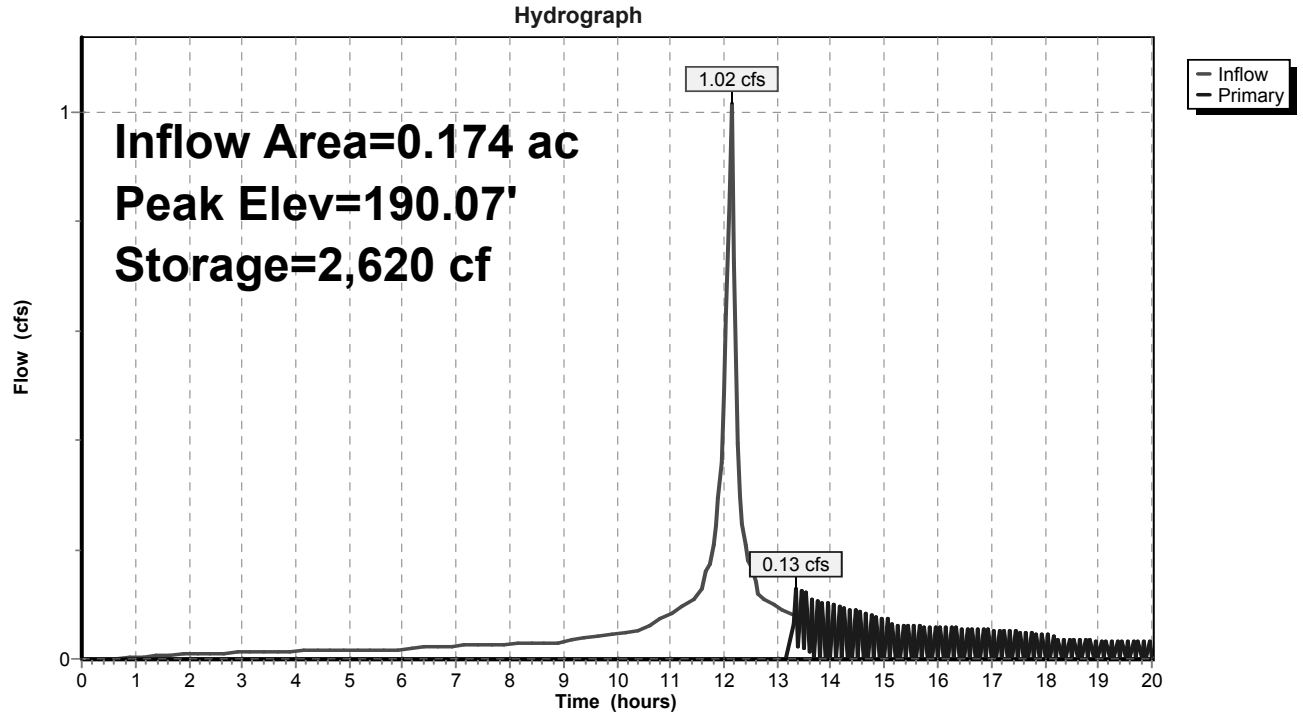
Plug-Flow detention time= 521.9 min calculated for 0.017 af (22% of inflow)
Center-of-Mass det. time= 244.1 min ( 953.1 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.13 cfs @ 13.35 hrs HW=190.07' TW=170.07' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.13 cfs @ 0.87 fps)

## Pond INF-ROOF-53: 362



## Summary for Pond INF-ROOF-55: 314

Inflow Area = 0.248 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.45 cfs @ 12.14 hrs, Volume= 0.110 af
Outflow = 0.60 cfs @ 12.40 hrs, Volume= 0.038 af, Atten= 59%, Lag= 15.4 min
Primary = 0.60 cfs @ 12.40 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.21' @ 12.40 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

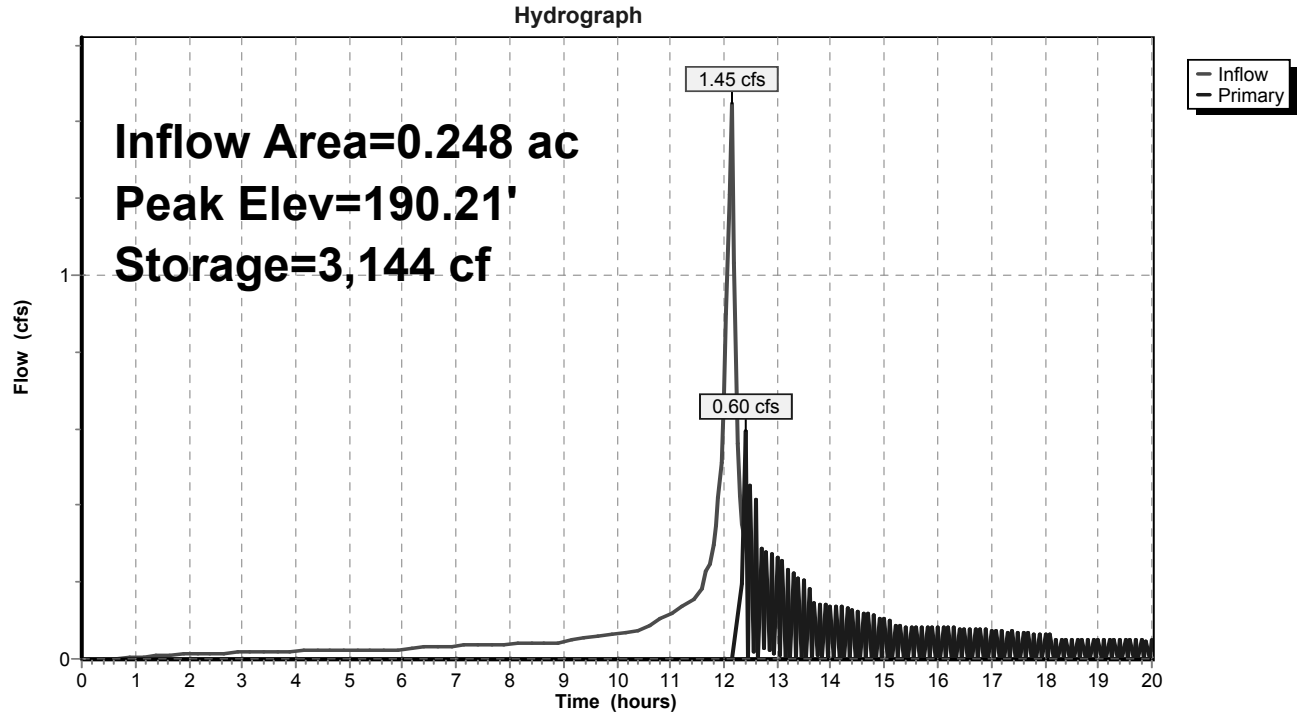
Plug-Flow detention time= 367.8 min calculated for 0.038 af (35% of inflow)
Center-of-Mass det. time= 177.4 min ( 886.4 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.60 cfs @ 12.40 hrs HW=190.21' TW=171.89' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.60 cfs @ 1.45 fps)

## Pond INF-ROOF-55: 314



## Summary for Pond INF-ROOF-62: 310

Inflow Area = 0.135 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.79 cfs @ 12.14 hrs, Volume= 0.060 af
Outflow = 0.89 cfs @ 12.11 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.11 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.27' @ 12.11 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

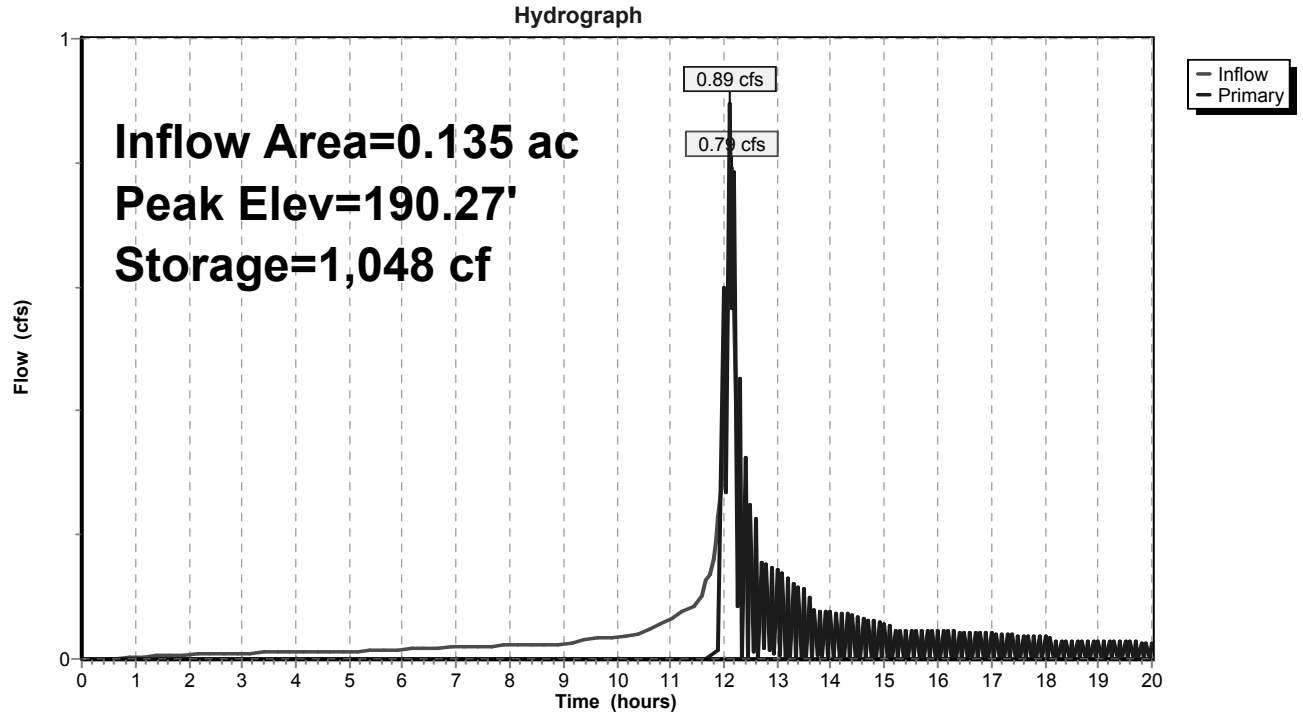
Plug-Flow detention time= 213.8 min calculated for 0.036 af (60% of inflow)
Center-of-Mass det. time= 110.3 min ( 819.2 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.83 cfs @ 12.11 hrs HW=190.26' TW=171.46' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.83 cfs @ 1.62 fps)

## Pond INF-ROOF-62: 310



## Summary for Pond INF-ROOF-63: 308

Inflow Area = 0.511 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 2.99 cfs @ 12.14 hrs, Volume= 0.227 af
Outflow = 2.92 cfs @ 12.14 hrs, Volume= 0.155 af, Atten= 2%, Lag= 0.0 min
Primary = 2.92 cfs @ 12.14 hrs, Volume= 0.155 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.63' @ 12.14 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

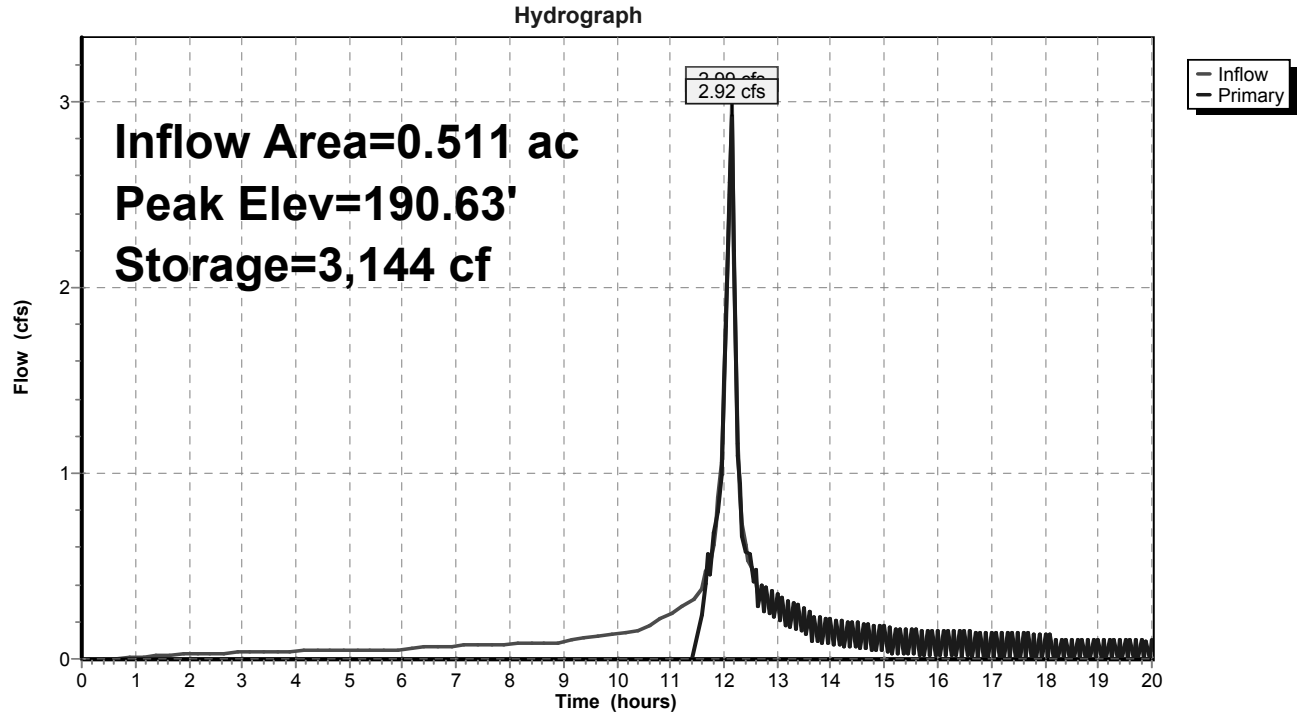
Plug-Flow detention time= 183.2 min calculated for 0.154 af (68% of inflow)
Center-of-Mass det. time= 96.7 min ( 805.6 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.85 cfs @ 12.14 hrs HW=190.62' TW=0.00' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 2.85 cfs @ 2.85 fps)

## Pond INF-ROOF-63: 308



## Summary for Pond INF-ROOF-67: 316

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.21 cfs @ 12.14 hrs, Volume= 0.092 af
Outflow = 1.13 cfs @ 12.13 hrs, Volume= 0.068 af, Atten= 6%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.13 hrs, Volume= 0.068 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.31' @ 12.13 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

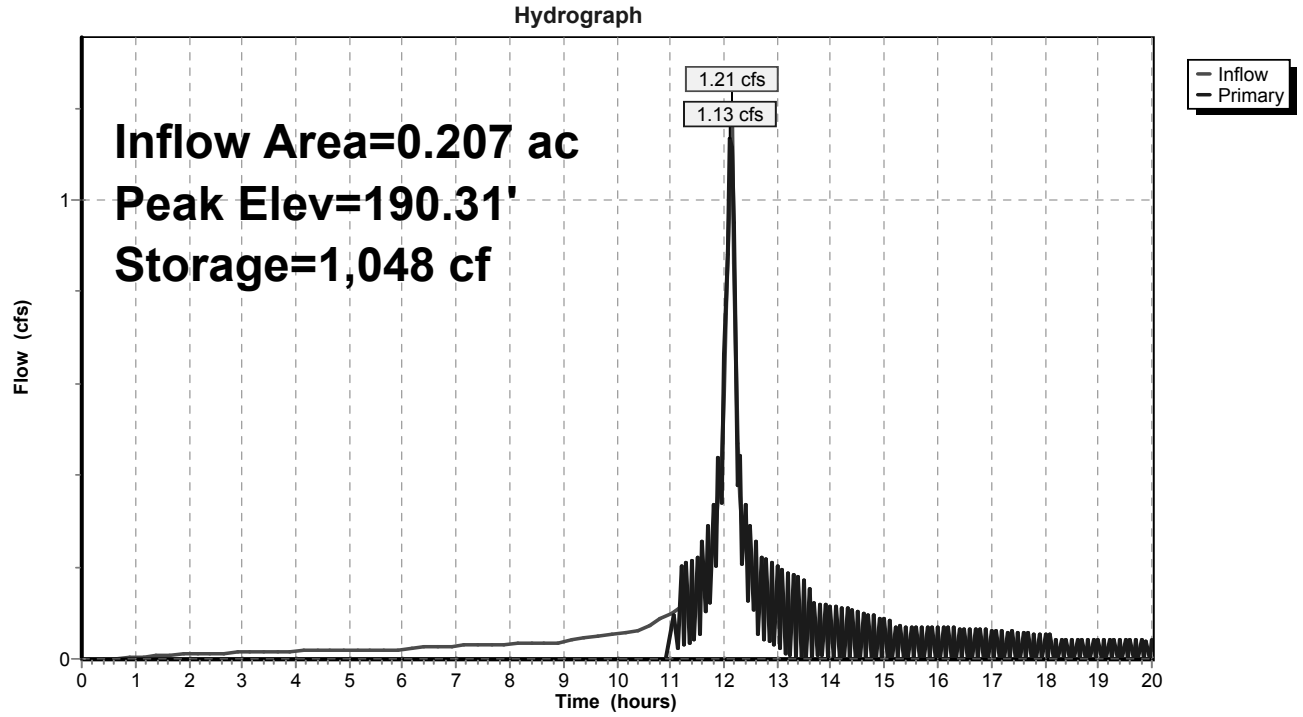
Plug-Flow detention time= 163.0 min calculated for 0.068 af (74% of inflow)
Center-of-Mass det. time= 87.0 min ( 796.0 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.11 cfs @ 12.13 hrs HW=190.31' TW=171.52' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.11 cfs @ 1.79 fps)

### Pond INF-ROOF-67: 316



## Summary for Pond INF-ROOF-71: 312

Inflow Area = 0.364 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 2.13 cfs @ 12.14 hrs, Volume= 0.162 af
Outflow = 2.28 cfs @ 12.11 hrs, Volume= 0.102 af, Atten= 0%, Lag= 0.0 min
Primary = 2.28 cfs @ 12.11 hrs, Volume= 0.102 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.50' @ 12.11 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

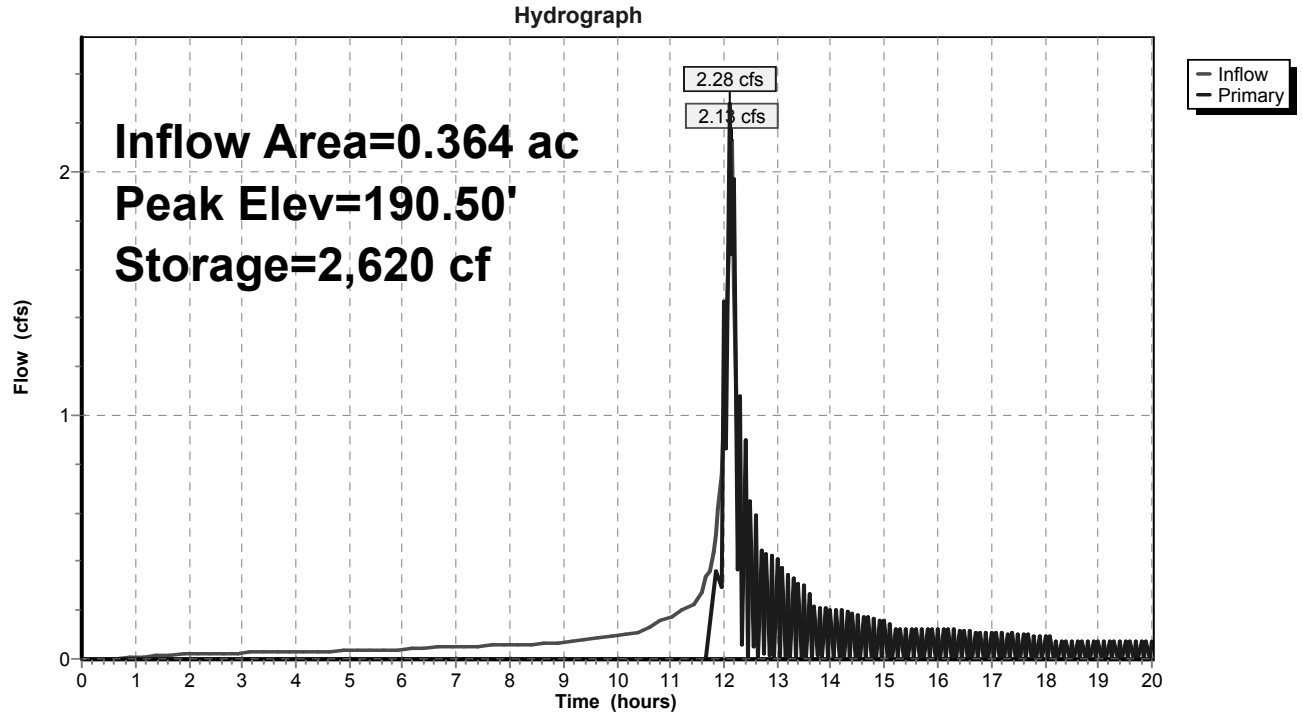
Plug-Flow detention time= 202.2 min calculated for 0.101 af (63% of inflow)
Center-of-Mass det. time= 105.4 min ( 814.4 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.12 cfs @ 12.11 hrs HW=190.48' TW=155.22' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 2.12 cfs @ 2.22 fps)

### Pond INF-ROOF-71: 312



## Summary for Pond INF-ROOF-76: 318

Inflow Area = 0.204 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.19 cfs @ 12.14 hrs, Volume= 0.091 af
Outflow = 0.37 cfs @ 12.45 hrs, Volume= 0.030 af, Atten= 69%, Lag= 18.4 min
Primary = 0.37 cfs @ 12.45 hrs, Volume= 0.030 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.15' @ 12.45 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

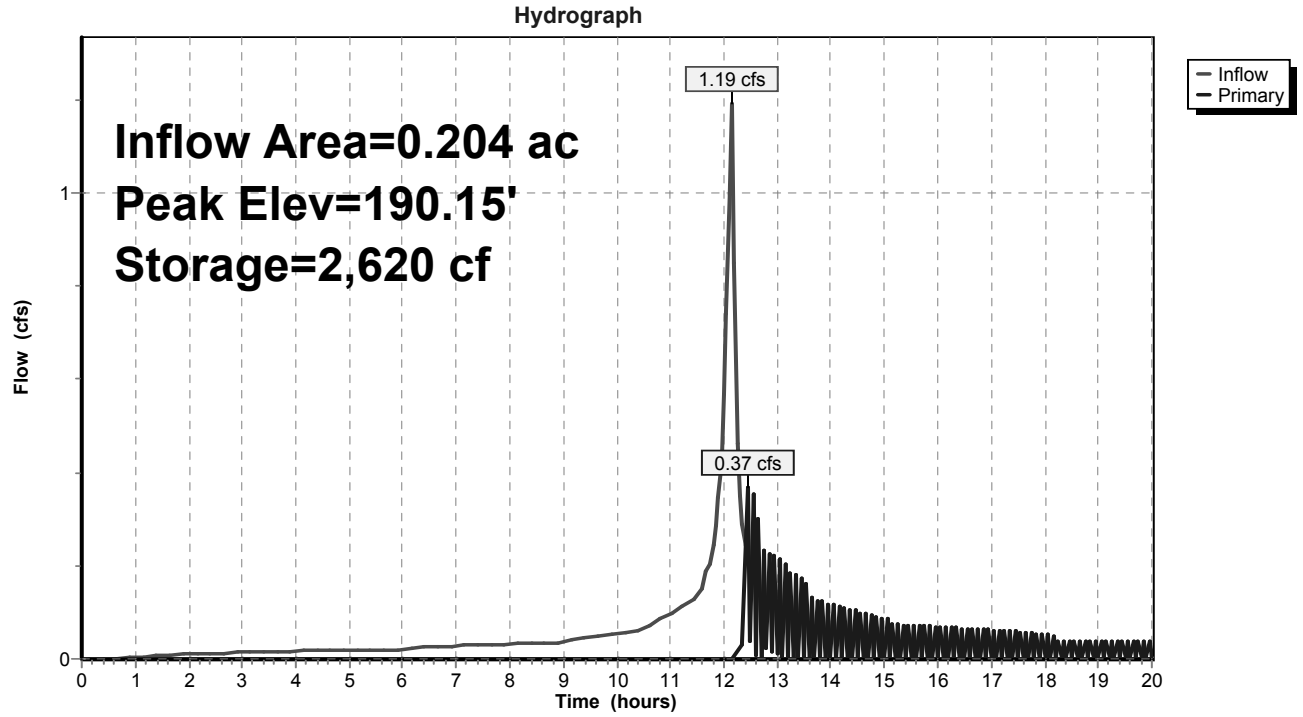
Plug-Flow detention time= 376.2 min calculated for 0.030 af (33% of inflow)
Center-of-Mass det. time= 180.6 min ( 889.6 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.37 cfs @ 12.45 hrs HW=190.15' TW=171.84' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.37 cfs @ 1.24 fps)

### Pond INF-ROOF-76: 318



## Summary for Pond INF-ROOF-89: 338

Inflow Area = 0.317 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.85 cfs @ 12.14 hrs, Volume= 0.141 af
Outflow = 0.30 cfs @ 13.25 hrs, Volume= 0.032 af, Atten= 84%, Lag= 66.4 min
Primary = 0.30 cfs @ 13.25 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 190.13' @ 13.25 hrs Surf.Area= 707 sf Storage= 4,716 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

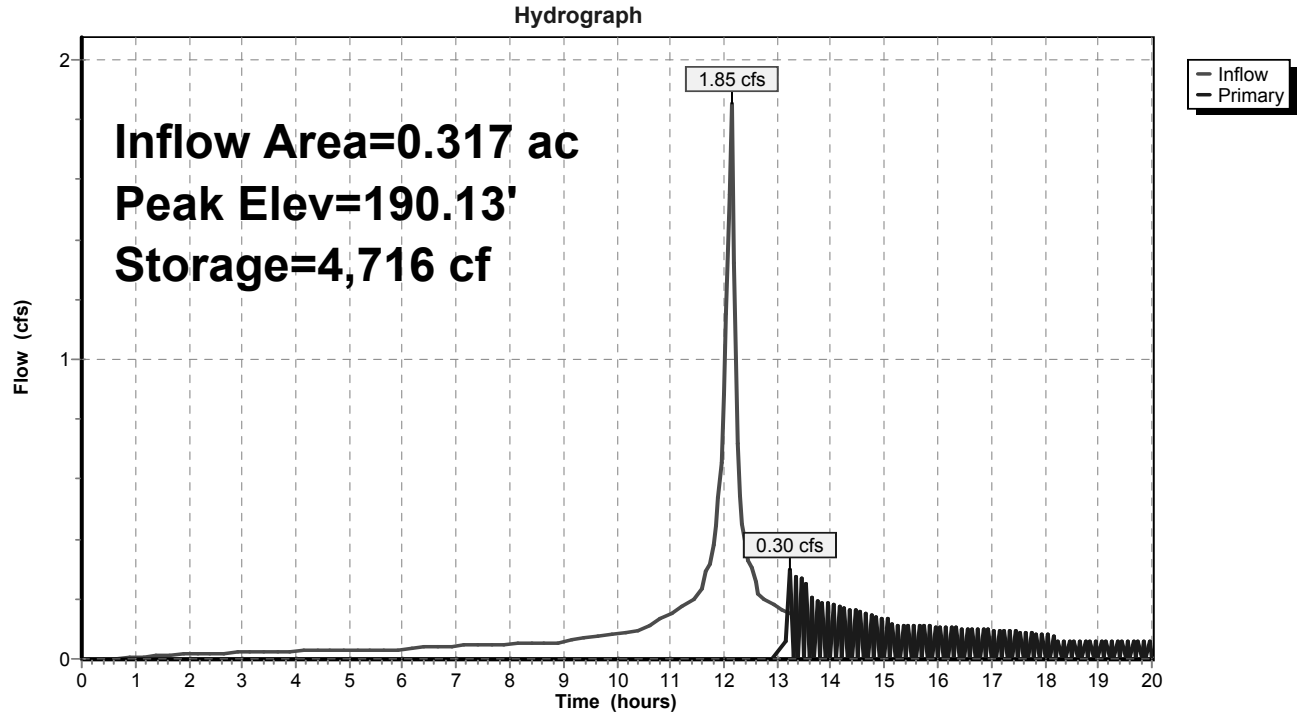
Plug-Flow detention time= 507.3 min calculated for 0.032 af (23% of inflow)
Center-of-Mass det. time= 237.7 min ( 946.7 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.30 cfs @ 13.25 hrs HW=190.13' TW=153.00' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.30 cfs @ 1.15 fps)

### Pond INF-ROOF-89: 338



## Summary for Pond INF-ROOF-90: 336

Inflow Area = 0.245 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.43 cfs @ 12.14 hrs, Volume= 0.109 af
Outflow = 0.37 cfs @ 12.45 hrs, Volume= 0.037 af, Atten= 74%, Lag= 18.2 min
Primary = 0.37 cfs @ 12.45 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.15' @ 12.45 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

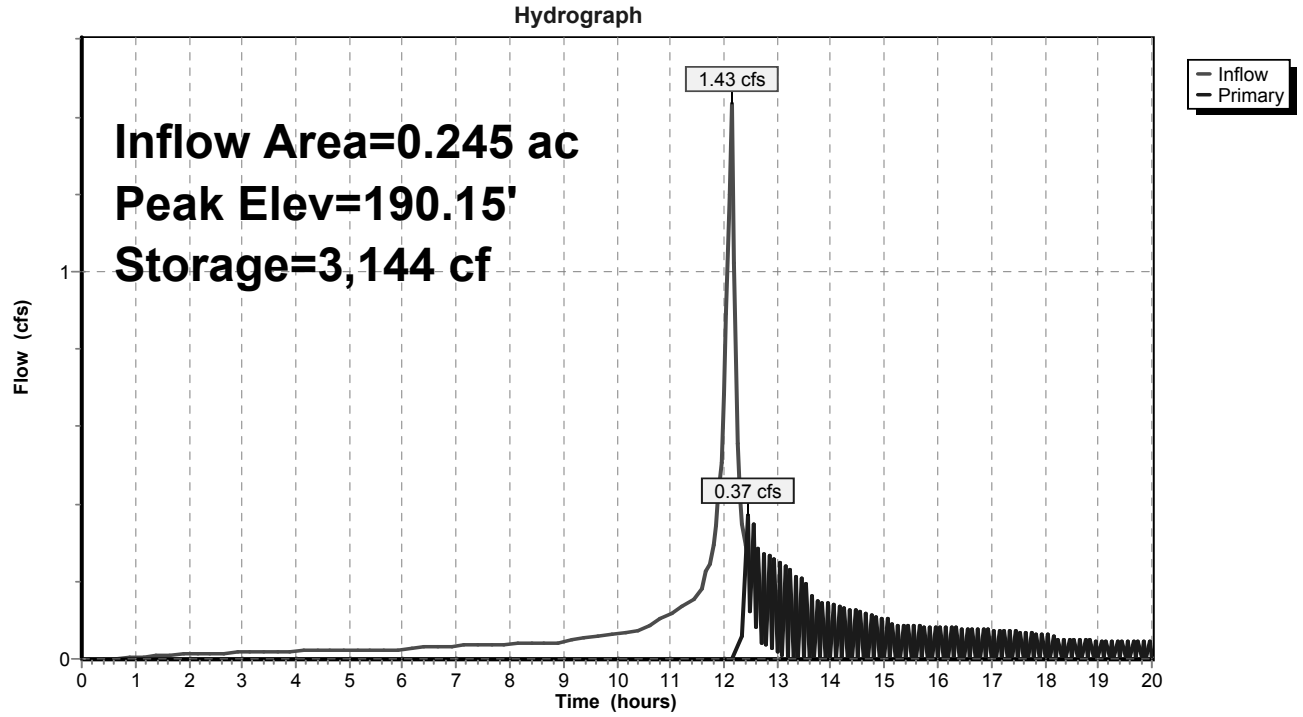
Plug-Flow detention time= 374.8 min calculated for 0.037 af (34% of inflow)
Center-of-Mass det. time= 180.0 min ( 889.0 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.36 cfs @ 12.45 hrs HW=190.15' TW=169.49' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.36 cfs @ 1.22 fps)

## Pond INF-ROOF-90: 336



## Summary for Pond INF-ROOF-94: 342

Inflow Area = 0.136 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.80 cfs @ 12.14 hrs, Volume= 0.061 af
Outflow = 0.73 cfs @ 12.25 hrs, Volume= 0.024 af, Atten= 8%, Lag= 6.4 min
Primary = 0.73 cfs @ 12.25 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.23' @ 12.25 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

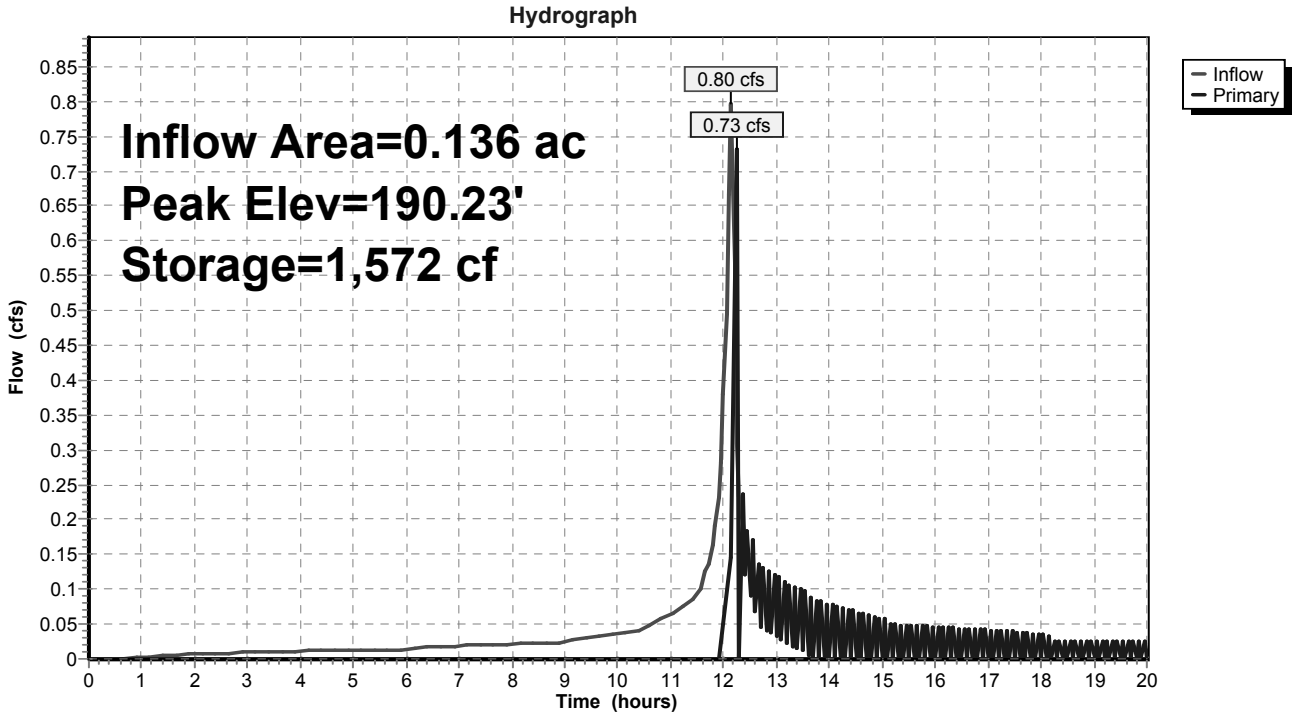
Plug-Flow detention time= 317.2 min calculated for 0.024 af (40% of inflow)
Center-of-Mass det. time= 154.7 min ( 863.7 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.73 cfs @ 12.25 hrs HW=190.23' TW=163.69' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.73 cfs @ 1.56 fps)

## Pond INF-ROOF-94: 342



## Summary for Pond INF-ROOF-95: 340

Inflow Area = 0.154 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 0.90 cfs @ 12.14 hrs, Volume= 0.068 af
Outflow = 1.00 cfs @ 12.19 hrs, Volume= 0.032 af, Atten= 0%, Lag= 2.8 min
Primary = 1.00 cfs @ 12.19 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.28' @ 12.20 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

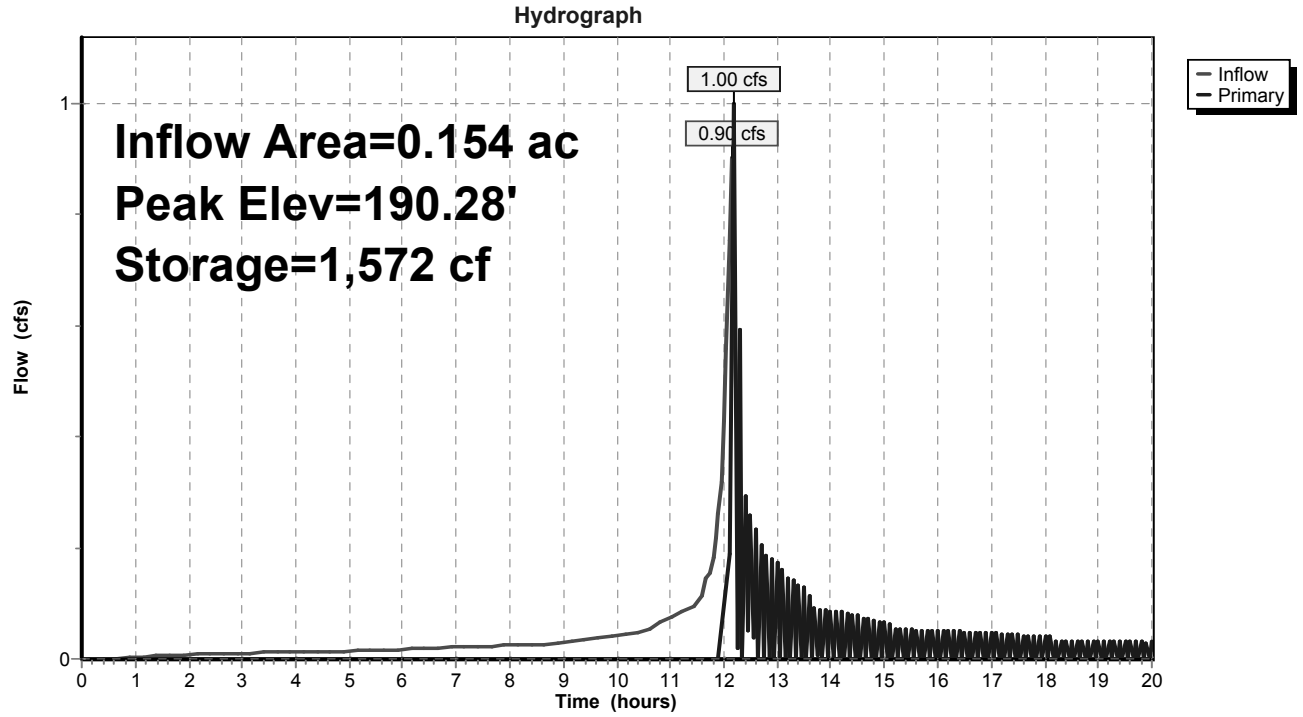
Plug-Flow detention time= 272.2 min calculated for 0.032 af (47% of inflow)
Center-of-Mass det. time= 136.0 min ( 844.9 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.88 cfs @ 12.19 hrs HW=190.27' TW=153.22' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.88 cfs @ 1.66 fps)

### Pond INF-ROOF-95: 340



## Summary for Pond INF-ROOF-96: 344

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 5.33" for 25_year event
Inflow = 1.21 cfs @ 12.14 hrs, Volume= 0.092 af
Outflow = 1.13 cfs @ 12.13 hrs, Volume= 0.068 af, Atten= 6%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.13 hrs, Volume= 0.068 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.31' @ 12.13 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

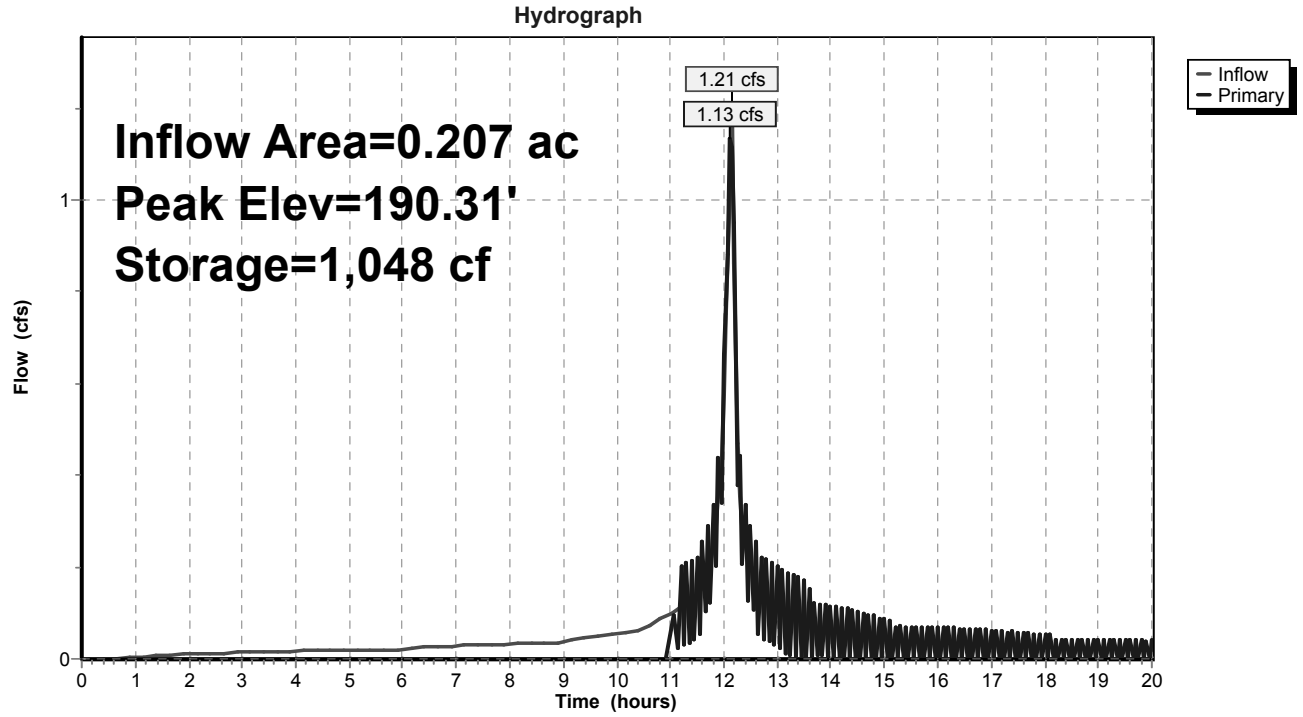
Plug-Flow detention time= 163.7 min calculated for 0.068 af (74% of inflow)
Center-of-Mass det. time= 87.0 min ( 796.0 - 709.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.11 cfs @ 12.13 hrs HW=190.31' TW=163.66' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.11 cfs @ 1.79 fps)

### Pond INF-ROOF-96: 344



## Summary for Pond P E 1.1A: 284

Inflow Area = 21.860 ac, 1.84% Impervious, Inflow Depth > 0.44" for 25_year event
Inflow = 11.02 cfs @ 12.23 hrs, Volume= 0.808 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 133.84' @ 20.00 hrs Surf.Area= 42,914 sf Storage= 35,178 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

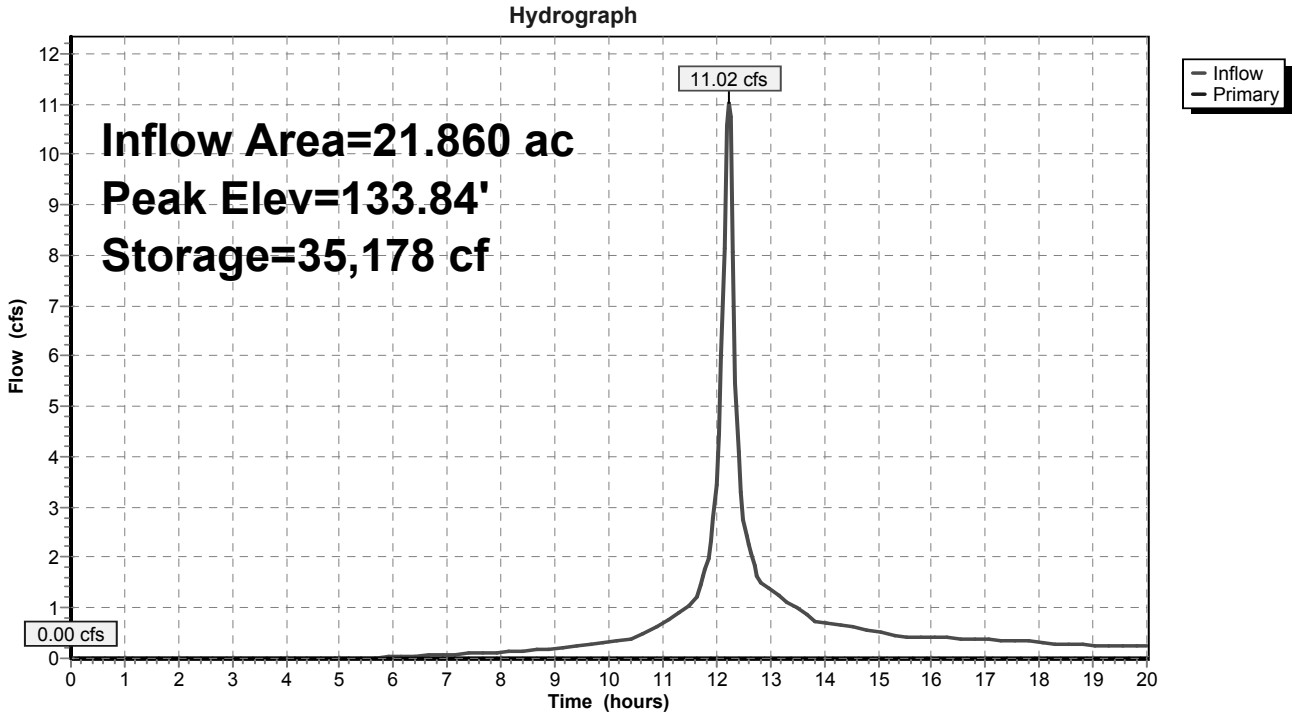
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 19.156 ac, 1.06% Impervious, Inflow Depth > 1.57" for 25_year event
Inflow = 27.33 cfs @ 12.27 hrs, Volume= 2.506 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 146.62' @ 20.00 hrs Surf.Area= 81,785 sf Storage= 109,056 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

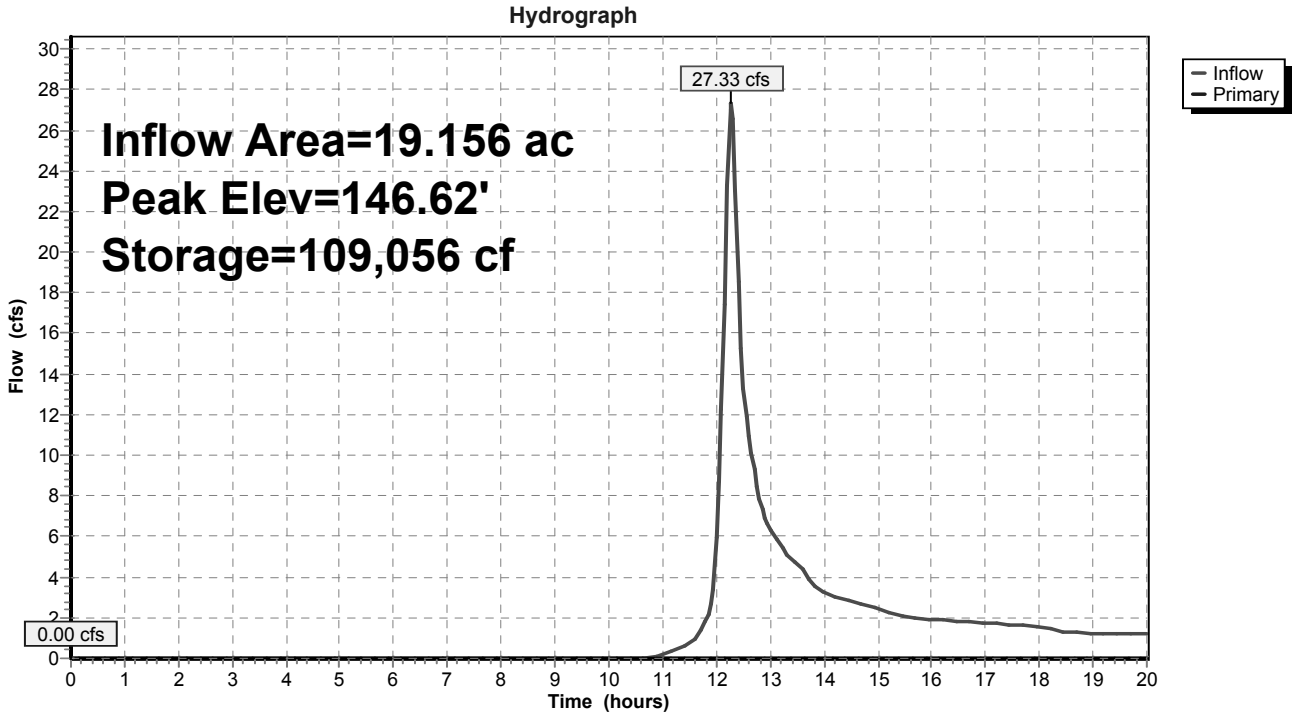
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=142.00' TW=133.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.2A: 282

Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 2.37" for 25_year event
Inflow = 18.76 cfs @ 12.30 hrs, Volume= 1.519 af
Outflow = 0.95 cfs @ 16.08 hrs, Volume= 0.332 af, Atten= 95%, Lag= 226.7 min
Primary = 0.95 cfs @ 16.08 hrs, Volume= 0.332 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 135.03' @ 16.08 hrs Surf.Area= 59,029 sf Storage= 52,242 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= 346.9 min calculated for 0.332 af (22% of inflow)
Center-of-Mass det. time= 223.8 min ( 1,041.5 - 817.7 )

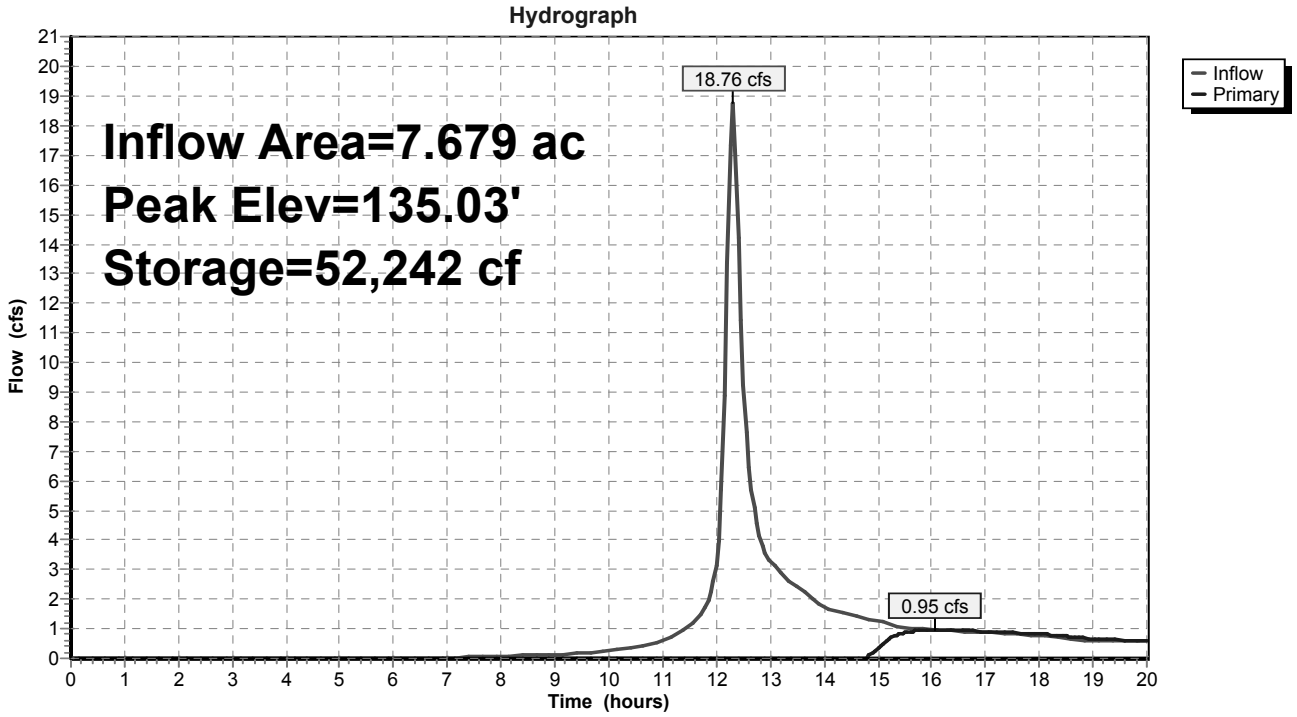
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.95 cfs @ 16.08 hrs HW=135.03' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 0.95 cfs @ 0.59 fps)

## Pond P E 1.2A: 282



## Summary for Pond P E-CULV-S: 231

Inflow Area = 4.510 ac, 0.93% Impervious, Inflow Depth > 1.95" for 25_year event
Inflow = 9.35 cfs @ 12.28 hrs, Volume= 0.734 af
Outflow = 9.00 cfs @ 12.31 hrs, Volume= 0.723 af, Atten= 4%, Lag= 1.9 min
Primary = 9.00 cfs @ 12.31 hrs, Volume= 0.723 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 168.83' @ 12.31 hrs Surf.Area= 2,702 sf Storage= 1,631 cf
Flood Elev= 171.00' Surf.Area= 9,105 sf Storage= 14,267 cf

Plug-Flow detention time= 10.1 min calculated for 0.723 af (99% of inflow)
Center-of-Mass det. time= 4.7 min ( 832.0 - 827.3 )

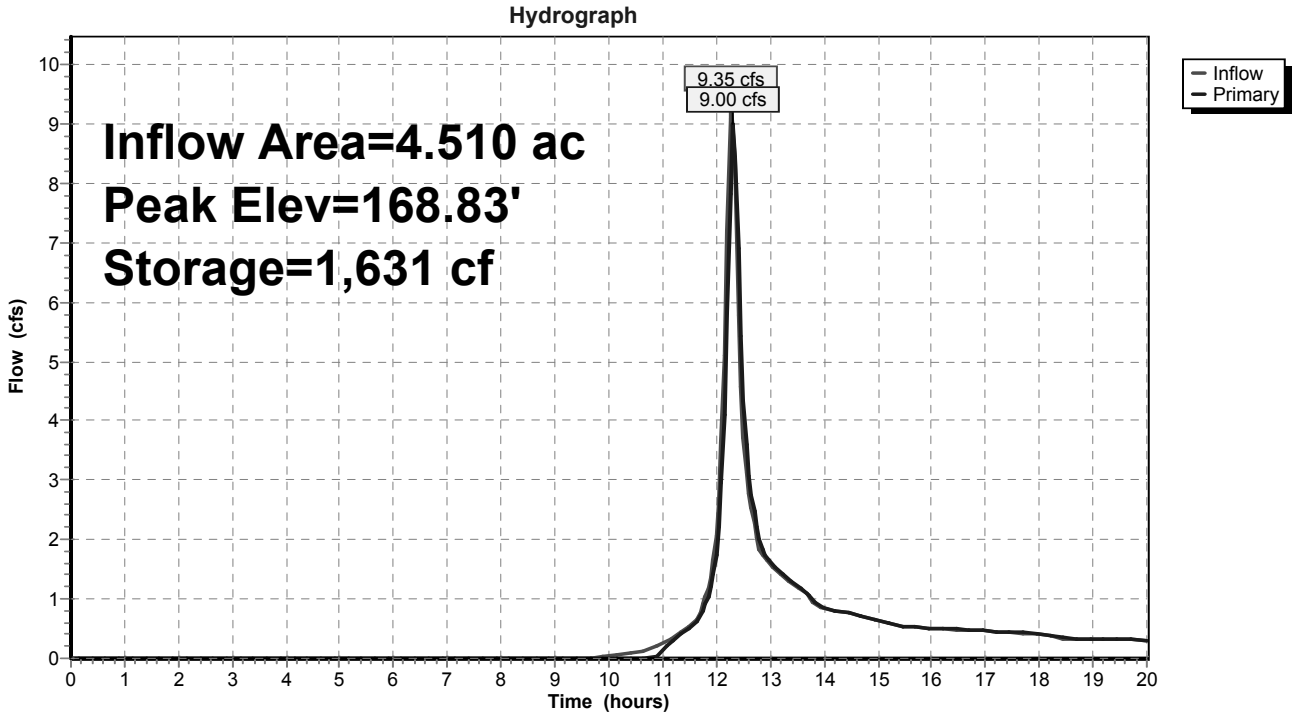
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 14,267 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 1,243 | 0 | 0 |
| 169.00 | 3,008 | 2,125 | 2,125 |
| 170.00 | 6,086 | 4,547 | 6,672 |
| 171.00 | 9,105 | 7,595 | 14,267 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 236.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 158.00' S= 0.0254 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 168.25' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=8.88 cfs @ 12.31 hrs HW=168.82' TW=144.59' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 8.88 cfs of 18.44 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 8.88 cfs @ 2.47 fps)

## Pond P E-CULV-S: 231



## Summary for Pond P INF-E-1:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.385 ac, 0.00% Impervious, Inflow Depth > 2.91" for 25_year event
Inflow = 4.20 cfs @ 12.25 hrs, Volume= 0.336 af
Outflow = 1.11 cfs @ 12.57 hrs, Volume= 0.198 af, Atten= 73%, Lag= 18.8 min
Discarded = 0.02 cfs @ 10.80 hrs, Volume= 0.025 af
Primary = 1.09 cfs @ 12.57 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 165.63' @ 12.57 hrs Surf.Area= 3,441 sf Storage= 6,801 cf
Flood Elev= 168.50' Surf.Area= 3,441 sf Storage= 7,308 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 73.6 min ( 870.1 - 796.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 162.50' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 163.00' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | x 2.00 = 7,308 cf Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 364.90' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #2 | Device 3 | 165.00' | **9.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Primary | 160.50' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 160.50' / 159.50' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #4 | Discarded | 162.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 10.80 hrs HW=163.00' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=1.09 cfs @ 12.57 hrs HW=165.63' TW=152.06' (Dynamic Tailwater)
└**3=RCP_Round 18"** (Passes 1.09 cfs of 13.84 cfs potential flow)
  ├**1=Bleeder at WQT Vol** ( Controls 0.00 cfs)
  └**2=Orifice/Grate Overflow** (Orifice Controls 1.09 cfs @ 2.90 fps)

## Pond P INF-E-1: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

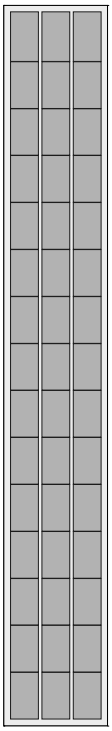
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

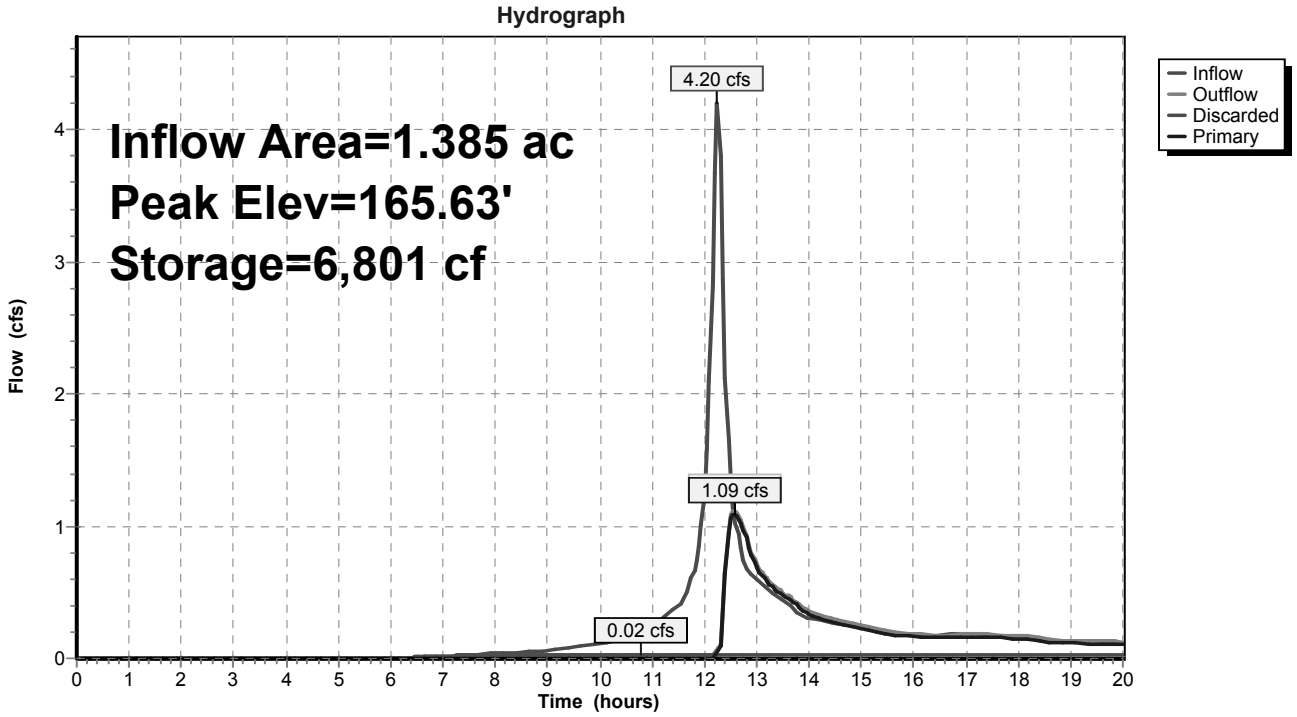
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-1:


Hydrograph
Inflow Area=1.385 ac
Peak Elev=165.63'
Storage=6,801 cf
4.20 cfs
1.09 cfs
0.02 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P INF-E-2: 142

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 3.69" for 25_year event
Inflow = 4.81 cfs @ 12.24 hrs, Volume= 0.359 af
Outflow = 4.59 cfs @ 12.26 hrs, Volume= 0.291 af, Atten= 4%, Lag= 1.3 min
Discarded = 0.01 cfs @ 8.80 hrs, Volume= 0.013 af
Primary = 4.58 cfs @ 12.26 hrs, Volume= 0.278 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 167.37' @ 12.26 hrs Surf.Area= 1,721 sf Storage= 3,564 cf
Flood Elev= 169.60' Surf.Area= 1,721 sf Storage= 3,654 cf

Plug-Flow detention time= 93.6 min calculated for 0.291 af (81% of inflow)
Center-of-Mass det. time= 37.7 min ( 818.3 - 780.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 164.00' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 164.50' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 166.50' | **18.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 4 | 167.00' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary overflow**<br>C= 0.600 |
| #3 | Device 4 | 366.40' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #4 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #5 | Discarded | 164.00' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 8.80 hrs HW=164.51' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=4.53 cfs @ 12.26 hrs HW=167.36' TW=160.20' (Dynamic Tailwater)
└**4=RCP_Round 18"** (Passes 4.53 cfs of 14.19 cfs potential flow)
  ├**1=Orifice/Grate Overflow** (Orifice Controls 2.80 cfs @ 3.74 fps)
  ├**2=Orifice/Grate Overflow - auxiliary overflow**(Orifice Controls 1.73 cfs @ 2.31 fps)
  └**3=Bleeder at WQT Vol** ( Controls 0.00 cfs)

## Pond P INF-E-2: 142 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

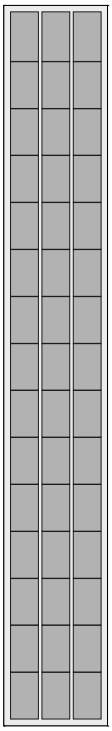
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

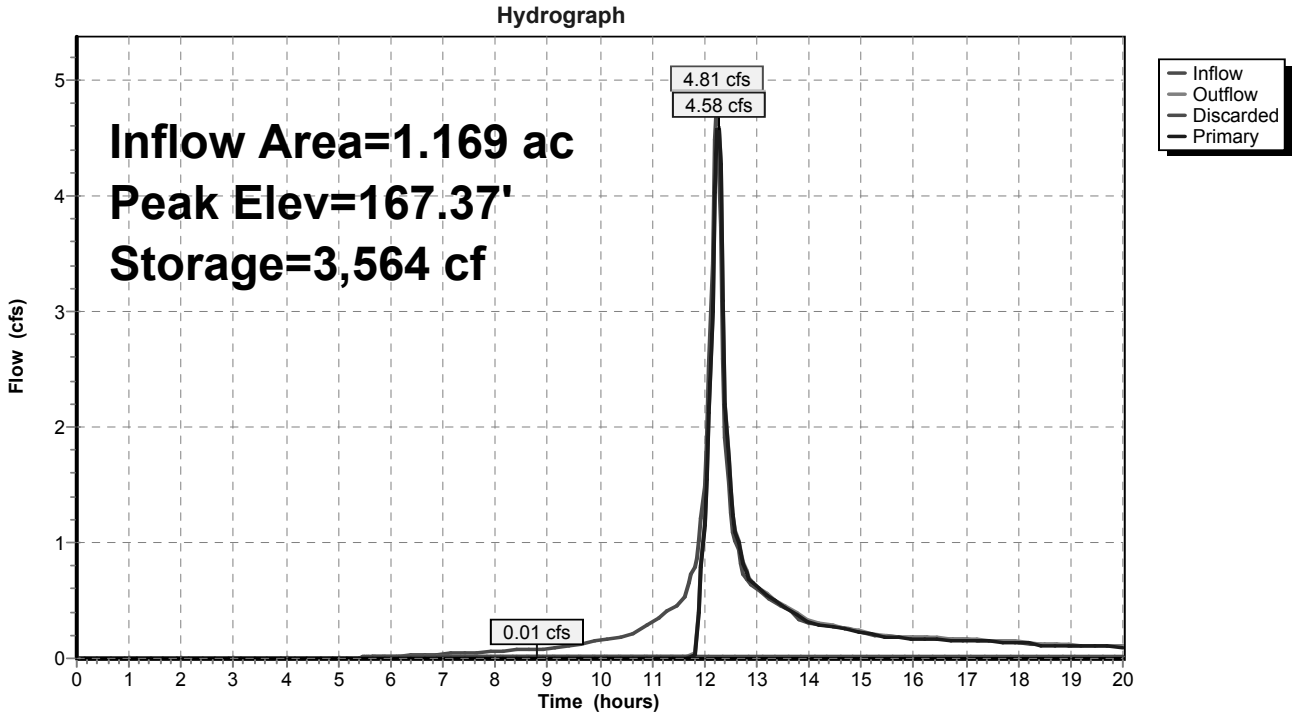
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-2: 142



## Summary for Pond P INF-E-3:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 6.824 ac, 5.44% Impervious, Inflow Depth > 2.87" for 25_year event
Inflow = 17.78 cfs @ 12.24 hrs, Volume= 1.631 af
Outflow = 15.86 cfs @ 12.31 hrs, Volume= 1.218 af, Atten= 11%, Lag= 4.4 min
Discarded = 0.02 cfs @ 6.95 hrs, Volume= 0.036 af
Primary = 15.84 cfs @ 12.31 hrs, Volume= 1.182 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.62' @ 12.31 hrs Surf.Area= 6,283 sf Storage= 21,129 cf
Flood Elev= 174.75' Surf.Area= 6,283 sf Storage= 21,456 cf

Plug-Flow detention time= 115.9 min calculated for 1.218 af (75% of inflow)
Center-of-Mass det. time= 46.9 min ( 845.0 - 798.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.25' | 8,735 cf | **44.25'W x 142.00'L x 5.50'H Field A**<br>34,558 cf Overall - 12,722 cf Embedded = 21,837 cf x 40.0% Voids |
| #2A | 168.00' | 12,722 cf | **ADS_StormTech MC-3500 c +Cap**x 114 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf |
| | | 21,456 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.75' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.75' / 161.75' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 171.25' | **14.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Device 1 | 171.75' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary X 4.00**<br>C= 0.600 |
| #4 | Device 1 | 169.35' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #5 | Discarded | 167.25' | **0.170 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 6.95 hrs HW=167.33' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=15.70 cfs @ 12.31 hrs HW=172.61' TW=161.55' (Dynamic Tailwater)
└**1=Culvert** (Passes 15.70 cfs of 39.04 cfs potential flow)
  ├**2=Orifice/Grate Overflow** (Orifice Controls 2.95 cfs @ 5.05 fps)
  ├**3=Orifice/Grate Overflow - auxiliary** (Orifice Controls 12.33 cfs @ 4.11 fps)
  └**4=Bleeder at WQT Vol** (Orifice Controls 0.42 cfs @ 8.52 fps)

## Pond P INF-E-3: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

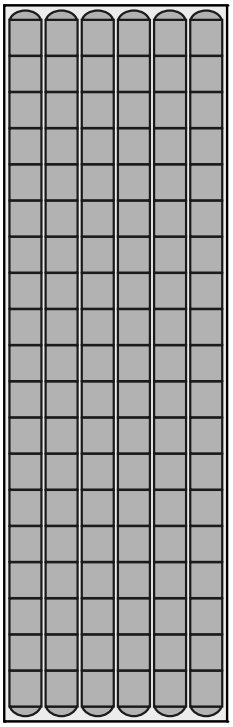
19 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 140.00' Row Length +12.0" End Stone x 2 = 142.00' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

114 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 6 Rows = 12,721.7 cf Chamber Storage

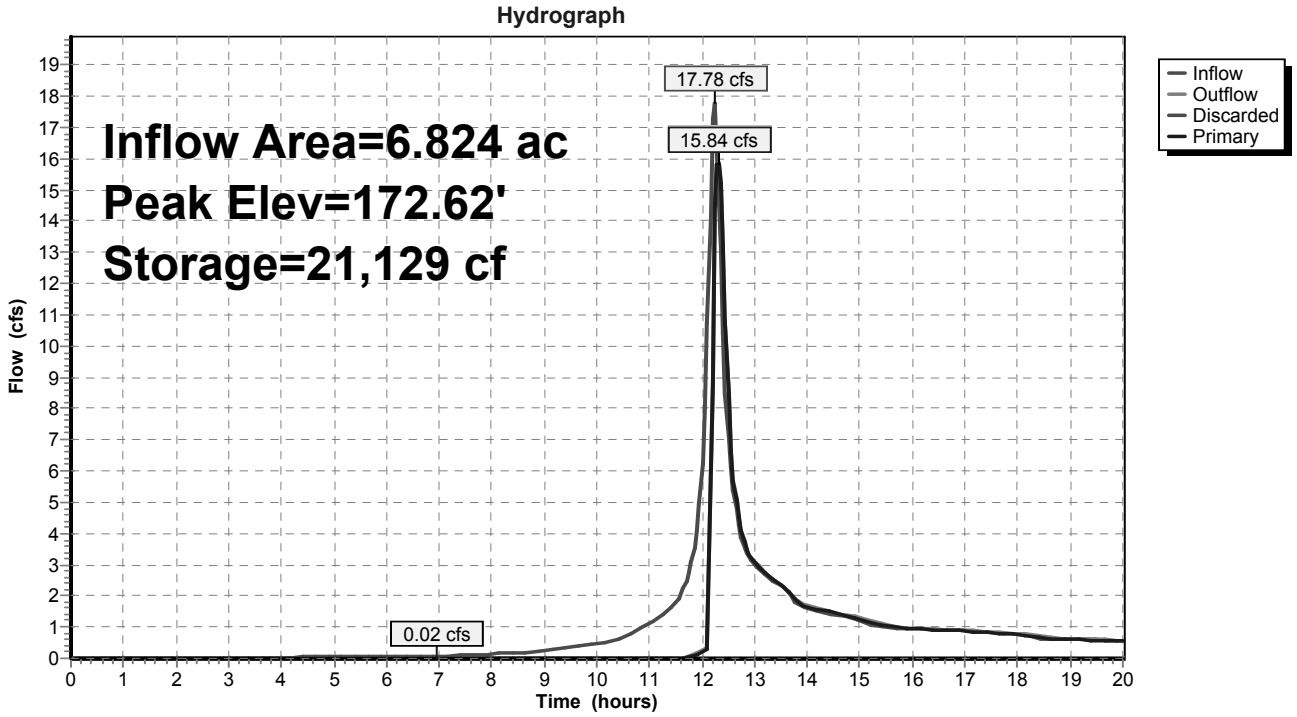
34,558.4 cf Field - 12,721.7 cf Chambers = 21,836.7 cf Stone x 40.0% Voids = 8,734.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,456.4 cf = 0.493 af
Overall Storage Efficiency = 62.1%

114 Chambers
1,279.9 cy Field
808.8 cy Stone



## Pond P INF-E-3:


Hydrograph
Inflow Area=6.824 ac
Peak Elev=172.62'
Storage=21,129 cf
17.78 cfs
15.84 cfs
0.02 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

## Summary for Pond P INF-E-4A: 145

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.603 ac, 0.00% Impervious, Inflow Depth > 2.79" for 25_year event
Inflow = 4.23 cfs @ 12.26 hrs, Volume= 0.372 af
Outflow = 0.68 cfs @ 13.19 hrs, Volume= 0.261 af, Atten= 84%, Lag= 56.2 min
Discarded = 0.01 cfs @ 11.05 hrs, Volume= 0.010 af
Primary = 0.67 cfs @ 13.19 hrs, Volume= 0.252 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.89' @ 13.19 hrs Surf.Area= 2,089 sf Storage= 6,936 cf
Flood Elev= 175.00' Surf.Area= 2,089 sf Storage= 7,026 cf

Plug-Flow detention time= 165.7 min calculated for 0.261 af (70% of inflow)
Center-of-Mass det. time= 91.2 min ( 920.5 - 829.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 2,974 cf | **22.75'W x 91.81'L x 5.50'H Field A**<br>11,487 cf Overall - 4,052 cf Embedded = 7,435 cf x 40.0% Voids |
| #2A | 168.25' | 4,052 cf | **ADS_StormTech MC-3500 c +Cap**x 36 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 7,026 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 171.50' | **3.0" Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 3 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #3 | Primary | 168.00' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #4 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 11.05 hrs HW=167.61' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=0.67 cfs @ 13.19 hrs HW=172.89' TW=162.49' (Dynamic Tailwater)
└**3=Culvert** (Passes 0.67 cfs of 25.88 cfs potential flow)
  ├**1=Orifice/Grate Overflow** (Orifice Controls 0.27 cfs @ 5.42 fps)
  └**2=Bleeder** (Orifice Controls 0.40 cfs @ 8.15 fps)

## Pond P INF-E-4A: 145 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

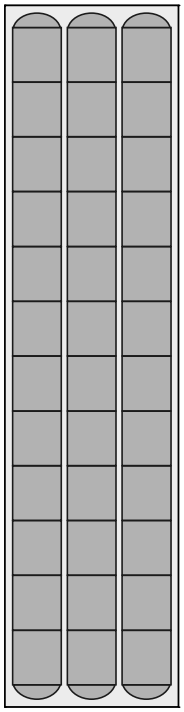
12 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 89.81' Row Length +12.0" End Stone x 2 = 91.81' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

36 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 4,051.9 cf Chamber Storage

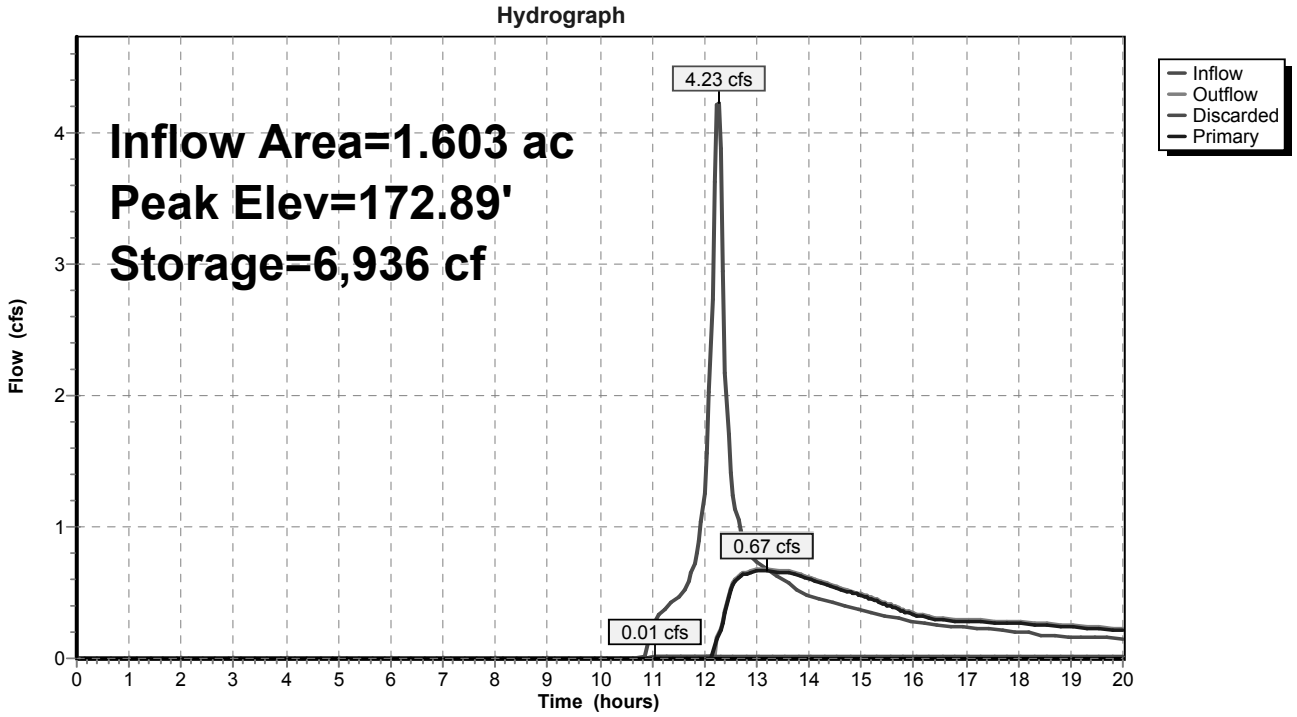
11,487.3 cf Field - 4,051.9 cf Chambers = 7,435.4 cf Stone x 40.0% Voids = 2,974.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,026.0 cf = 0.161 af
Overall Storage Efficiency = 61.2%

36 Chambers
425.5 cy Field
275.4 cy Stone



## Pond P INF-E-4A: 145



## Summary for Pond P INF-E-4B: 140

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth > 4.87" for 25_year event
Inflow = 3.36 cfs @ 12.14 hrs, Volume= 0.240 af
Outflow = 3.04 cfs @ 12.17 hrs, Volume= 0.188 af, Atten= 10%, Lag= 1.9 min
Discarded = 0.01 cfs @ 3.70 hrs, Volume= 0.012 af
Primary = 3.03 cfs @ 12.17 hrs, Volume= 0.176 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.56' @ 12.17 hrs Surf.Area= 1,273 sf Storage= 4,018 cf
Flood Elev= 175.00' Surf.Area= 1,273 sf Storage= 4,242 cf

Plug-Flow detention time= 153.3 min calculated for 0.188 af (79% of inflow)
Center-of-Mass det. time= 88.9 min ( 823.8 - 734.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 1,840 cf | **22.75'W x 55.96'L x 5.50'H Field A**<br>7,002 cf Overall - 2,403 cf Embedded = 4,599 cf x 40.0% Voids |
| #2A | 168.25' | 2,403 cf | **ADS_StormTech MC-3500 c +Cap**x 21 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 4,242 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.90' | **18.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.90' / 166.80' S= 0.0005 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.50' | **3.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 172.00' | **36.0" W x 3.0" H Vert. Orifice/Grate-auxiliary** C= 0.600 |
| #4 | Device 1 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #5 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 3.70 hrs HW=167.58' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=2.87 cfs @ 12.17 hrs HW=172.52' TW=162.79' (Dynamic Tailwater)
└**1=Culvert** (Passes 2.87 cfs of 13.22 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.22 cfs @ 4.56 fps)
  ├**3=Orifice/Grate-auxiliary** (Orifice Controls 2.27 cfs @ 3.03 fps)
  └**4=Bleeder** (Orifice Controls 0.37 cfs @ 7.61 fps)

## Pond P INF-E-4B: 140 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

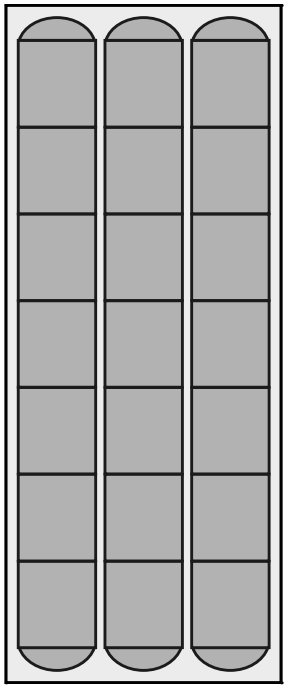
7 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 53.96' Row Length +12.0" End Stone x 2 = 55.96' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

21 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 2,402.6 cf Chamber Storage

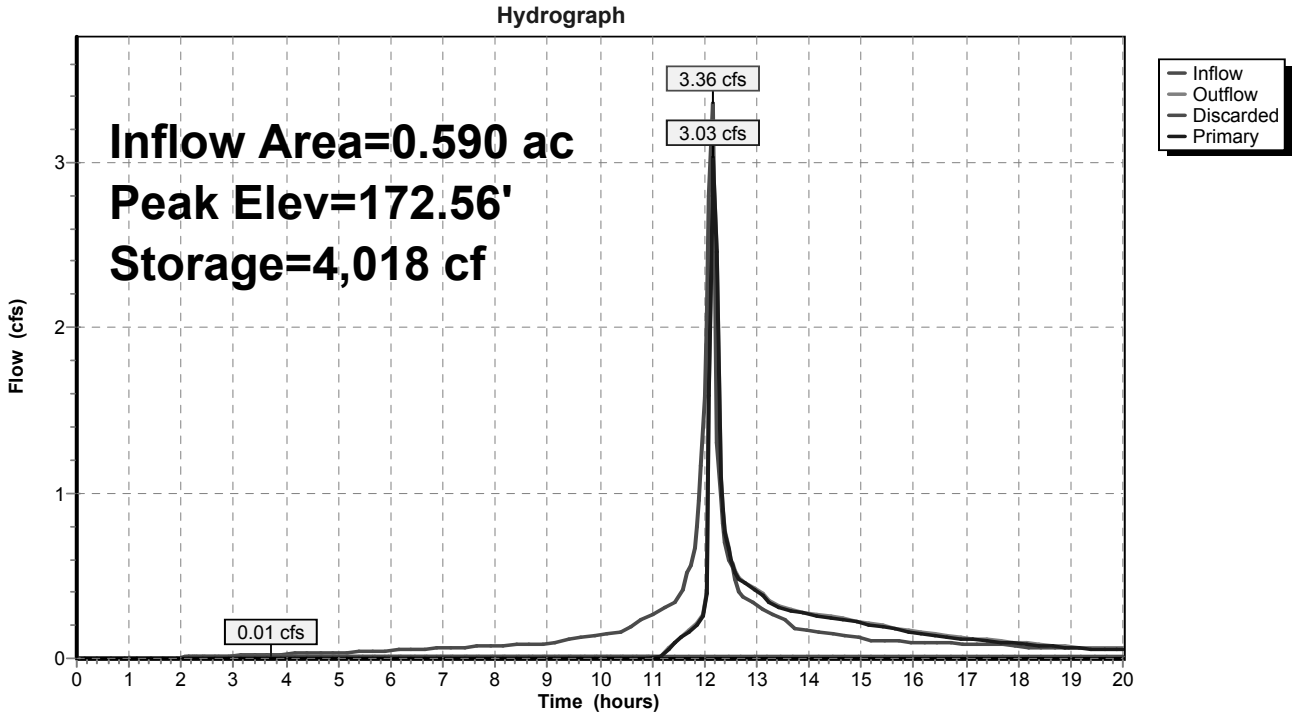
7,001.6 cf Field - 2,402.6 cf Chambers = 4,599.0 cf Stone x 40.0% Voids = 1,839.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,242.2 cf = 0.097 af
Overall Storage Efficiency = 60.6%

21 Chambers
259.3 cy Field
170.3 cy Stone



## Pond P INF-E-4B: 140



## Summary for Pond P MH-CULV-NA: 114

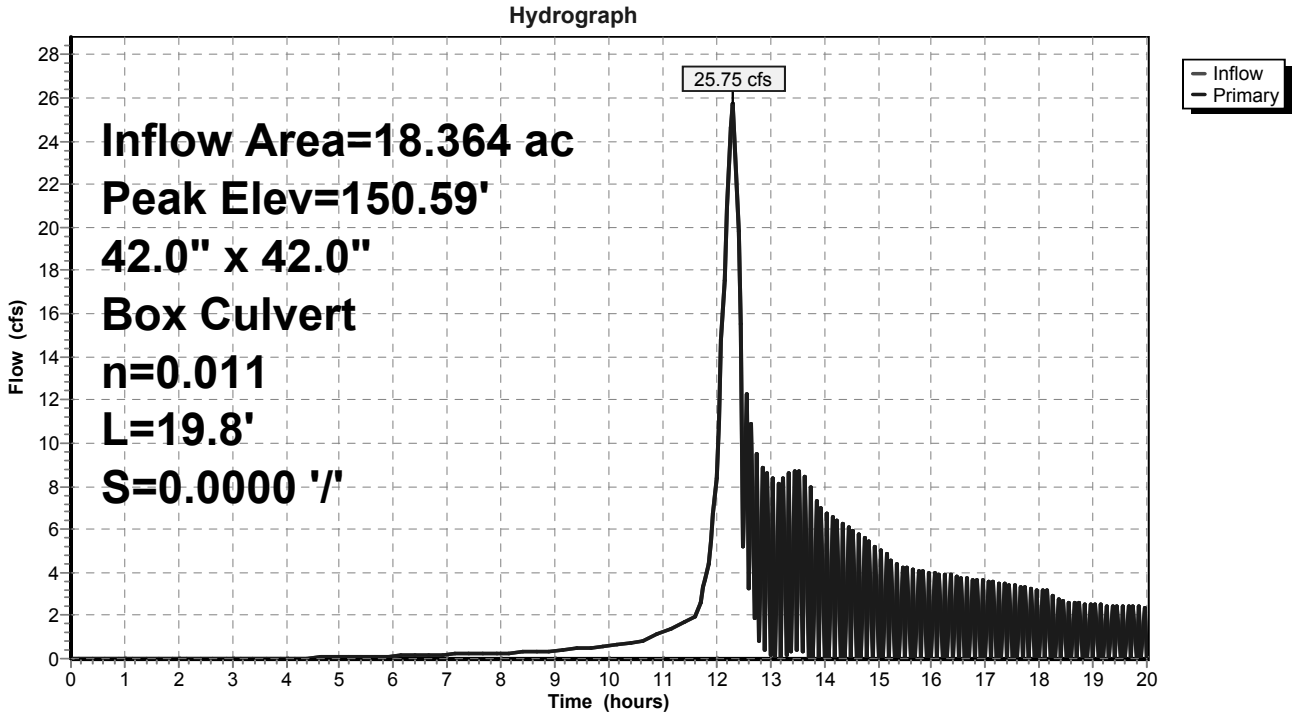
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.74" for 25_year event
Inflow = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af
Outflow = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af, Atten= 0%, Lag= 0.0 min
Primary = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.59' @ 12.29 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=25.53 cfs @ 12.29 hrs HW=150.58' TW=150.31' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 25.53 cfs @ 2.43 fps)

## Pond P MH-CULV-NA: 114



## Summary for Pond P MH-CULV-NB: 115

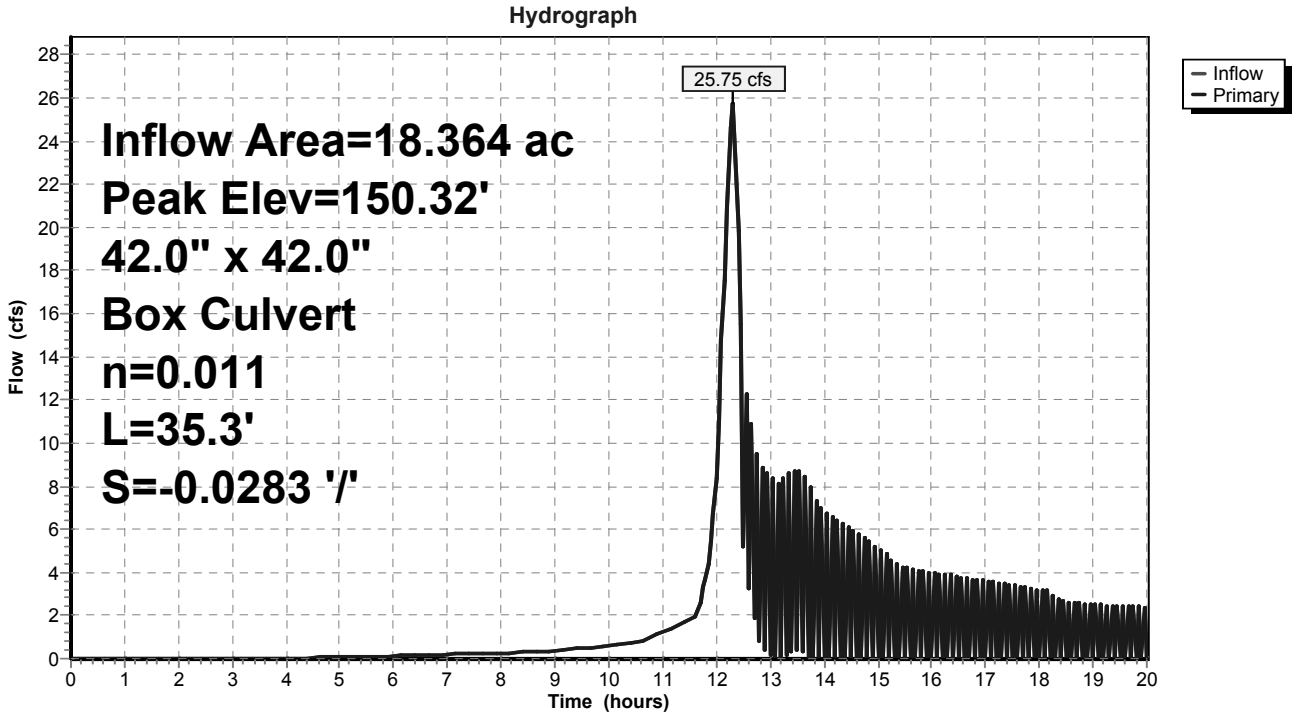
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.74" for 25_year event
Inflow = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af
Outflow = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af, Atten= 0%, Lag= 0.0 min
Primary = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.32' @ 12.29 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=25.53 cfs @ 12.29 hrs HW=150.31' TW=0.00' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 25.53 cfs @ 4.22 fps)

## Pond P MH-CULV-NB: 115



## Summary for Pond P RG-E-7:

Inflow Area = 0.951 ac, 0.00% Impervious, Inflow Depth > 4.42" for 25_year event
Inflow = 4.50 cfs @ 12.23 hrs, Volume= 0.350 af
Outflow = 4.23 cfs @ 12.26 hrs, Volume= 0.295 af, Atten= 6%, Lag= 1.9 min
Primary = 4.23 cfs @ 12.26 hrs, Volume= 0.295 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.02' @ 12.26 hrs Surf.Area= 3,762 sf Storage= 3,116 cf
Flood Elev= 175.00' Surf.Area= 7,929 sf Storage= 8,847 cf

Plug-Flow detention time= 96.6 min calculated for 0.295 af (84% of inflow)
Center-of-Mass det. time= 46.7 min ( 804.1 - 757.4 )

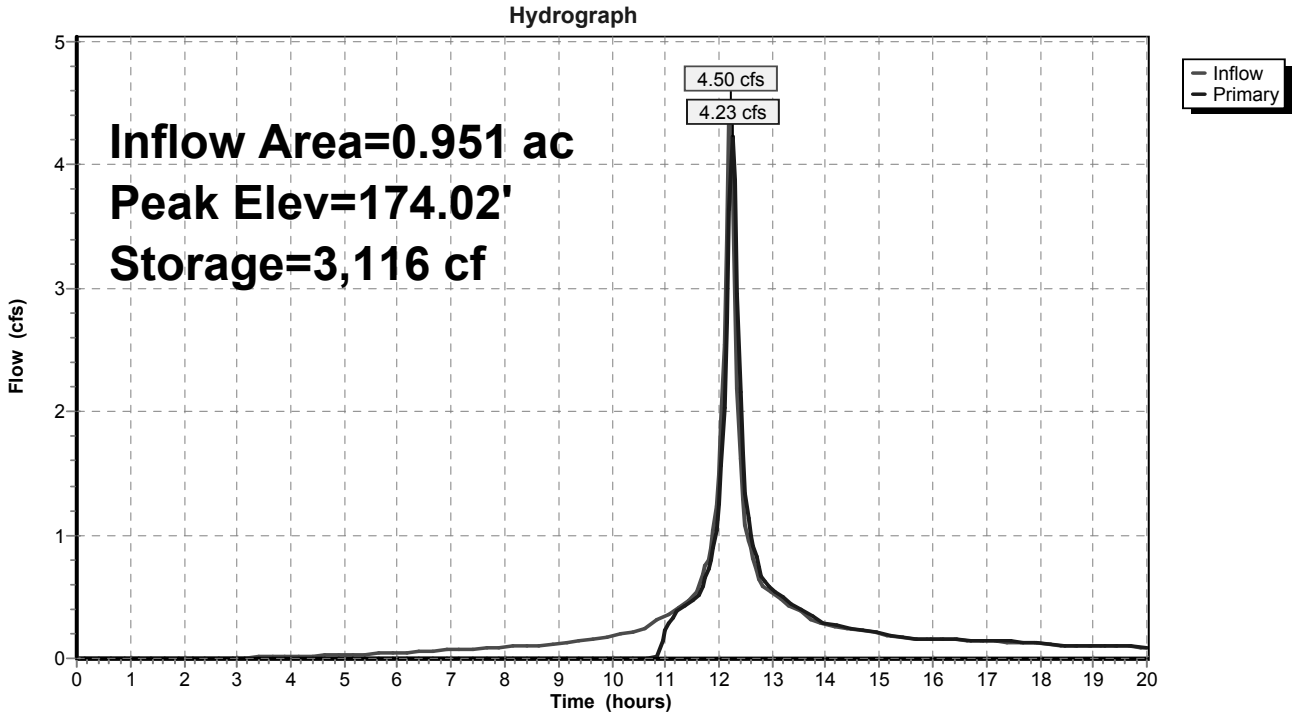
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 8,847 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 2,408 | 0 | 0 |
| 174.00 | 3,678 | 3,043 | 3,043 |
| 175.00 | 7,929 | 5,804 | 8,847 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 173.80' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.40' | **18.0" Round Culvert**<br>L= 35.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.40' / 169.20' S= 0.0057 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=4.18 cfs @ 12.26 hrs HW=174.02' TW=170.47' (Dynamic Tailwater)
↑**2=Culvert** (Passes 4.18 cfs of 19.04 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 4.18 cfs @ 1.53 fps)

## Pond P RG-E-7:


Hydrograph
Inflow Area=0.951 ac
Peak Elev=174.02'
Storage=3,116 cf
4.50 cfs
4.23 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

## Summary for Pond P RG-E-9A:

Inflow Area = 2.302 ac, 0.00% Impervious, Inflow Depth > 3.05" for 25_year event
Inflow = 7.54 cfs @ 12.24 hrs, Volume= 0.586 af
Outflow = 7.03 cfs @ 12.27 hrs, Volume= 0.580 af, Atten= 7%, Lag= 1.8 min
Primary = 7.03 cfs @ 12.27 hrs, Volume= 0.580 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.18' @ 12.27 hrs Surf.Area= 1,037 sf Storage= 759 cf
Flood Elev= 167.00' Surf.Area= 1,657 sf Storage= 1,860 cf

Plug-Flow detention time= 8.9 min calculated for 0.578 af (99% of inflow)
Center-of-Mass det. time= 5.5 min ( 797.4 - 791.9 )

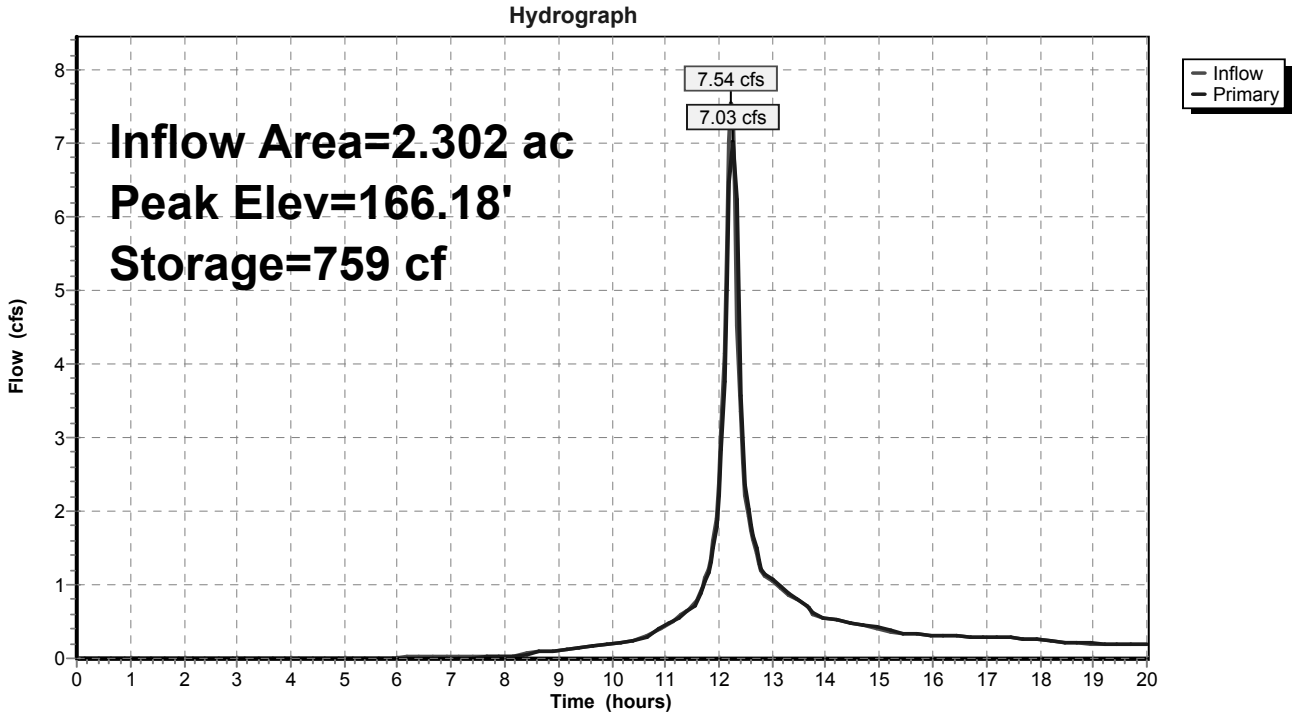
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 1,860 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 266 | 0 | 0 |
| 166.00 | 898 | 582 | 582 |
| 167.00 | 1,657 | 1,278 | 1,860 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 165.50' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 151.00' | **18.0" Round Culvert**<br>L= 46.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 151.00' / 150.20' S= 0.0174 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=6.96 cfs @ 12.27 hrs HW=166.17' TW=150.71' (Dynamic Tailwater)
↑**2=Culvert** (Passes 6.96 cfs of 37.76 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 6.96 cfs @ 3.94 fps)

## Pond P RG-E-9A:


Hydrograph
Inflow Area=2.302 ac
Peak Elev=166.18'
Storage=759 cf
7.54 cfs
7.03 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

## Summary for Pond P RG-E-9B: 244

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

---

Inflow Area = 2.836 ac, 0.00% Impervious, Inflow Depth > 2.78" for 25_year event
Inflow = 8.02 cfs @ 12.26 hrs, Volume= 0.656 af
Outflow = 7.99 cfs @ 12.28 hrs, Volume= 0.544 af, Atten= 0%, Lag= 1.1 min
Primary = 7.99 cfs @ 12.28 hrs, Volume= 0.544 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.71' @ 12.28 hrs Surf.Area= 3,941 sf Storage= 5,605 cf
Flood Elev= 151.00' Surf.Area= 4,178 sf Storage= 6,784 cf

Plug-Flow detention time= 82.0 min calculated for 0.543 af (83% of inflow)
Center-of-Mass det. time= 31.4 min ( 832.1 - 800.7 )

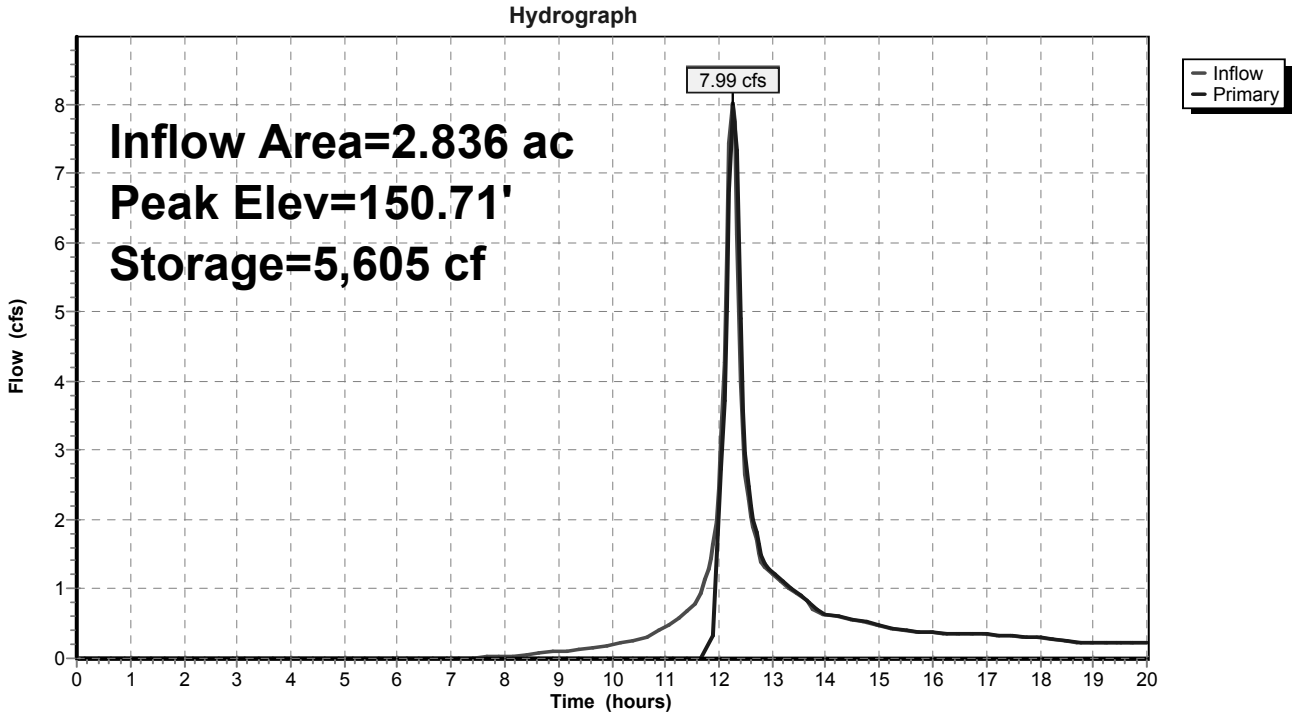
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 149.00' | 6,784 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 149.00 | 2,666 | 0 | 0 |
| 150.00 | 3,362 | 3,014 | 3,014 |
| 151.00 | 4,178 | 3,770 | 6,784 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 28.00 31.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=7.86 cfs @ 12.28 hrs HW=150.71' TW=144.43' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 7.86 cfs @ 1.45 fps)

## Pond P RG-E-9B: 244



## Summary for Pond P RG-W-5A: 250

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 2.53" for 25_year event
Inflow = 3.80 cfs @ 12.23 hrs, Volume= 0.279 af
Outflow = 3.83 cfs @ 12.24 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.2 min
Primary = 3.83 cfs @ 12.24 hrs, Volume= 0.277 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 163.70' @ 12.24 hrs Surf.Area= 204 sf Storage= 104 cf
Flood Elev= 164.00' Surf.Area= 252 sf Storage= 173 cf

Plug-Flow detention time= 3.6 min calculated for 0.276 af (99% of inflow)
Center-of-Mass det. time= 1.5 min ( 816.9 - 815.4 )

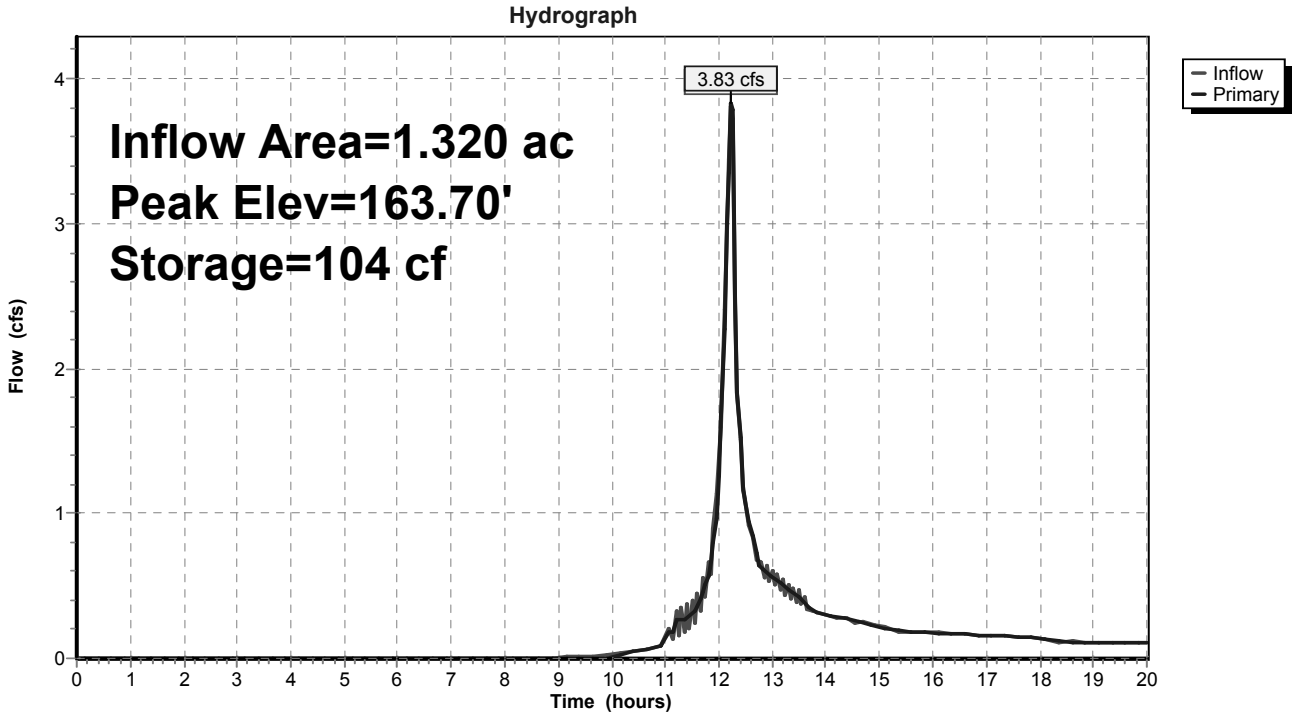
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 173 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 95 | 0 | 0 |
| 164.00 | 252 | 173 | 173 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 163.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=3.67 cfs @ 12.24 hrs HW=163.69' TW=162.69' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 3.67 cfs @ 1.36 fps)

## Pond P RG-W-5A: 250



## Summary for Pond P RG-W-5B: 252

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 2.52" for 25_year event
Inflow = 3.83 cfs @ 12.24 hrs, Volume= 0.277 af
Outflow = 3.80 cfs @ 12.24 hrs, Volume= 0.276 af, Atten= 1%, Lag= 0.0 min
Primary = 3.80 cfs @ 12.24 hrs, Volume= 0.276 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.70' @ 12.24 hrs Surf.Area= 167 sf Storage= 81 cf
Flood Elev= 163.00' Surf.Area= 212 sf Storage= 138 cf

Plug-Flow detention time= 2.7 min calculated for 0.275 af (99% of inflow)
Center-of-Mass det. time= 1.0 min ( 817.9 - 816.9 )

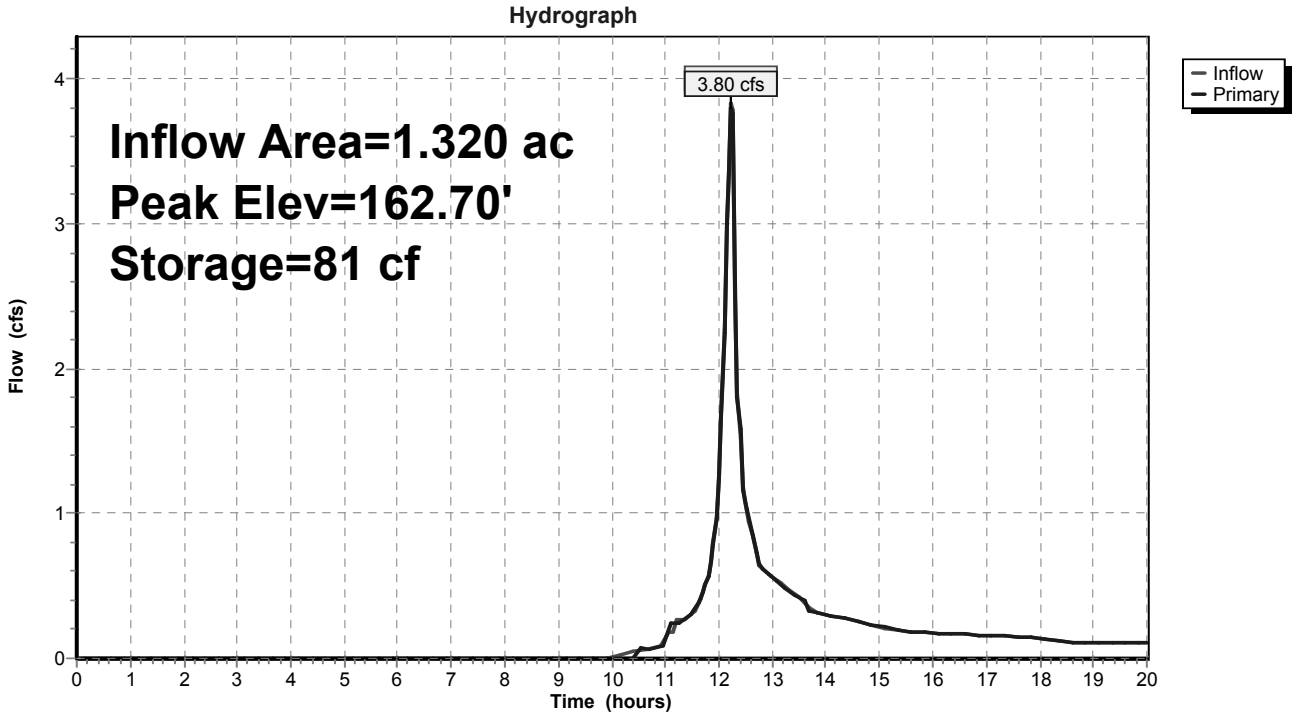
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 138 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 65 | 0 | 0 |
| 163.00 | 212 | 138 | 138 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=3.65 cfs @ 12.24 hrs HW=162.69' TW=161.69' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 3.65 cfs @ 1.36 fps)

## Pond P RG-W-5B: 252



## Summary for Pond P RG-W-5C: 254

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.1 in/hr to drawdown in 72 hours.

---

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 2.51" for 25_year event
Inflow = 3.80 cfs @ 12.24 hrs, Volume= 0.276 af
Outflow = 3.67 cfs @ 12.24 hrs, Volume= 0.258 af, Atten= 3%, Lag= 0.2 min
Primary = 3.67 cfs @ 12.24 hrs, Volume= 0.258 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 161.69' @ 12.24 hrs Surf.Area= 984 sf Storage= 966 cf
Flood Elev= 162.00' Surf.Area= 1,046 sf Storage= 1,280 cf

Plug-Flow detention time= 33.5 min calculated for 0.257 af (93% of inflow)
Center-of-Mass det. time= 10.8 min ( 828.6 - 817.9 )

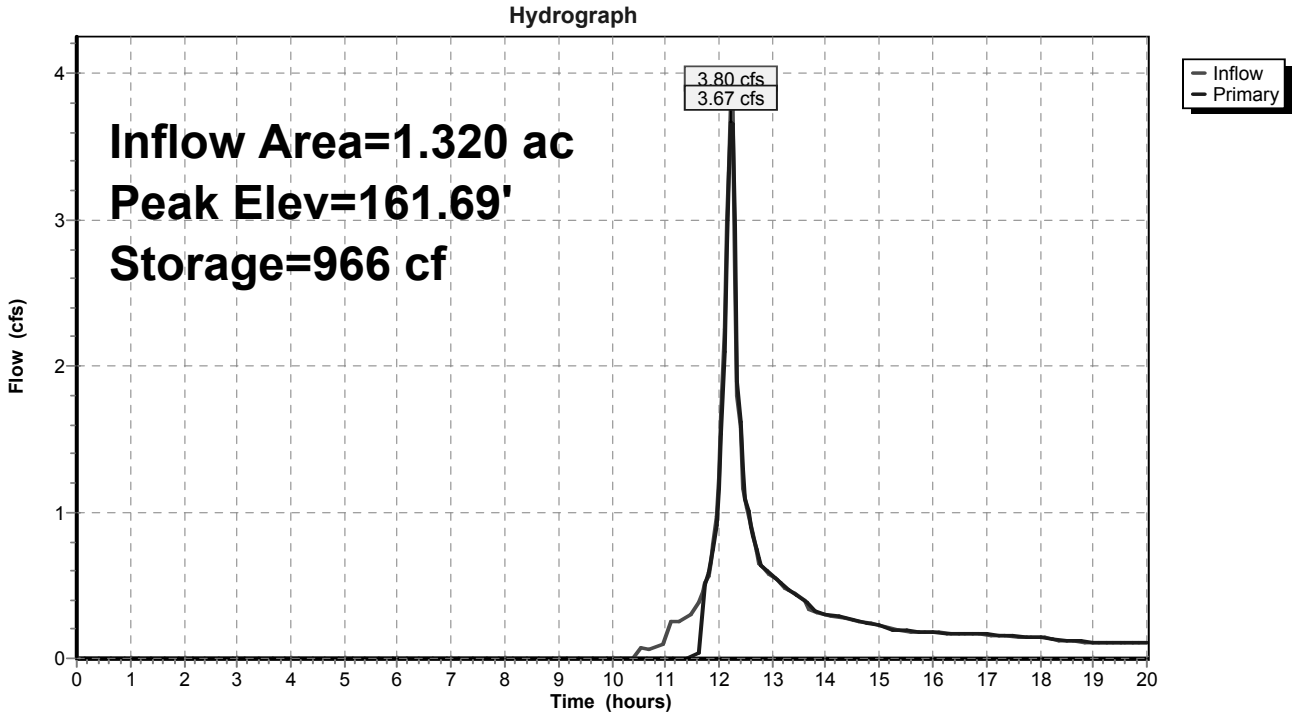
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 160.50' | 1,280 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 160.50 | 624 | 0 | 0 |
| 161.00 | 778 | 351 | 351 |
| 161.50 | 946 | 431 | 782 |
| 162.00 | 1,046 | 498 | 1,280 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 161.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=3.60 cfs @ 12.24 hrs HW=161.69' TW=153.42' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 3.60 cfs @ 1.35 fps)

## Pond P RG-W-5C: 254



## Summary for Pond P S-CB-E-1: 263

Inflow Area = 1.190 ac, 0.00% Impervious, Inflow Depth > 3.01" for 25_year event
Inflow = 4.08 cfs @ 12.23 hrs, Volume= 0.298 af
Outflow = 4.08 cfs @ 12.24 hrs, Volume= 0.294 af, Atten= 0%, Lag= 0.5 min
Primary = 4.08 cfs @ 12.24 hrs, Volume= 0.294 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 155 sf Storage= 0 cf
Peak Elev= 171.71' @ 12.24 hrs Surf.Area= 697 sf Storage= 304 cf
Flood Elev= 172.00' Surf.Area= 913 sf Storage= 534 cf

Plug-Flow detention time= 10.8 min calculated for 0.293 af (98% of inflow)
Center-of-Mass det. time= 5.7 min ( 796.7 - 791.0 )

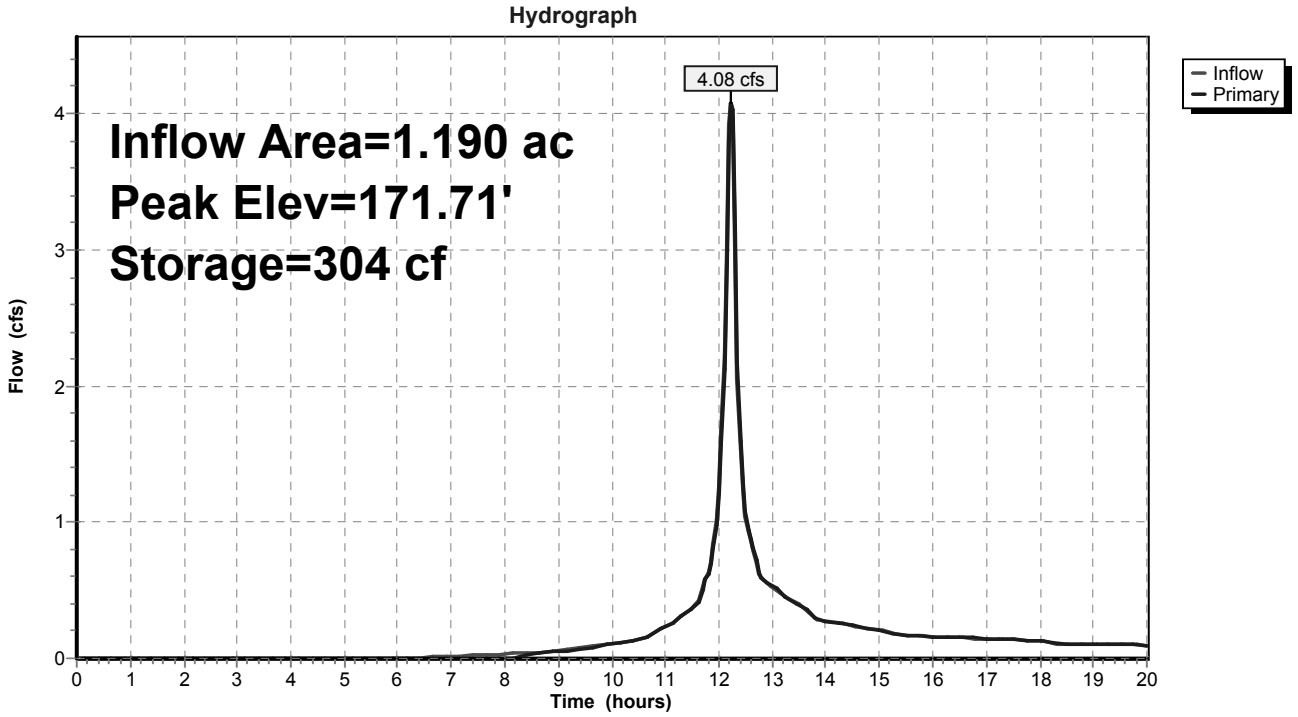
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 534 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 155 | 0 | 0 |
| 172.00 | 913 | 534 | 534 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.50' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.20' | **18.0" Round Culvert**<br>L= 16.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.80' / 169.20' S= -0.0875 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.97 cfs @ 12.24 hrs HW=171.71' TW=166.15' (Dynamic Tailwater)
↑**2=Culvert** (Passes 3.97 cfs of 14.11 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 3.97 cfs @ 1.50 fps)

## Pond P S-CB-E-1: 263



## Summary for Pond P W 3.1: 5

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 2.32" for 25_year event
Inflow = 12.34 cfs @ 12.29 hrs, Volume= 1.263 af
Outflow = 15.82 cfs @ 12.26 hrs, Volume= 1.093 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 8.80 hrs, Volume= 0.010 af
Primary = 15.81 cfs @ 12.26 hrs, Volume= 1.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.13' @ 12.25 hrs Surf.Area= 4,837 sf Storage= 7,965 cf
Flood Elev= 157.00' Surf.Area= 6,397 sf Storage= 12,836 cf

Plug-Flow detention time= 60.1 min calculated for 1.091 af (86% of inflow)
Center-of-Mass det. time= 19.2 min ( 853.4 - 834.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 12,836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

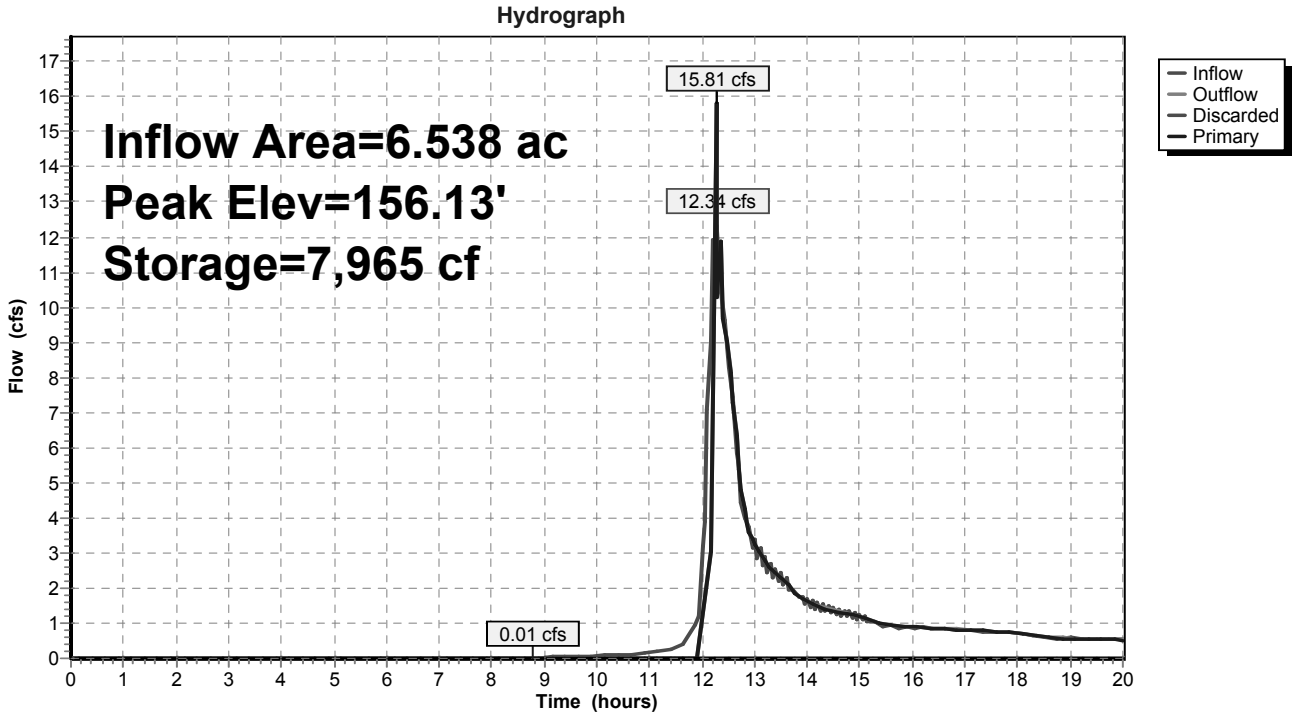
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,598 | 3,930 | 7,338 |
| 157.00 | 6,397 | 5,498 | 12,836 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Discarded | 153.00' | **0.01 cfs Exfiltration at all elevations** |

**Discarded OutFlow** Max=0.01 cfs @ 8.80 hrs HW=153.03' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=13.83 cfs @ 12.26 hrs HW=156.13' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 13.83 cfs @ 1.12 fps)

## Pond P W 3.1: 5


Hydrograph
Inflow Area=6.538 ac
Peak Elev=156.13'
Storage=7,965 cf
15.81 cfs
12.34 cfs
0.01 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

## Summary for Pond P W 3.4: 13

Inflow Area = 3.043 ac, 5.02% Impervious, Inflow Depth > 0.42" for 25_year event
Inflow = 0.52 cfs @ 12.45 hrs, Volume= 0.106 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 182.08' @ 20.00 hrs Surf.Area= 4,062 sf Storage= 4,613 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

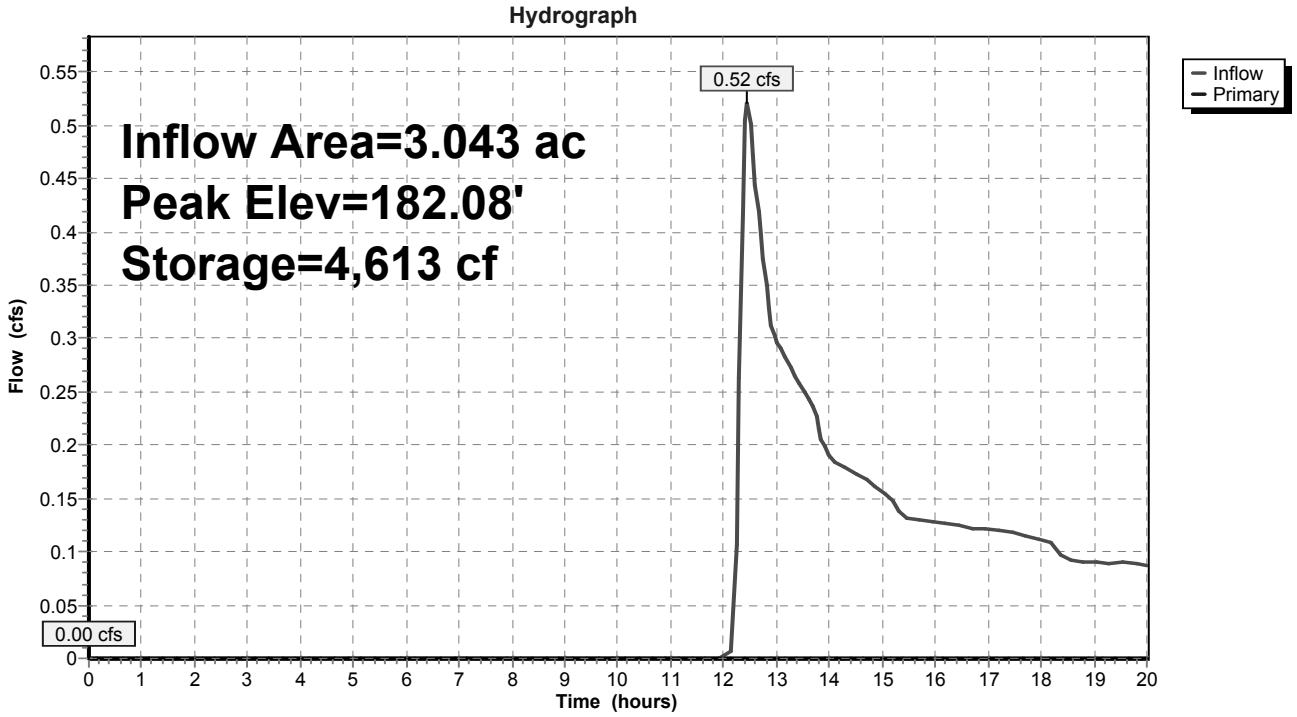
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=180.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 3.4: 13


Hydrograph
Inflow Area=3.043 ac
Peak Elev=182.08'
Storage=4,613 cf
0.52 cfs
0.00 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P W 9.1B: 14

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 732 sf Storage= 0 cf
Flood Elev= 159.00' Surf.Area= 4,550 sf Storage= 5,474 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

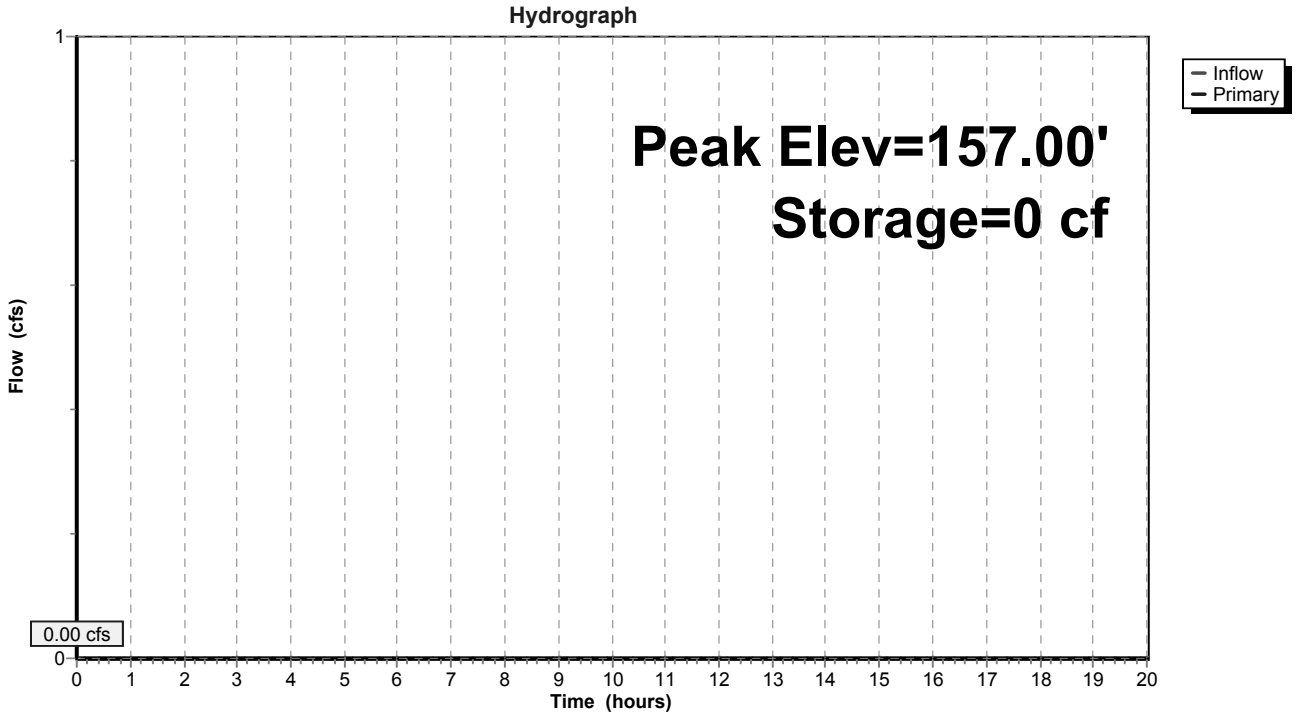
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=157.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 9.1B: 14



## Summary for Pond P W-CULV-N: 227

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.74" for 25_year event
Inflow = 29.18 cfs @ 12.24 hrs, Volume= 2.657 af
Outflow = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af, Atten= 12%, Lag= 3.3 min
Primary = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 4,411 sf Storage= 0 cf
Peak Elev= 153.51' @ 12.29 hrs Surf.Area= 5,652 sf Storage= 2,549 cf
Flood Elev= 159.00' Surf.Area= 21,416 sf Storage= 72,181 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min ( 821.4 - 821.3 )

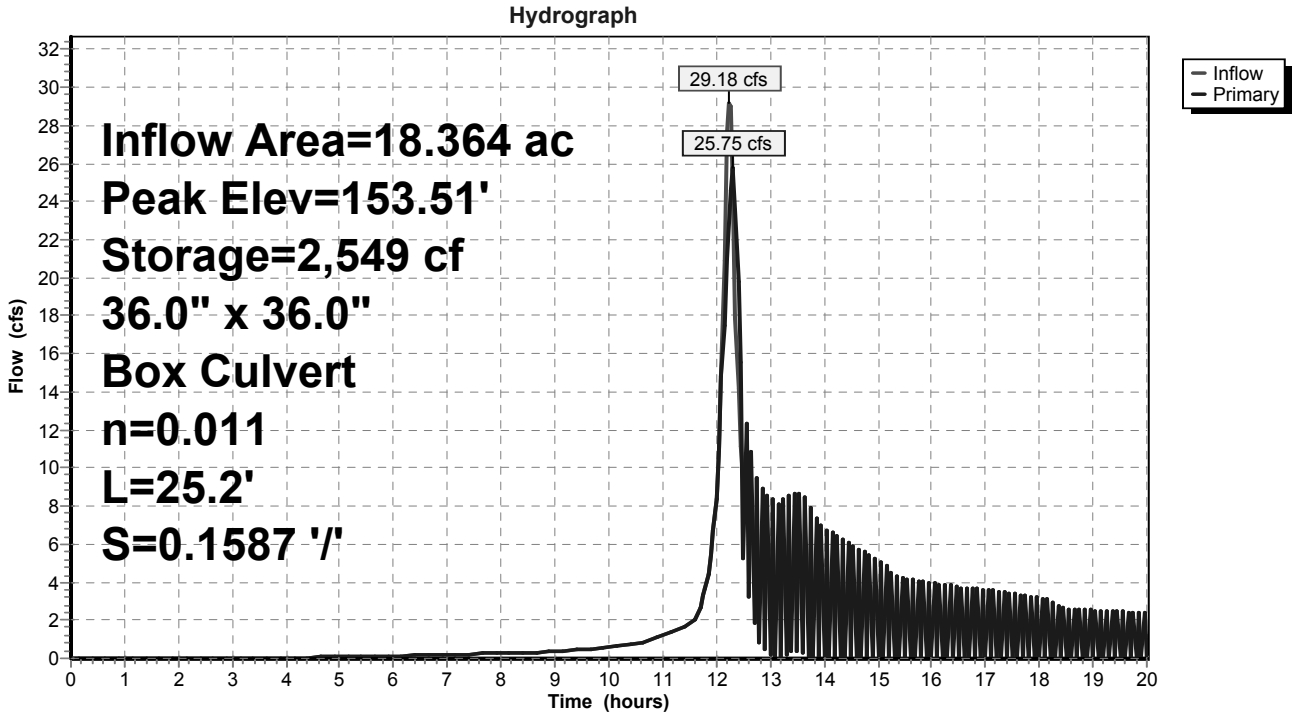
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 72,181 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 4,411 | 0 | 0 |
| 154.00 | 6,861 | 5,636 | 5,636 |
| 155.00 | 8,907 | 7,884 | 13,520 |
| 156.00 | 11,660 | 10,284 | 23,804 |
| 157.00 | 14,425 | 13,042 | 36,846 |
| 158.00 | 17,414 | 15,919 | 52,765 |
| 159.00 | 21,416 | 19,415 | 72,181 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **36.0" W x 36.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 9.00 sf |

**Primary OutFlow** Max=25.53 cfs @ 12.29 hrs HW=153.50' TW=150.58' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 25.53 cfs @ 4.44 fps)

## Pond P W-CULV-N: 227



## Summary for Pond P W-D-3: 111

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 158.00' Surf.Area= 435 sf Storage= 0 cf
Peak Elev= 158.00' @ 0.00 hrs Surf.Area= 435 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,217 sf Storage= 2,517 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

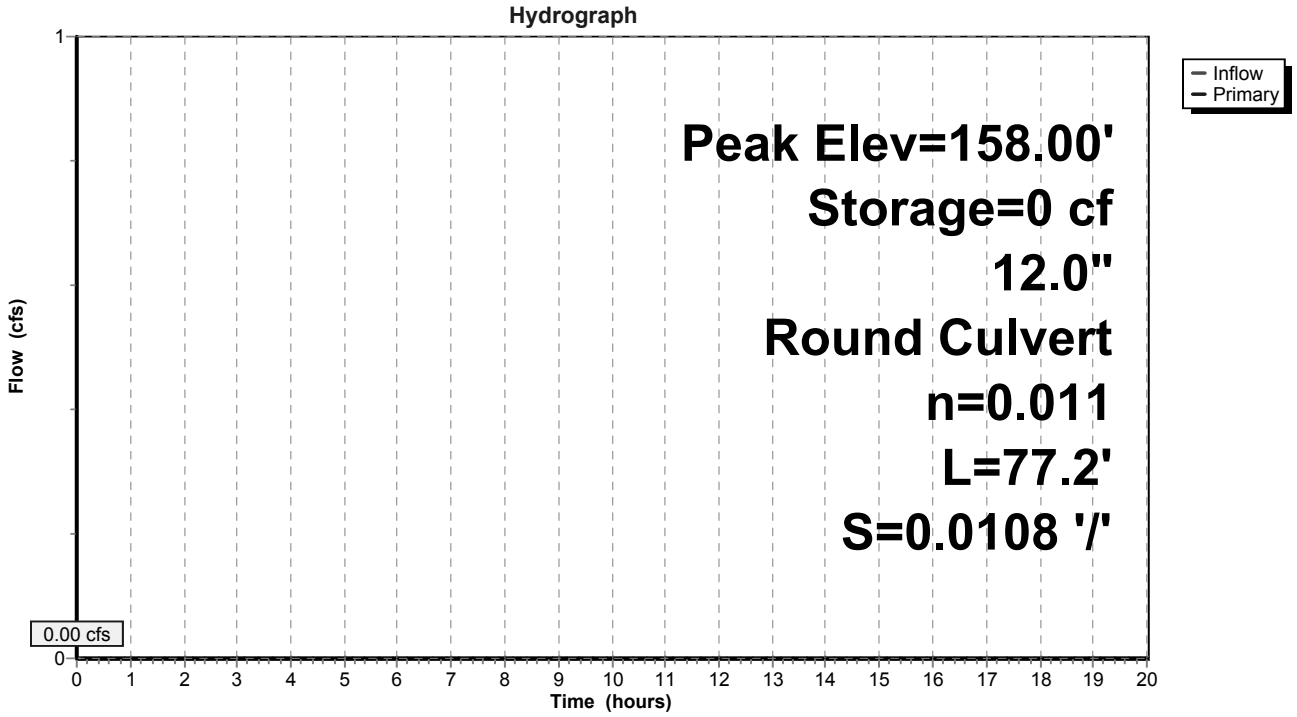
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 158.00' | 2,517 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 158.00 | 435 | 0 | 0 |
| 159.00 | 722 | 578 | 578 |
| 161.00 | 1,217 | 1,939 | 2,517 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Existing Culvert to Remain in Place**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=158.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Existing Culvert to Remain in Place**(Passes 0.00 cfs of 3.51 cfs potential flow)

## Pond P W-D-3: 111



## Summary for Pond P-RG-E-1:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

---

Inflow Area = 2.568 ac, 0.00% Impervious, Inflow Depth > 2.71" for 25_year event
Inflow = 7.39 cfs @ 12.24 hrs, Volume= 0.581 af
Outflow = 5.36 cfs @ 12.34 hrs, Volume= 0.512 af, Atten= 27%, Lag= 5.7 min
Primary = 3.29 cfs @ 12.34 hrs, Volume= 0.479 af
Secondary = 2.07 cfs @ 12.34 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 142.32' @ 12.34 hrs Surf.Area= 3,813 sf Storage= 6,308 cf
Flood Elev= 143.00' Surf.Area= 4,489 sf Storage= 9,132 cf

Plug-Flow detention time= 71.5 min calculated for 0.512 af (88% of inflow)
Center-of-Mass det. time= 32.7 min ( 833.3 - 800.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.00' | 9,132 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

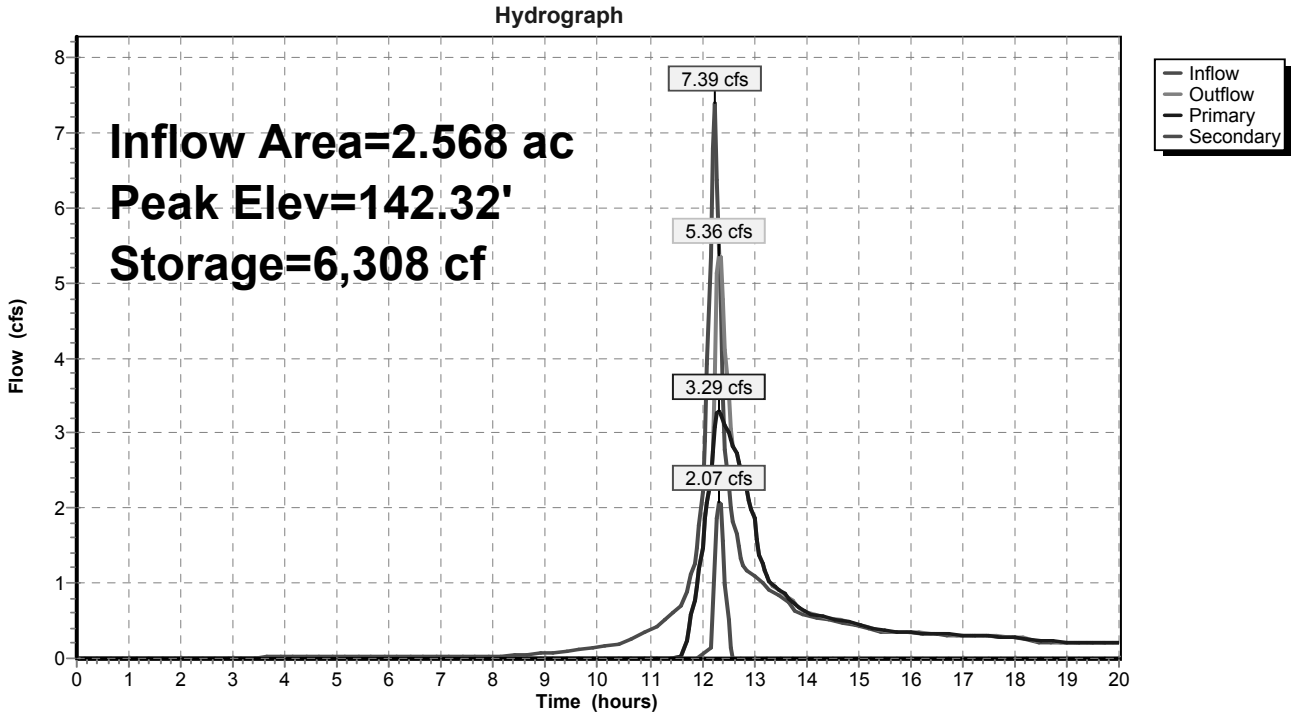
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 140.00 | 1,669 | 0 | 0 |
| 141.00 | 2,558 | 2,114 | 2,114 |
| 142.00 | 3,495 | 3,027 | 5,140 |
| 143.00 | 4,489 | 3,992 | 9,132 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 142.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 6.00 9.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Device 3 | 141.25' | **11.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 140.00' | **18.0" Round Culvert**<br>L= 50.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 140.00' / 139.50' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.28 cfs @ 12.34 hrs HW=142.31' TW=139.24' (Dynamic Tailwater)
↑—**3=Culvert** (Passes 3.28 cfs of 11.18 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 3.28 cfs @ 4.97 fps)

**Secondary OutFlow** Max=2.02 cfs @ 12.34 hrs HW=142.31' TW=142.13' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 2.02 cfs @ 1.31 fps)

## Pond P-RG-E-1:


Hydrograph
Inflow Area=2.568 ac
Peak Elev=142.32'
Storage=6,308 cf
7.39 cfs
5.36 cfs
3.29 cfs
2.07 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-2:

No Infiltration rate assumed in the model. However, an infiltration rate of 0.17 in/hr will be required to meet the 72 hour drawdown requirement.

---

Inflow Area = 0.477 ac, 0.08% Impervious, Inflow Depth > 3.20" for 25_year event
Inflow = 1.76 cfs @ 12.23 hrs, Volume= 0.127 af
Outflow = 1.66 cfs @ 12.26 hrs, Volume= 0.113 af, Atten= 6%, Lag= 1.8 min
Primary = 1.66 cfs @ 12.26 hrs, Volume= 0.113 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.69' @ 12.26 hrs Surf.Area= 1,625 sf Storage= 888 cf
Flood Elev= 163.00' Surf.Area= 1,929 sf Storage= 1,444 cf

Plug-Flow detention time= 63.0 min calculated for 0.112 af (88% of inflow)
Center-of-Mass det. time= 26.0 min ( 819.5 - 793.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 1,444 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

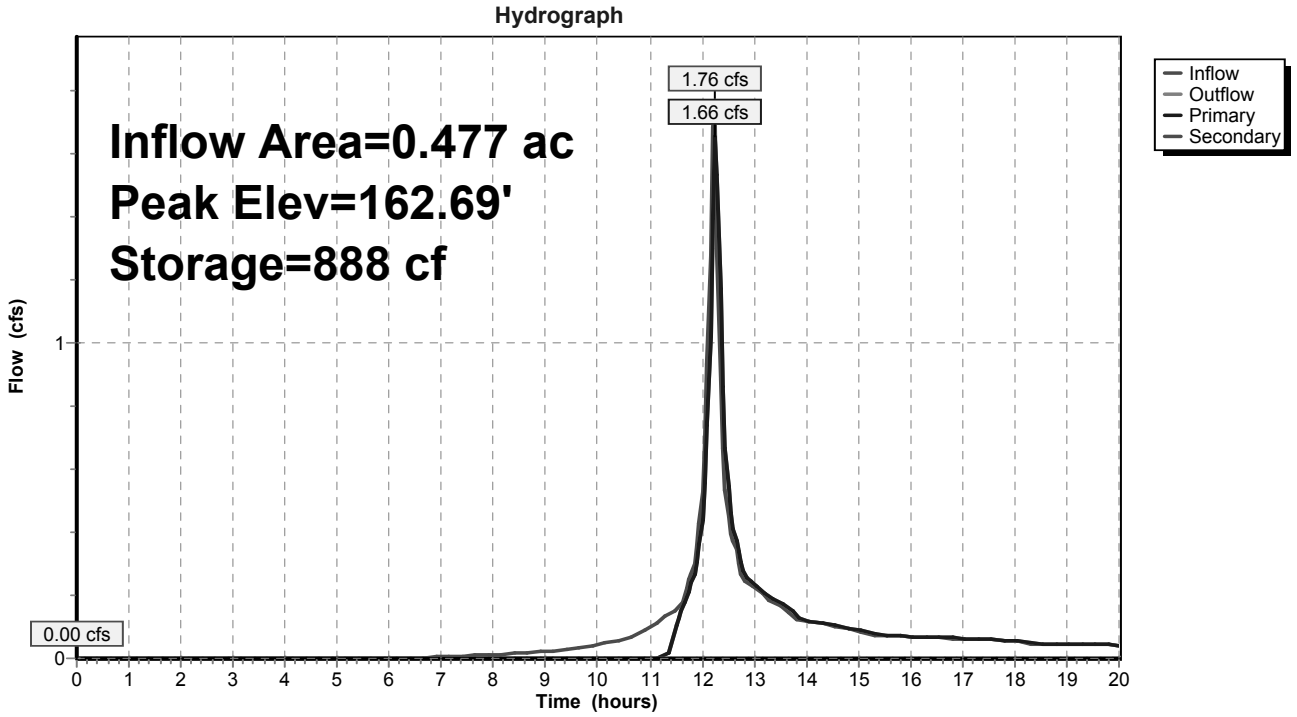
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 959 | 0 | 0 |
| 163.00 | 1,929 | 1,444 | 1,444 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.90' | **18.0" Round RCP_Round 18"**<br>L= 18.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.90' / 155.70' S= 0.0111 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 162.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 162.80' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 1.00 5.00 6.00<br>Height (feet) 0.33 0.00 0.00 0.33 |

**Primary OutFlow** Max=1.63 cfs @ 12.26 hrs HW=162.68' TW=150.09' (Dynamic Tailwater)
↑—**1=RCP_Round 18"** (Passes 1.63 cfs of 26.13 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 1.63 cfs @ 1.41 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
↑—**3=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P-RG-E-2:


Hydrograph
Inflow Area=0.477 ac
Peak Elev=162.69'
Storage=888 cf
1.76 cfs
1.66 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4A:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth > 2.73" for 25_year event
Inflow = 1.55 cfs @ 12.23 hrs, Volume= 0.110 af
Outflow = 0.78 cfs @ 12.36 hrs, Volume= 0.101 af, Atten= 50%, Lag= 7.8 min
Primary = 0.78 cfs @ 12.36 hrs, Volume= 0.101 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.28' @ 12.36 hrs Surf.Area= 1,446 sf Storage= 1,050 cf
Flood Elev= 173.00' Surf.Area= 2,506 sf Storage= 2,480 cf

Plug-Flow detention time= 49.0 min calculated for 0.101 af (92% of inflow)
Center-of-Mass det. time= 22.1 min ( 827.2 - 805.1 )

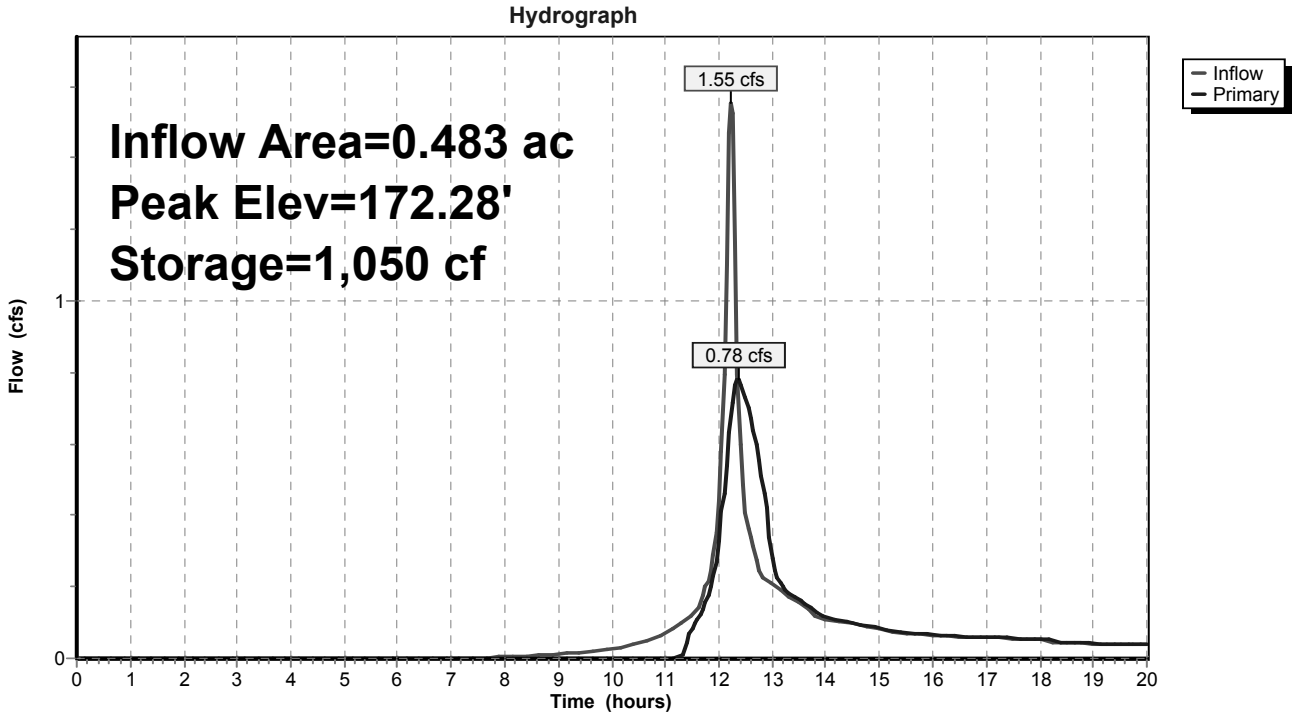
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 2,480 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 371 | 0 | 0 |
| 172.00 | 1,041 | 706 | 706 |
| 173.00 | 2,506 | 1,774 | 2,480 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 168.00' | **18.0" Round Culvert**<br>L= 65.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.30' S= 0.0108 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.60' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.78 cfs @ 12.36 hrs HW=172.27' TW=159.97' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.78 cfs of 17.10 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.78 cfs @ 3.95 fps)

## Pond P-RG-E-4A:


Hydrograph
Inflow Area=0.483 ac
Peak Elev=172.28'
Storage=1,050 cf
1.55 cfs
0.78 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4B:

Inflow Area = 0.527 ac, 0.00% Impervious, Inflow Depth > 3.69" for 25_year event
Inflow = 2.19 cfs @ 12.23 hrs, Volume= 0.162 af
Outflow = 1.43 cfs @ 12.32 hrs, Volume= 0.139 af, Atten= 35%, Lag= 5.5 min
Primary = 1.43 cfs @ 12.32 hrs, Volume= 0.139 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.15' @ 12.32 hrs Surf.Area= 2,084 sf Storage= 1,822 cf
Flood Elev= 171.00' Surf.Area= 2,920 sf Storage= 3,942 cf

Plug-Flow detention time= 85.2 min calculated for 0.138 af (85% of inflow)
Center-of-Mass det. time= 39.4 min ( 819.3 - 779.9 )

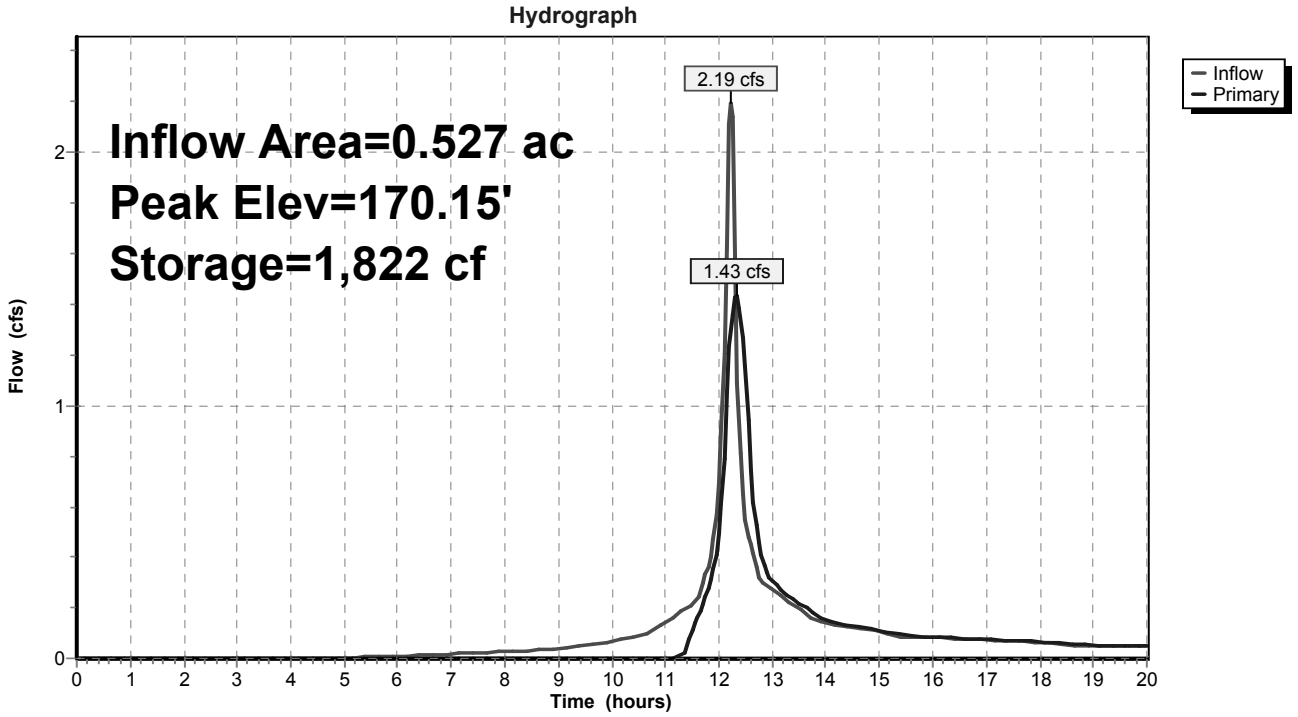
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 3,942 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 1,097 | 0 | 0 |
| 170.00 | 1,933 | 1,515 | 1,515 |
| 171.00 | 2,920 | 2,427 | 3,942 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.90' | **18.0" Round Culvert**<br>L= 72.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.90' / 161.90' S= 0.0139 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.70' | **9.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.42 cfs @ 12.32 hrs HW=170.15' TW=161.02' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.42 cfs of 23.22 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.42 cfs @ 3.22 fps)

## Pond P-RG-E-4B:


Hydrograph
Inflow Area=0.527 ac
Peak Elev=170.15'
Storage=1,822 cf
2.19 cfs
1.43 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-8:

Inflow Area = 0.652 ac, 0.01% Impervious, Inflow Depth > 2.82" for 25_year event
Inflow = 2.16 cfs @ 12.23 hrs, Volume= 0.153 af
Outflow = 0.19 cfs @ 13.65 hrs, Volume= 0.077 af, Atten= 91%, Lag= 85.3 min
Primary = 0.19 cfs @ 13.65 hrs, Volume= 0.077 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 175.11' @ 13.65 hrs Surf.Area= 4,099 sf Storage= 3,919 cf
Flood Elev= 176.00' Surf.Area= 5,077 sf Storage= 8,003 cf

Plug-Flow detention time= 215.9 min calculated for 0.076 af (50% of inflow)
Center-of-Mass det. time= 123.8 min ( 926.7 - 802.9 )

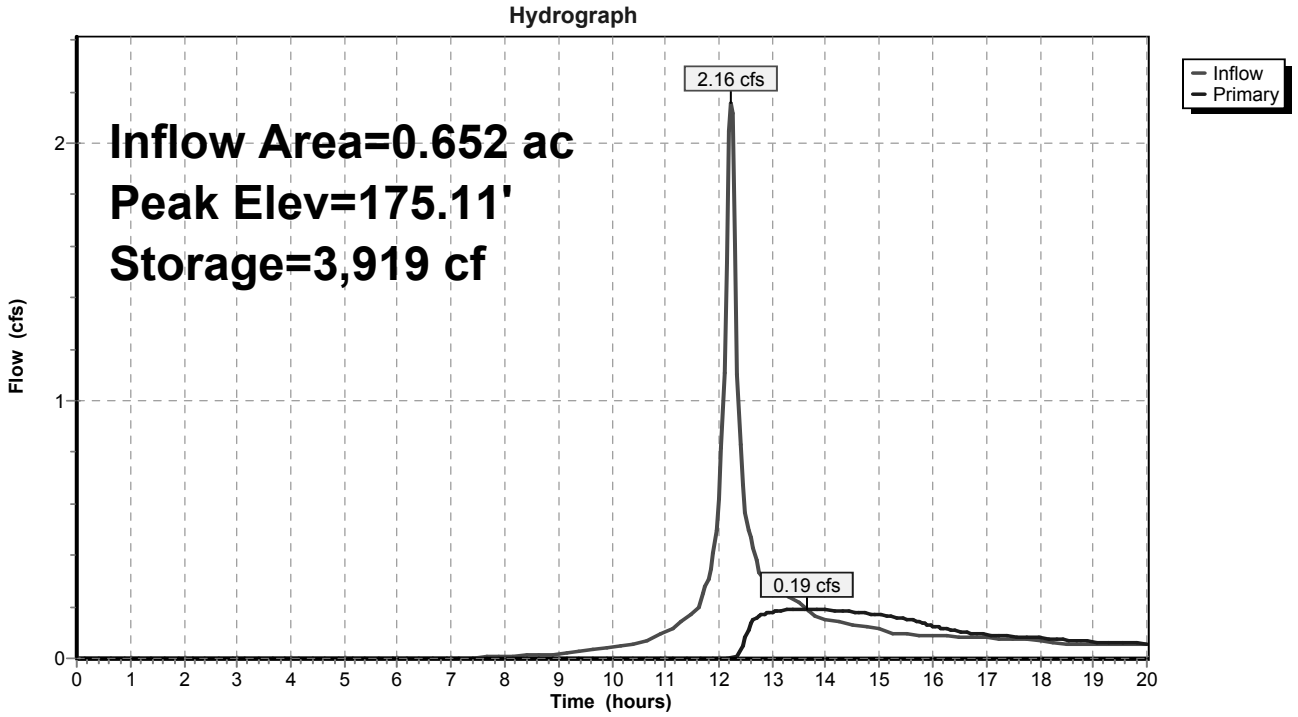
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 174.00' | 8,003 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 174.00 | 2,972 | 0 | 0 |
| 175.00 | 3,978 | 3,475 | 3,475 |
| 176.00 | 5,077 | 4,528 | 8,003 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 174.90' | **4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 170.40' | **18.0" Round RCP_Round 18"**<br>L= 91.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 170.40' / 169.20' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.19 cfs @ 13.65 hrs HW=175.11' TW=172.78' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 0.19 cfs of 12.78 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 0.19 cfs @ 2.21 fps)

## Pond P-RG-E-8:


Hydrograph
Inflow Area=0.652 ac
Peak Elev=175.11'
Storage=3,919 cf
2.16 cfs
0.19 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-W-2: 306

Inflow Area = 4.854 ac, 0.00% Impervious, Inflow Depth > 2.49" for 25_year event
Inflow = 13.01 cfs @ 12.21 hrs, Volume= 1.007 af
Outflow = 7.73 cfs @ 12.33 hrs, Volume= 0.872 af, Atten= 41%, Lag= 7.2 min
Primary = 7.73 cfs @ 12.33 hrs, Volume= 0.872 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.93' @ 12.33 hrs Surf.Area= 7,961 sf Storage= 11,148 cf
Flood Elev= 174.00' Surf.Area= 14,642 sf Storage= 34,022 cf

Plug-Flow detention time= 71.8 min calculated for 0.869 af (86% of inflow)
Center-of-Mass det. time= 29.8 min ( 844.9 - 815.1 )

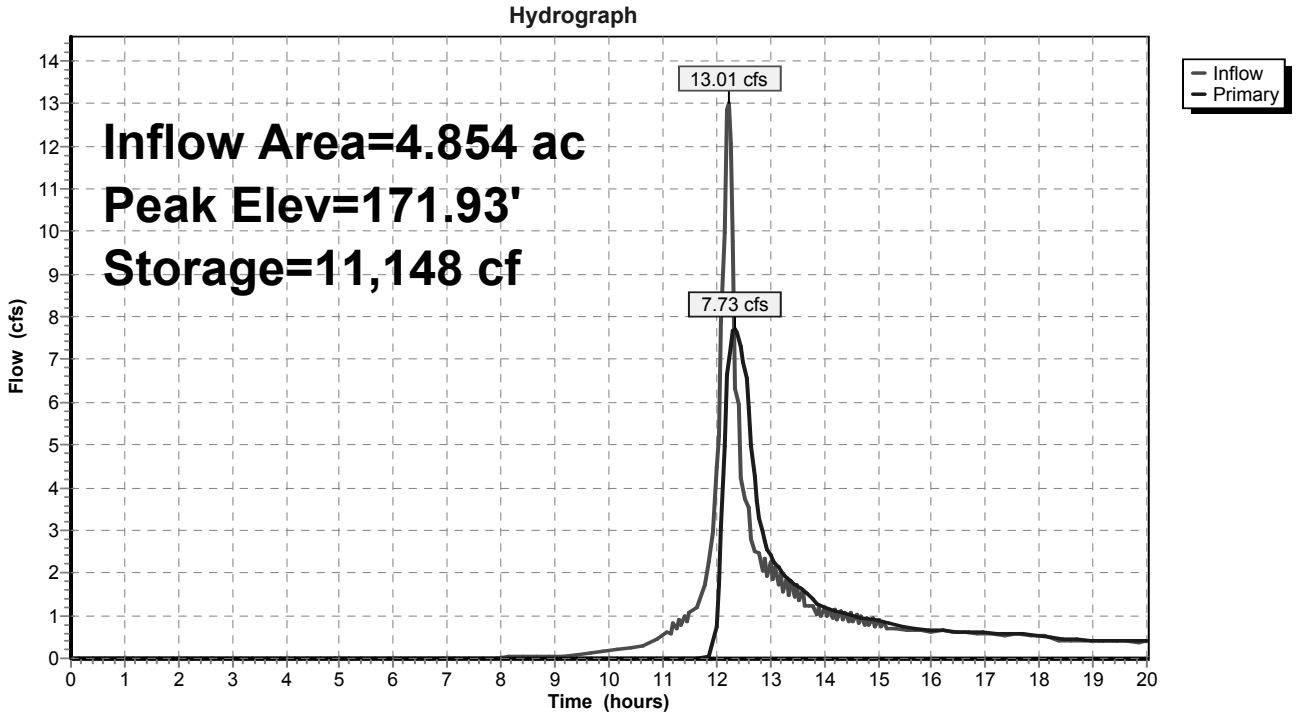
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 34,022 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 3,744 | 0 | 0 |
| 171.00 | 5,804 | 4,774 | 4,774 |
| 172.00 | 8,133 | 6,969 | 11,743 |
| 173.00 | 10,892 | 9,513 | 21,255 |
| 174.00 | 14,642 | 12,767 | 34,022 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.10' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 162.10' | **18.0" Round RCP_Round 18"**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.10' / 160.80' S= 0.0096 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=7.71 cfs @ 12.33 hrs HW=171.92' TW=156.11' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 7.71 cfs of 22.97 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 7.71 cfs @ 4.36 fps)

## Pond P-RG-W-2: 306



## Summary for Pond P-RG-W-3:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.85 in/hr to drawdown in 72 hours.

Inflow Area = 4.660 ac, 0.00% Impervious, Inflow Depth > 2.12" for 25_year event
Inflow = 9.59 cfs @ 12.23 hrs, Volume= 0.822 af
Outflow = 1.26 cfs @ 13.64 hrs, Volume= 0.355 af, Atten= 87%, Lag= 84.0 min
Primary = 1.26 cfs @ 13.64 hrs, Volume= 0.355 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.10' @ 13.64 hrs Surf.Area= 12,073 sf Storage= 21,006 cf
Flood Elev= 173.00' Surf.Area= 24,206 sf Storage= 71,944 cf

Plug-Flow detention time= 248.7 min calculated for 0.355 af (43% of inflow)
Center-of-Mass det. time= 135.5 min ( 956.3 - 820.9 )

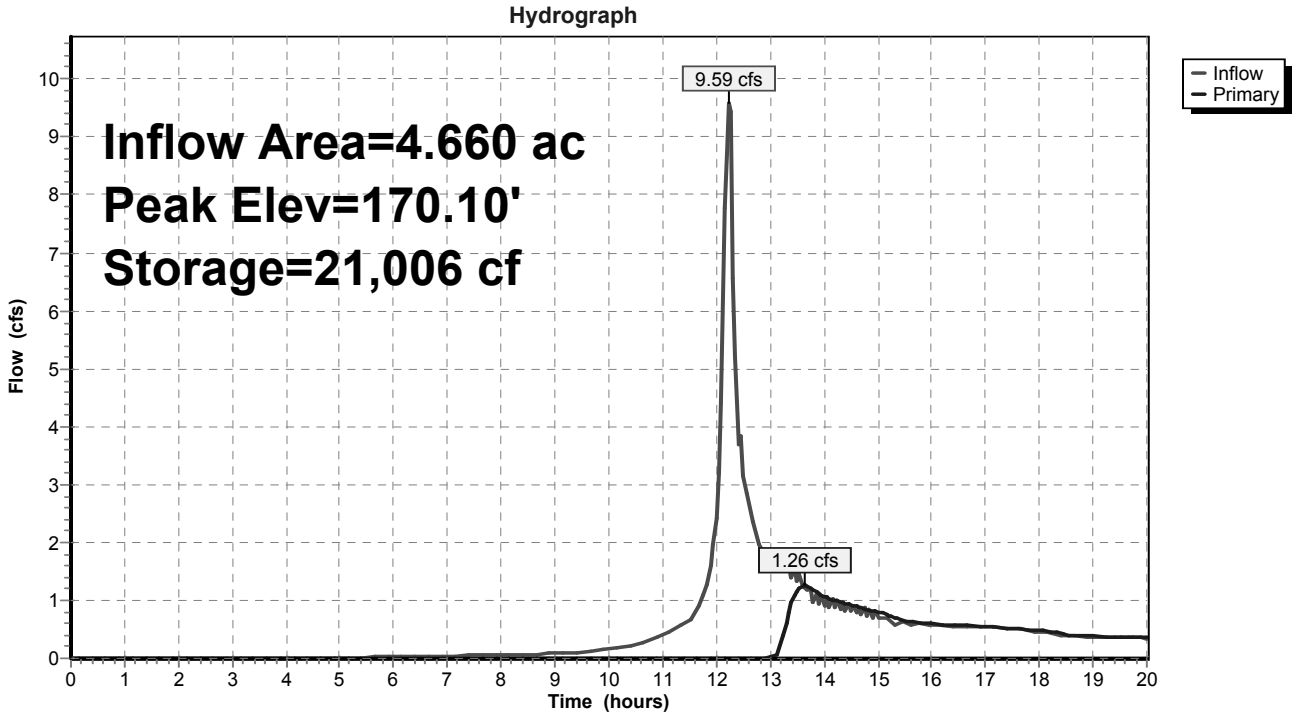
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 71,944 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 1,954 | 0 | 0 |
| 168.00 | 4,656 | 3,305 | 3,305 |
| 169.00 | 8,325 | 6,491 | 9,796 |
| 170.00 | 11,764 | 10,045 | 19,840 |
| 171.00 | 14,923 | 13,344 | 33,184 |
| 172.00 | 19,196 | 17,060 | 50,243 |
| 173.00 | 24,206 | 21,701 | 71,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 170.00' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 133.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.00' S= 0.0075 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=1.26 cfs @ 13.64 hrs HW=170.10' TW=153.00' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 1.26 cfs of 17.60 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 1.26 cfs @ 1.02 fps)

## Pond P-RG-W-3:


Hydrograph
Inflow Area=4.660 ac
Peak Elev=170.10'
Storage=21,006 cf
9.59 cfs
1.26 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

## Summary for Pond P-RG-W-4:

Inflow Area = 2.305 ac, 0.00% Impervious, Inflow Depth > 2.82" for 25_year event
Inflow = 7.61 cfs @ 12.23 hrs, Volume= 0.542 af
Outflow = 6.67 cfs @ 12.28 hrs, Volume= 0.470 af, Atten= 12%, Lag= 2.8 min
Primary = 6.67 cfs @ 12.28 hrs, Volume= 0.470 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.67' @ 12.28 hrs Surf.Area= 4,361 sf Storage= 4,829 cf
Flood Elev= 172.00' Surf.Area= 5,024 sf Storage= 6,366 cf

Plug-Flow detention time= 69.7 min calculated for 0.469 af (86% of inflow)
Center-of-Mass det. time= 27.8 min ( 830.6 - 802.8 )

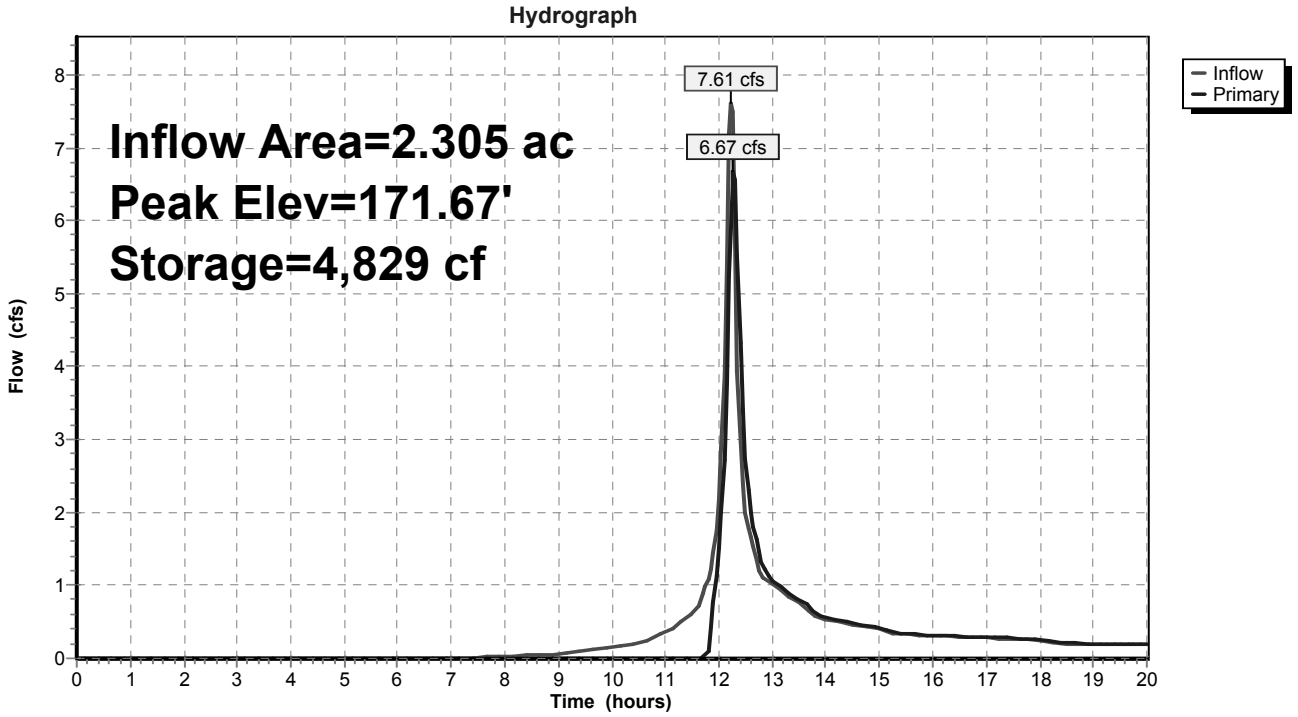
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 15,687 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 1,710 | 0 | 0 |
| 171.00 | 2,999 | 2,355 | 2,355 |
| 172.00 | 5,024 | 4,012 | 6,366 |
| 173.00 | 13,618 | 9,321 | 15,687 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 166.40' | **18.0" Round RCP_Round 18"**<br>L= 42.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.40' / 166.00' S= 0.0095 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=6.53 cfs @ 12.28 hrs HW=171.67' TW=153.48' (Dynamic Tailwater)
↑└**2=RCP_Round 18"** (Passes 6.53 cfs of 20.63 cfs potential flow)
↑└**1=Orifice/Grate** (Weir Controls 6.53 cfs @ 2.23 fps)

## Pond P-RG-W-4:


Hydrograph
Inflow Area=2.305 ac
Peak Elev=171.67'
Storage=4,829 cf
7.61 cfs
6.67 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

## Summary for Pond R-CULV-1: PIPE 1

Inflow Area = 3.188 ac, 0.00% Impervious, Inflow Depth > 2.67" for 25_year event
Inflow = 4.49 cfs @ 12.18 hrs, Volume= 0.709 af
Outflow = 4.49 cfs @ 12.18 hrs, Volume= 0.709 af, Atten= 0%, Lag= 0.0 min
Primary = 4.49 cfs @ 12.18 hrs, Volume= 0.709 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

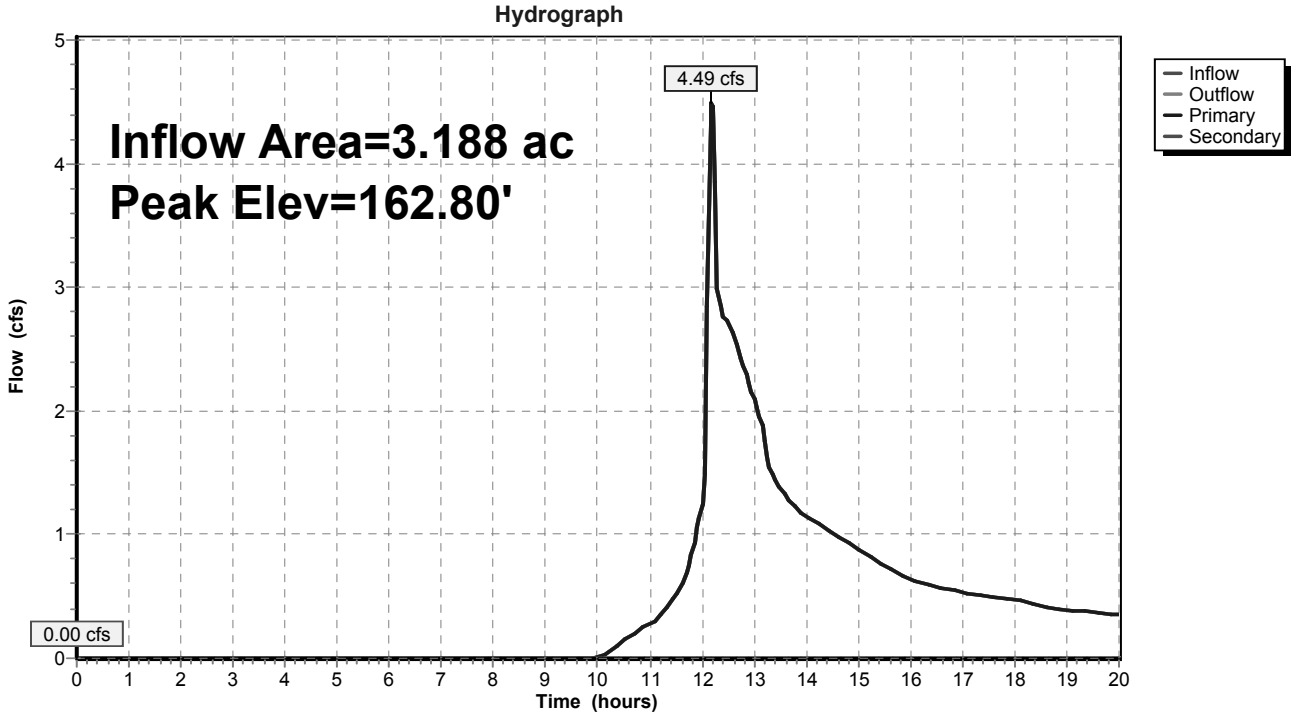
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.80' @ 12.18 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **24.0" Round RCP_Round 24"**<br>L= 195.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 158.10' S= 0.0200 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 173.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=4.41 cfs @ 12.18 hrs HW=162.79' TW=159.28' (Dynamic Tailwater)
↑—**1=RCP_Round 24"** (Inlet Controls 4.41 cfs @ 3.79 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-1: PIPE 1



## Summary for Pond R-CULV-10: PIPE 10

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 2.36" for 25_year event
Inflow = 36.09 cfs @ 12.28 hrs, Volume= 3.897 af
Outflow = 36.09 cfs @ 12.28 hrs, Volume= 3.897 af, Atten= 0%, Lag= 0.0 min
Primary = 36.09 cfs @ 12.28 hrs, Volume= 3.897 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

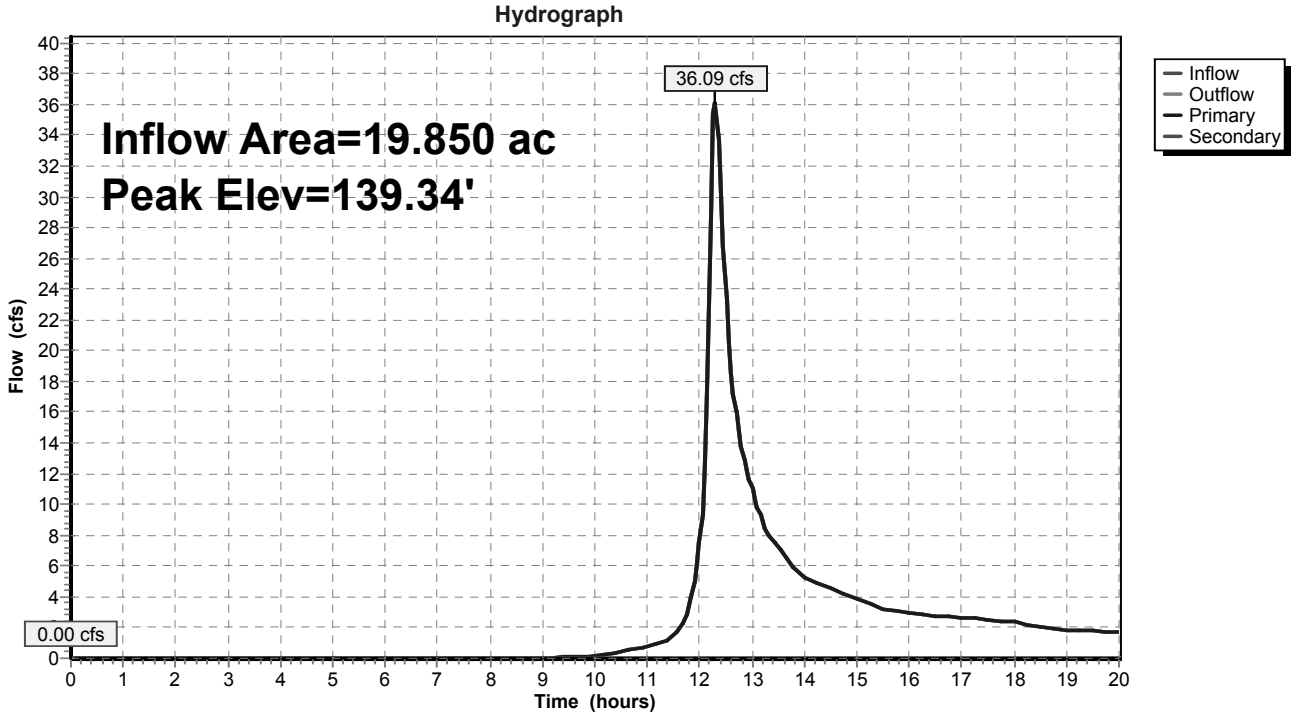
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 139.34' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 136.50' | **36.0" Round Culvert**<br>L= 339.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 136.50' / 135.00' S= 0.0044 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 144.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=35.80 cfs @ 12.28 hrs HW=139.32' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 35.80 cfs @ 6.71 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=136.50' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-10: PIPE 10



## Summary for Pond R-CULV-2: PIPE 2

Inflow Area = 10.999 ac, 3.37% Impervious, Inflow Depth > 2.38" for 25_year event
Inflow = 20.60 cfs @ 12.29 hrs, Volume= 2.179 af
Outflow = 20.60 cfs @ 12.29 hrs, Volume= 2.179 af, Atten= 0%, Lag= 0.0 min
Primary = 20.60 cfs @ 12.29 hrs, Volume= 2.179 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

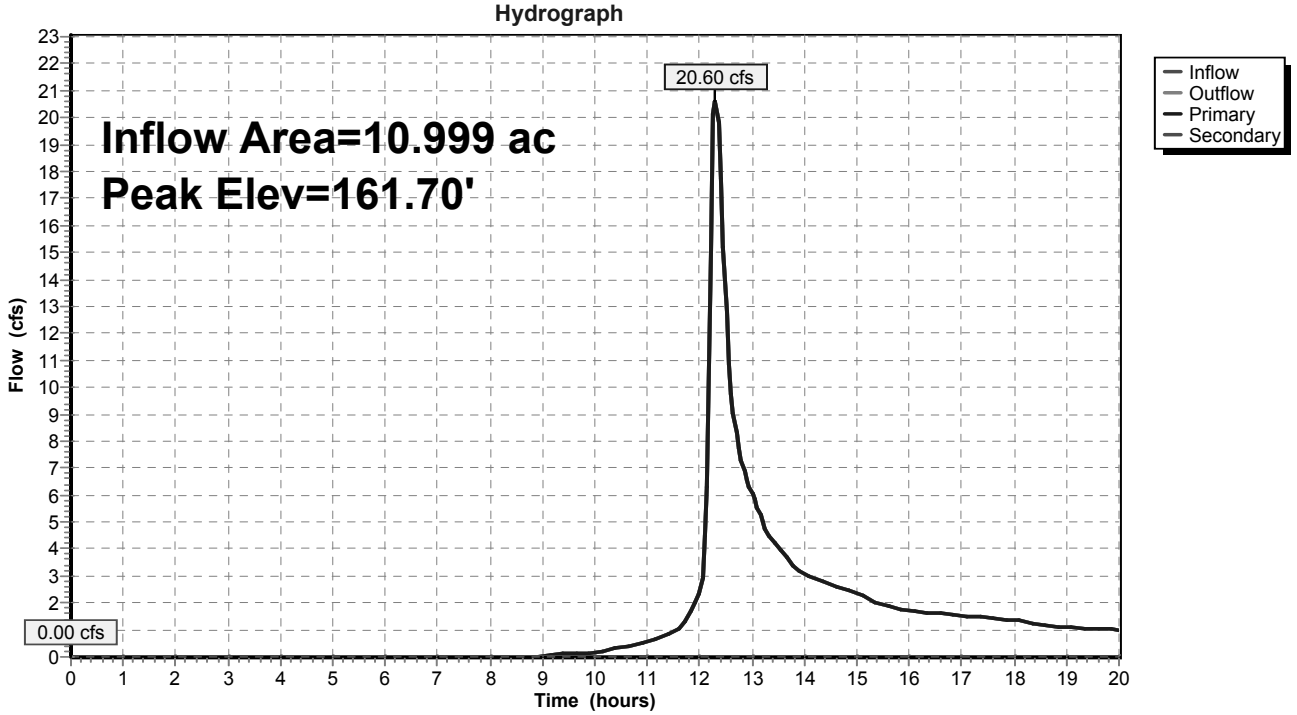
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 161.70' @ 12.31 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **36.0" Round Culvert**<br>L= 191.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 158.00' / 155.10' S= 0.0152 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 166.80' | **36.0" Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=17.64 cfs @ 12.29 hrs HW=161.43' TW=161.16' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 17.64 cfs @ 2.74 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=158.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-2: PIPE 2



## Summary for Pond R-CULV-3: PIPE 3

Inflow Area = 14.512 ac, 2.87% Impervious, Inflow Depth > 2.46" for 25_year event
Inflow = 29.71 cfs @ 12.28 hrs, Volume= 2.973 af
Outflow = 29.71 cfs @ 12.28 hrs, Volume= 2.973 af, Atten= 0%, Lag= 0.0 min
Primary = 29.71 cfs @ 12.28 hrs, Volume= 2.973 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

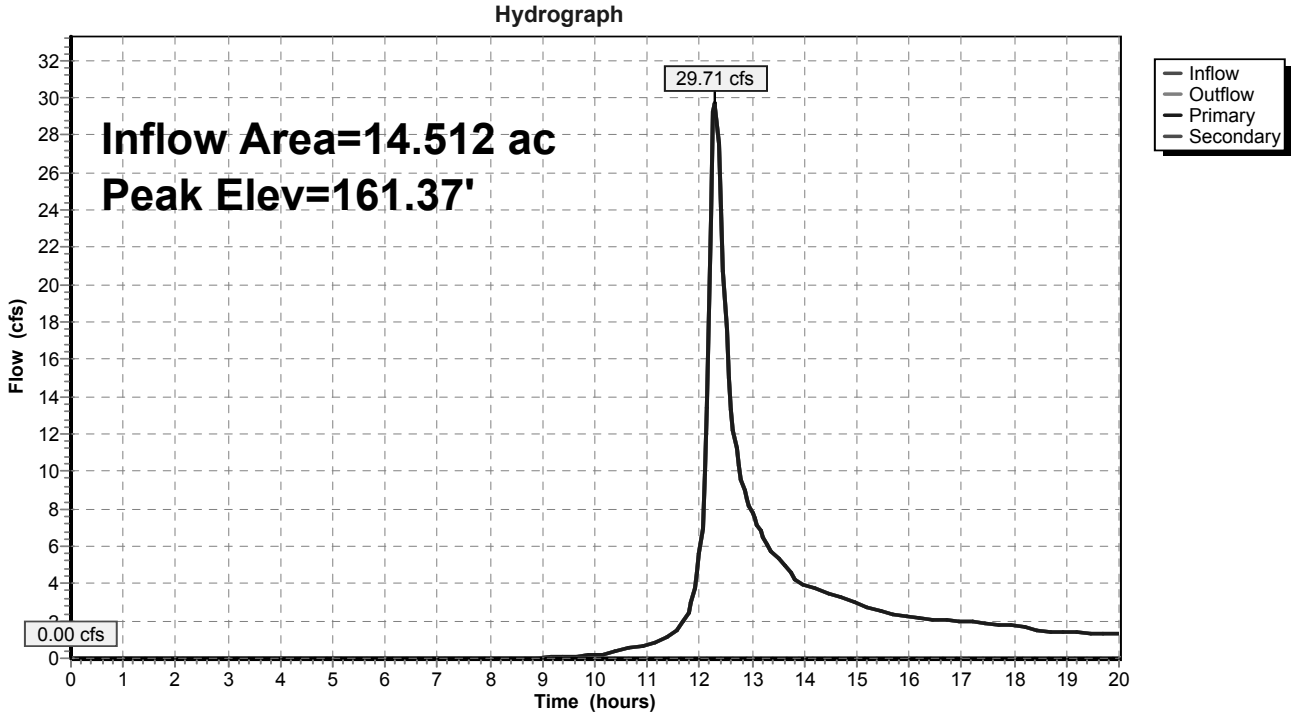
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 161.37' @ 12.30 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.00' | **24.0" Round Culvert**<br>L= 230.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.00' / 150.10' S= 0.0213 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=28.10 cfs @ 12.28 hrs HW=160.87' TW=155.81' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 28.10 cfs @ 8.95 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=155.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-3: PIPE 3



## Summary for Pond R-CULV-4: PIPE 4

Inflow Area = 15.897 ac, 2.62% Impervious, Inflow Depth > 2.37" for 25_year event
Inflow = 29.69 cfs @ 12.28 hrs, Volume= 3.146 af
Outflow = 29.69 cfs @ 12.28 hrs, Volume= 3.146 af, Atten= 0%, Lag= 0.0 min
Primary = 29.69 cfs @ 12.28 hrs, Volume= 3.146 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

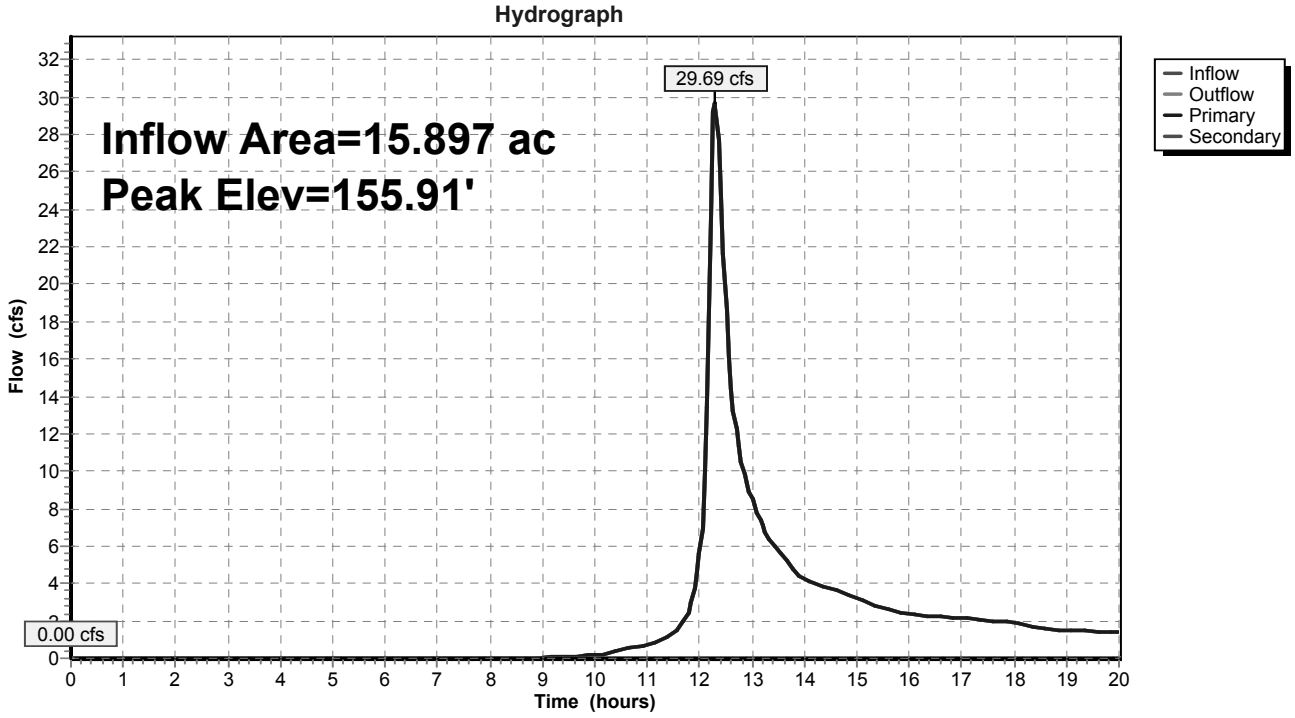
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 155.91' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.00' | **24.0" Round Culvert**<br>L= 38.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 150.00' / 149.50' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=29.42 cfs @ 12.28 hrs HW=155.81' TW=153.39' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 29.42 cfs @ 9.37 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=150.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-4: PIPE 4



## Summary for Pond R-CULV-5: PIPE 5

Inflow Area = 16.805 ac, 2.48% Impervious, Inflow Depth > 2.36" for 25_year event
Inflow = 31.27 cfs @ 12.28 hrs, Volume= 3.305 af
Outflow = 31.27 cfs @ 12.28 hrs, Volume= 3.305 af, Atten= 0%, Lag= 0.0 min
Primary = 31.27 cfs @ 12.28 hrs, Volume= 3.305 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

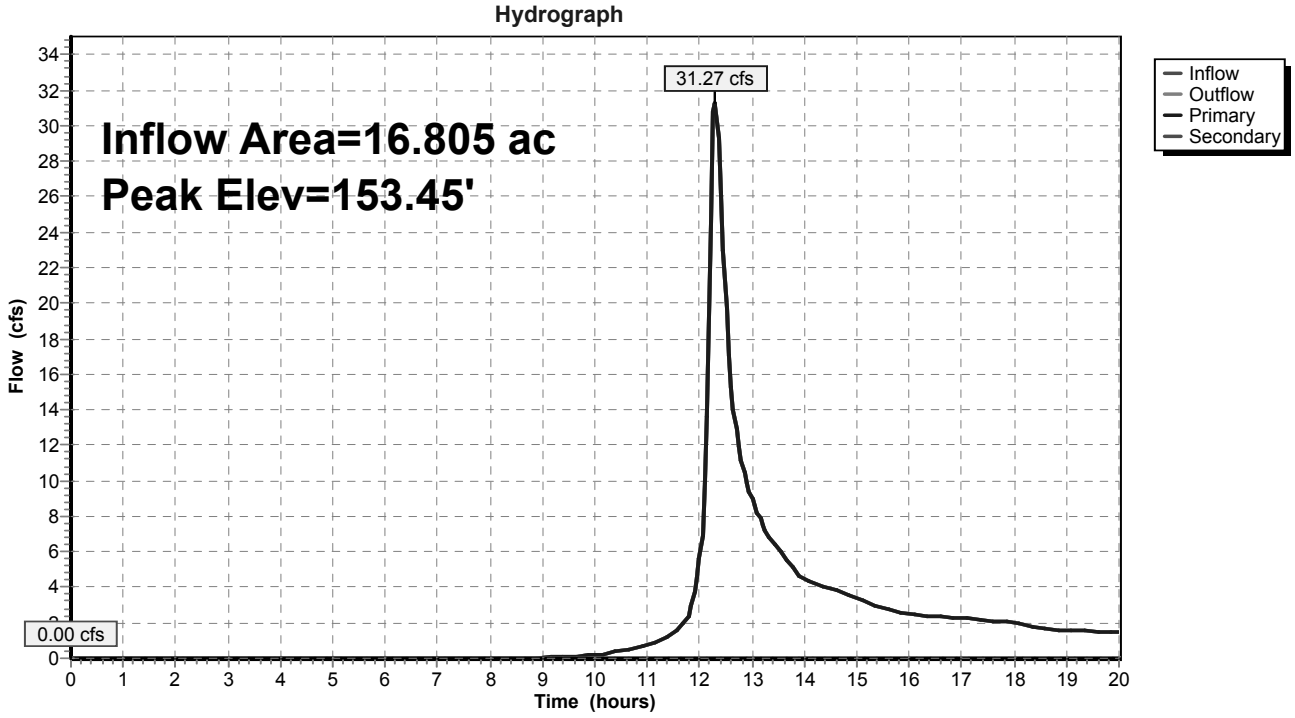
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 153.45' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 149.40' | **24.0" Round Culvert**<br>L= 78.3' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 149.40' / 148.10' S= 0.0166 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 170.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=31.03 cfs @ 12.28 hrs HW=153.40' TW=150.10' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 31.03 cfs @ 9.88 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=149.40' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-5: PIPE 5



## Summary for Pond R-CULV-6: PIPE 6

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 2.37" for 25_year event
Inflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Outflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af, Atten= 0%, Lag= 0.0 min
Primary = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

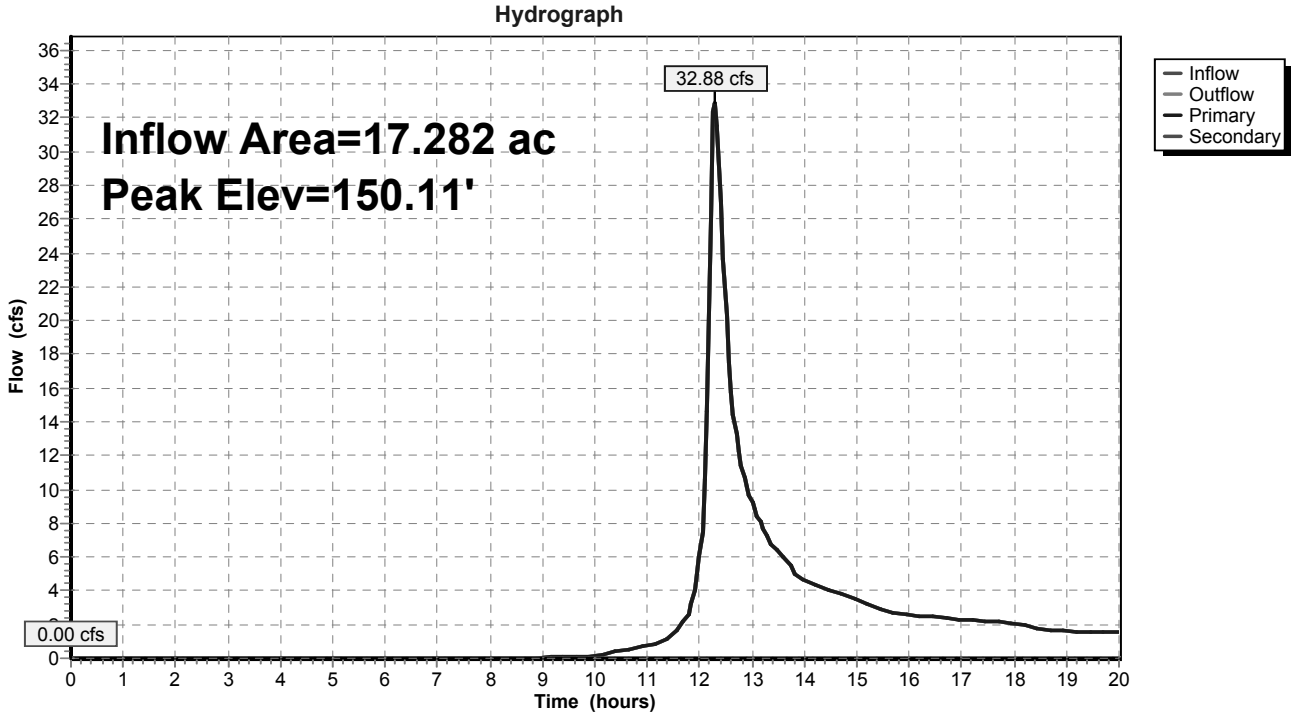
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.11' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.00' | **36.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 148.00' / 145.10' S= 0.0215 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 161.10' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=32.57 cfs @ 12.28 hrs HW=150.10' TW=147.10' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 32.57 cfs @ 6.17 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=148.00' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-6: PIPE 6



## Summary for Pond R-CULV-7: PIPE 7

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 2.37" for 25_year event
Inflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Outflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af, Atten= 0%, Lag= 0.0 min
Primary = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

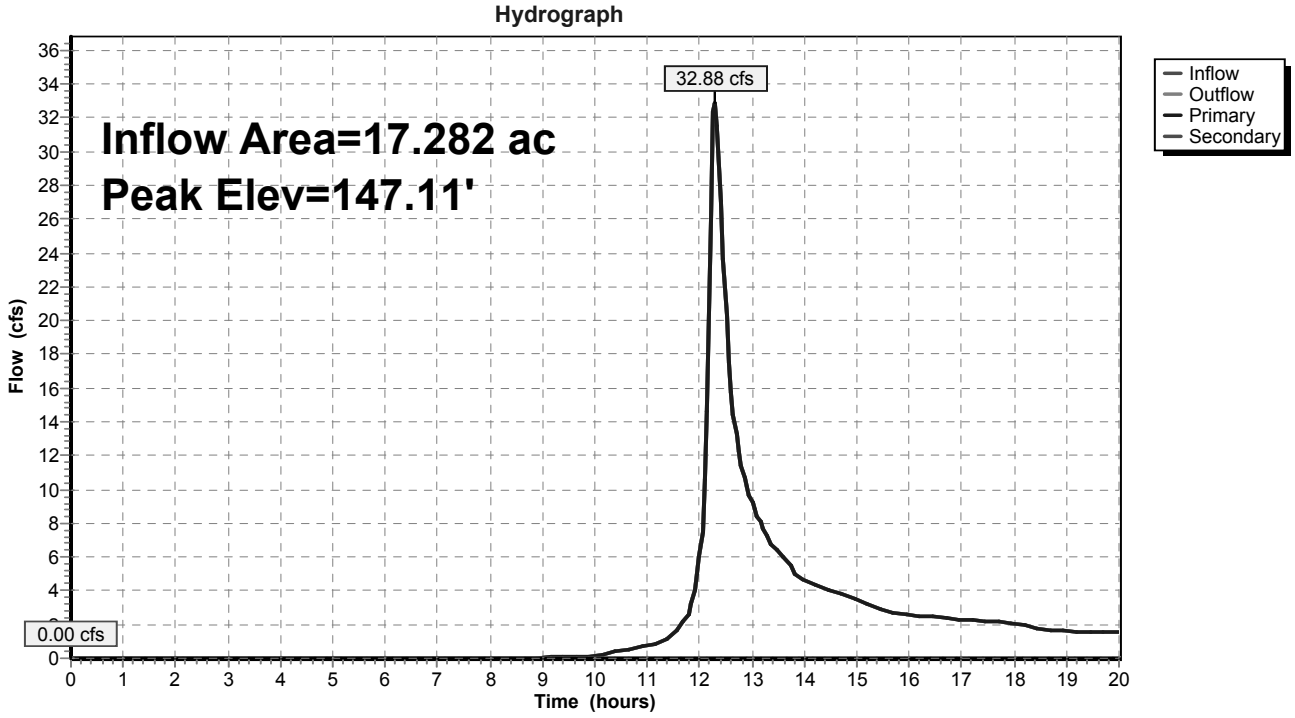
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 147.11' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 145.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 145.00' / 141.10' S= 0.0198 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=32.57 cfs @ 12.28 hrs HW=147.10' TW=143.34' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 32.57 cfs @ 6.17 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=145.00' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-7: PIPE 7



## Summary for Pond R-CULV-8: PIPE 8

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 2.37" for 25_year event
Inflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Outflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af, Atten= 0%, Lag= 0.0 min
Primary = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

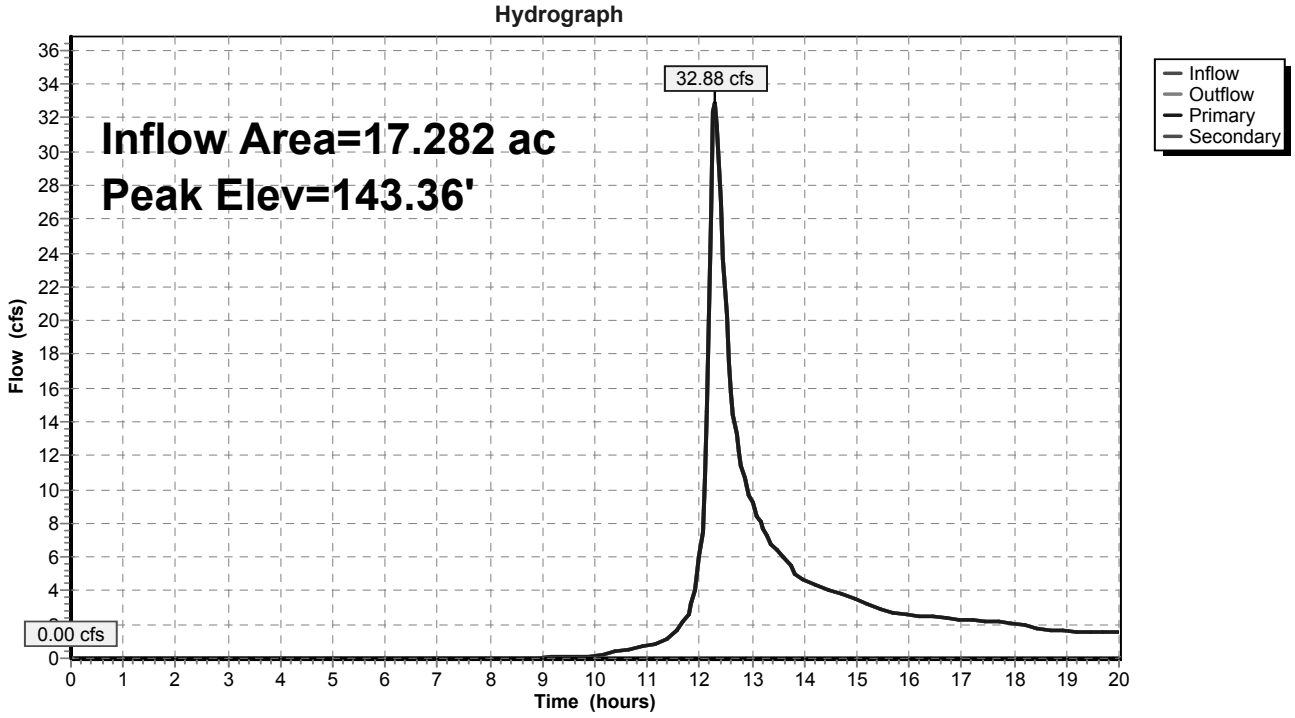
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 143.36' @ 12.29 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 141.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 141.00' / 138.70' S= 0.0117 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=32.21 cfs @ 12.28 hrs HW=143.34' TW=141.19' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 32.21 cfs @ 7.49 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=141.00' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-8: PIPE 8



## Summary for Pond R-CULV-9: PIPE 9

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 2.37" for 25_year event
Inflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Outflow = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af, Atten= 0%, Lag= 0.0 min
Primary = 32.88 cfs @ 12.28 hrs, Volume= 3.417 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

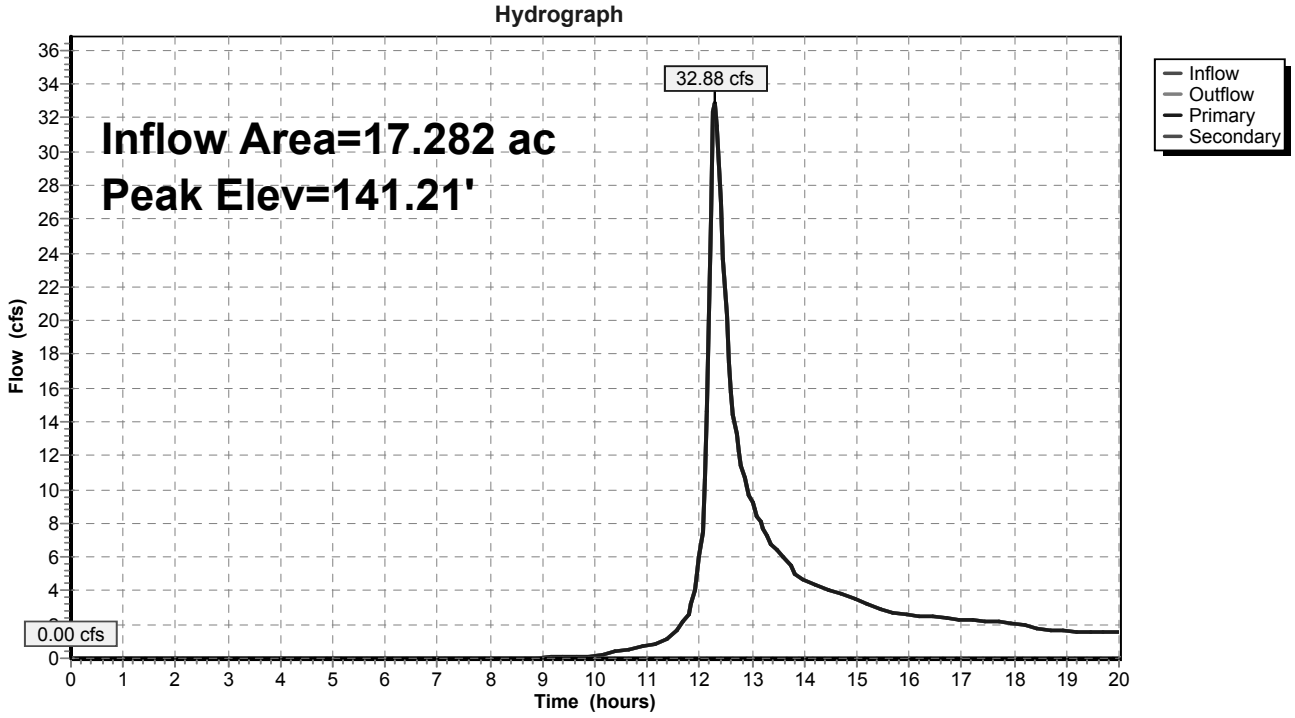
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 141.21' @ 12.28 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 138.71' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 138.71' / 136.60' S= 0.0107 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 143.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=32.57 cfs @ 12.28 hrs HW=141.19' TW=139.32' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 32.57 cfs @ 7.06 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=138.71' TW=133.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-9: PIPE 9

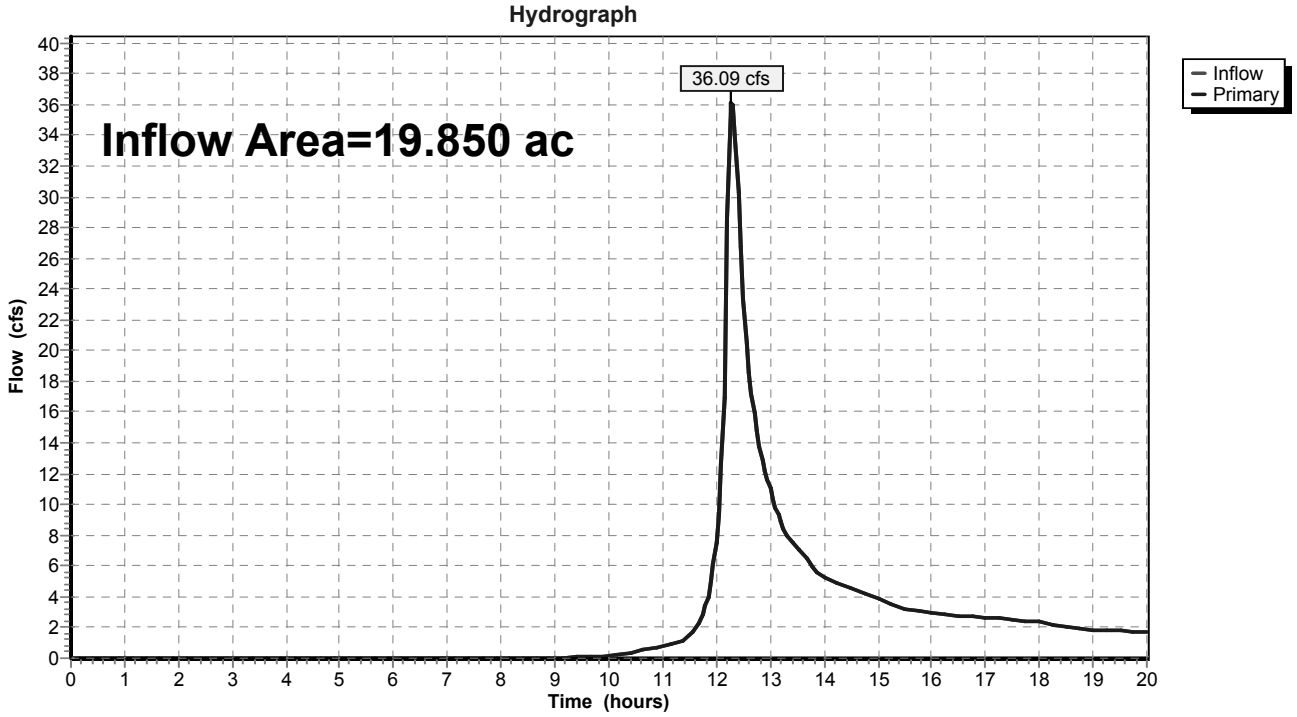


## Summary for Link DP CULV: outflow from culvert

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 2.36" for 25_year event
Inflow = 36.09 cfs @ 12.28 hrs, Volume= 3.897 af
Primary = 36.09 cfs @ 12.28 hrs, Volume= 3.897 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP CULV: outflow from culvert

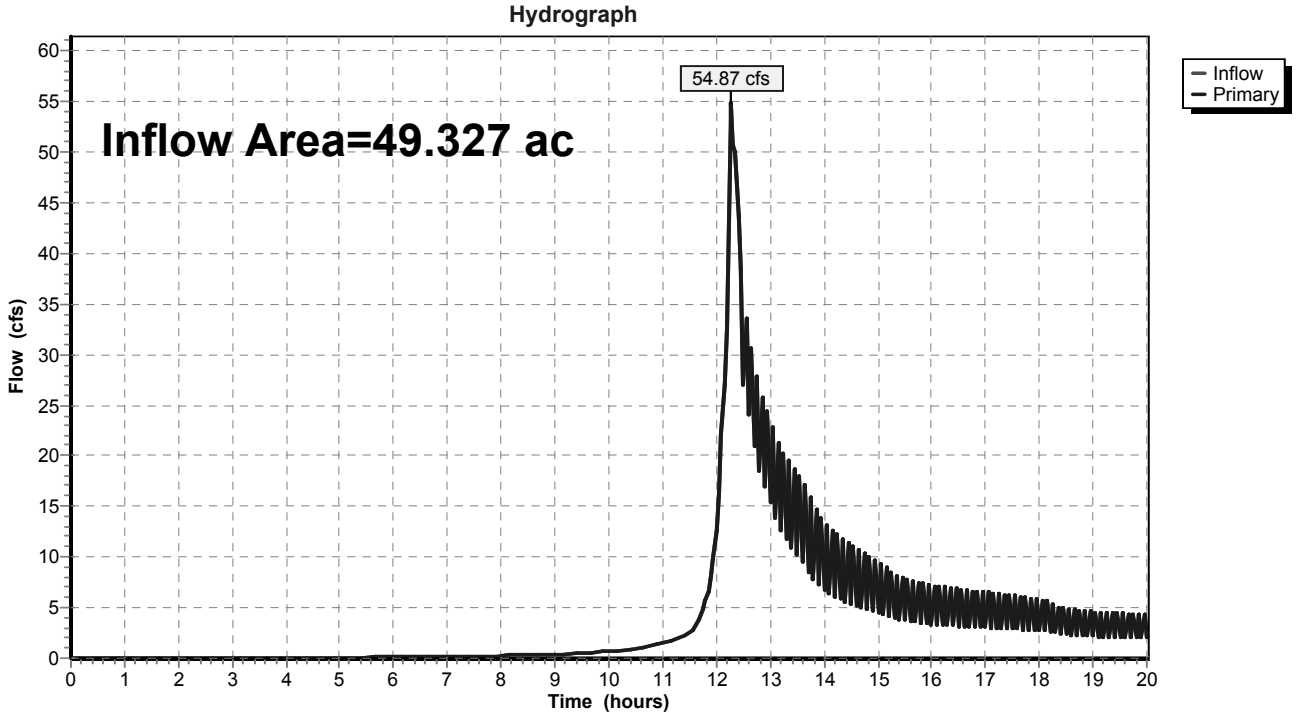


## Summary for Link DP North: DP North

Inflow Area = 49.327 ac, 7.79% Impervious, Inflow Depth > 1.63" for 25_year event
Inflow = 54.87 cfs @ 12.27 hrs, Volume= 6.706 af
Primary = 54.87 cfs @ 12.27 hrs, Volume= 6.706 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

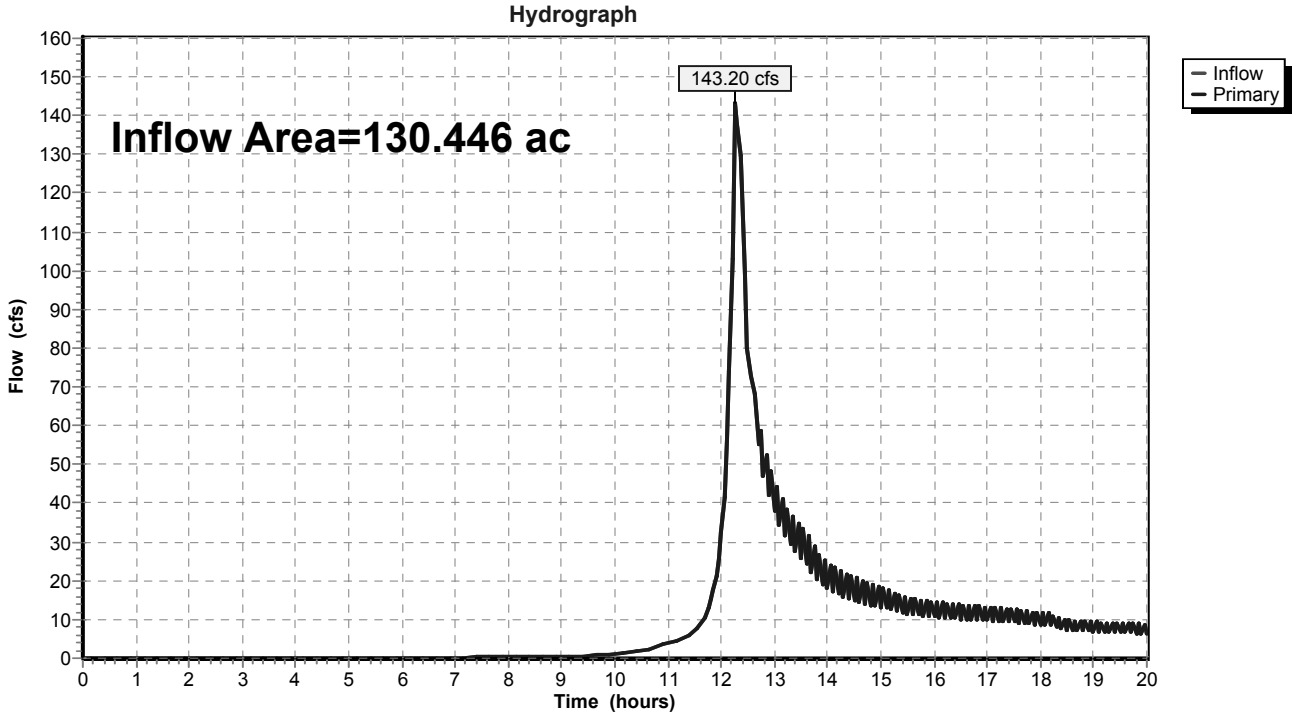


## Summary for Link DP Sudbury: DP Sudbury

Inflow Area = 130.446 ac, 6.65% Impervious, Inflow Depth > 1.46" for 25_year event
Inflow = 143.20 cfs @ 12.27 hrs, Volume= 15.879 af
Primary = 143.20 cfs @ 12.27 hrs, Volume= 15.879 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: DP Sudbury

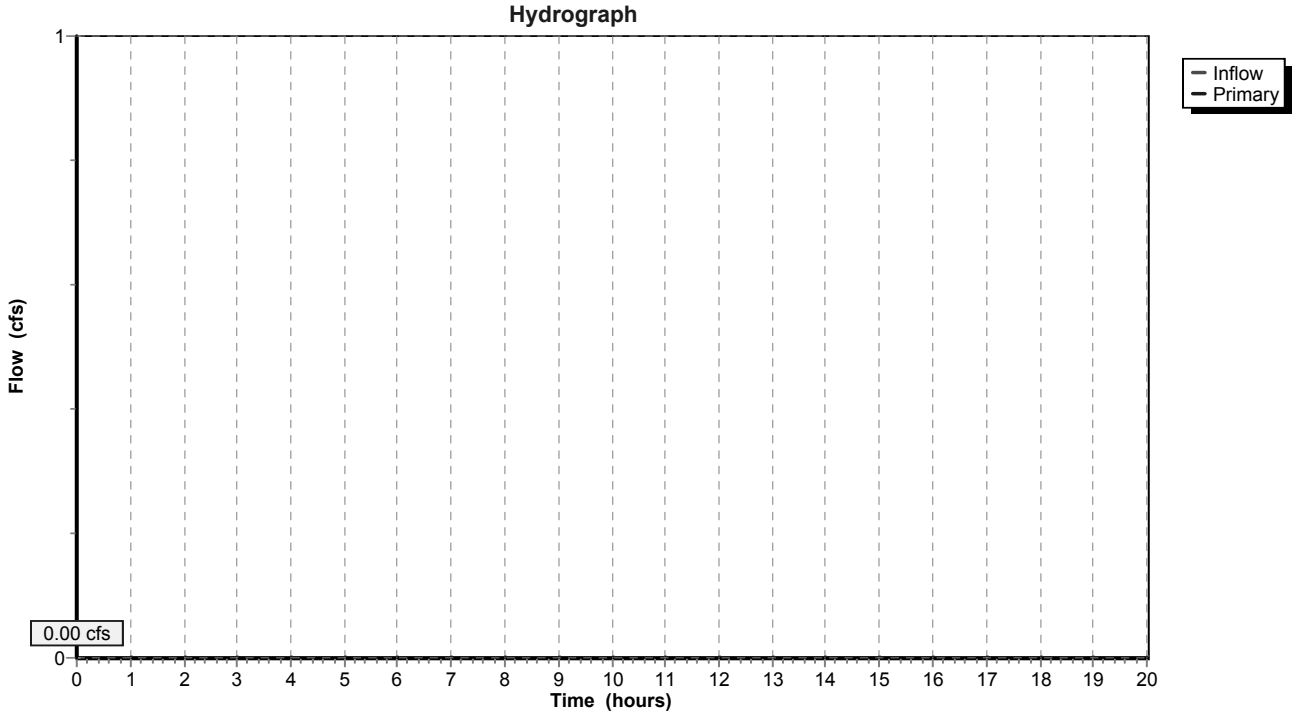


## Summary for Link DP Wellhead: DP Wellhead

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

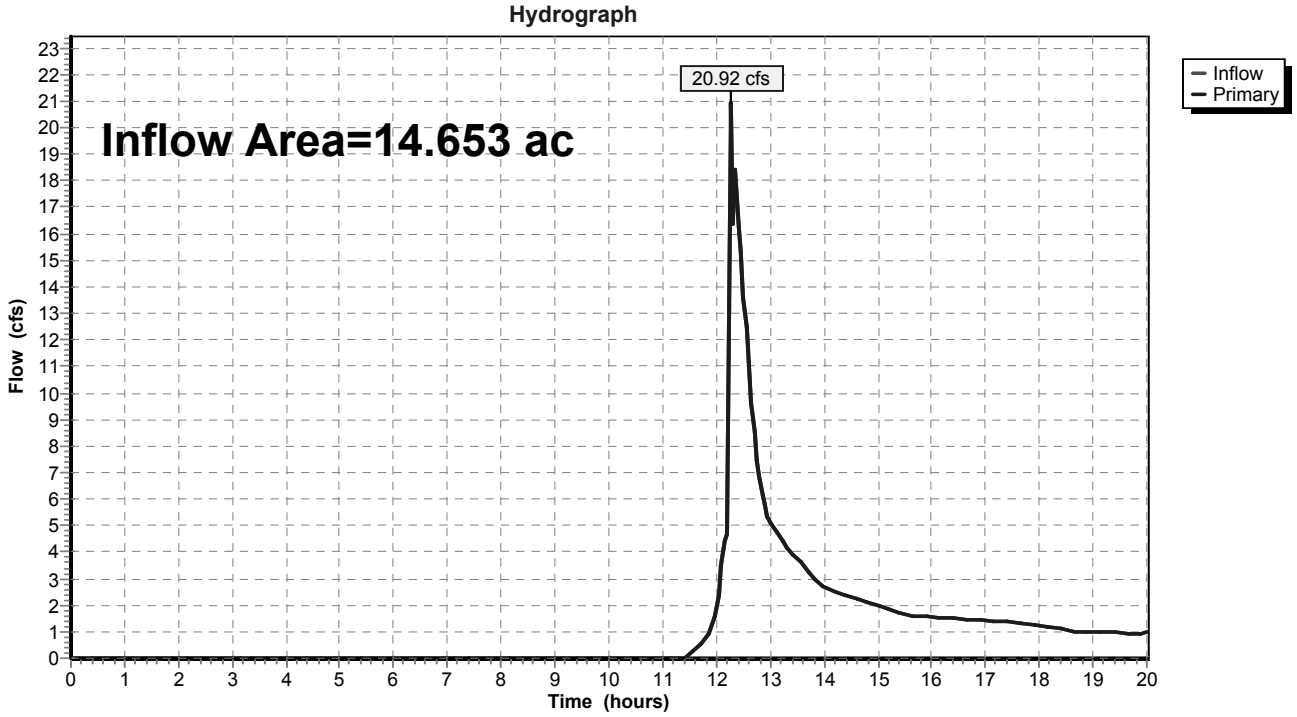


## Summary for Link DP West: DP West

Inflow Area = 14.653 ac, 3.51% Impervious, Inflow Depth > 1.53" for 25_year event
Inflow = 20.92 cfs @ 12.27 hrs, Volume= 1.868 af
Primary = 20.92 cfs @ 12.27 hrs, Volume= 1.868 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

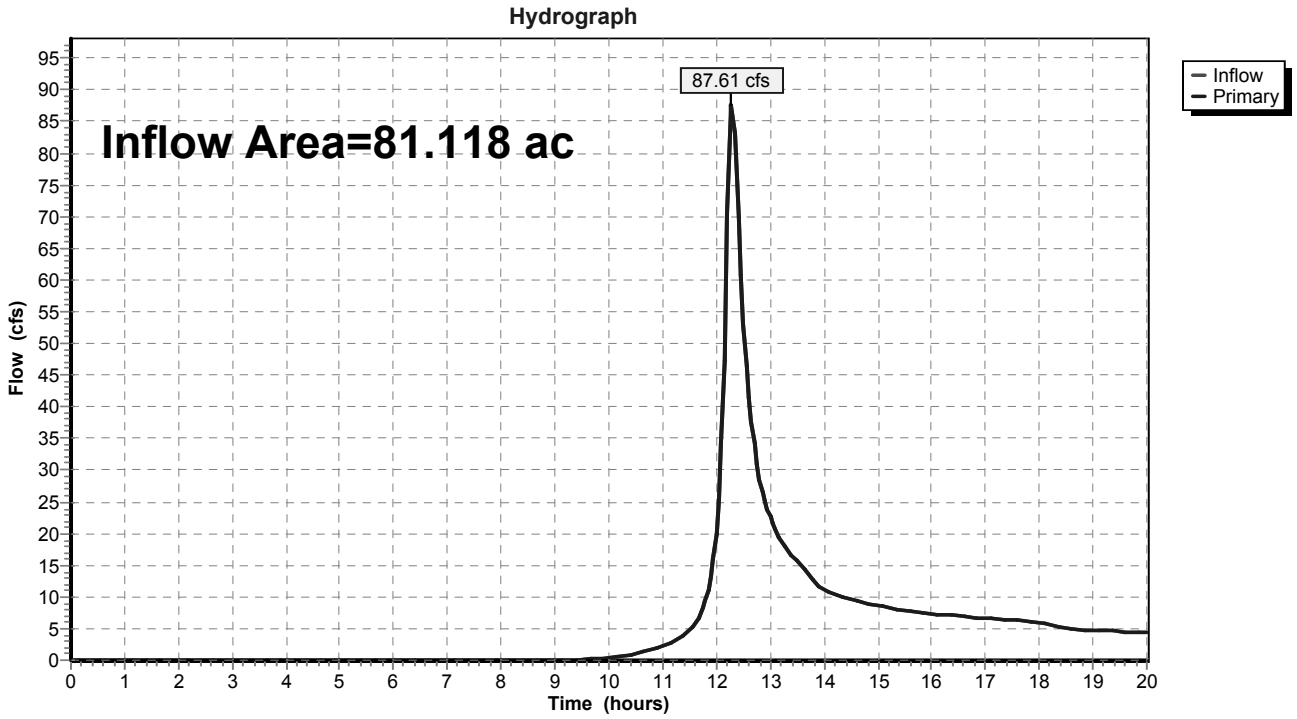


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 81.118 ac, 5.95% Impervious, Inflow Depth > 1.36" for 25_year event
Inflow = 87.61 cfs @ 12.28 hrs, Volume= 9.173 af
Primary = 87.61 cfs @ 12.28 hrs, Volume= 9.173 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

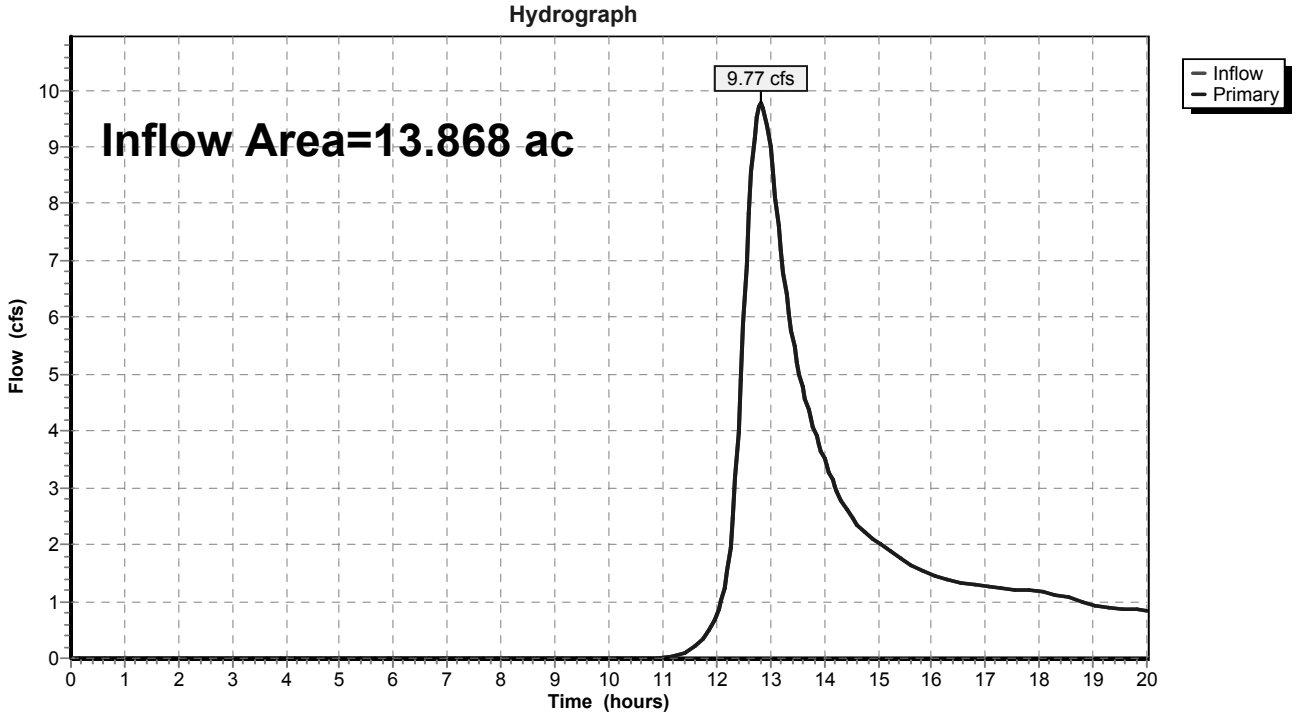


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.868 ac, 9.70% Impervious, Inflow Depth > 1.45" for 25_year event
Inflow = 9.77 cfs @ 12.84 hrs, Volume= 1.676 af
Primary = 9.77 cfs @ 12.84 hrs, Volume= 1.676 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

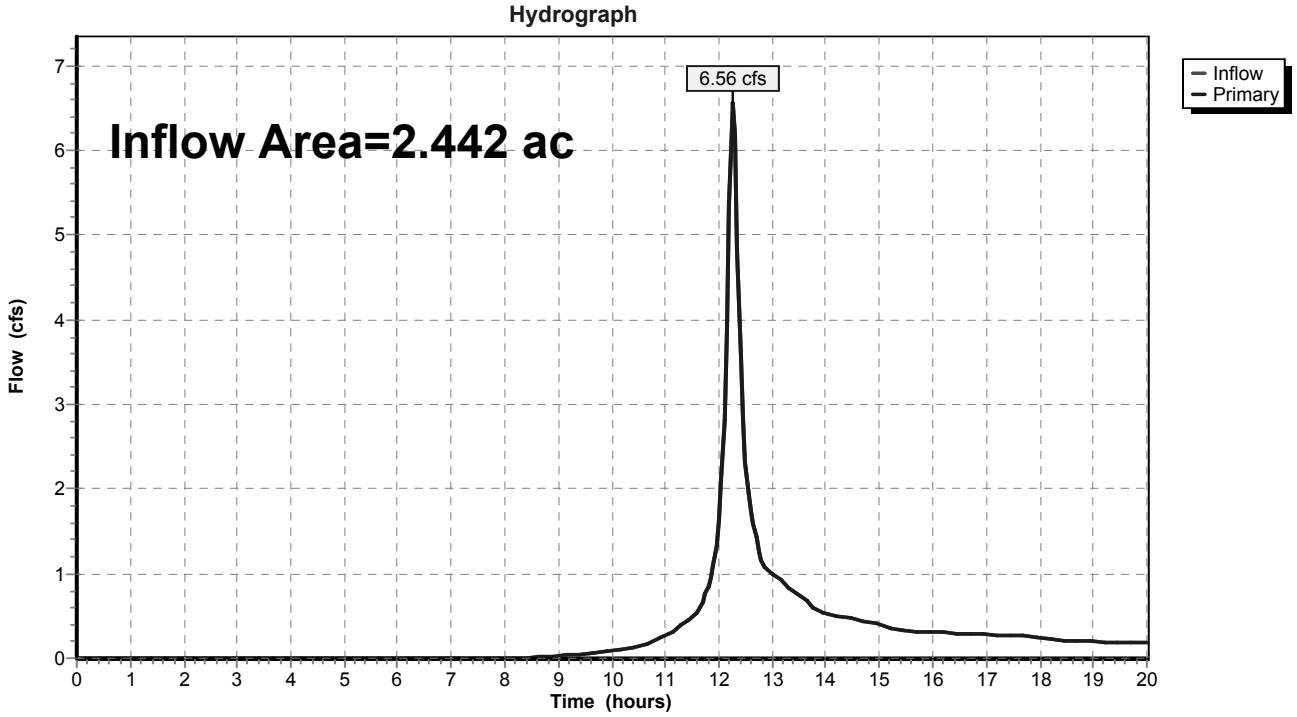


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 2.46" for 25_year event
Inflow = 6.56 cfs @ 12.26 hrs, Volume= 0.501 af
Primary = 6.56 cfs @ 12.26 hrs, Volume= 0.501 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

### Link L W 10.0: L W 10.0

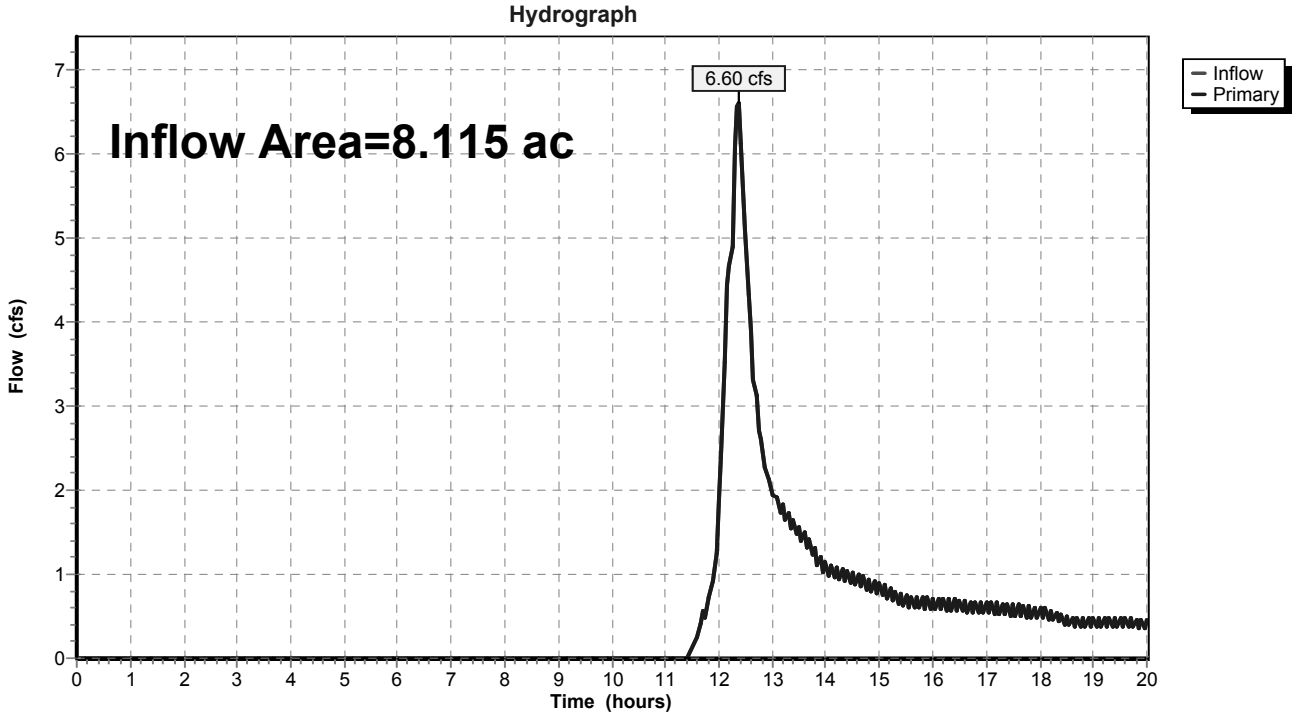


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 8.115 ac, 3.16% Impervious, Inflow Depth > 1.16" for 25_year event
Inflow = 6.60 cfs @ 12.37 hrs, Volume= 0.785 af
Primary = 6.60 cfs @ 12.37 hrs, Volume= 0.785 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 2.0: L W 2.0

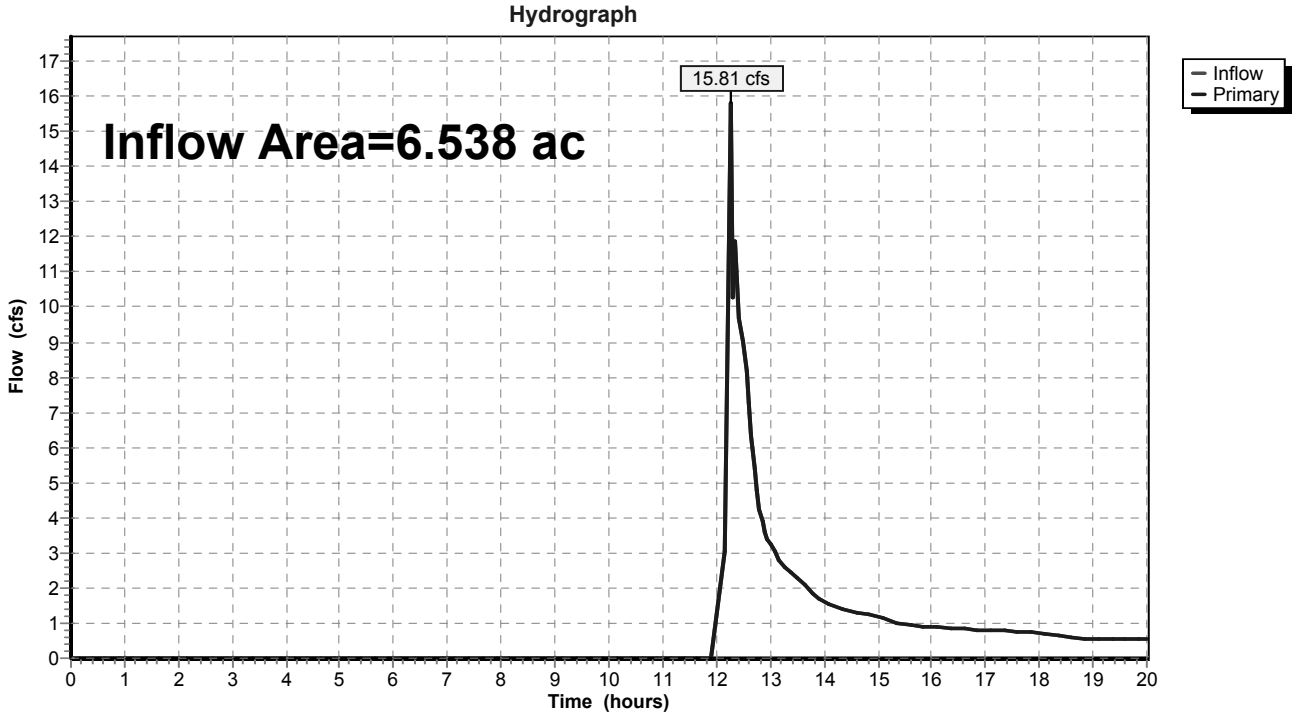


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 1.99" for 25_year event
Inflow = 15.81 cfs @ 12.26 hrs, Volume= 1.083 af
Primary = 15.81 cfs @ 12.26 hrs, Volume= 1.083 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 3.0: L W 3.0

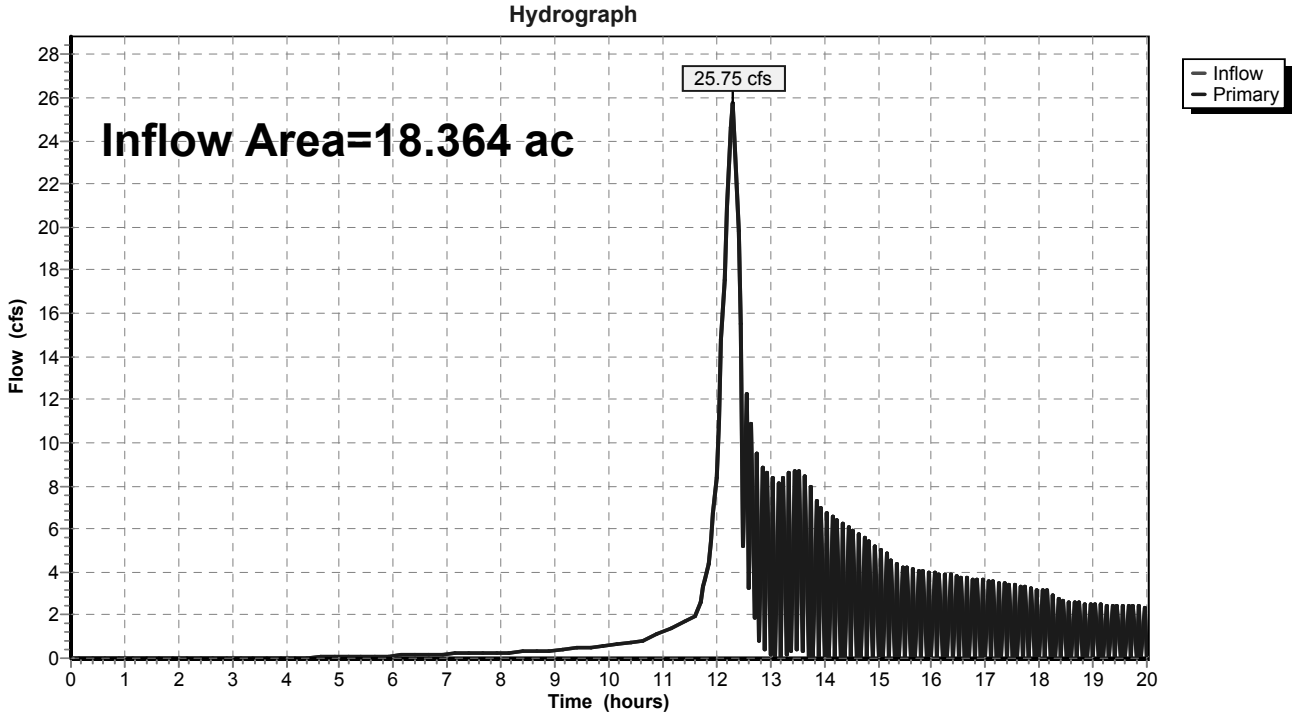


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 1.74" for 25_year event
Inflow = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af
Primary = 25.75 cfs @ 12.29 hrs, Volume= 2.661 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

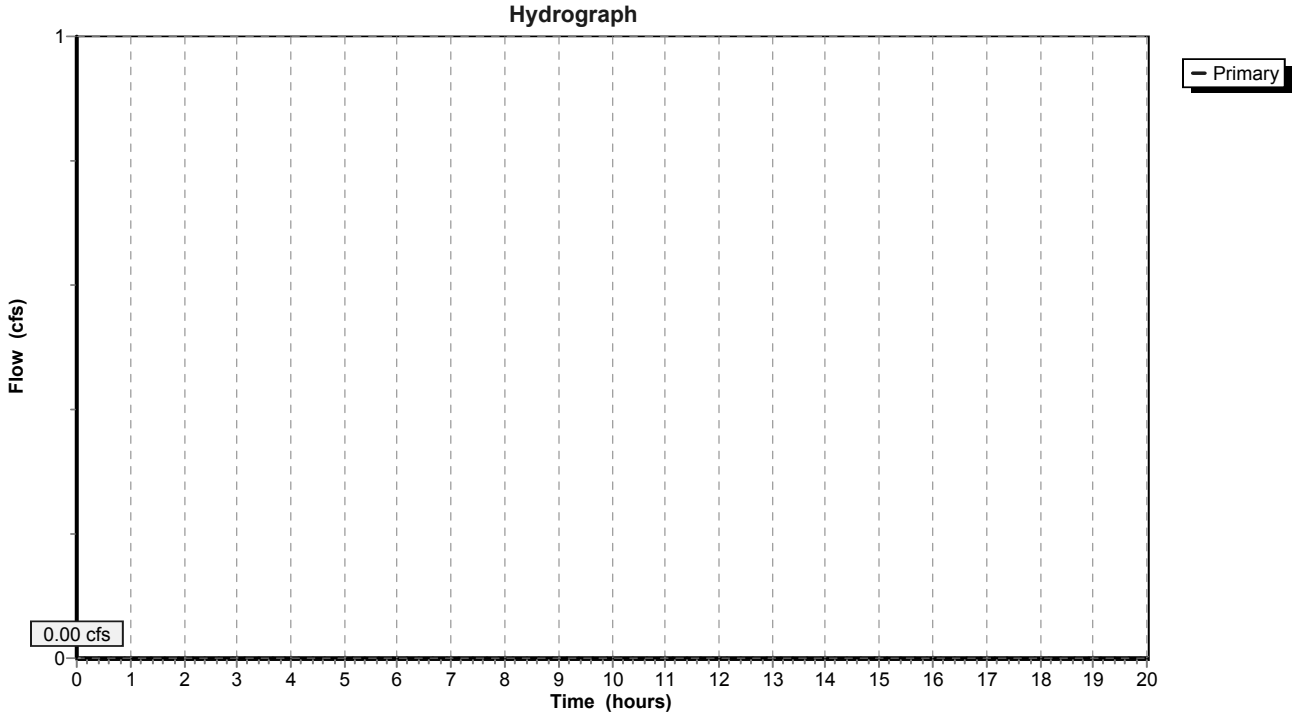


## Summary for Link L Well 1.1B: L Well 1.1B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.1B: L Well 1.1B

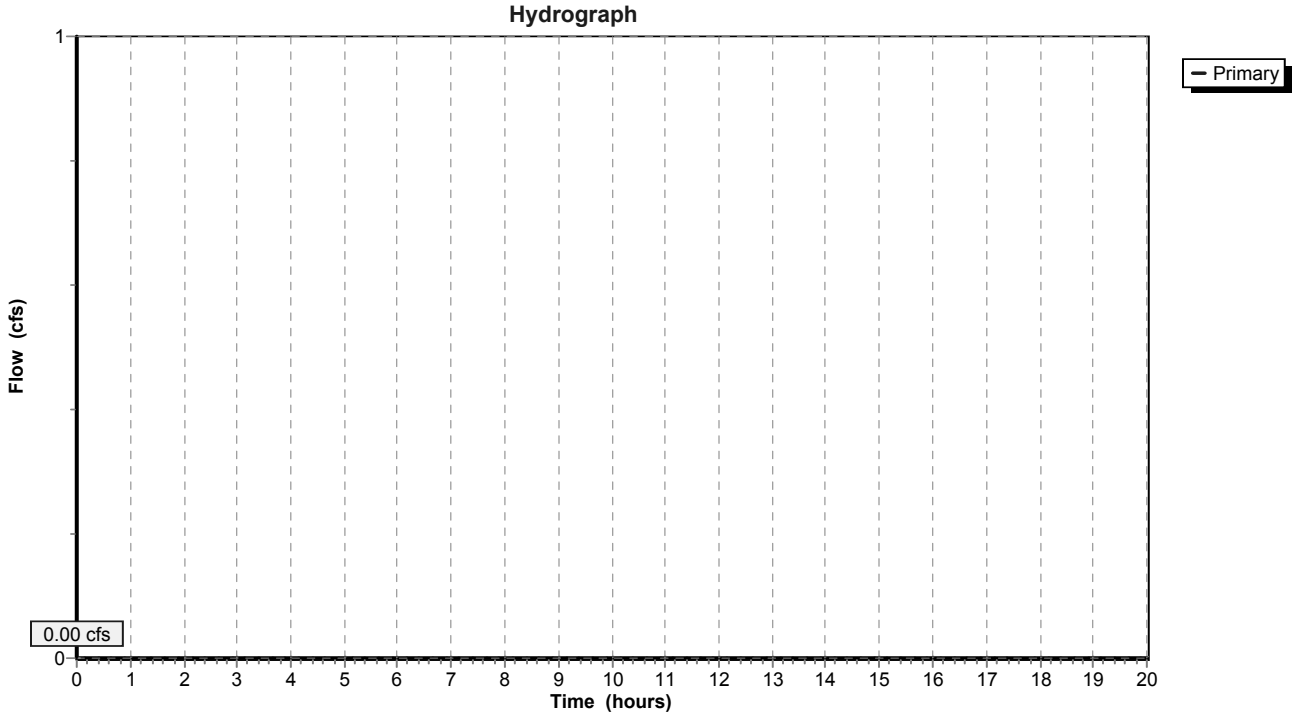


## Summary for Link L Well 1.2A: L Well 1.2A

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2A: L Well 1.2A

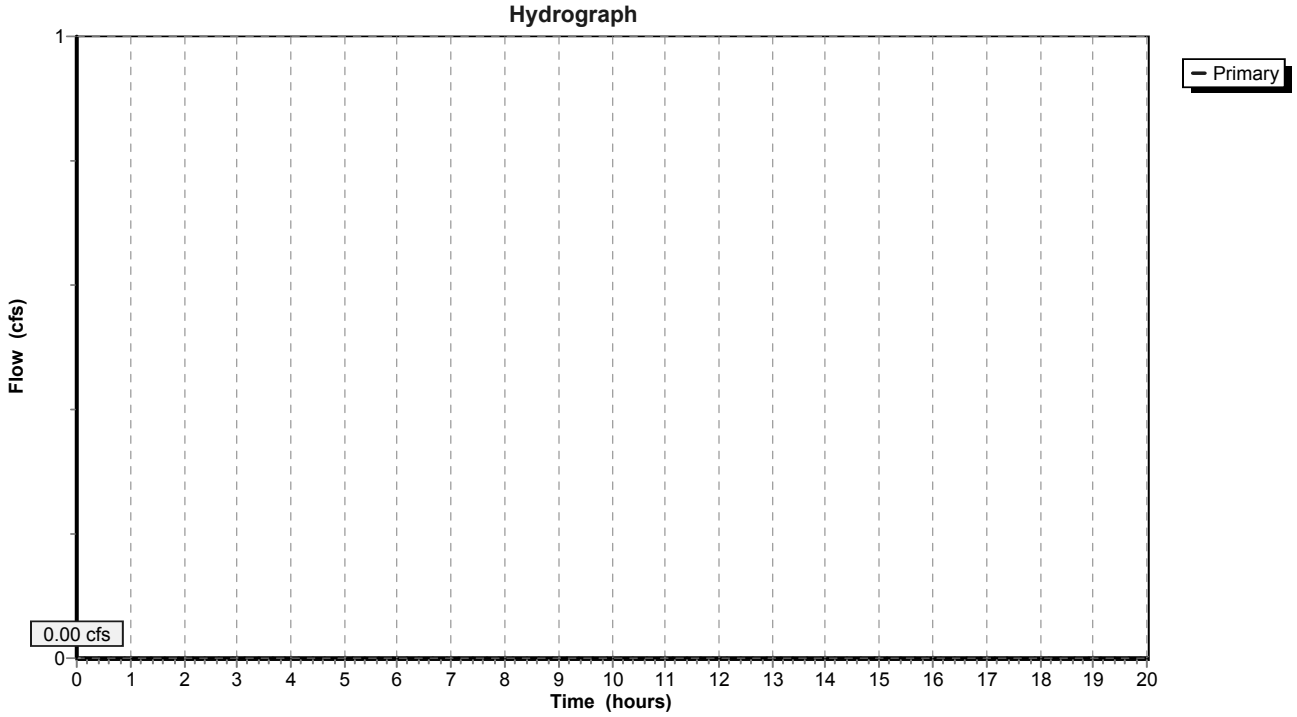


## Summary for Link L Well 1.2B: L Well 1.2B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2B: L Well 1.2B

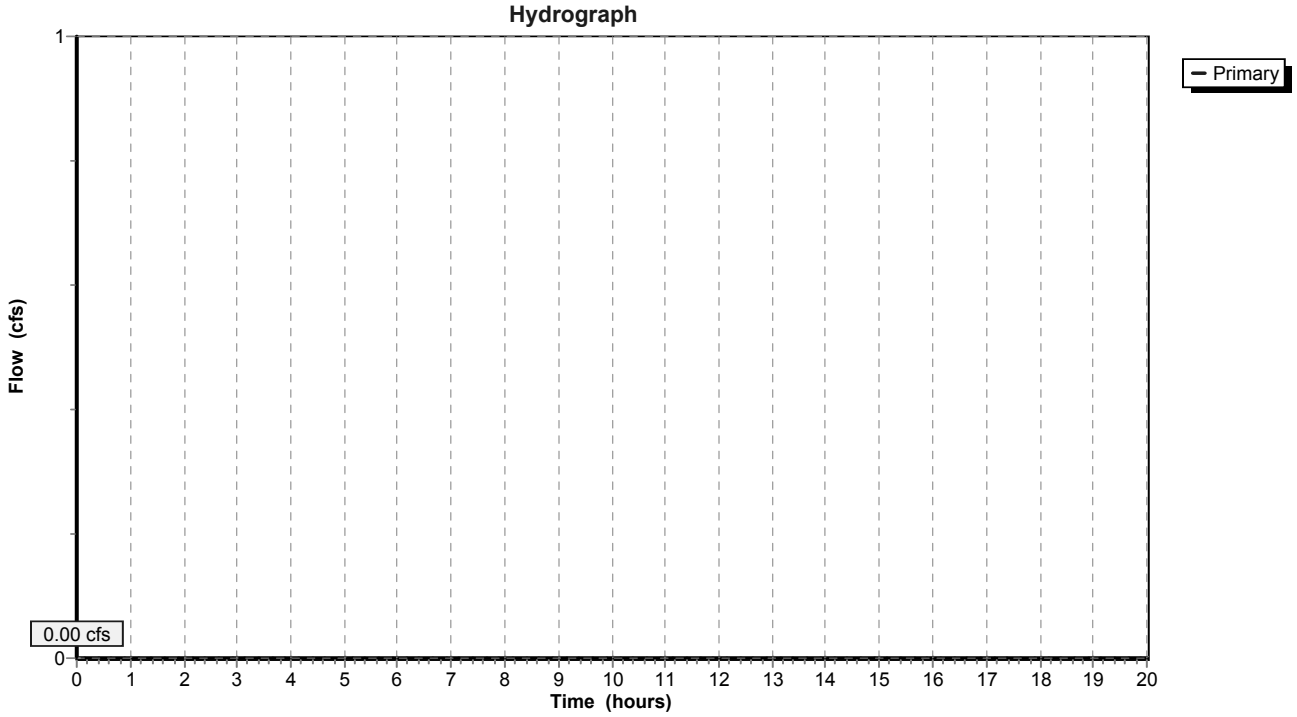


## Summary for Link L Well 1.2C: L Well 1.2C

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2C: L Well 1.2C



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points x 2
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE 1.0: (blank)** Runoff Area=588,258 sf 0.70% Impervious Runoff Depth>3.81"
Flow Length=583' Tc=11.3 min CN=65 Runoff=49.03 cfs 4.285 af

**SubcatchmentE 1.0A: (blank)** Runoff Area=3,956 sf 65.00% Impervious Runoff Depth>5.19"
Flow Length=94' Tc=6.0 min CN=77 Runoff=0.50 cfs 0.039 af

**SubcatchmentE 1.0B: (blank)** Runoff Area=33,902 sf 25.51% Impervious Runoff Depth>2.51"
Flow Length=186' Tc=6.0 min CN=53 Runoff=2.14 cfs 0.163 af

**SubcatchmentE 1.0C: (blank)** Runoff Area=283,702 sf 11.45% Impervious Runoff Depth>3.82"
Flow Length=277' Tc=6.0 min CN=65 Runoff=27.27 cfs 2.071 af

**SubcatchmentE 1.0D: (blank)** Runoff Area=52,799 sf 0.00% Impervious Runoff Depth>3.04"
Flow Length=194' Slope=0.0500 '/' Tc=6.0 min CN=58 Runoff=4.07 cfs 0.307 af

**SubcatchmentE 1.1A: (blank)** Runoff Area=117,762 sf 7.36% Impervious Runoff Depth>5.77"
Flow Length=346' Tc=6.0 min CN=82 Runoff=16.05 cfs 1.300 af

**SubcatchmentE 1.1B: (blank)** Runoff Area=182,822 sf 0.00% Impervious Runoff Depth>2.47"
Flow Length=1,539' Tc=32.8 min CN=53 Runoff=6.28 cfs 0.864 af

**SubcatchmentE 1.1B-1: (blank)** Runoff Area=59,014 sf 2.20% Impervious Runoff Depth>2.82"
Flow Length=252' Tc=7.5 min CN=56 Runoff=4.06 cfs 0.319 af

**SubcatchmentE 1.1B-2: (blank)** Runoff Area=234,126 sf 2.43% Impervious Runoff Depth>2.72"
Flow Length=139' Tc=6.0 min CN=55 Runoff=16.07 cfs 1.218 af

**SubcatchmentE 1.1B-4: (blank)** Runoff Area=38,504 sf 0.00% Impervious Runoff Depth>3.38"
Tc=0.0 min CN=61 Runoff=3.76 cfs 0.249 af

**SubcatchmentE 1.2A: (blank)** Runoff Area=217,938 sf 3.14% Impervious Runoff Depth>2.80"
Flow Length=1,025' Tc=23.9 min CN=56 Runoff=9.98 cfs 1.167 af

**SubcatchmentE 1.2A-1: (blank)** Runoff Area=61,649 sf 17.27% Impervious Runoff Depth>3.15"
Flow Length=344' Tc=6.0 min CN=59 Runoff=4.92 cfs 0.372 af

**SubcatchmentE 1.2A-2: (blank)** Runoff Area=48,650 sf 0.01% Impervious Runoff Depth>2.40"
Flow Length=93' Tc=6.0 min CN=52 Runoff=2.93 cfs 0.223 af

**SubcatchmentE 1.2B: (blank)** Runoff Area=82,957 sf 52.49% Impervious Runoff Depth>5.42"
Flow Length=448' Tc=6.0 min CN=79 Runoff=10.79 cfs 0.860 af

**SubcatchmentE 1.2B-1: (blank)** Runoff Area=28,861 sf 2.32% Impervious Runoff Depth>3.48"
Flow Length=182' Tc=8.0 min CN=62 Runoff=2.42 cfs 0.192 af

**SubcatchmentE 1.2C: (blank)** Runoff Area=46,053 sf 10.05% Impervious Runoff Depth>5.77"
Flow Length=193' Tc=6.0 min CN=82 Runoff=6.28 cfs 0.508 af

**SubcatchmentE 1.2C-1: (blank)** Runoff Area=15,993 sf 0.21% Impervious Runoff Depth>3.93"
Flow Length=98' Tc=6.0 min CN=66 Runoff=1.58 cfs 0.120 af

**SubcatchmentE 1.2C-2: (blank)** Runoff Area=20,935 sf 0.00% Impervious Runoff Depth>3.37"
Flow Length=288' Tc=7.7 min CN=61 Runoff=1.71 cfs 0.135 af

**SubcatchmentE 1.3A: (blank)** Runoff Area=201,598 sf 29.96% Impervious Runoff Depth>3.68"
Flow Length=1,196' Tc=20.9 min CN=64 Runoff=12.99 cfs 1.419 af

**SubcatchmentE 4.0: (blank)** Runoff Area=604,094 sf 9.70% Impervious Runoff Depth>2.98"
Flow Length=1,859' Tc=50.0 min CN=58 Runoff=20.49 cfs 3.438 af

**SubcatchmentE-CULV-S: (blank)** Runoff Area=196,467 sf 0.93% Impervious Runoff Depth>3.70"
Flow Length=319' Tc=9.5 min CN=64 Runoff=16.67 cfs 1.390 af

**SubcatchmentRG-E-1: (blank)** Runoff Area=104,917 sf 0.00% Impervious Runoff Depth>4.49"
Flow Length=750' Tc=7.6 min CN=71 Runoff=11.28 cfs 0.902 af

**SubcatchmentRG-E-2: (blank)** Runoff Area=20,767 sf 0.08% Impervious Runoff Depth>5.30"
Flow Length=270' Tc=6.0 min CN=78 Runoff=2.66 cfs 0.211 af

**SubcatchmentRG-E-4A: (blank)** Runoff Area=21,054 sf 0.00% Impervious Runoff Depth>4.72"
Flow Length=114' Tc=6.0 min CN=73 Runoff=2.45 cfs 0.190 af

**SubcatchmentRG-E-4B: (blank)** Runoff Area=22,865 sf 0.00% Impervious Runoff Depth>5.89"
Flow Length=197' Tc=6.0 min CN=83 Runoff=3.16 cfs 0.257 af

**SubcatchmentRG-E-7: (blank)** Runoff Area=41,427 sf 0.00% Impervious Runoff Depth>6.71"
Flow Length=88' Tc=6.0 min CN=90 Runoff=6.17 cfs 0.532 af

**SubcatchmentRG-E-8: (blank)** Runoff Area=28,390 sf 0.01% Impervious Runoff Depth>4.84"
Flow Length=252' Tc=6.0 min CN=74 Runoff=3.37 cfs 0.263 af

**SubcatchmentRG-E-9A: (blank)** Runoff Area=43,781 sf 0.00% Impervious Runoff Depth>4.95"
Flow Length=372' Tc=8.2 min CN=75 Runoff=5.03 cfs 0.415 af

**SubcatchmentRG-E-9B: (blank)** Runoff Area=22,781 sf 0.00% Impervious Runoff Depth>3.26"
Flow Length=186' Tc=6.0 min CN=60 Runoff=1.88 cfs 0.142 af

**SubcatchmentRG-W-1: (blank)** Runoff Area=65,101 sf 0.00% Impervious Runoff Depth>4.95"
Flow Length=495' Tc=6.0 min CN=75 Runoff=7.89 cfs 0.617 af

**SubcatchmentRG-W-2: (blank)** Runoff Area=111,691 sf 0.00% Impervious Runoff Depth>4.04"
Flow Length=336' Tc=6.0 min CN=67 Runoff=11.32 cfs 0.864 af

**SubcatchmentRG-W-3: (blank)** Runoff Area=91,227 sf 0.00% Impervious Runoff Depth>3.70"
Flow Length=97' Tc=6.0 min CN=64 Runoff=8.53 cfs 0.647 af

**SubcatchmentRG-W-3A: (blank)** Runoff Area=37,790 sf 0.00% Impervious Runoff Depth>6.24"
Flow Length=365' Tc=6.0 min CN=86 Runoff=5.42 cfs 0.451 af

**SubcatchmentRG-W-4: (blank)** Runoff Area=100,346 sf 0.00% Impervious Runoff Depth>4.84"
Flow Length=452' Tc=6.1 min CN=74 Runoff=11.90 cfs 0.929 af

**SubcatchmentRG-W-5: (blank)** Runoff Area=42,562 sf 0.79% Impervious Runoff Depth>4.15"
Flow Length=182' Tc=6.0 min CN=68 Runoff=4.43 cfs 0.338 af

**SubcatchmentROOF-1: (blank)** Runoff Area=4,580 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.067 af

**SubcatchmentROOF-10: (blank)** Runoff Area=4,268 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.76 cfs 0.063 af

**SubcatchmentROOF-100: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-101: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-102: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-103: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-104: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-105: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-106: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-107: (blank)** Runoff Area=1,154 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.017 af

**SubcatchmentROOF-108: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-109: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-11: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.89 cfs 0.073 af

**SubcatchmentROOF-110: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-111: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.55 cfs 0.046 af

**SubcatchmentROOF-112: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-113: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-114: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.55 cfs 0.046 af

**SubcatchmentROOF-115: (blank)** Runoff Area=2,606 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.46 cfs 0.038 af

**SubcatchmentROOF-117: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-118: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.46 cfs 0.038 af

**SubcatchmentROOF-119: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-11MAIL: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-12: (blank)** Runoff Area=2,311 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-120: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-121: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.46 cfs 0.038 af

**SubcatchmentROOF-122: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-123: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.46 cfs 0.038 af

**SubcatchmentROOF-13: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-14: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-15: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-16: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-17: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.55 cfs 0.046 af

**SubcatchmentROOF-18: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.021 af

**SubcatchmentROOF-19: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.021 af

**SubcatchmentROOF-2: (blank)** Runoff Area=5,339 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.95 cfs 0.078 af

**SubcatchmentROOF-20: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.021 af

**SubcatchmentROOF-21: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.021 af

**SubcatchmentROOF-22: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.021 af

**SubcatchmentROOF-23: (blank)** Runoff Area=1,455 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.26 cfs 0.021 af

**SubcatchmentROOF-24: (blank)** Runoff Area=3,107 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.55 cfs 0.046 af

**SubcatchmentROOF-25: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-26: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.068 af

**SubcatchmentROOF-27: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.78 cfs 0.065 af

**SubcatchmentROOF-28: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-29: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.068 af

**SubcatchmentROOF-3: (blank)** Runoff Area=11,005 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=1.95 cfs 0.162 af

**SubcatchmentROOF-30: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.068 af

**SubcatchmentROOF-31: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.46 cfs 0.038 af

**SubcatchmentROOF-32: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-33: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-34: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-35: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-36: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-37: (blank)** Runoff Area=1,153 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.017 af

**SubcatchmentROOF-38: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-39: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-4: (blank)** Runoff Area=9,675 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=1.71 cfs 0.142 af

**SubcatchmentROOF-40: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-41: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-42: (blank)** Runoff Area=1,505 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.27 cfs 0.022 af

**SubcatchmentROOF-43: (blank)** Runoff Area=1,553 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.28 cfs 0.023 af

**SubcatchmentROOF-44: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.017 af

**SubcatchmentROOF-45: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-46: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-47: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-48: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-49: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-5: (blank)** Runoff Area=9,831 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=1.74 cfs 0.144 af

**SubcatchmentROOF-50: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-51: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-52: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.017 af

**SubcatchmentROOF-53: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-54: (blank)** Runoff Area=2,936 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-55: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-56: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.068 af

**SubcatchmentROOF-57: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-58: (blank)** Runoff Area=2,942 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-59: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.78 cfs 0.065 af

**SubcatchmentROOF-6: (blank)** Runoff Area=9,941 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=1.76 cfs 0.146 af

**SubcatchmentROOF-60: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-61: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.78 cfs 0.065 af

**SubcatchmentROOF-62: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-63: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-64: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.78 cfs 0.065 af

**SubcatchmentROOF-65: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.78 cfs 0.065 af

**SubcatchmentROOF-66: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-67: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.068 af

**SubcatchmentROOF-68: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.78 cfs 0.065 af

**SubcatchmentROOF-69: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-7: (blank)** Runoff Area=4,999 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.89 cfs 0.073 af

**SubcatchmentROOF-70: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-71: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-72: (blank)** Runoff Area=1,156 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.017 af

**SubcatchmentROOF-73: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-74: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-75: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-76: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-77: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-78: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-79: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-8: (blank)** Runoff Area=11,381 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=2.02 cfs 0.167 af

**SubcatchmentROOF-80: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-81: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-82: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-83: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-84: (blank)** Runoff Area=1,149 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.017 af

**SubcatchmentROOF-85: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-86: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-87: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-88: (blank)** Runoff Area=1,302 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-89: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-9: (blank)** Runoff Area=4,992 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.88 cfs 0.073 af

**SubcatchmentROOF-90: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.068 af

**SubcatchmentROOF-91: (blank)** Runoff Area=2,940 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.52 cfs 0.043 af

**SubcatchmentROOF-92: (blank)** Runoff Area=2,315 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.41 cfs 0.034 af

**SubcatchmentROOF-93: (blank)** Runoff Area=2,604 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.46 cfs 0.038 af

**SubcatchmentROOF-94: (blank)** Runoff Area=1,301 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.23 cfs 0.019 af

**SubcatchmentROOF-95: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-96: (blank)** Runoff Area=4,410 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.78 cfs 0.065 af

**SubcatchmentROOF-97: (blank)** Runoff Area=4,599 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.81 cfs 0.068 af

**SubcatchmentROOF-98: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-99: (blank)** Runoff Area=1,157 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.21 cfs 0.017 af

**SubcatchmentROOF-BS1: (blank)** Runoff Area=84 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL20: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.03 cfs 0.002 af

**SubcatchmentROOF-MAIL29: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL5: (blank)** Runoff Area=156 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.03 cfs 0.002 af

**SubcatchmentROOF-MAIL64: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAIL8: (blank)** Runoff Area=97 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.02 cfs 0.001 af

**SubcatchmentROOF-MAIL91: (blank)** Runoff Area=78 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.01 cfs 0.001 af

**SubcatchmentROOF-MAINT11: (blank)** Runoff Area=1,104 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.20 cfs 0.016 af

**SubcatchmentROOF-PL11: (blank)** Runoff Area=1,431 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.25 cfs 0.021 af

**SubcatchmentROOF-PL6: (blank)** Runoff Area=1,429 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.25 cfs 0.021 af

**SubcatchmentROOF-POOL: (blank)** Runoff Area=449 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.08 cfs 0.007 af

**SubcatchmentROOF-RECY: (blank)** Runoff Area=854 sf 0.00% Impervious Runoff Depth>7.68"
Tc=0.0 min CN=98 Runoff=0.15 cfs 0.013 af

**SubcatchmentS-CB-E-1: (blank)** Runoff Area=47,382 sf 0.00% Impervious Runoff Depth>5.30"
Flow Length=297' Tc=6.0 min CN=78 Runoff=6.06 cfs 0.481 af

**SubcatchmentS-CB-INF-E-3: (blank)** Runoff Area=25,604 sf 0.00% Impervious Runoff Depth>6.84"
Tc=0.0 min CN=91 Runoff=4.38 cfs 0.335 af

**SubcatchmentS-CB-INF-E-4A: (blank)** Runoff Area=25,704 sf 0.00% Impervious Runoff Depth>7.20"
Tc=0.0 min CN=94 Runoff=4.49 cfs 0.354 af

**SubcatchmentS-DET-1: (blank)** Runoff Area=17,810 sf 0.18% Impervious Runoff Depth>3.59"
Flow Length=96' Tc=9.6 min CN=63 Runoff=1.46 cfs 0.122 af

**SubcatchmentS-DET-3: (blank)** Runoff Area=17,177 sf 0.00% Impervious Runoff Depth>3.92"
Flow Length=131' Tc=8.8 min CN=66 Runoff=1.58 cfs 0.129 af

**SubcatchmentS-INF-E-1: (blank)** Runoff Area=51,657 sf 0.00% Impervious Runoff Depth>5.30"
Flow Length=363' Tc=8.3 min CN=78 Runoff=6.26 cfs 0.524 af

**SubcatchmentS-INF-E-2: (blank)** Runoff Area=50,824 sf 0.00% Impervious Runoff Depth>5.88"
Flow Length=358' Tc=6.6 min CN=83 Runoff=6.94 cfs 0.572 af

**SubcatchmentS-INF-E-3: (blank)** Runoff Area=74,846 sf 0.00% Impervious Runoff Depth>5.06"
Flow Length=616' Tc=13.2 min CN=76 Runoff=7.68 cfs 0.724 af

**SubcatchmentS-LD-1: (blank)** Runoff Area=46,138 sf 4.25% Impervious Runoff Depth>3.80"
Flow Length=447' Tc=13.4 min CN=65 Runoff=3.64 cfs 0.336 af

**SubcatchmentS-LD-11: (blank)** Runoff Area=18,104 sf 0.00% Impervious Runoff Depth>3.94"
Tc=0.0 min CN=66 Runoff=2.04 cfs 0.136 af

**SubcatchmentS-LD-2: (blank)** Runoff Area=74,501 sf 9.20% Impervious Runoff Depth>4.15"
Flow Length=214' Tc=6.0 min CN=68 Runoff=7.75 cfs 0.592 af

**SubcatchmentS-LD-4: (blank)** Runoff Area=94,445 sf 9.85% Impervious Runoff Depth>4.95"
Flow Length=345' Tc=8.3 min CN=75 Runoff=10.83 cfs 0.894 af

**SubcatchmentW 10.0: (blank)** Runoff Area=106,387 sf 21.52% Impervious Runoff Depth>4.38"
Flow Length=509' Tc=8.8 min CN=70 Runoff=10.79 cfs 0.891 af

**SubcatchmentW 2.0: (blank)** Runoff Area=331,247 sf 3.38% Impervious Runoff Depth>2.28"
Flow Length=793' Tc=15.6 min CN=51 Runoff=14.50 cfs 1.447 af

**SubcatchmentW 3.1: (blank)** Runoff Area=57,507 sf 19.47% Impervious Runoff Depth>4.61"
Flow Length=413' Tc=8.1 min CN=72 Runoff=6.23 cfs 0.507 af

**SubcatchmentW 3.2: (blank)** Runoff Area=34,449 sf 0.01% Impervious Runoff Depth>3.36"
Flow Length=456' Tc=12.9 min CN=61 Runoff=2.44 cfs 0.221 af

**SubcatchmentW 3.3: (blank)** Runoff Area=88,756 sf 10.36% Impervious Runoff Depth>6.59"
Flow Length=530' Tc=6.0 min CN=89 Runoff=13.09 cfs 1.119 af

**SubcatchmentW 3.4: (blank)** Runoff Area=132,546 sf 5.02% Impervious Runoff Depth>1.29"
Flow Length=460' Tc=14.6 min CN=41 Runoff=2.90 cfs 0.328 af

**SubcatchmentW 9.1A: (blank)** Runoff Area=64,234 sf 61.01% Impervious Runoff Depth>6.12"
Flow Length=323' Tc=6.0 min CN=85 Runoff=9.11 cfs 0.752 af

**SubcatchmentW 9.1B: (blank)** Runoff Area=24,364 sf 16.02% Impervious Runoff Depth>3.59"
Flow Length=235' Tc=6.0 min CN=63 Runoff=2.21 cfs 0.167 af

**SubcatchmentW-CULV-N: (blank)** Runoff Area=74,124 sf 5.73% Impervious Runoff Depth>1.78"
Flow Length=84' Tc=6.0 min CN=46 Runoff=3.19 cfs 0.253 af

**SubcatchmentW-D-1: (blank)** Runoff Area=26,114 sf 0.00% Impervious Runoff Depth>1.57"
Flow Length=312' Tc=22.9 min CN=44 Runoff=0.62 cfs 0.078 af

**SubcatchmentW-D-3: (blank)** Runoff Area=6,640 sf 9.99% Impervious Runoff Depth>1.49"
Flow Length=89' Slope=0.1229 '/' Tc=6.0 min CN=43 Runoff=0.23 cfs 0.019 af

**Reach R-SWALE1: (new Reach)** Avg. Flow Depth=0.03' Max Vel=1.03 fps Inflow=2.42 cfs 0.192 af
n=0.035 L=377.0' S=0.0531 '/' Capacity=189.21 cfs Outflow=2.12 cfs 0.190 af

**Reach R-SWALE2: (new Reach)** Avg. Flow Depth=0.20' Max Vel=1.87 fps Inflow=23.21 cfs 1.920 af
n=0.035 L=174.0' S=0.0172 '/' Capacity=107.87 cfs Outflow=22.98 cfs 1.914 af

**Reach R-SWALE3: (new Reach)** Avg. Flow Depth=0.37' Max Vel=2.10 fps Inflow=102.71 cfs 3.801 af
n=0.035 L=302.0' S=0.0099 '/' Capacity=161.76 cfs Outflow=95.28 cfs 3.782 af

**Pond DET-1: 387** Peak Elev=169.63' Storage=7,015 cf Inflow=4.71 cfs 0.442 af
Outflow=3.85 cfs 0.314 af

**Pond DET-2: 391** Peak Elev=183.59' Storage=5,490 cf Inflow=6.45 cfs 0.502 af
Outflow=6.15 cfs 0.462 af

**Pond DET-3: 395** Peak Elev=175.89' Storage=6,319 cf Inflow=5.61 cfs 0.513 af
Outflow=2.12 cfs 0.457 af

**Pond INF-ROOF-100: 368** Peak Elev=174.70' Storage=3,032 cf Inflow=1.28 cfs 0.106 af
Outflow=0.56 cfs 0.038 af

**Pond INF-ROOF-110: 299** Peak Elev=166.83' Storage=130 cf Inflow=1.23 cfs 0.102 af
Outflow=1.20 cfs 0.100 af

**Pond INF-ROOF-114: 297** Peak Elev=164.44' Storage=2,447 cf Inflow=1.93 cfs 0.160 af
Outflow=1.85 cfs 0.106 af

**Pond INF-ROOF-117: 295** Peak Elev=164.26' Storage=1,435 cf Inflow=0.87 cfs 0.072 af
Outflow=0.84 cfs 0.040 af

**Pond INF-ROOF-123: 119** Peak Elev=149.01' Storage=2,961 cf Inflow=2.41 cfs 0.200 af
Outflow=2.31 cfs 0.136 af

**Pond INF-ROOF-13: 384** Peak Elev=184.03' Storage=1,858 cf Inflow=0.64 cfs 0.053 af
Outflow=0.04 cfs 0.011 af

**Pond INF-ROOF-16: 375** Peak Elev=184.62' Storage=2,003 cf Inflow=0.87 cfs 0.072 af
Outflow=0.27 cfs 0.027 af

**Pond INF-ROOF-19: 377** Peak Elev=178.73' Storage=1,522 cf Inflow=1.07 cfs 0.088 af
Outflow=1.05 cfs 0.054 af

**Pond INF-ROOF-23: 372** Peak Elev=184.79' Storage=2,045 cf Inflow=1.03 cfs 0.085 af
Outflow=1.02 cfs 0.040 af

**Pond INF-ROOF-25: 382** Peak Elev=176.24' Storage=1,433 cf Inflow=0.83 cfs 0.068 af
Outflow=0.78 cfs 0.037 af

**Pond INF-ROOF-28:** Peak Elev=174.97' Storage=1,197 cf Inflow=2.12 cfs 0.175 af
Outflow=2.08 cfs 0.150 af

**Pond INF-ROOF-3: 370** Peak Elev=190.85' Storage=4,716 cf Inflow=2.79 cfs 0.231 af
Outflow=3.75 cfs 0.123 af

**Pond INF-ROOF-36: 366** Peak Elev=190.40' Storage=2,096 cf Inflow=1.64 cfs 0.136 af
Outflow=1.59 cfs 0.088 af

**Pond INF-ROOF-43: 364** Peak Elev=190.28' Storage=1,572 cf Inflow=0.82 cfs 0.068 af
Outflow=0.95 cfs 0.032 af

**Pond INF-ROOF-53: 362** Peak Elev=190.45' Storage=2,620 cf Inflow=1.34 cfs 0.111 af
Outflow=1.96 cfs 0.051 af

**Pond INF-ROOF-55: 314** Peak Elev=190.48' Storage=3,144 cf Inflow=1.91 cfs 0.159 af
Outflow=2.17 cfs 0.086 af

**Pond INF-ROOF-62: 310** Peak Elev=190.30' Storage=1,048 cf Inflow=1.04 cfs 0.086 af
Outflow=1.07 cfs 0.062 af

**Pond INF-ROOF-63: 308** Peak Elev=190.93' Storage=3,144 cf Inflow=3.94 cfs 0.327 af
Outflow=3.96 cfs 0.254 af

**Pond INF-ROOF-67: 316** Peak Elev=190.40' Storage=1,048 cf Inflow=1.60 cfs 0.132 af
Outflow=1.61 cfs 0.108 af

**Pond INF-ROOF-71: 312** Peak Elev=190.59' Storage=2,620 cf Inflow=2.81 cfs 0.233 af
Outflow=2.76 cfs 0.173 af

**Pond INF-ROOF-76: 318** Peak Elev=190.49' Storage=2,620 cf Inflow=1.57 cfs 0.130 af
Outflow=2.18 cfs 0.070 af

**Pond INF-ROOF-89: 338** Peak Elev=190.64' Storage=4,716 cf Inflow=2.44 cfs 0.203 af
Outflow=2.98 cfs 0.094 af

**Pond INF-ROOF-90: 336** Peak Elev=190.55' Storage=3,144 cf Inflow=1.89 cfs 0.157 af
Outflow=2.55 cfs 0.085 af

**Pond INF-ROOF-94: 342** Peak Elev=190.34' Storage=1,572 cf Inflow=1.05 cfs 0.087 af
Outflow=1.28 cfs 0.051 af

**Pond INF-ROOF-95: 340** Peak Elev=190.36' Storage=1,572 cf Inflow=1.19 cfs 0.098 af
Outflow=1.41 cfs 0.062 af

**Pond INF-ROOF-96: 344** Peak Elev=190.40' Storage=1,048 cf Inflow=1.60 cfs 0.132 af
Outflow=1.61 cfs 0.108 af

**Pond P E 1.1A: 284** Peak Elev=135.92' Storage=128,579 cf Inflow=16.05 cfs 2.956 af
Outflow=0.00 cfs 0.000 af

**Pond P E 1.1B: 283** Peak Elev=147.06' Storage=150,173 cf Inflow=49.08 cfs 5.040 af
Outflow=5.25 cfs 1.657 af

**Pond P E 1.2A: 282** Peak Elev=135.40' Storage=76,389 cf Inflow=95.28 cfs 3.782 af
Outflow=43.44 cfs 2.585 af

**Pond P E-CULV-S: 231** Peak Elev=169.20' Storage=2,794 cf Inflow=16.67 cfs 1.390 af
Outflow=14.76 cfs 1.378 af

**Pond P INF-E-1:** Peak Elev=183.90' Storage=7,308 cf Inflow=6.36 cfs 0.584 af
Discarded=0.02 cfs 0.027 af Primary=7.80 cfs 0.416 af Outflow=7.82 cfs 0.444 af

**Pond P INF-E-2: 142** Peak Elev=171.87' Storage=3,654 cf Inflow=6.95 cfs 0.573 af
Discarded=0.01 cfs 0.014 af Primary=8.27 cfs 0.490 af Outflow=8.28 cfs 0.505 af

**Pond P INF-E-3:** Peak Elev=174.94' Storage=21,456 cf Inflow=29.26 cfs 2.798 af
Discarded=0.02 cfs 0.038 af Primary=30.95 cfs 2.340 af Outflow=30.98 cfs 2.378 af

**Pond P INF-E-4A: 145** Peak Elev=593.15' Storage=7,026 cf Inflow=11.01 cfs 0.817 af
Discarded=0.01 cfs 0.011 af Primary=10.06 cfs 0.671 af Outflow=10.07 cfs 0.682 af

**Pond P INF-E-4B: 140** Peak Elev=172.91' Storage=4,196 cf Inflow=4.49 cfs 0.354 af
Discarded=0.01 cfs 0.012 af Primary=3.88 cfs 0.289 af Outflow=3.89 cfs 0.301 af

**Pond P MH-CULV-NA: 114** Peak Elev=151.75' Inflow=46.06 cfs 5.087 af
42.0" x 42.0" Box Culvert n=0.011 L=19.8' S=0.0000 '/' Outflow=46.06 cfs 5.086 af

**Pond P MH-CULV-NB: 115** Peak Elev=151.14' Inflow=46.06 cfs 5.086 af
42.0" x 42.0" Box Culvert n=0.011 L=35.3' S=-0.0283 '/' Outflow=46.06 cfs 5.086 af

**Pond P RG-E-7:** Peak Elev=174.21' Storage=3,893 cf Inflow=6.17 cfs 0.532 af
Outflow=10.41 cfs 0.477 af

**Pond P RG-E-9A:** Peak Elev=166.87' Storage=1,649 cf Inflow=11.51 cfs 0.983 af
Outflow=9.96 cfs 0.977 af

**Pond P RG-E-9B: 244** Peak Elev=150.77' Storage=5,831 cf Inflow=11.62 cfs 1.125 af
Outflow=11.54 cfs 1.013 af

**Pond P RG-W-5A: 250** Peak Elev=163.77' Storage=120 cf Inflow=6.52 cfs 0.498 af
Outflow=6.34 cfs 0.496 af

**Pond P RG-W-5B: 252** Peak Elev=162.77' Storage=94 cf Inflow=6.34 cfs 0.496 af
Outflow=6.24 cfs 0.495 af

**Pond P RG-W-5C: 254** Peak Elev=161.77' Storage=1,041 cf Inflow=6.24 cfs 0.495 af
Outflow=6.14 cfs 0.476 af

**Pond P S-CB-E-1: 263** Peak Elev=171.78' Storage=353 cf Inflow=6.14 cfs 0.504 af
Outflow=6.14 cfs 0.499 af

**Pond P W 3.1: 5** Peak Elev=156.15' Storage=8,034 cf Inflow=17.69 cfs 2.349 af
Discarded=0.01 cfs 0.011 af Primary=17.68 cfs 2.168 af Outflow=17.69 cfs 2.179 af

**Pond P W 3.4: 13** Peak Elev=183.66' Storage=14,263 cf Inflow=2.90 cfs 0.328 af
Outflow=0.00 cfs 0.000 af

**Pond P W 9.1B: 14** Peak Elev=157.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

**Pond P W-CULV-N: 227** Peak Elev=154.42' Storage=8,696 cf Inflow=52.50 cfs 5.088 af
36.0" x 36.0" Box Culvert n=0.011 L=25.2' S=0.1587 '/' Outflow=46.06 cfs 5.087 af

**Pond P W-D-3: 111** Peak Elev=158.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.011 L=77.2' S=0.0108 '/' Outflow=0.00 cfs 0.000 af

**Pond P-RG-E-1:** Peak Elev=142.64' Storage=7,585 cf Inflow=11.89 cfs 1.002 af
Primary=3.75 cfs 0.776 af Secondary=6.79 cfs 0.155 af Outflow=10.54 cfs 0.931 af

**Pond P-RG-E-2:** Peak Elev=162.75' Storage=989 cf Inflow=2.66 cfs 0.211 af
Primary=2.54 cfs 0.196 af Secondary=0.00 cfs 0.000 af Outflow=2.54 cfs 0.196 af

**Pond P-RG-E-4A:** Peak Elev=172.71' Storage=1,806 cf Inflow=2.45 cfs 0.190 af
Outflow=0.99 cfs 0.182 af

**Pond P-RG-E-4B:** Peak Elev=170.50' Storage=2,596 cf Inflow=3.17 cfs 0.259 af
Outflow=1.90 cfs 0.235 af

**Pond P-RG-E-8:** Peak Elev=175.88' Storage=7,419 cf Inflow=3.37 cfs 0.263 af
Outflow=0.42 cfs 0.172 af

**Pond P-RG-W-2: 306** Peak Elev=172.78' Storage=18,970 cf Inflow=24.18 cfs 1.809 af
Outflow=11.04 cfs 1.670 af

**Pond P-RG-W-3:** Peak Elev=170.41' Storage=24,962 cf Inflow=23.44 cfs 1.554 af
Outflow=10.89 cfs 1.083 af

**Pond P-RG-W-4:** Peak Elev=171.85' Storage=5,628 cf Inflow=11.91 cfs 0.930 af
Outflow=10.72 cfs 0.857 af

**Pond R-CULV-1: PIPE 1** Peak Elev=171.60' Inflow=14.88 cfs 1.417 af
Primary=14.88 cfs 1.417 af Secondary=0.00 cfs 0.000 af Outflow=14.88 cfs 1.417 af

**Pond R-CULV-10: PIPE 10** Peak Elev=142.10' Inflow=60.00 cfs 7.099 af
Primary=60.00 cfs 7.099 af Secondary=0.00 cfs 0.000 af Outflow=60.00 cfs 7.099 af

**Pond R-CULV-2: PIPE 2** Peak Elev=169.58' Inflow=47.87 cfs 4.222 af
Primary=47.87 cfs 4.189 af Secondary=46.97 cfs 0.774 af Outflow=47.87 cfs 4.222 af

**Pond R-CULV-3: PIPE 3** Peak Elev=170.87' Inflow=60.04 cfs 5.582 af
Primary=42.31 cfs 5.396 af Secondary=17.79 cfs 0.185 af Outflow=60.04 cfs 5.582 af

**Pond R-CULV-4: PIPE 4** Peak Elev=163.03' Inflow=50.11 cfs 5.813 af
Primary=50.11 cfs 5.813 af Secondary=0.00 cfs 0.000 af Outflow=50.11 cfs 5.813 af

**Pond R-CULV-5: PIPE 5** Peak Elev=160.02' Inflow=53.78 cfs 6.127 af
Primary=53.78 cfs 6.127 af Secondary=0.00 cfs 0.000 af Outflow=53.78 cfs 6.127 af

**Pond R-CULV-6: PIPE 6** Peak Elev=151.25' Inflow=56.32 cfs 6.323 af
Primary=56.32 cfs 6.323 af Secondary=0.00 cfs 0.000 af Outflow=56.32 cfs 6.323 af

**Pond R-CULV-7: PIPE 7** Peak Elev=148.25' Inflow=56.32 cfs 6.323 af
Primary=56.32 cfs 6.323 af Secondary=0.00 cfs 0.000 af Outflow=56.32 cfs 6.323 af

**Pond R-CULV-8: PIPE 8** Peak Elev=144.52' Inflow=56.32 cfs 6.323 af
Primary=56.32 cfs 6.323 af Secondary=0.00 cfs 0.000 af Outflow=56.32 cfs 6.323 af

**Pond R-CULV-9: PIPE 9** Peak Elev=143.10' Inflow=56.32 cfs 6.323 af
Primary=56.32 cfs 6.323 af Secondary=0.00 cfs 0.000 af Outflow=56.32 cfs 6.323 af

**Link DP CULV: outflow from culvert** Inflow=60.00 cfs 7.099 af
Primary=60.00 cfs 7.099 af

**Link DP North: DP North** Inflow=95.37 cfs 13.284 af
Primary=95.37 cfs 13.284 af

**Link DP Sudbury: DP Sudbury** Inflow=265.82 cfs 32.420 af
Primary=265.82 cfs 32.420 af

**Link DP Wellhead: DP Wellhead** Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

**Link DP West: DP West** Inflow=32.28 cfs 3.869 af
Primary=32.28 cfs 3.869 af

**Link L E 1.0: L E 1.0** Inflow=172.19 cfs 19.136 af
Primary=172.19 cfs 19.136 af

**Link L E 4.0: L E 4.0** Inflow=20.49 cfs 3.438 af
Primary=20.49 cfs 3.438 af

**Link L W 10.0: L W 10.0** Inflow=10.79 cfs 0.891 af
Primary=10.79 cfs 0.891 af

**Link L W 2.0: L W 2.0** Inflow=15.59 cfs 1.701 af
Primary=15.59 cfs 1.701 af

**Link L W 3.0: L W 3.0** Inflow=17.68 cfs 2.168 af
Primary=17.68 cfs 2.168 af

**Link L W 9.0: L W 9.0** Inflow=46.06 cfs 5.086 af
Primary=46.06 cfs 5.086 af

**Link L Well 1.1B: L Well 1.1B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2A: L Well 1.2A**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2B: L Well 1.2B**
Primary=0.00 cfs 0.000 af

**Link L Well 1.2C: L Well 1.2C**
Primary=0.00 cfs 0.000 af

**Total Runoff Area = 130.598 ac Runoff Volume = 43.130 af Average Runoff Depth = 3.96"**
**93.35% Pervious = 121.914 ac 6.65% Impervious = 8.684 ac**

## Summary for Subcatchment E 1.0: (blank)

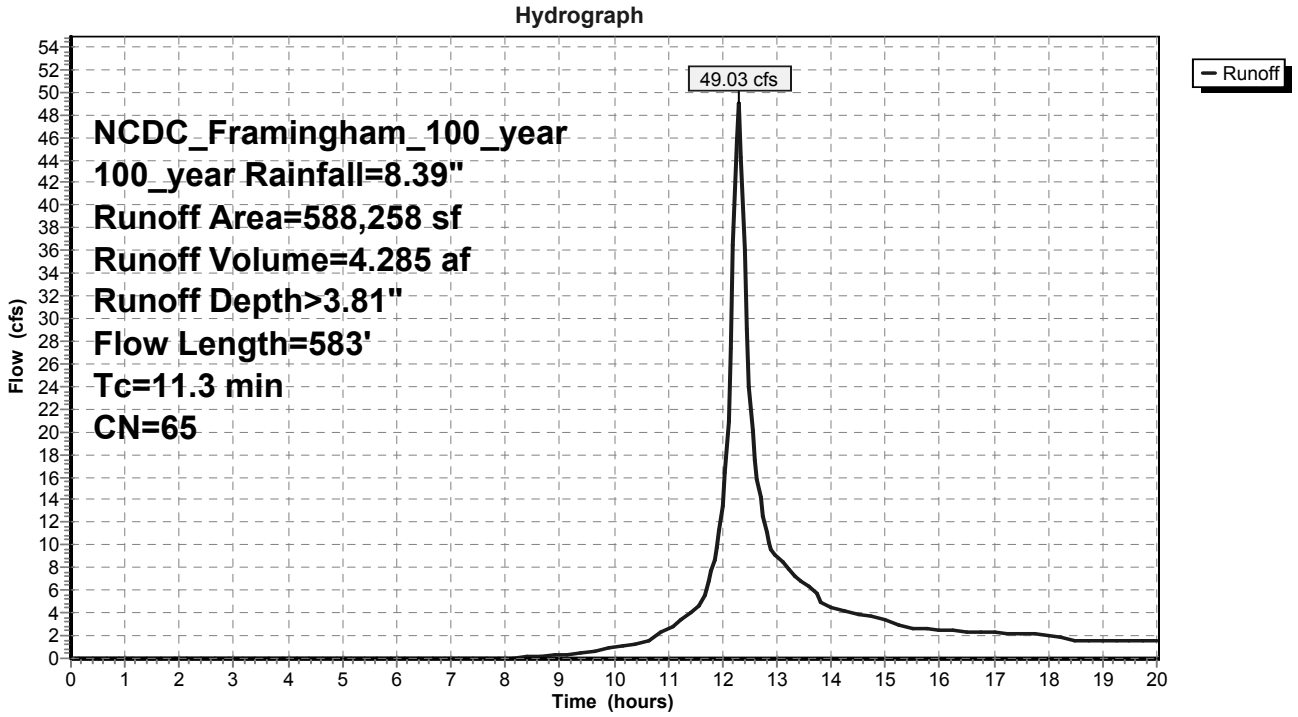
Runoff = 49.03 cfs @ 12.30 hrs, Volume= 4.285 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 39 | GRASS, 0% imperv, HSG A |
| * | 20,062 | 30 | Forest, 0% imperv, HSG A |
| * | 206,993 | 55 | Forest, 0% imperv, HSG B |
| * | 103,780 | 77 | Forest, 0% imperv, HSG D |
| * | 2,467 | 98 | Forest, 0% imperv, HSG W |
| * | 39,655 | 30 | WOODS, 0% imperv, HSG A |
| * | 21,977 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,031 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 45,581 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 21,590 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 52,038 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 636 | 77 | Mining, 0% imperv, HSG A |
| * | 6,121 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 212 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12,458 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 29,600 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 21,059 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 588,258 | 65 | Weighted Average |
| | 584,142 | | 99.30% Pervious Area |
| | 4,116 | | 0.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.2 | 225 | 0.0399 | 3.21 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 137 | 0.0480 | 1.10 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 168 | 0.0206 | 0.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.5 | 4 | 0.0001 | 0.02 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 11.3 | 583 | Total | | | |

## Subcatchment E 1.0: (blank)



## Summary for Subcatchment E 1.0A: (blank)

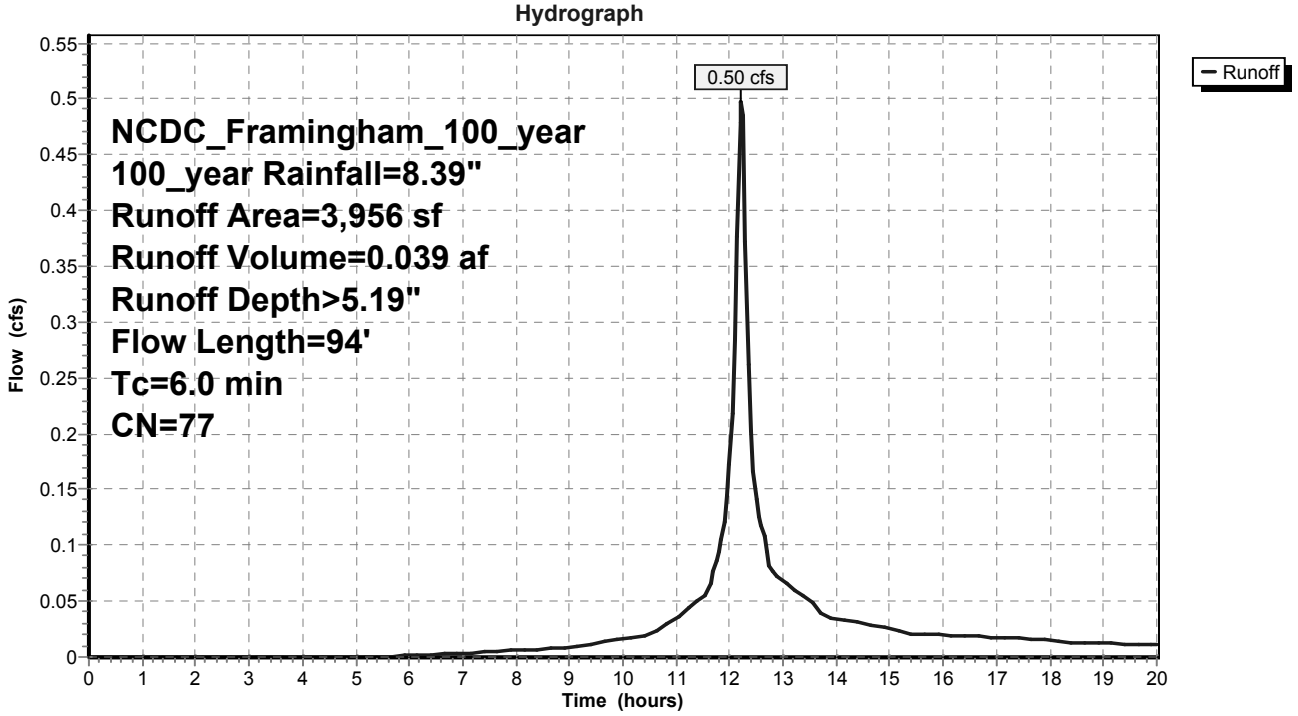
Runoff = 0.50 cfs @ 12.23 hrs, Volume= 0.039 af, Depth> 5.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,956 | 77 | GRAVEL, 65% imperv, HSG A |
| | 1,385 | | 35.00% Pervious Area |
| | 2,572 | | 65.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.1 | 50 | 0.3508 | 0.21 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.2 | 44 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Range Kv= 16.1 fps |
| 4.3 | 94 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0A: (blank)



## Summary for Subcatchment E 1.0B: (blank)

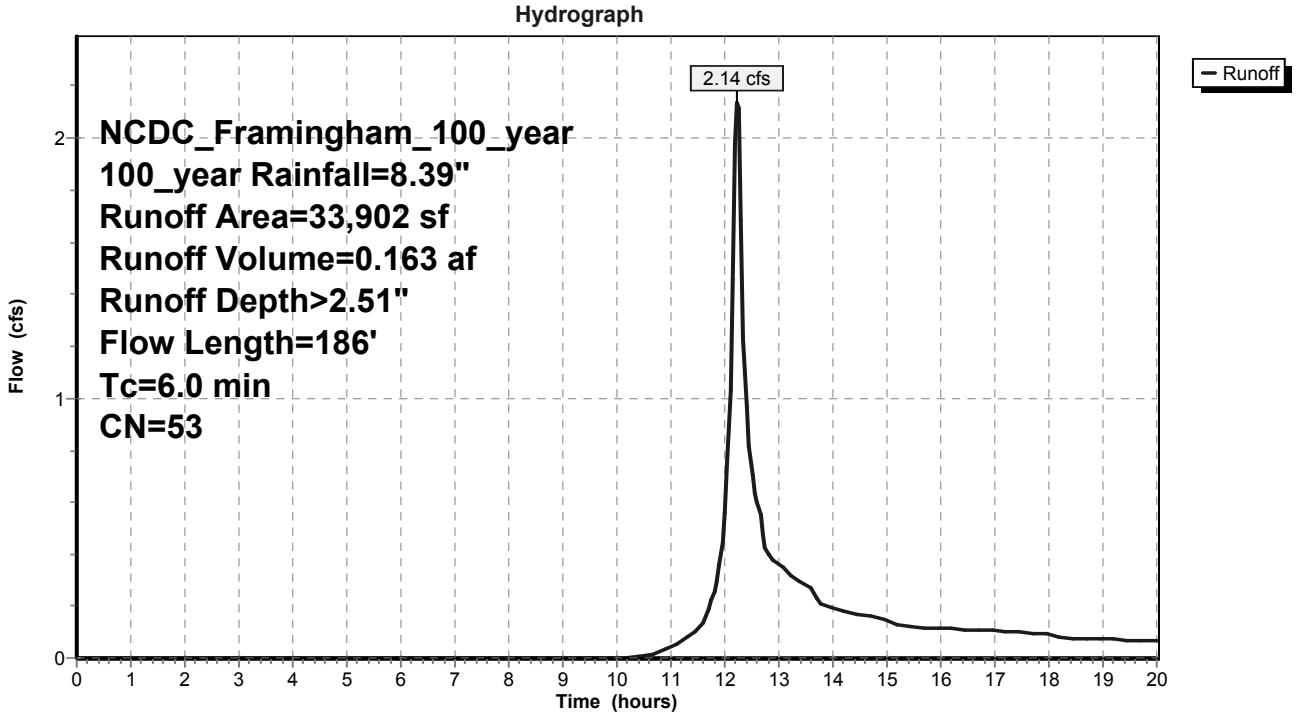
Runoff = 2.14 cfs @ 12.24 hrs, Volume= 0.163 af, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,518 | 39 | GRASS, 0% imperv, HSG A |
| * | 5,077 | 30 | WOODS, 0% imperv, HSG A |
| * | 13,308 | 77 | GRAVEL, 65% imperv, HSG A |
| | 33,902 | 53 | Weighted Average |
| | 25,252 | | 74.49% Pervious Area |
| | 8,650 | | 25.51% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 50 | 0.3600 | 0.51 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.4 | 102 | 0.0687 | 4.22 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 3.5 | 34 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.5 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0B: (blank)



## Summary for Subcatchment E 1.0C: (blank)

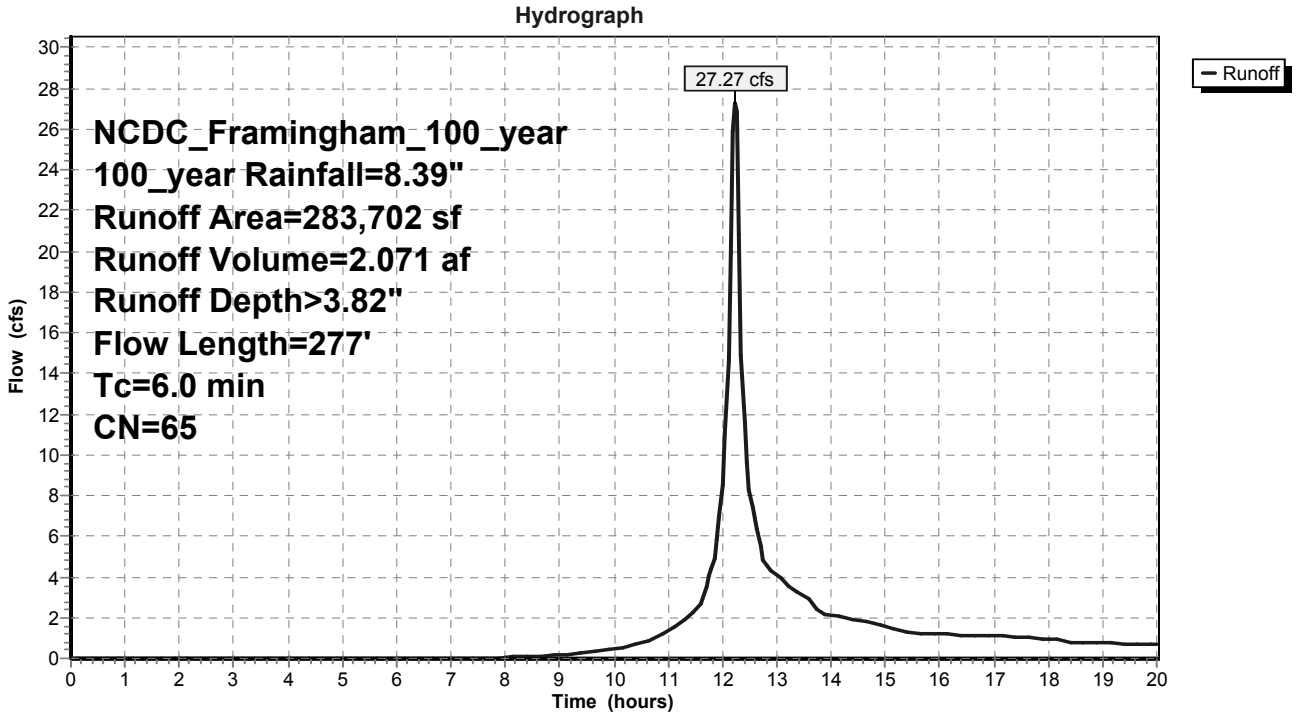
Runoff = 27.27 cfs @ 12.23 hrs, Volume= 2.071 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 510 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,354 | 30 | Forest, 0% imperv, HSG A |
| * | 18,238 | 55 | Forest, 0% imperv, HSG B |
| * | 26,777 | 77 | Forest, 0% imperv, HSG D |
| * | 12,224 | 98 | Forest, 0% imperv, HSG W |
| * | 60,426 | 30 | WOODS, 0% imperv, HSG A |
| * | 34,243 | 55 | WOODS, 0% imperv, HSG B |
| * | 174 | 78 | Non-Forested Wetland, 0% imperv, HSG A |
| * | 1,430 | 78 | Non-Forested Wetland, 0% imperv, HSG B |
| * | 3,514 | 78 | Non-Forested Wetland, 0% imperv, HSG D |
| * | 49,639 | 98 | Non-Forested Wetland, 0% imperv, HSG W |
| * | 9,307 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 40,682 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 710 | 98 | IMP, 100% imperv, HSG A |
| * | 2,473 | 98 | IMP, 100% imperv, HSG B |
| | 283,702 | 65 | Weighted Average |
| | 251,209 | | 88.55% Pervious Area |
| | 32,493 | | 11.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.9 | 50 | 0.2500 | 0.44 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.7 | 102 | 0.0390 | 0.99 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 0.2 | 35 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 90 | 0.2000 | 7.20 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 277 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0C: (blank)



## Summary for Subcatchment E 1.0D: (blank)

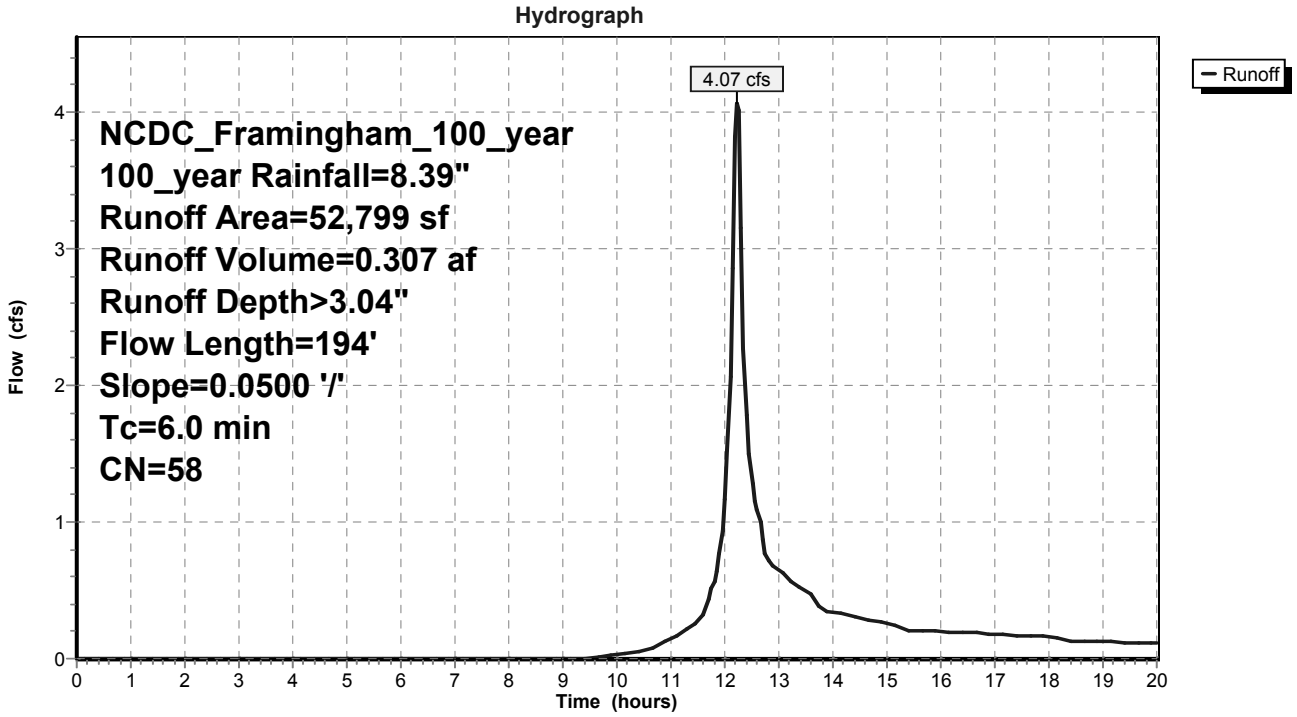
Runoff = 4.07 cfs @ 12.23 hrs, Volume= 0.307 af, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,018 | 39 | GRASS, 0% imperv, HSG A |
| * | 8,416 | 30 | WOODS, 0% imperv, HSG A |
| * | 18,365 | 98 | IMP, 100% imperv, HSG A |
| | 52,799 | 58 | Weighted Average |
| | 52,799 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0500 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 144 | 0.0500 | 4.54 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.5 | 194 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.0D: (blank)



## Summary for Subcatchment E 1.1A: (blank)

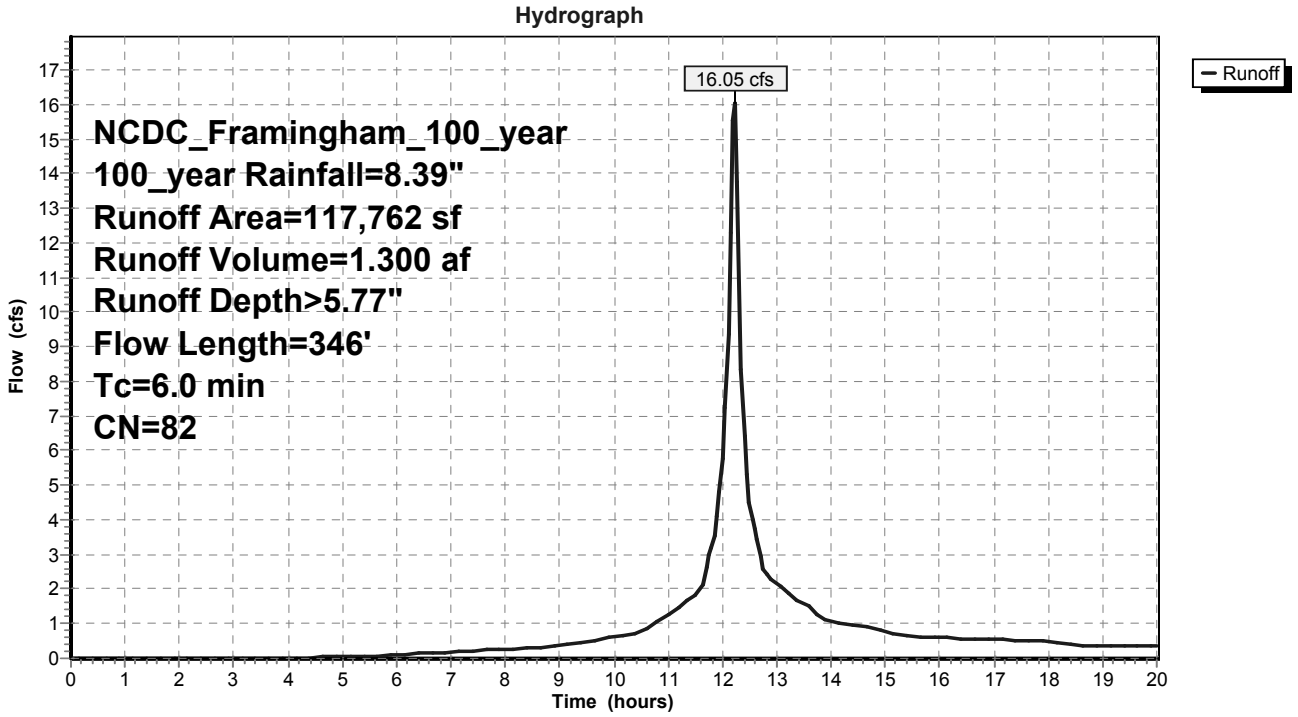
Runoff = 16.05 cfs @ 12.23 hrs, Volume= 1.300 af, Depth> 5.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,526 | 39 | GRASS, 0% imperv, HSG A |
| * | 15,534 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,968 | 30 | WOODS, 0% imperv, HSG A |
| * | 17,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 13,333 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3,652 | 98 | IMP, 100% imperv, HSG A |
| * | 11,904 | 98 | IMP, 100% imperv, HSG B |
| * | 50,736 | 98 | W, 100% imperv, HSG B |
| | 117,762 | 82 | Weighted Average |
| | 109,096 | | 92.64% Pervious Area |
| | 8,666 | | 7.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1277 | 2.43 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 21 | 0.1502 | 7.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.5 | 234 | 0.1382 | 7.55 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 22 | 0.0060 | 0.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 10 | 0.0508 | 4.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0382 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 1 | 0.0385 | 1.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 346 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1A: (blank)



## Summary for Subcatchment E 1.1B: (blank)

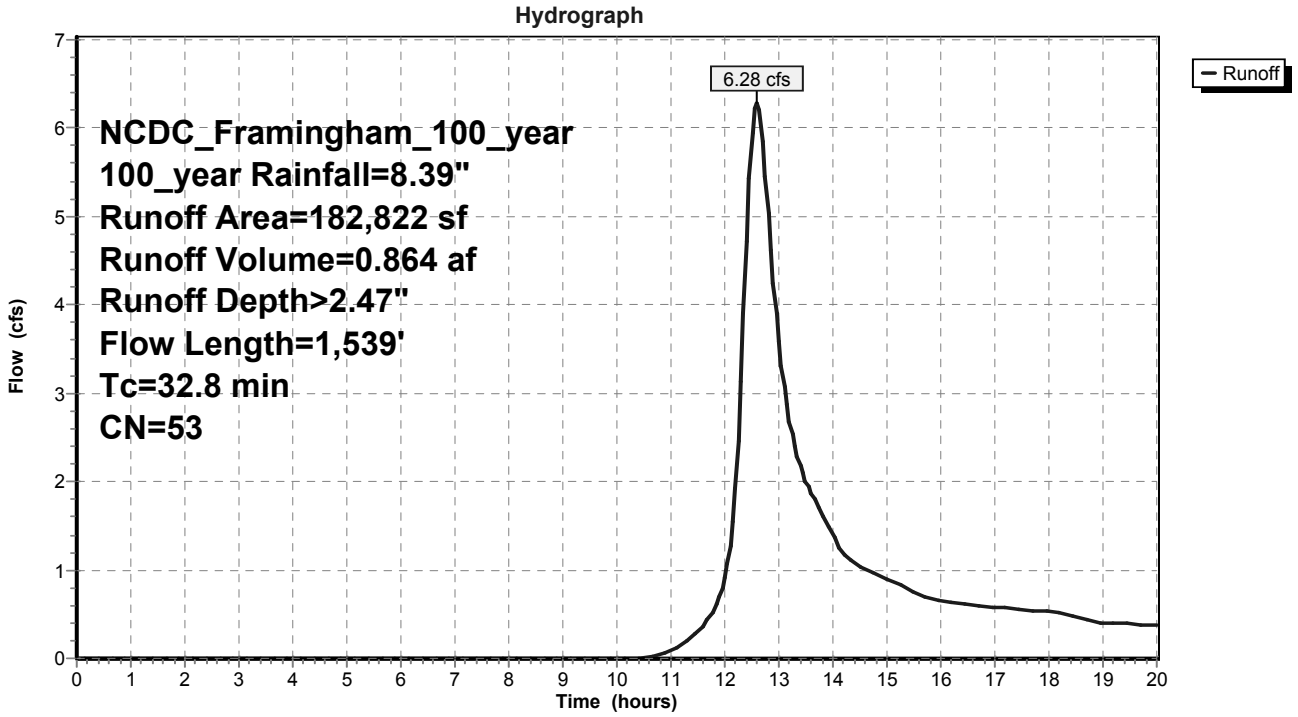
Runoff = 6.28 cfs @ 12.59 hrs, Volume= 0.864 af, Depth> 2.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 30,442 | 39 | GRASS, 0% imperv, HSG A |
| * | 25,501 | 61 | GRASS, 0% imperv, HSG B |
| * | 9,928 | 30 | WOODS, 0% imperv, HSG A |
| * | 113,629 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,320 | 98 | IMP, 100% imperv, HSG A |
| | 182,822 | 53 | Weighted Average |
| | 182,822 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.0 | 50 | 0.0050 | 0.09 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 2.8 | 245 | 0.0081 | 1.45 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 45 | 0.0221 | 3.02 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.4 | 646 | 0.0108 | 1.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0314 | 3.60 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.9 | 159 | 0.0060 | 0.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 9 | 0.0046 | 1.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.6 | 378 | 0.0502 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.8 | 5 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0277 | 2.68 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 32.8 | 1,539 | Total | | | |

## Subcatchment E 1.1B: (blank)



## Summary for Subcatchment E 1.1B-1: (blank)

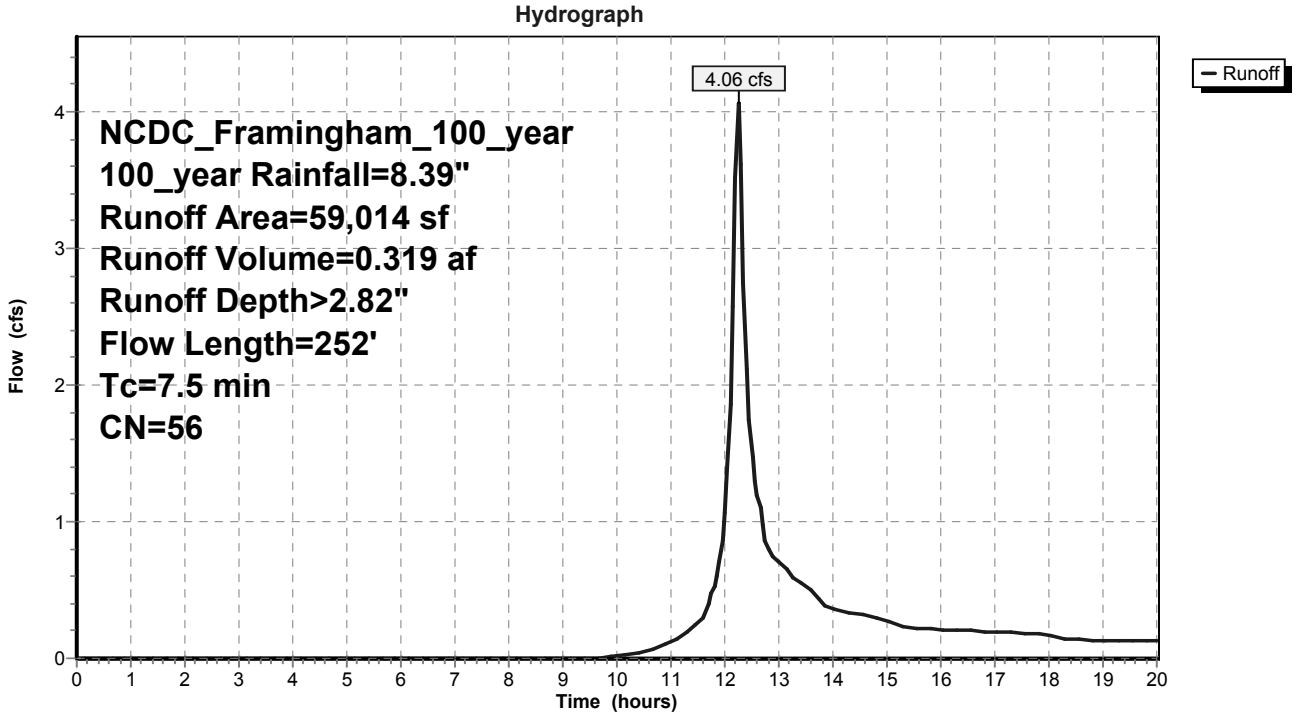
Runoff = 4.06 cfs @ 12.25 hrs, Volume= 0.319 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 57,007 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,002 | 85 | GRAVEL, 65% imperv, HSG B |
| | 59,014 | 56 | Weighted Average |
| | 57,713 | | 97.80% Pervious Area |
| | 1,301 | | 2.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 50 | 0.1560 | 0.15 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 1.9 | 202 | 0.1200 | 1.73 | | **Shallow Concentrated Flow,** Woods: Light Underbrush Kv= 5.0 fps |
| 7.5 | 252 | Total | | | |

## Subcatchment E 1.1B-1: (blank)



## Summary for Subcatchment E 1.1B-2: (blank)

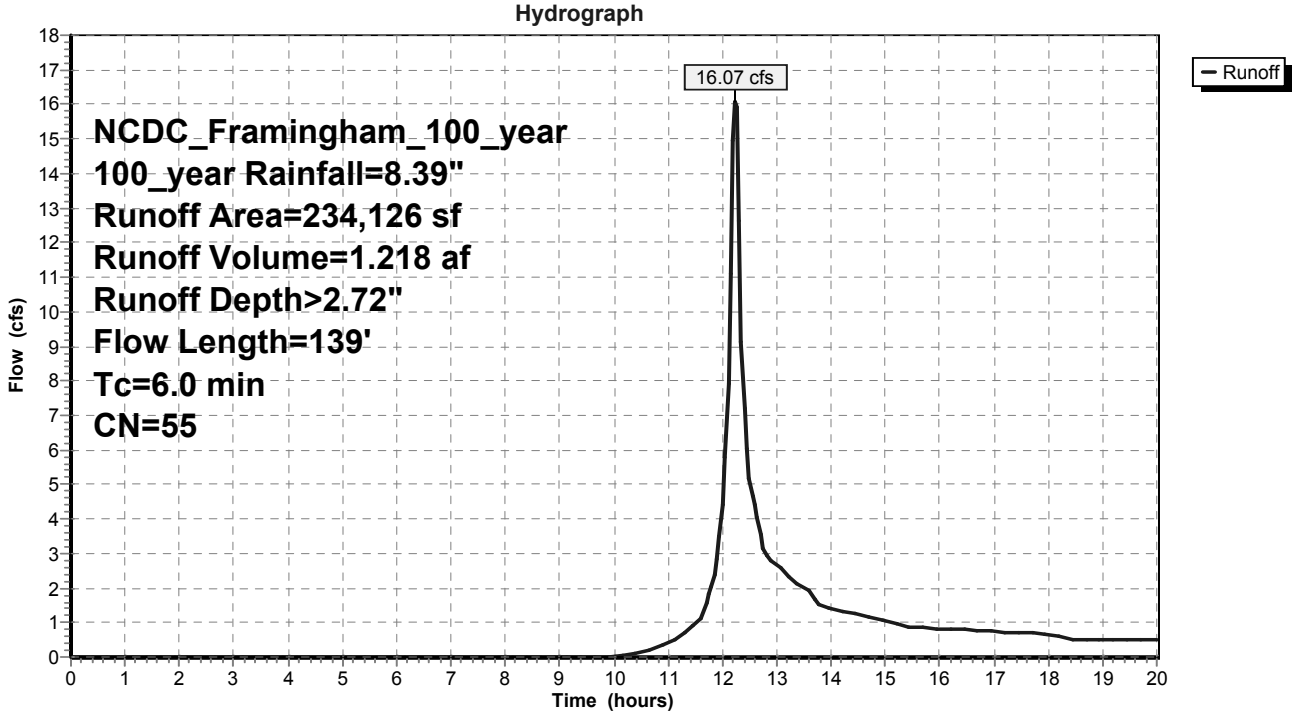
Runoff = 16.07 cfs @ 12.24 hrs, Volume= 1.218 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 31,870 | 39 | GRASS, 0% imperv, HSG A |
| * | 17,925 | 61 | GRASS, 0% imperv, HSG B |
| * | 51,480 | 30 | WOODS, 0% imperv, HSG A |
| * | 93,321 | 55 | WOODS, 0% imperv, HSG B |
| * | 8,750 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 10,052 | 98 | IMP, 100% imperv, HSG A |
| * | 20,729 | 98 | IMP, 100% imperv, HSG B |
| | 234,126 | 55 | Weighted Average |
| | 228,439 | | 97.57% Pervious Area |
| | 5,687 | | 2.43% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.8 | 50 | 0.4000 | 0.48 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.4 | 89 | 0.3200 | 3.96 | | **Shallow Concentrated Flow,** Grass: Short Kv= 7.0 fps |
| 2.2 | 139 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.1B-2: (blank)



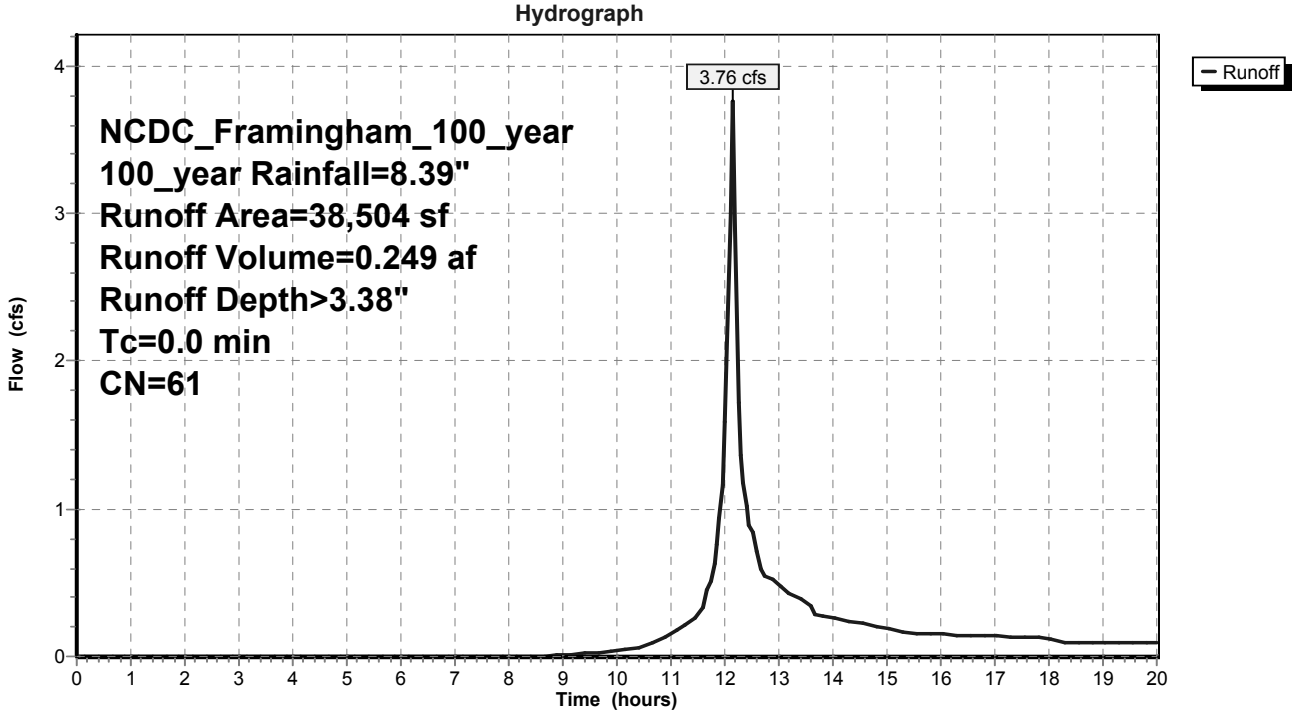
## Summary for Subcatchment E 1.1B-4: (blank)

Runoff = 3.76 cfs @ 12.15 hrs, Volume= 0.249 af, Depth> 3.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,690 | 39 | GRASS, 0% imperv, HSG A |
| * | 34,430 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 55 | WOODS, 0% imperv, HSG B |
| * | 398 | 98 | DECK, 100% imperv, HSG B |
| * | 984 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 38,504 | 61 | Weighted Average |
| | 38,504 | | 100.00% Pervious Area |

## Subcatchment E 1.1B-4: (blank)



## Summary for Subcatchment E 1.2A: (blank)

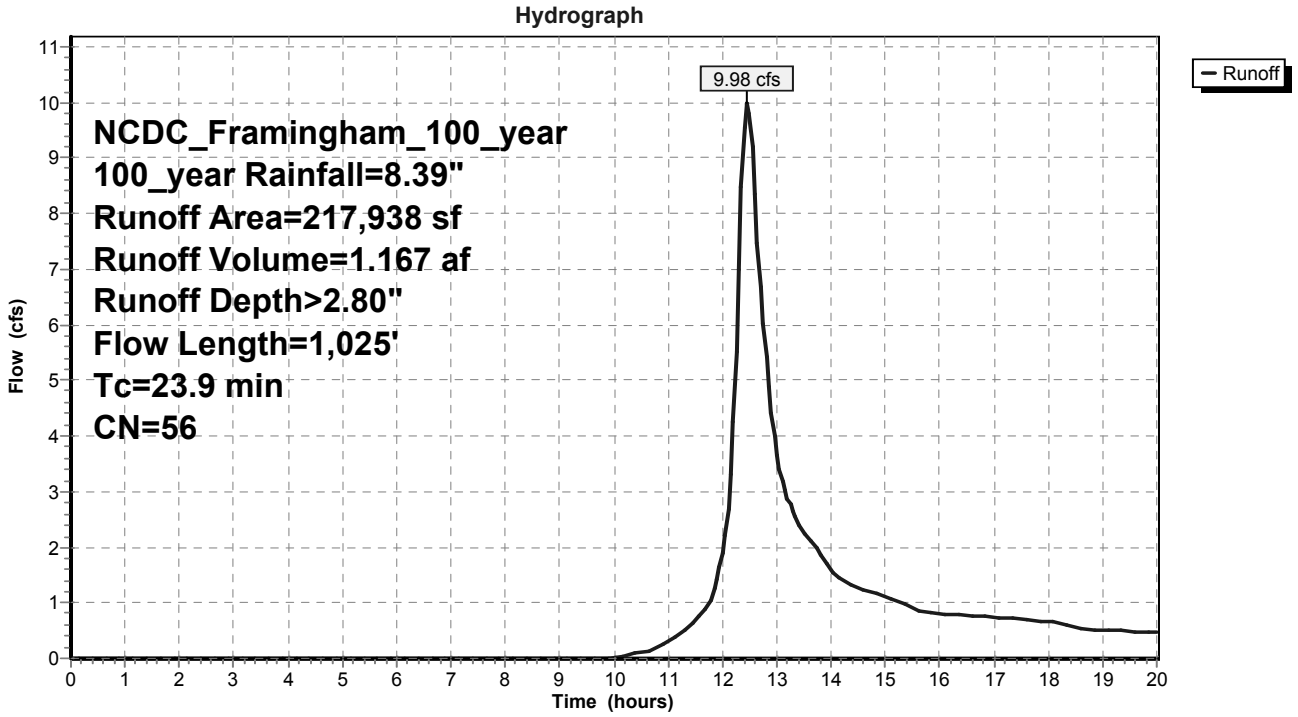
Runoff = 9.98 cfs @ 12.46 hrs, Volume= 1.167 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,906 | 30 | WOODS, 0% imperv, HSG A |
| * | 204,525 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,643 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 7,871 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 994 | 98 | IMP, 100% imperv, HSG B |
| | 217,938 | 56 | Weighted Average |
| | 211,104 | | 96.86% Pervious Area |
| | 6,834 | | 3.14% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.3 | 50 | 0.1755 | 0.16 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.3 | 32 | 0.1463 | 1.91 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.2051 | 2.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 5 | 0.0202 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0161 | 2.04 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.7 | 153 | 0.0894 | 1.49 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.2 | 21 | 0.0827 | 1.44 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 6 | 0.0572 | 1.20 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.6 | 89 | 0.0359 | 0.95 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 216 | 0.0244 | 2.52 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 431 | 0.0325 | 0.90 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.2 | 16 | 0.0001 | 0.05 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 0 | 0.0001 | 0.16 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 23.9 | 1,025 | Total | | | |

## Subcatchment E 1.2A: (blank)



## Summary for Subcatchment E 1.2A-1: (blank)

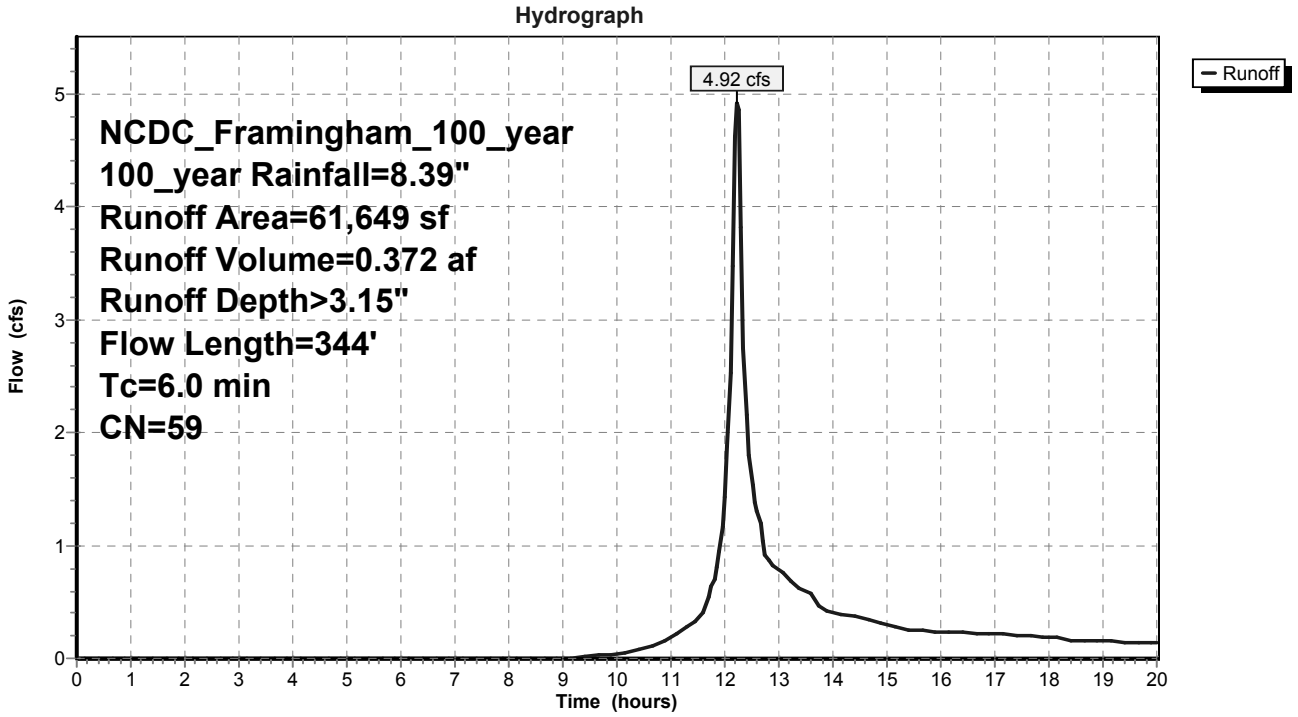
Runoff = 4.92 cfs @ 12.23 hrs, Volume= 0.372 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 39 | 39 | GRASS, 0% imperv, HSG A |
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 8,920 | 30 | WOODS, 0% imperv, HSG A |
| * | 36,309 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,085 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 13,291 | 85 | GRAVEL, 65% imperv, HSG B |
| | 61,649 | 59 | Weighted Average |
| | 51,005 | | 82.73% Pervious Area |
| | 10,644 | | 17.27% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1300 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.2 | 15 | 0.0500 | 1.12 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 137 | 0.0500 | 3.60 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.3 | 42 | 0.1700 | 2.06 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.7 | 100 | 0.0200 | 2.28 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.3 | 344 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-1: (blank)



## Summary for Subcatchment E 1.2A-2: (blank)

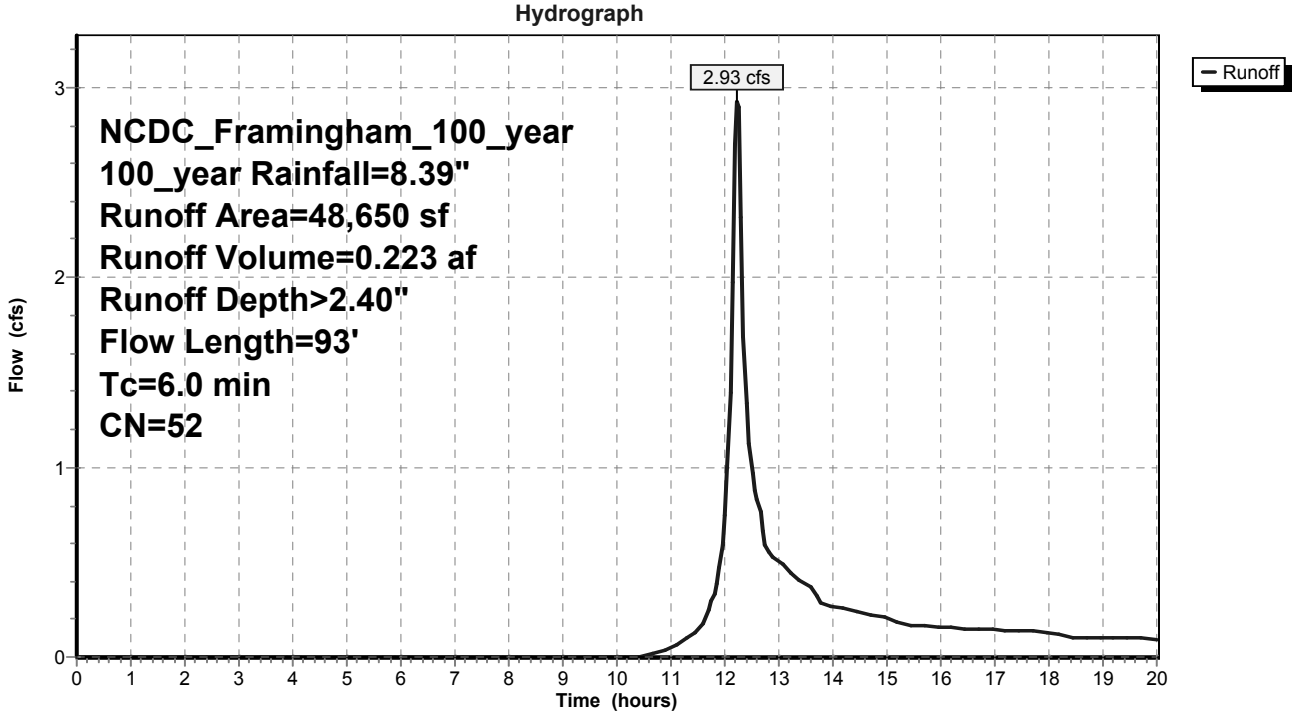
Runoff = 2.93 cfs @ 12.24 hrs, Volume= 0.223 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,296 | 39 | GRASS, 0% imperv, HSG A |
| * | 28,321 | 61 | GRASS, 0% imperv, HSG B |
| * | 1 | 30 | WOODS, 0% imperv, HSG A |
| * | 24 | 55 | WOODS, 0% imperv, HSG B |
| * | 0 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG B |
| | 48,650 | 52 | Weighted Average |
| | 48,646 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.8 | 50 | 0.1251 | 0.30 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 43 | 0.1289 | 2.51 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.1 | 93 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2A-2: (blank)



## Summary for Subcatchment E 1.2B: (blank)

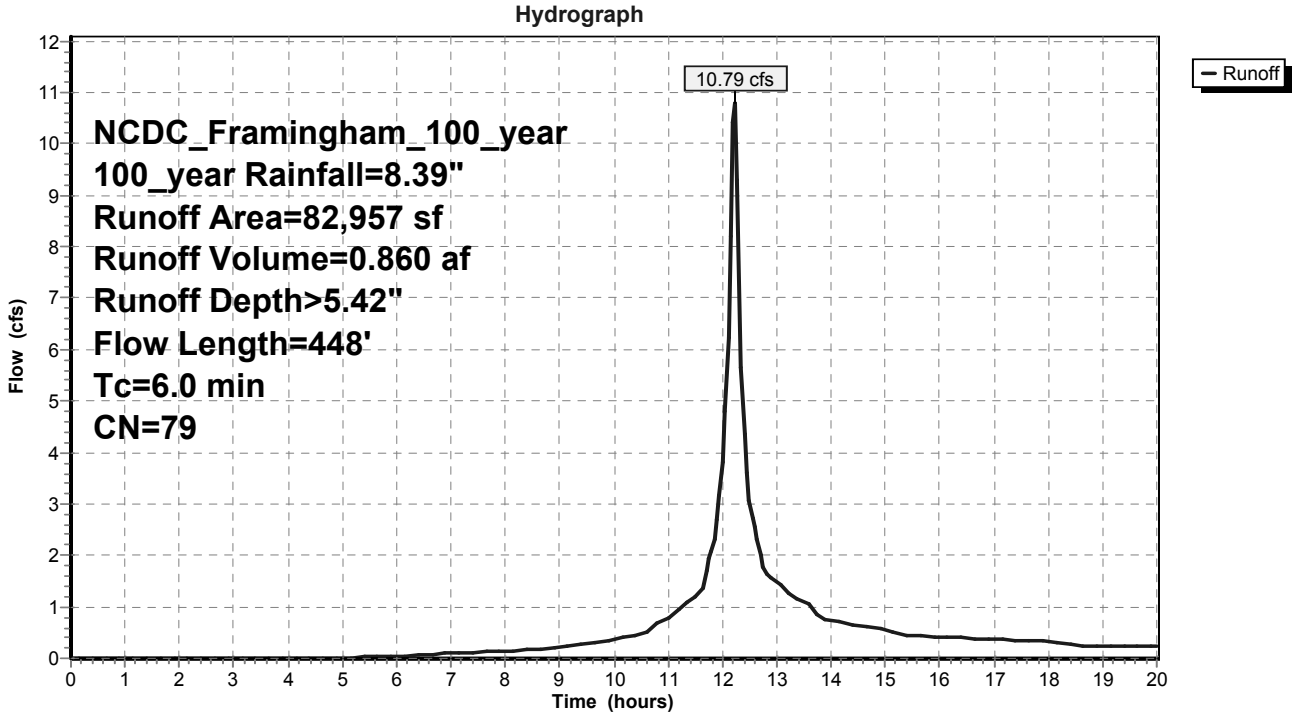
Runoff = 10.79 cfs @ 12.23 hrs, Volume= 0.860 af, Depth> 5.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,968 | 55 | WOODS, 0% imperv, HSG B |
| * | 66,984 | 85 | GRAVEL, 65% imperv, HSG B |
| | 82,957 | 79 | Weighted Average |
| | 39,417 | | 47.51% Pervious Area |
| | 43,540 | | 52.49% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.9 | 50 | 0.0420 | 0.22 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 1.5 | 398 | 0.0755 | 4.42 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.4 | 448 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2B: (blank)



## Summary for Subcatchment E 1.2B-1: (blank)

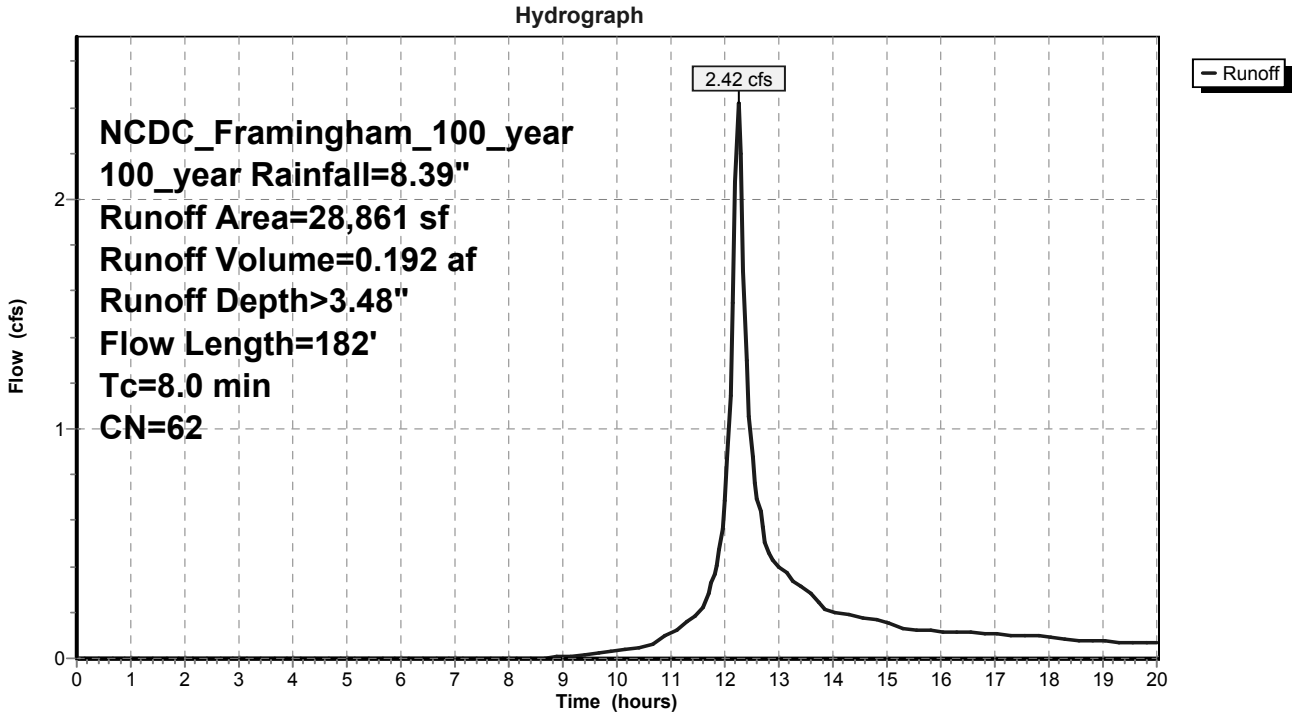
Runoff = 2.42 cfs @ 12.26 hrs, Volume= 0.192 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 26,232 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,162 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,032 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 145 | 98 | DECK, 100% imperv, HSG B |
| * | 0 | 98 | IMP, 100% imperv, HSG B |
| * | 289 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,861 | 62 | Weighted Average |
| | 28,190 | | 97.68% Pervious Area |
| | 671 | | 2.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.9 | 50 | 0.0129 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 127 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 3 | 0.0270 | 0.82 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0294 | 2.76 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 8.0 | 182 | Total | | | |

## Subcatchment E 1.2B-1: (blank)



## Summary for Subcatchment E 1.2C: (blank)

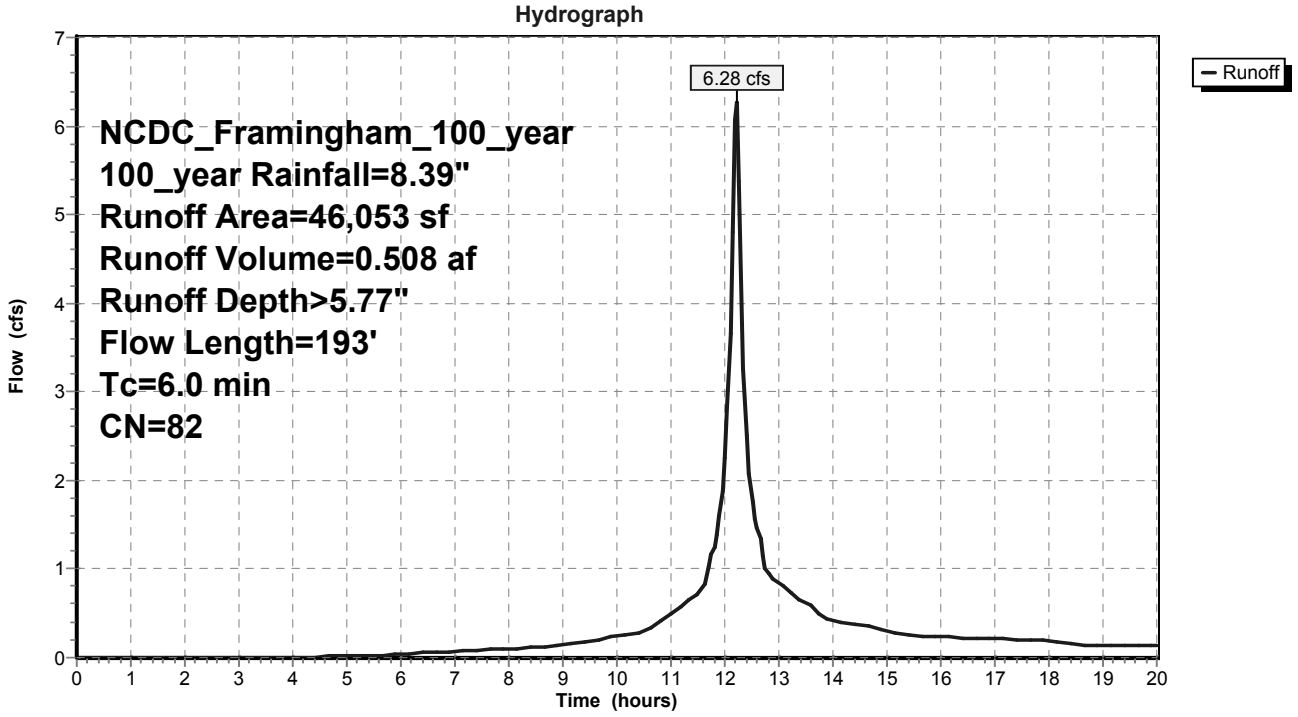
Runoff = 6.28 cfs @ 12.23 hrs, Volume= 0.508 af, Depth> 5.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 15,110 | 55 | WOODS, 0% imperv, HSG B |
| * | 7,118 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 23,825 | 98 | WATER, 100% imperv, HSG B |
| | 46,053 | 82 | Weighted Average |
| | 41,427 | | 89.95% Pervious Area |
| | 4,626 | | 10.05% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.4 | 50 | 0.0577 | 0.25 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 118 | 0.1538 | 6.31 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 25 | 0.2342 | 2.42 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 3.9 | 193 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C: (blank)



## Summary for Subcatchment E 1.2C-1: (blank)

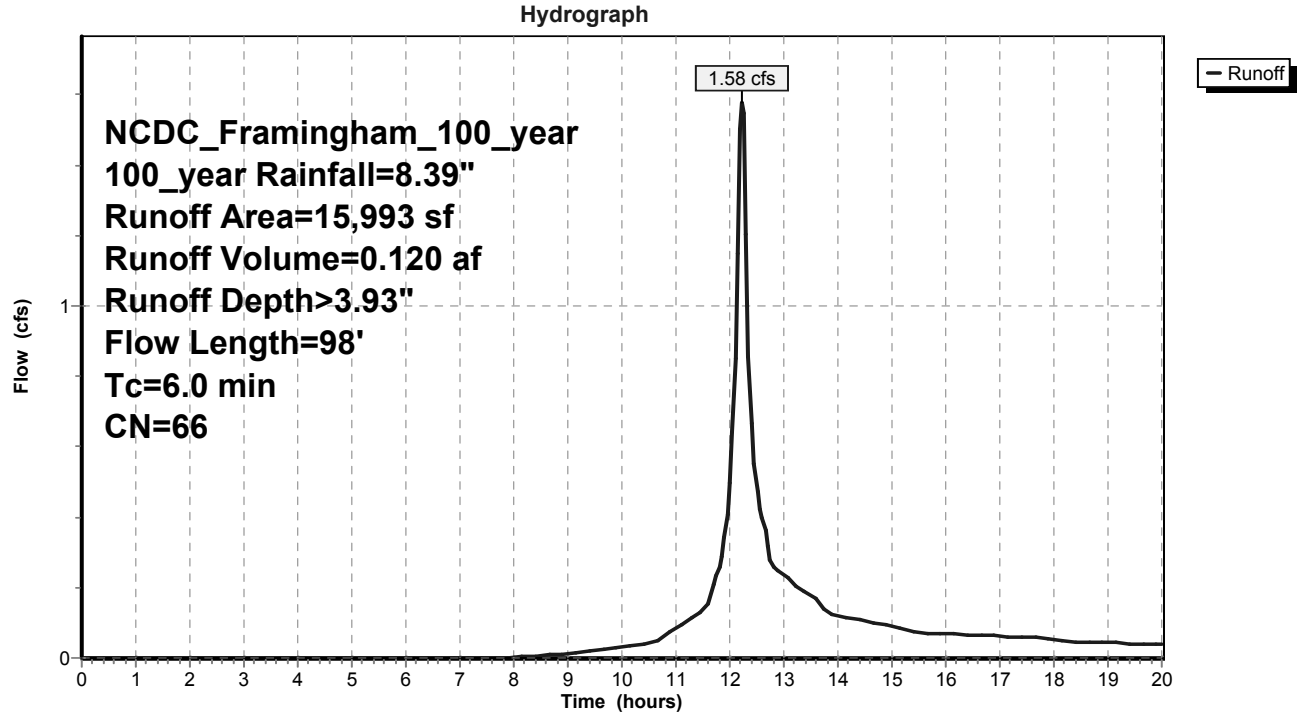
Runoff = 1.58 cfs @ 12.23 hrs, Volume= 0.120 af, Depth> 3.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,637 | 61 | GRASS, 0% imperv, HSG B |
| * | 53 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 449 | 98 | DECK, 100% imperv, HSG B |
| * | 2 | 98 | IMP, 100% imperv, HSG B |
| * | 1,852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 15,993 | 66 | Weighted Average |
| | 15,959 | | 99.79% Pervious Area |
| | 34 | | 0.21% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.6 | 50 | 0.1160 | 0.32 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.3 | 48 | 0.3500 | 2.96 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.9 | 98 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment E 1.2C-1: (blank)



## Summary for Subcatchment E 1.2C-2: (blank)

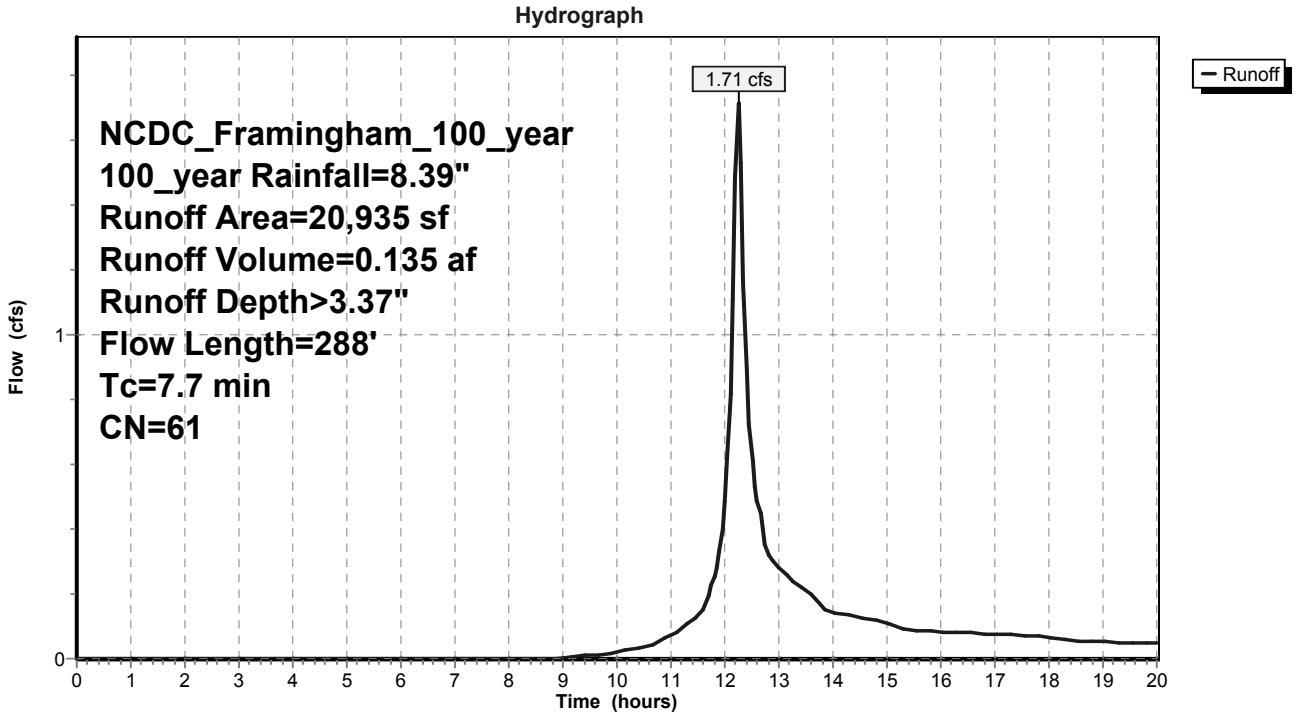
Runoff = 1.71 cfs @ 12.25 hrs, Volume= 0.135 af, Depth> 3.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,831 | 61 | GRASS, 0% imperv, HSG B |
| * | 99 | 55 | WOODS, 0% imperv, HSG B |
| * | 4 | 98 | ROOF, 100% imperv, HSG B |
| | 20,935 | 61 | Weighted Average |
| | 20,935 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 238 | 0.0295 | 1.20 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 7.7 | 288 | Total | | | |

## Subcatchment E 1.2C-2: (blank)



## Summary for Subcatchment E 1.3A: (blank)

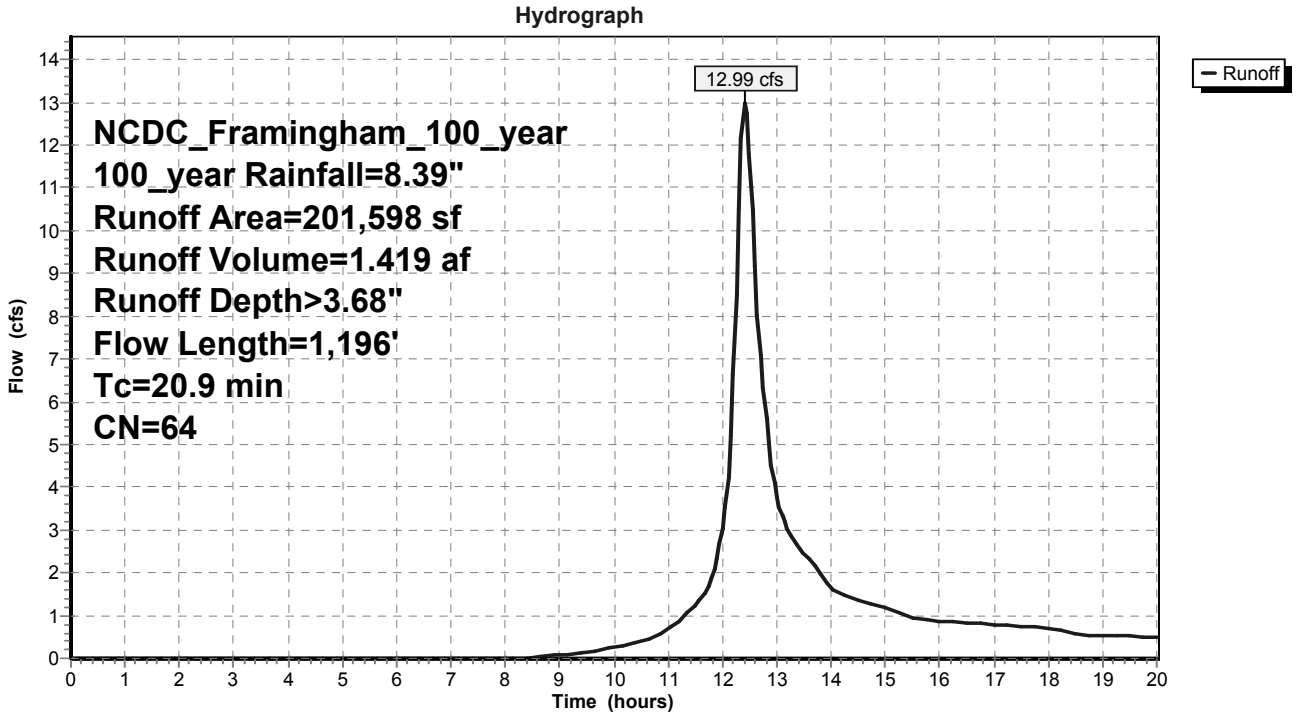
Runoff = 12.99 cfs @ 12.41 hrs, Volume= 1.419 af, Depth> 3.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,522 | 39 | GRASS, 0% imperv, HSG A |
| * | 23,999 | 61 | GRASS, 0% imperv, HSG B |
| * | 665 | 55 | Forest, 0% imperv, HSG B |
| * | 4,288 | 30 | WOODS, 0% imperv, HSG A |
| * | 61,112 | 55 | WOODS, 0% imperv, HSG B |
| * | 82,137 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 10,789 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,084 | 79 | Powerline/Utility, 0% imperv, HSG B |
| | 201,598 | 64 | Weighted Average |
| | 141,195 | | 70.04% Pervious Area |
| | 60,402 | | 29.96% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.5 | 50 | 0.1288 | 0.34 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.0 | 3 | 0.0626 | 4.03 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 7.0 | 472 | 0.0512 | 1.13 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.5 | 65 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 2.4 | 101 | 0.0201 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 1.4 | 45 | 0.0061 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.7 | 139 | 0.0080 | 0.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.1 | 255 | 0.0548 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 1 | 1.6445 | 6.41 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 12 | 0.0806 | 4.57 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 54 | 0.0186 | 0.68 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.9 | 1,196 | Total | | | |

## Subcatchment E 1.3A: (blank)



## Summary for Subcatchment E 4.0: (blank)

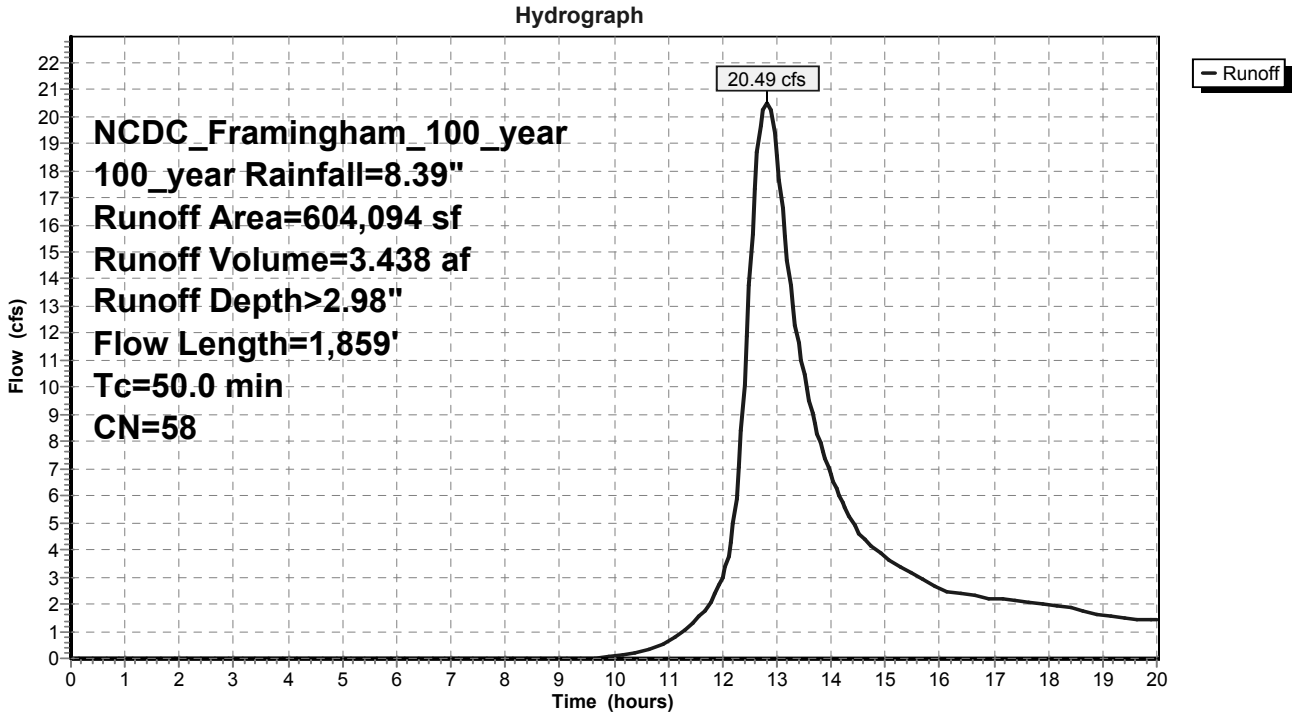
Runoff = 20.49 cfs @ 12.81 hrs, Volume= 3.438 af, Depth> 2.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 23,808 | 39 | GRASS, 0% imperv, HSG A |
| * | 82,277 | 61 | GRASS, 0% imperv, HSG B |
| * | 156,044 | 30 | Forest, 0% imperv, HSG A |
| * | 73,478 | 55 | Forest, 0% imperv, HSG B |
| * | 17,265 | 70 | Forest, 0% imperv, HSG C |
| * | 1,185 | 77 | Forest, 0% imperv, HSG D |
| * | 3,937 | 98 | Forest, 0% imperv, HSG W |
| * | 20,870 | 55 | WOODS, 0% imperv, HSG B |
| * | 6,232 | 77 | Mining, 0% imperv, HSG A |
| * | 56,692 | 86 | Mining, 0% imperv, HSG B |
| * | 223 | 91 | Mining, 0% imperv, HSG C |
| * | 7,226 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 64,230 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,649 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 109 | 98 | IMP, 100% imperv, HSG B |
| * | 1,334 | 98 | Water, 100% imperv, HSG A |
| * | 6,325 | 98 | Water, 100% imperv, HSG C |
| * | 12,063 | 98 | Water, 100% imperv, HSG W |
| * | 10,220 | 79 | Powerline/Utility, 0% imperv, HSG B |
| * | 37,054 | 45 | Forested Wetland, 0% imperv, HSG A |
| * | 3,530 | 66 | Forested Wetland, 0% imperv, HSG B |
| * | 1,343 | 77 | Forested Wetland, 0% imperv, HSG C |
| | 604,094 | 58 | Weighted Average |
| | 545,526 | | 90.30% Pervious Area |
| | 58,568 | | 9.70% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.8 | 50 | 0.1436 | 0.14 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.1 | 9 | 0.1333 | 1.83 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 6 | 0.0663 | 4.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.4 | 388 | 0.0287 | 2.73 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.3 | 76 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 22 | 0.0683 | 1.83 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 88 | 0.1489 | 3.86 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 3.3 | 465 | 0.0217 | 2.37 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.1 | 203 | 0.0539 | 1.63 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0540 | 2.32 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 6.5 | 194 | 0.0399 | 0.50 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 10.5 | 113 | 0.0013 | 0.18 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 17.3 | 227 | 0.0076 | 0.22 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 50.0 | 1,859 | Total | | | |

## Subcatchment E 4.0: (blank)



## Summary for Subcatchment E-CULV-S: (blank)

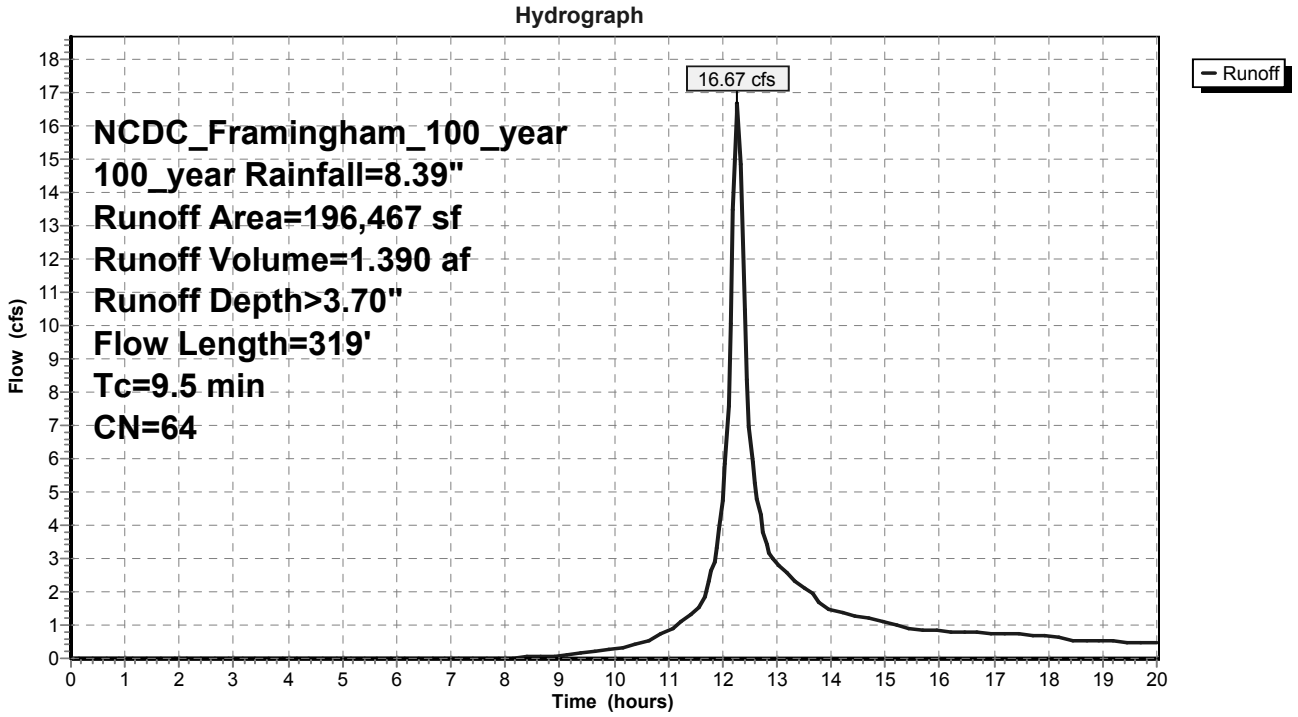
Runoff = 16.67 cfs @ 12.27 hrs, Volume= 1.390 af, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 17,373 | 39 | GRASS, 0% imperv, HSG A |
| * | 153,204 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,809 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,544 | 98 | IMP, 100% imperv, HSG A |
| * | 18,529 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 8 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 196,467 | 64 | Weighted Average |
| | 194,642 | | 99.07% Pervious Area |
| | 1,826 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 128 | 0.1151 | 2.37 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 141 | 0.0163 | 2.59 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 9.5 | 319 | Total | | | |

## Subcatchment E-CULV-S: (blank)



## Summary for Subcatchment RG-E-1: (blank)

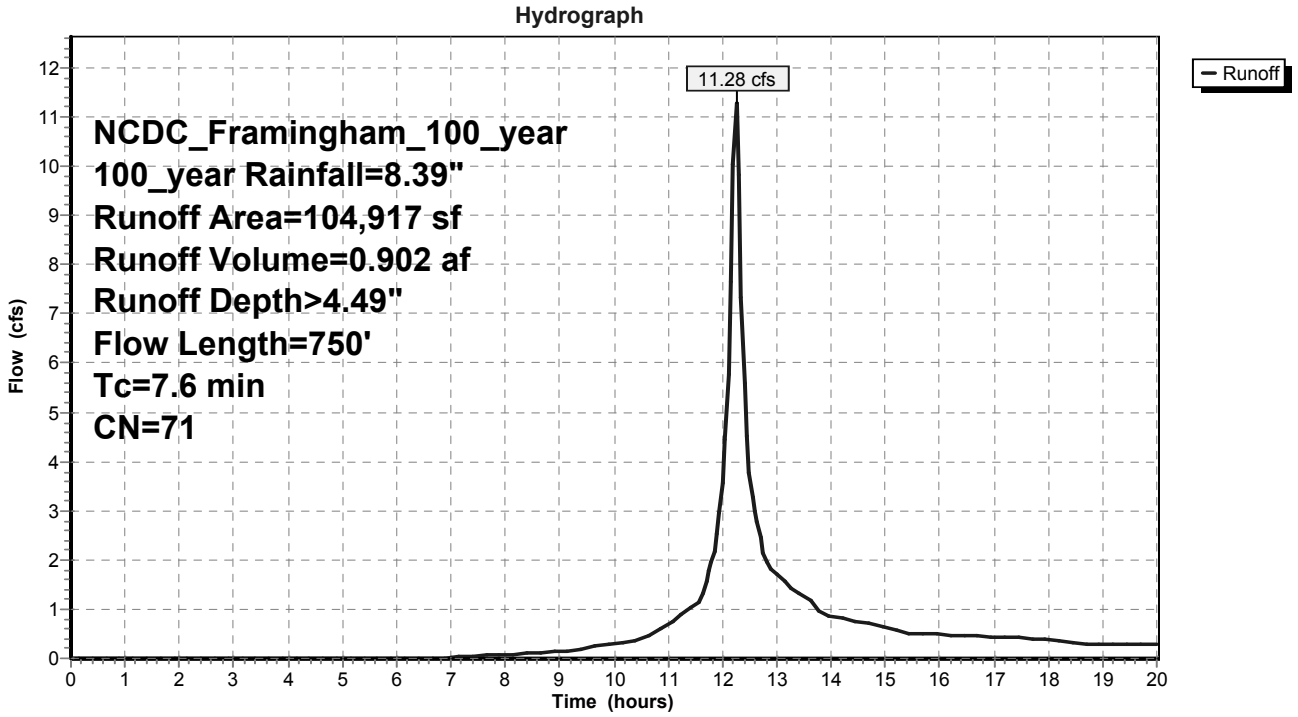
Runoff = 11.28 cfs @ 12.25 hrs, Volume= 0.902 af, Depth> 4.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,274 | 39 | GRASS, 0% imperv, HSG A |
| * | 54,529 | 61 | GRASS, 0% imperv, HSG B |
| * | 171 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 98 | DECK, 100% imperv, HSG A |
| * | 700 | 98 | DECK, 100% imperv, HSG B |
| * | 3,592 | 98 | IMP, 100% imperv, HSG A |
| * | 29,105 | 98 | IMP, 100% imperv, HSG B |
| * | 27 | 98 | ROOF, 100% imperv, HSG B |
| * | 262 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,962 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 104,917 | 71 | Weighted Average |
| | 104,917 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2000 | 0.36 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.3 | 700 | 0.1000 | 2.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.6 | 750 | Total | | | |

## Subcatchment RG-E-1: (blank)



## Summary for Subcatchment RG-E-2: (blank)

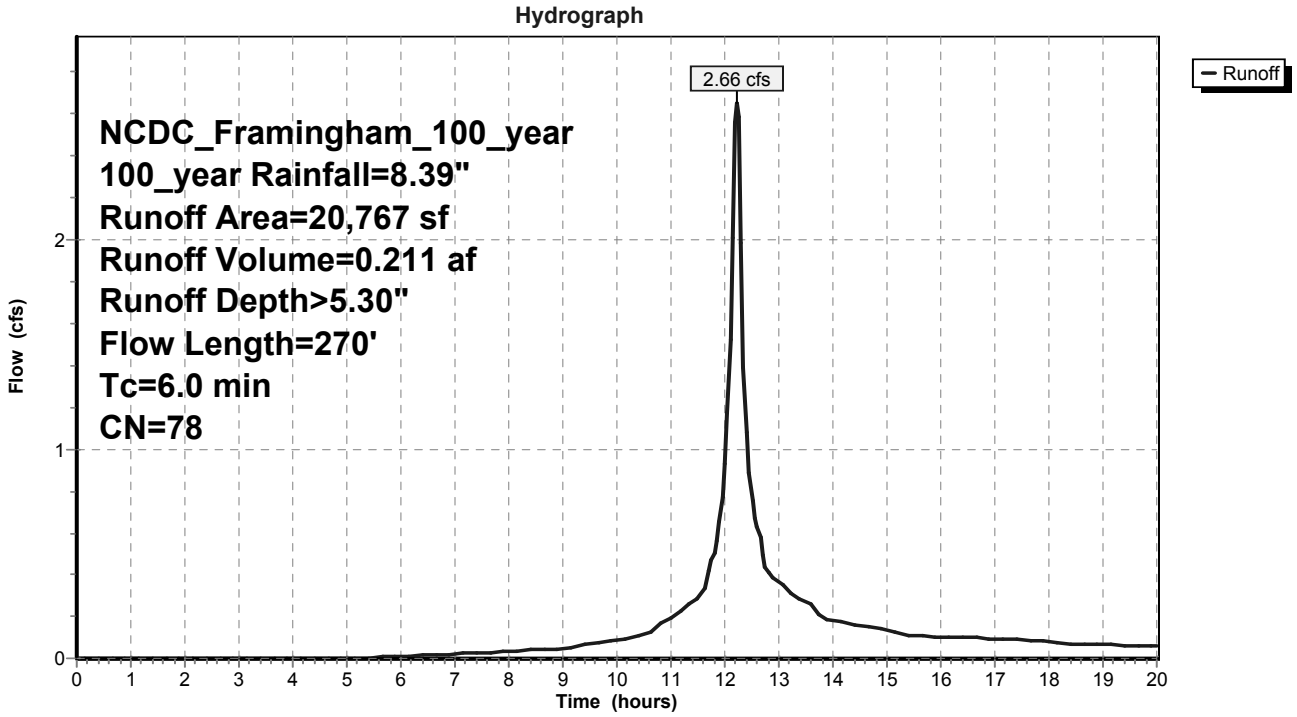
Runoff = 2.66 cfs @ 12.23 hrs, Volume= 0.211 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 11,066 | 61 | GRASS, 0% imperv, HSG B |
| * | 27 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 142 | 98 | DECK, 100% imperv, HSG B |
| * | 9,131 | 98 | IMP, 100% imperv, HSG B |
| * | 402 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 20,767 | 78 | Weighted Average |
| | 20,750 | | 99.92% Pervious Area |
| | 18 | | 0.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 50 | 0.0110 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 38 | 0.0310 | 3.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 7 | 0.0034 | 0.41 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.9 | 175 | 0.0486 | 1.54 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 3.3 | 270 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-2: (blank)



## Summary for Subcatchment RG-E-4A: (blank)

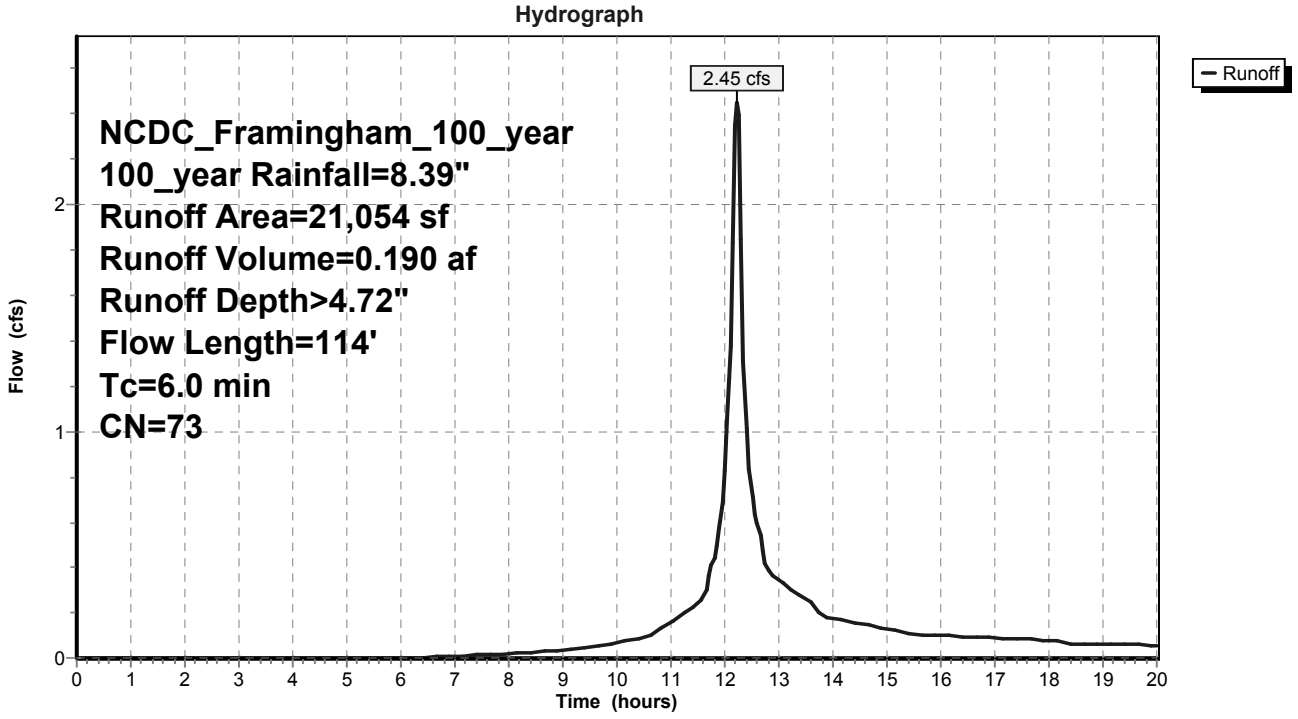
Runoff = 2.45 cfs @ 12.23 hrs, Volume= 0.190 af, Depth> 4.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,476 | 61 | GRASS, 0% imperv, HSG B |
| * | 408 | 98 | DECK, 100% imperv, HSG B |
| * | 4,883 | 98 | IMP, 100% imperv, HSG B |
| * | 1,286 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 21,054 | 73 | Weighted Average |
| | 21,054 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0344 | 1.44 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 2 | 0.0253 | 3.23 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 62 | 0.0359 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.4 | 114 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4A: (blank)



## Summary for Subcatchment RG-E-4B: (blank)

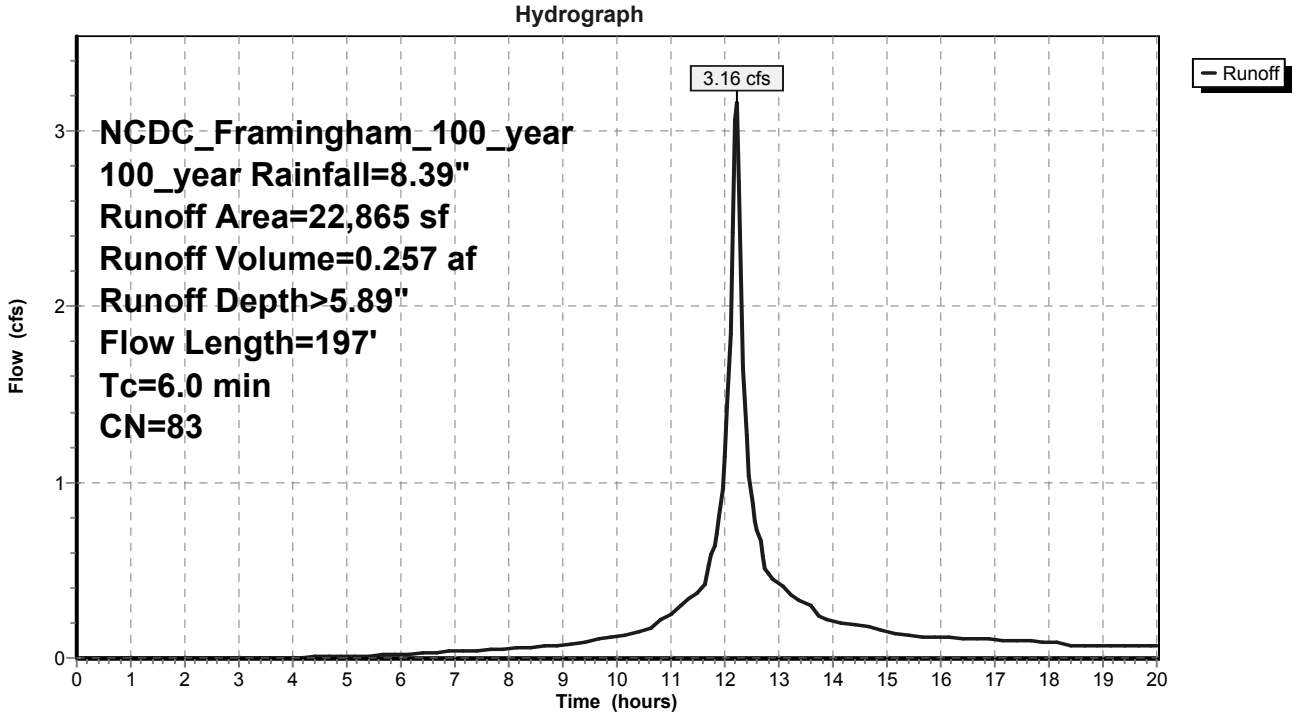
Runoff = 3.16 cfs @ 12.23 hrs, Volume= 0.257 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,428 | 61 | GRASS, 0% imperv, HSG B |
| * | 293 | 98 | DECK, 100% imperv, HSG B |
| * | 11,895 | 98 | IMP, 100% imperv, HSG B |
| * | 1,250 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,865 | 83 | Weighted Average |
| | 22,865 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.8 | 50 | 0.0137 | 1.00 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.9 | 138 | 0.0142 | 2.42 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.1488 | 2.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.8 | 197 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-4B: (blank)



## Summary for Subcatchment RG-E-7: (blank)

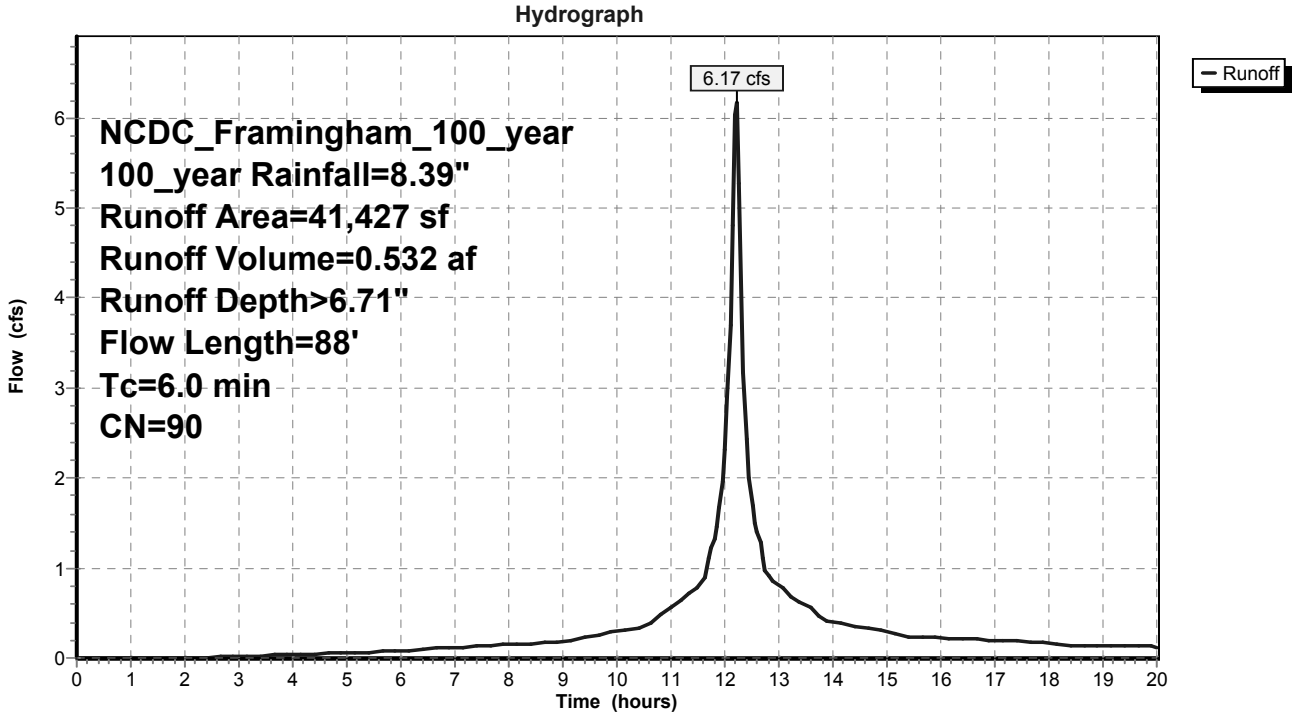
Runoff = 6.17 cfs @ 12.22 hrs, Volume= 0.532 af, Depth> 6.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 9,373 | 61 | GRASS, 0% imperv, HSG B |
| * | 28,458 | 98 | IMP, 100% imperv, HSG B |
| * | 3,411 | 98 | ROOF, 100% imperv, HSG B |
| * | 185 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 41,427 | 90 | Weighted Average |
| | 41,427 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.6 | 50 | 0.0269 | 1.31 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 27 | 0.0251 | 3.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 11 | 0.0299 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.9 | 88 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-7: (blank)



## Summary for Subcatchment RG-E-8: (blank)

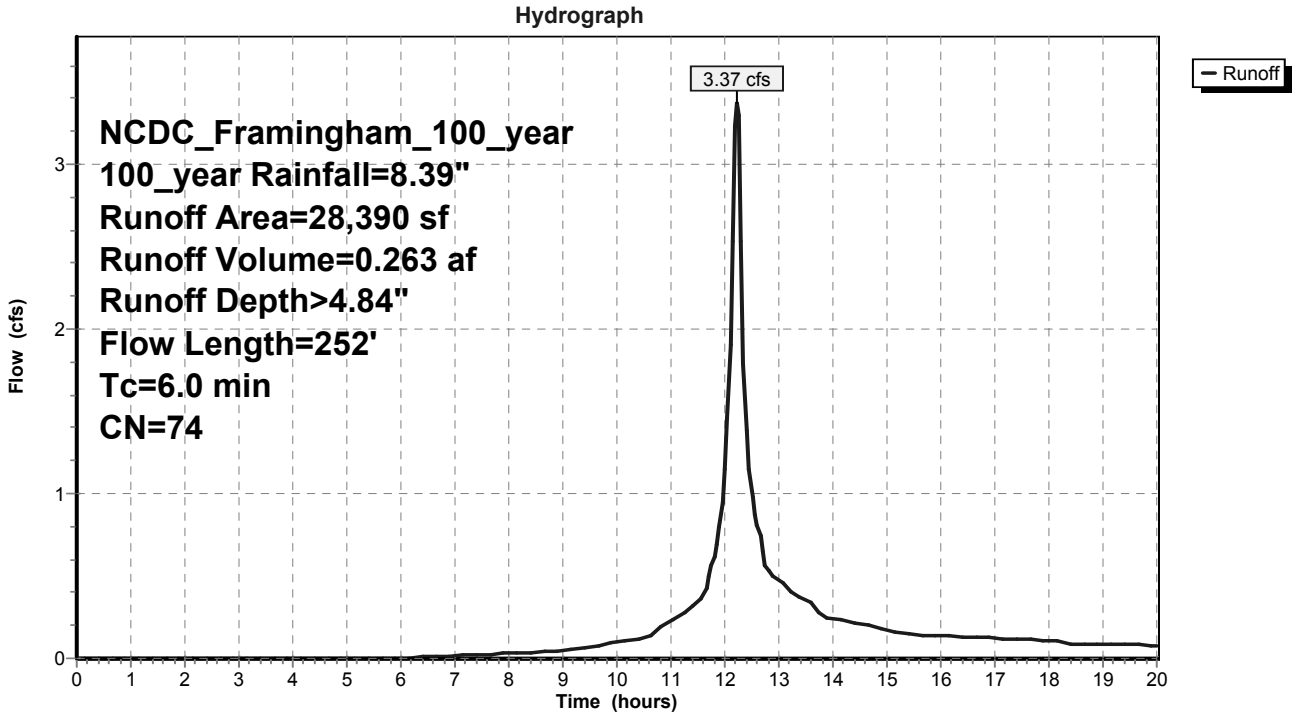
Runoff = 3.37 cfs @ 12.23 hrs, Volume= 0.263 af, Depth> 4.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 18,045 | 61 | GRASS, 0% imperv, HSG B |
| * | 5 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 355 | 98 | DECK, 100% imperv, HSG B |
| * | 9,134 | 98 | IMP, 100% imperv, HSG B |
| * | 852 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 28,390 | 74 | Weighted Average |
| | 28,387 | | 99.99% Pervious Area |
| | 3 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.0 | 50 | 0.0517 | 0.21 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.3 | 32 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0331 | 3.69 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 51 | 0.0546 | 4.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.1 | 113 | 0.0620 | 1.74 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 252 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-8: (blank)



## Summary for Subcatchment RG-E-9A: (blank)

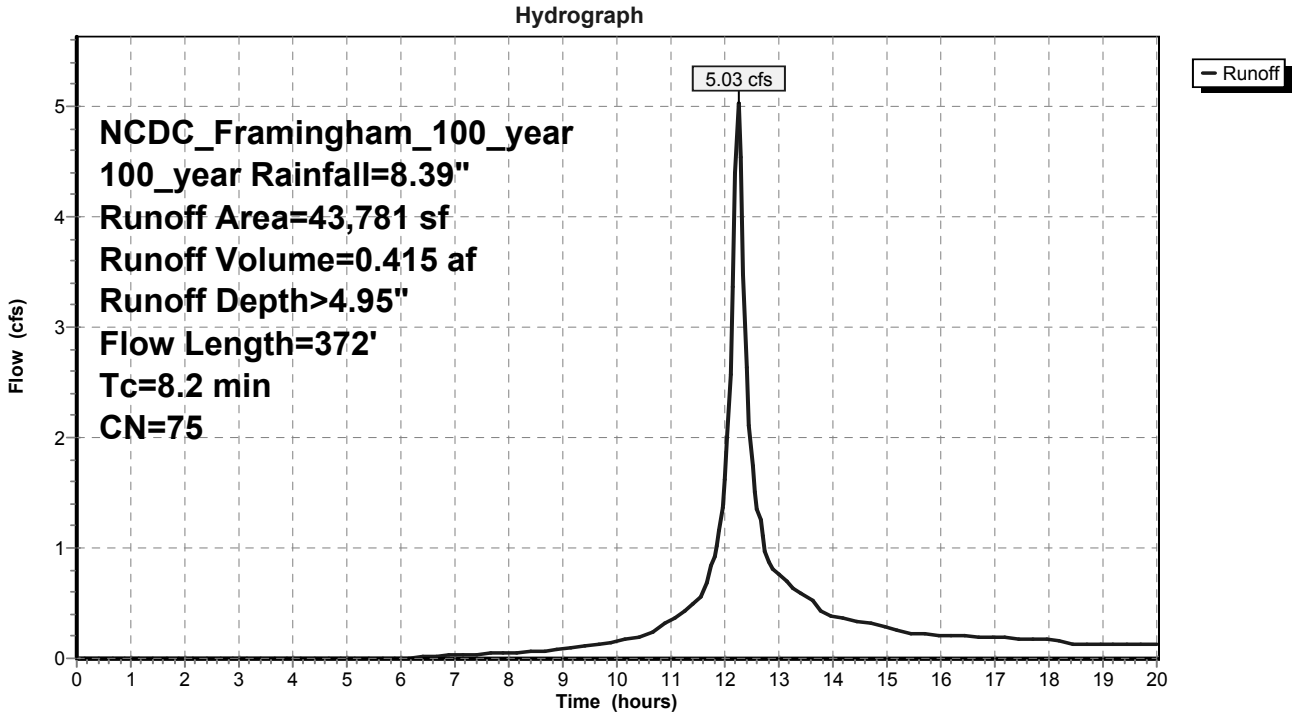
Runoff = 5.03 cfs @ 12.25 hrs, Volume= 0.415 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 10,864 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,515 | 61 | GRASS, 0% imperv, HSG B |
| * | 314 | 98 | DECK, 100% imperv, HSG A |
| * | 336 | 98 | DECK, 100% imperv, HSG B |
| * | 5,552 | 98 | IMP, 100% imperv, HSG A |
| * | 13,443 | 98 | IMP, 100% imperv, HSG B |
| * | 800 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 2,957 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 43,781 | 75 | Weighted Average |
| | 43,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 42 | 0.0271 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 8 | 0.0426 | 1.08 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.0 | 158 | 0.0180 | 2.72 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 1.9 | 65 | 0.0068 | 0.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0114 | 5.72 | 4.49 | **Pipe Channel, Smooth surfaces** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.011 |
| 0.6 | 66 | 0.0646 | 1.78 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.2 | 372 | Total | | | |

## Subcatchment RG-E-9A: (blank)



## Summary for Subcatchment RG-E-9B: (blank)

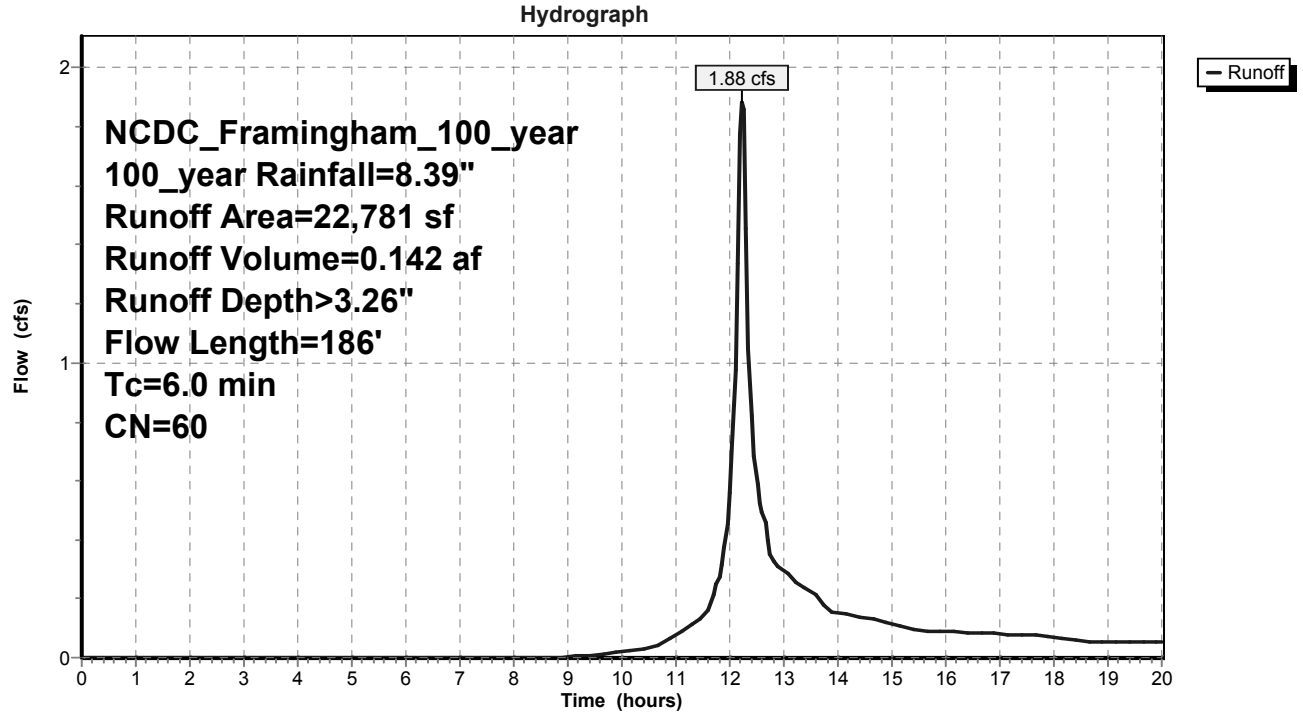
Runoff = 1.88 cfs @ 12.23 hrs, Volume= 0.142 af, Depth> 3.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,064 | 39 | GRASS, 0% imperv, HSG A |
| * | 2,638 | 61 | GRASS, 0% imperv, HSG B |
| * | 3 | 98 | DECK, 100% imperv, HSG A |
| * | 829 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 6,248 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 22,781 | 60 | Weighted Average |
| | 22,781 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.4 | 50 | 0.0010 | 0.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.3 | 80 | 0.3019 | 3.85 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.3 | 56 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.0 | 186 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-E-9B: (blank)



## Summary for Subcatchment RG-W-1: (blank)

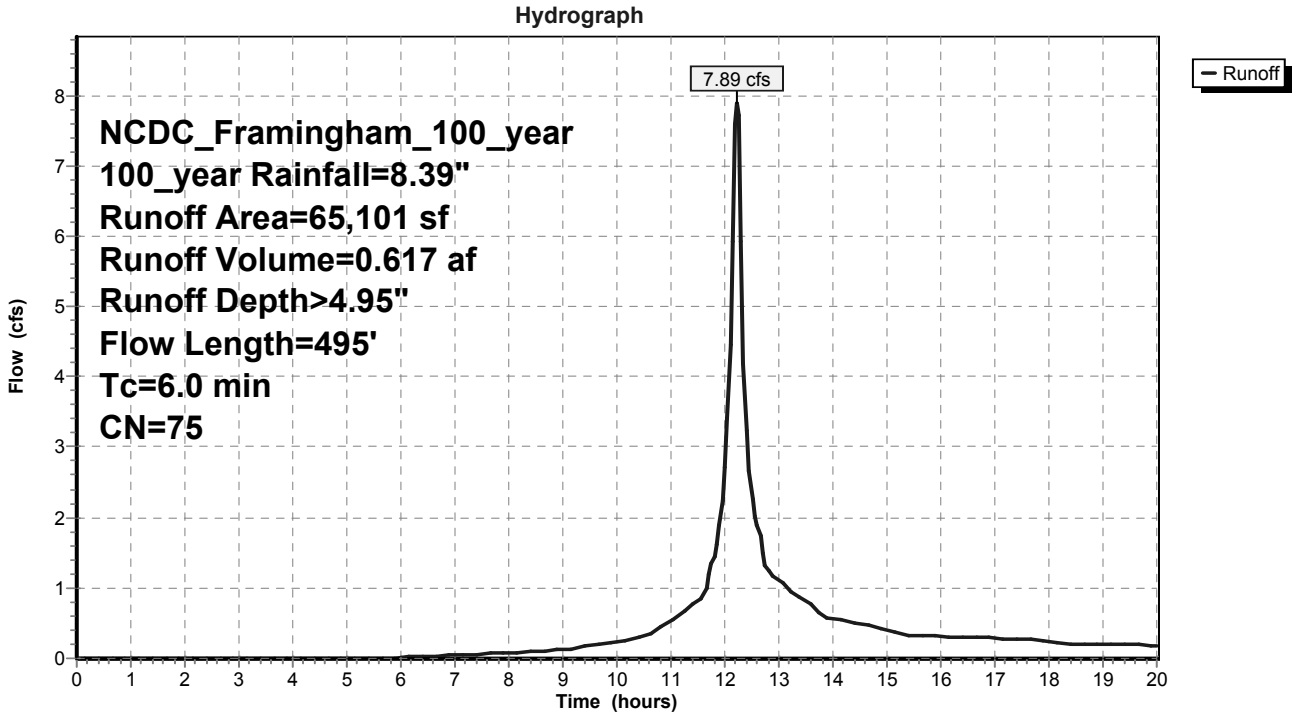
Runoff = 7.89 cfs @ 12.23 hrs, Volume= 0.617 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,550 | 39 | GRASS, 0% imperv, HSG A |
| * | 14,690 | 61 | GRASS, 0% imperv, HSG B |
| * | 733 | 98 | DECK, 100% imperv, HSG A |
| * | 379 | 98 | DECK, 100% imperv, HSG B |
| * | 23,694 | 98 | IMP, 100% imperv, HSG A |
| * | 7,512 | 98 | IMP, 100% imperv, HSG B |
| * | 3 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,345 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 194 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 65,101 | 75 | Weighted Average |
| | 65,101 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0185 | 1.12 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 1.8 | 280 | 0.0159 | 2.56 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.3 | 165 | 0.0281 | 1.17 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.8 | 495 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-1: (blank)



## Summary for Subcatchment RG-W-2: (blank)

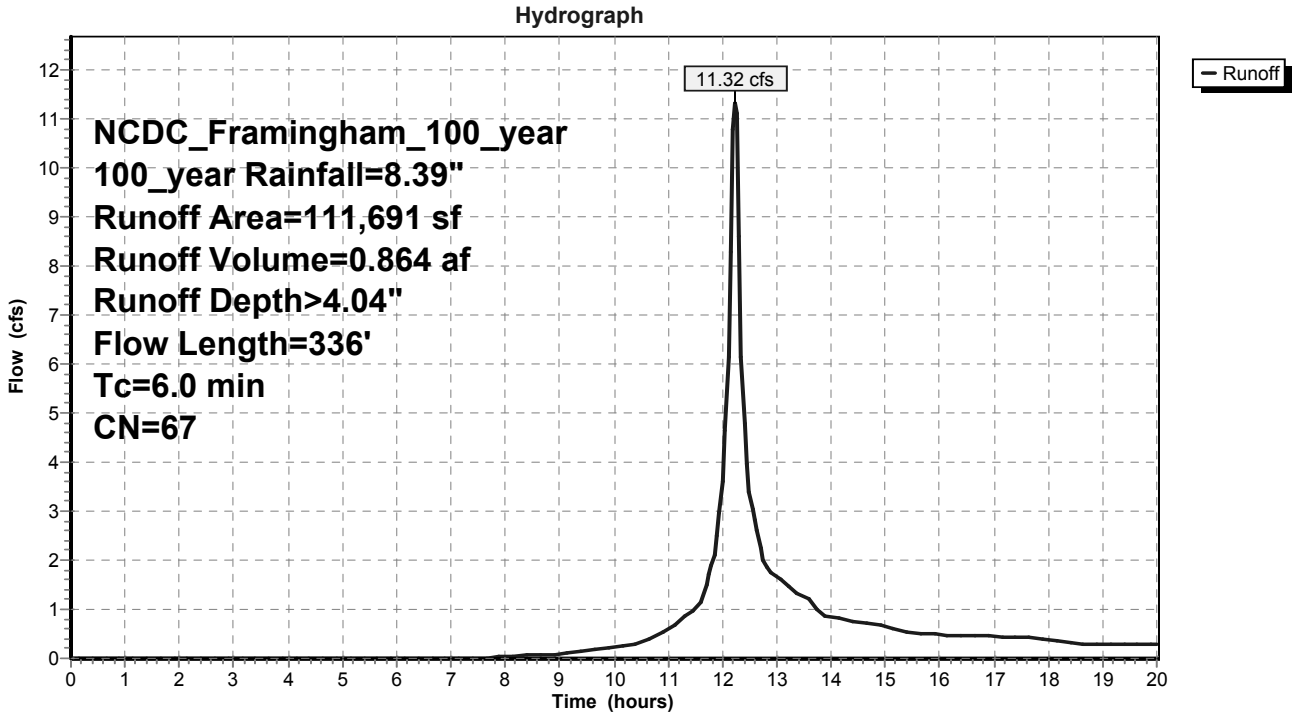
Runoff = 11.32 cfs @ 12.23 hrs, Volume= 0.864 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,818 | 39 | GRASS, 0% imperv, HSG A |
| * | 48,934 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,542 | 98 | DECK, 100% imperv, HSG A |
| * | 2,092 | 98 | DECK, 100% imperv, HSG B |
| * | 10,373 | 98 | IMP, 100% imperv, HSG A |
| * | 19,162 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG A |
| * | 864 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 111,691 | 67 | Weighted Average |
| | 111,691 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.2 | 33 | 0.0376 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.1 | 4 | 0.0215 | 0.73 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.2 | 13 | 0.0217 | 0.91 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.0 | 274 | 0.0124 | 2.26 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 11 | 0.1347 | 2.57 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 336 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-2: (blank)



## Summary for Subcatchment RG-W-3: (blank)

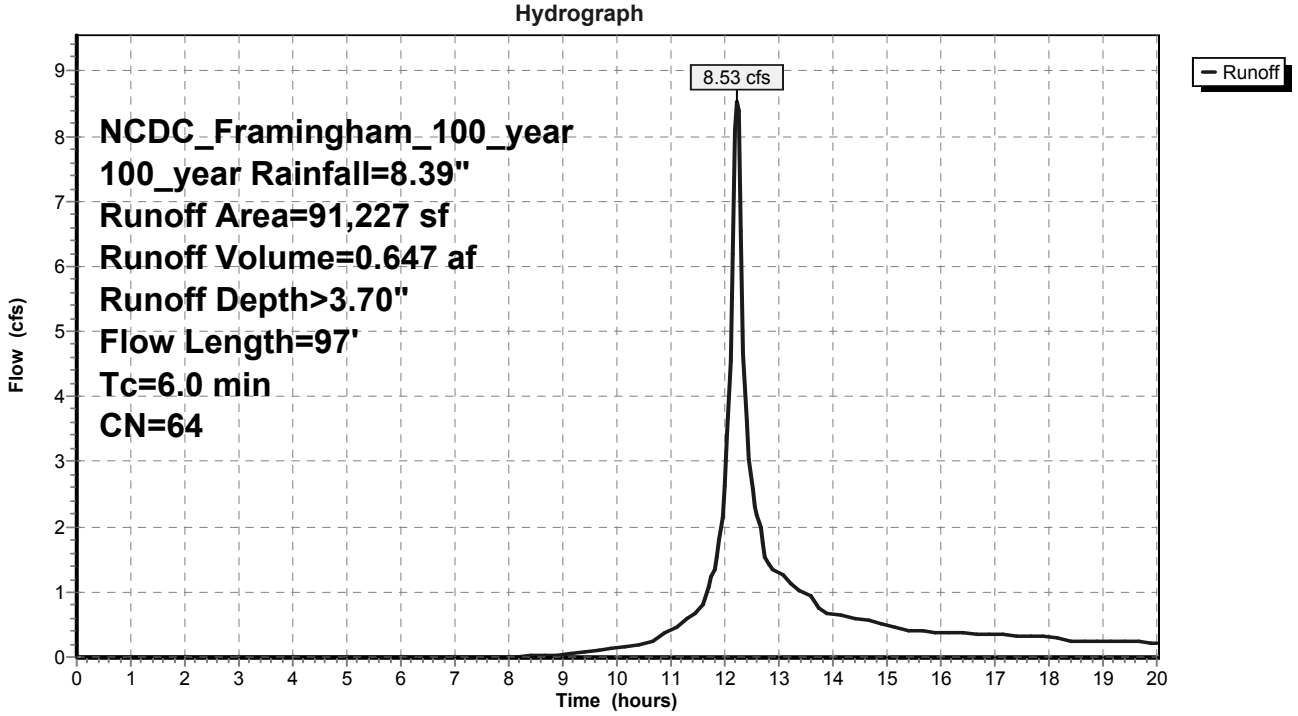
Runoff = 8.53 cfs @ 12.23 hrs, Volume= 0.647 af, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 13,998 | 39 | GRASS, 0% imperv, HSG A |
| * | 60,494 | 61 | GRASS, 0% imperv, HSG B |
| * | 751 | 98 | DECK, 100% imperv, HSG A |
| * | 1,912 | 98 | DECK, 100% imperv, HSG B |
| * | 11,505 | 98 | IMP, 100% imperv, HSG A |
| * | 1,575 | 98 | IMP, 100% imperv, HSG B |
| * | 12 | 98 | ROOF, 100% imperv, HSG B |
| * | 980 | 98 | SIDEWALK, 100% imperv, HSG A |
| | 91,227 | 64 | Weighted Average |
| | 91,227 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.0 | 50 | 0.0296 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 47 | 0.2223 | 3.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.2 | 97 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3: (blank)



## Summary for Subcatchment RG-W-3A: (blank)

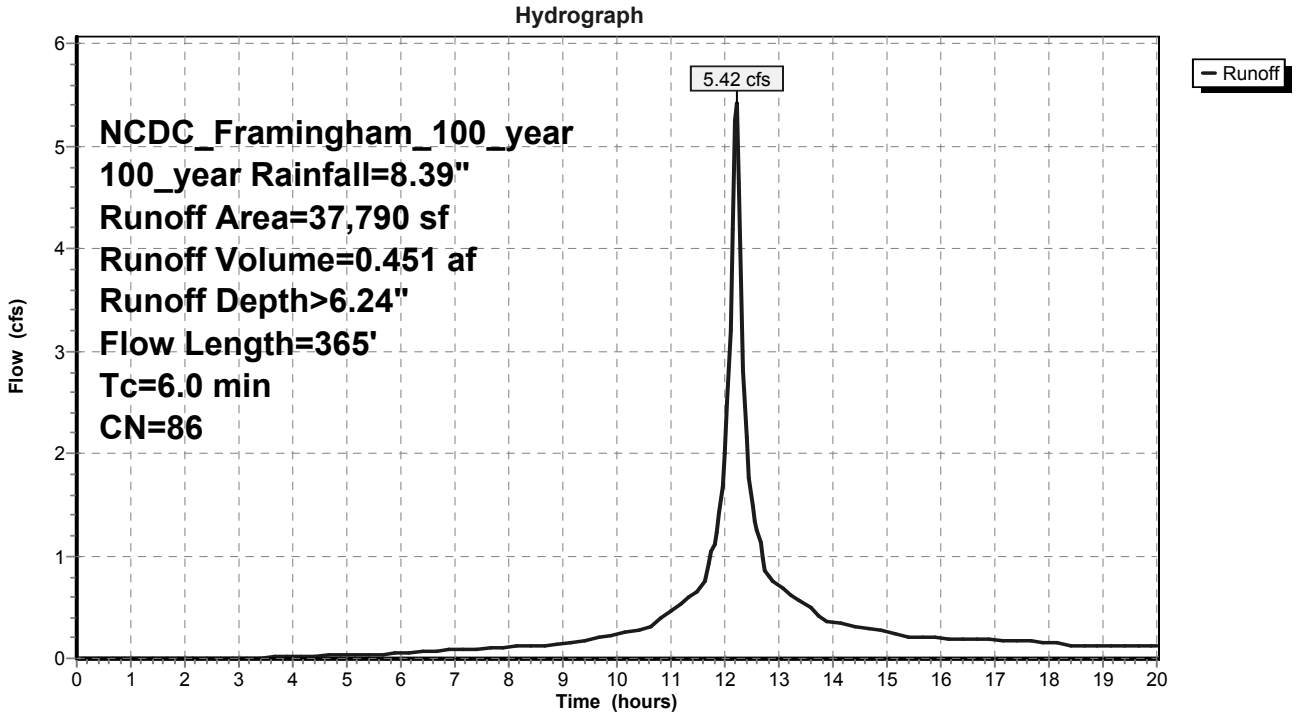
Runoff = 5.42 cfs @ 12.23 hrs, Volume= 0.451 af, Depth> 6.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,877 | 39 | GRASS, 0% imperv, HSG A |
| * | 9,646 | 61 | GRASS, 0% imperv, HSG B |
| * | 52 | 98 | DECK, 100% imperv, HSG A |
| * | 386 | 98 | DECK, 100% imperv, HSG B |
| * | 7,875 | 98 | IMP, 100% imperv, HSG A |
| * | 16,446 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| * | 340 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,166 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 37,790 | 86 | Weighted Average |
| | 37,790 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.4 | 50 | 0.0037 | 0.59 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.1 | 315 | 0.0153 | 2.51 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.5 | 365 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-3A: (blank)



## Summary for Subcatchment RG-W-4: (blank)

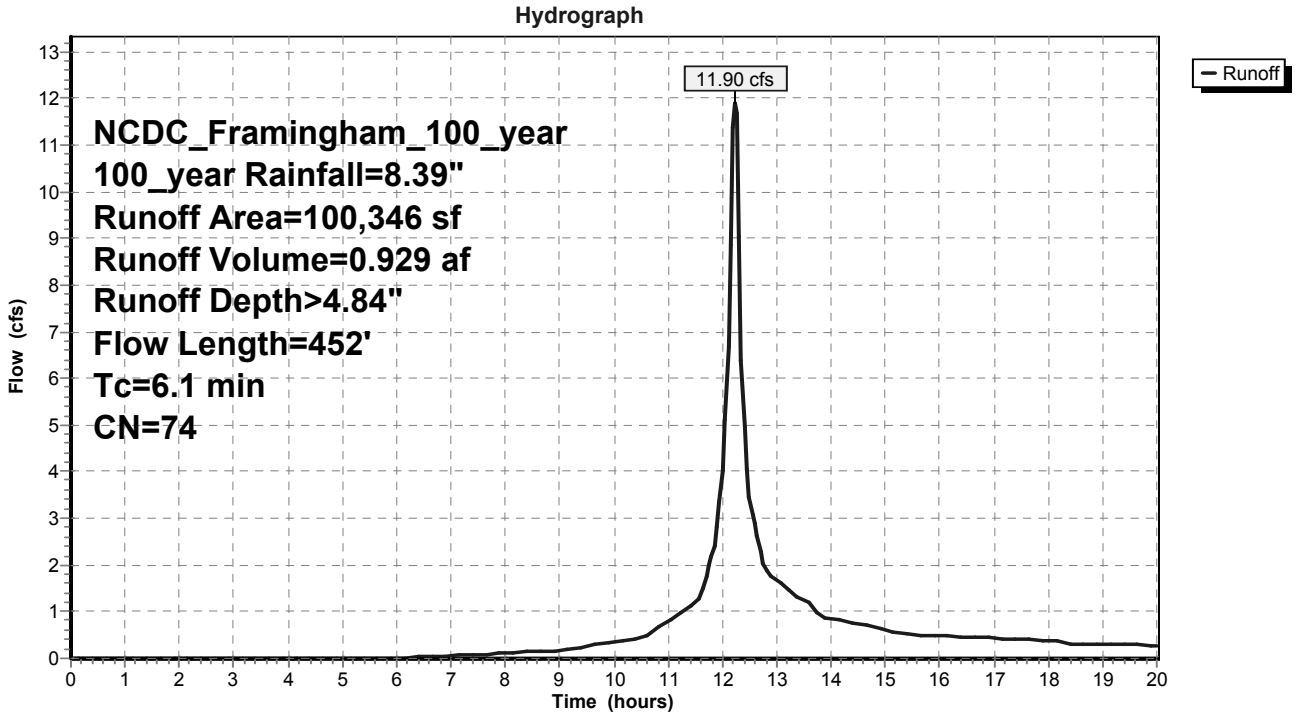
Runoff = 11.90 cfs @ 12.23 hrs, Volume= 0.929 af, Depth> 4.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 820 | 39 | GRASS, 0% imperv, HSG A |
| * | 65,039 | 61 | GRASS, 0% imperv, HSG B |
| * | 108 | 98 | DECK, 100% imperv, HSG A |
| * | 657 | 98 | DECK, 100% imperv, HSG B |
| * | 19 | 98 | IMP, 100% imperv, HSG A |
| * | 32,102 | 98 | IMP, 100% imperv, HSG B |
| * | 76 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 1,525 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 100,346 | 74 | Weighted Average |
| | 100,346 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0228 | 1.22 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.8 | 127 | 0.0184 | 2.76 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 4.6 | 275 | 0.0199 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.1 | 452 | Total | | | |

## Subcatchment RG-W-4: (blank)



## Summary for Subcatchment RG-W-5: (blank)

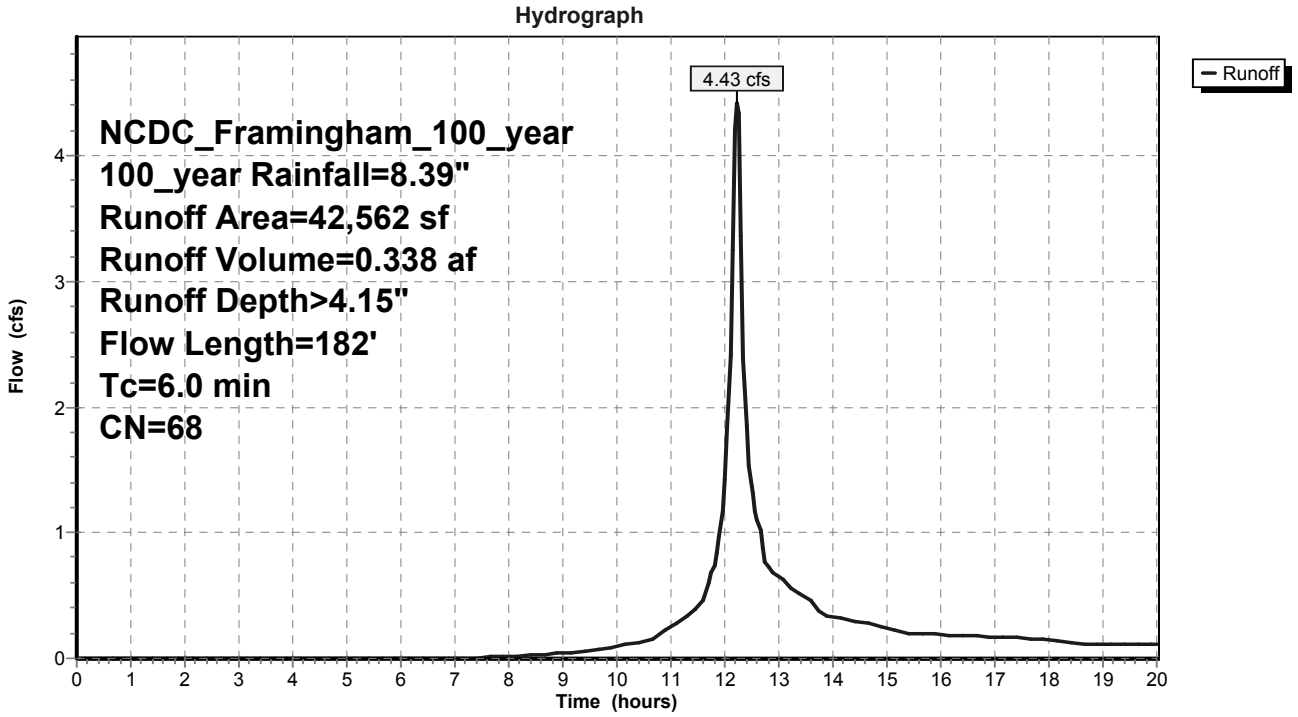
Runoff = 4.43 cfs @ 12.23 hrs, Volume= 0.338 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 723 | 39 | GRASS, 0% imperv, HSG A |
| * | 31,185 | 61 | GRASS, 0% imperv, HSG B |
| * | 704 | 30 | WOODS, 0% imperv, HSG A |
| * | 126 | 55 | WOODS, 0% imperv, HSG B |
| * | 296 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 219 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,120 | 98 | DECK, 100% imperv, HSG B |
| * | 205 | 98 | IMP, 100% imperv, HSG A |
| * | 7,984 | 98 | IMP, 100% imperv, HSG B |
| * | 1 | 98 | ROOF, 100% imperv, HSG B |
| | 42,562 | 68 | Weighted Average |
| | 42,227 | | 99.21% Pervious Area |
| | 335 | | 0.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0413 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 38 | 0.0260 | 1.13 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 24 | 0.0354 | 3.82 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 31 | 0.0362 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 11 | 0.0429 | 4.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 27 | 0.1361 | 2.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 5.6 | 182 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment RG-W-5: (blank)



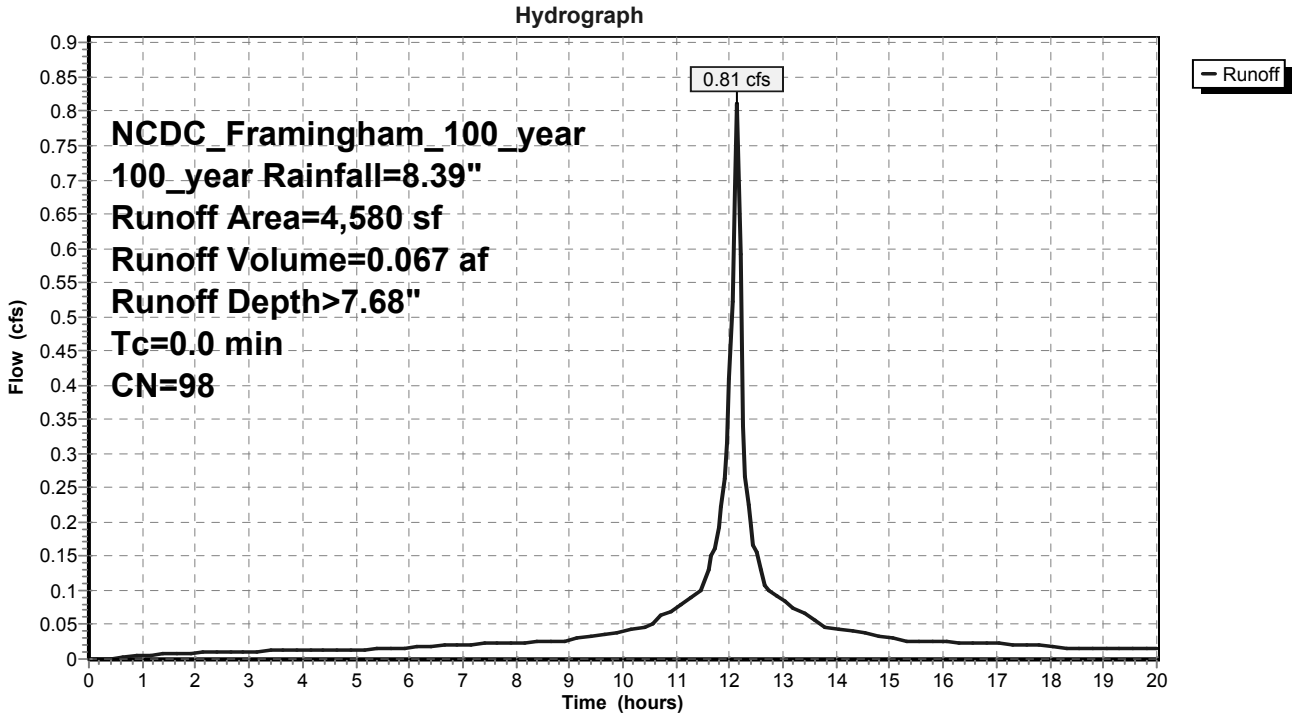
## Summary for Subcatchment ROOF-1: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.067 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,478 | 98 | ROOF, 100% imperv, HSG A |
| * | 3,102 | 98 | ROOF, 100% imperv, HSG B |
| | 4,580 | 98 | Weighted Average |
| | 4,580 | | 100.00% Pervious Area |

## Subcatchment ROOF-1: (blank)



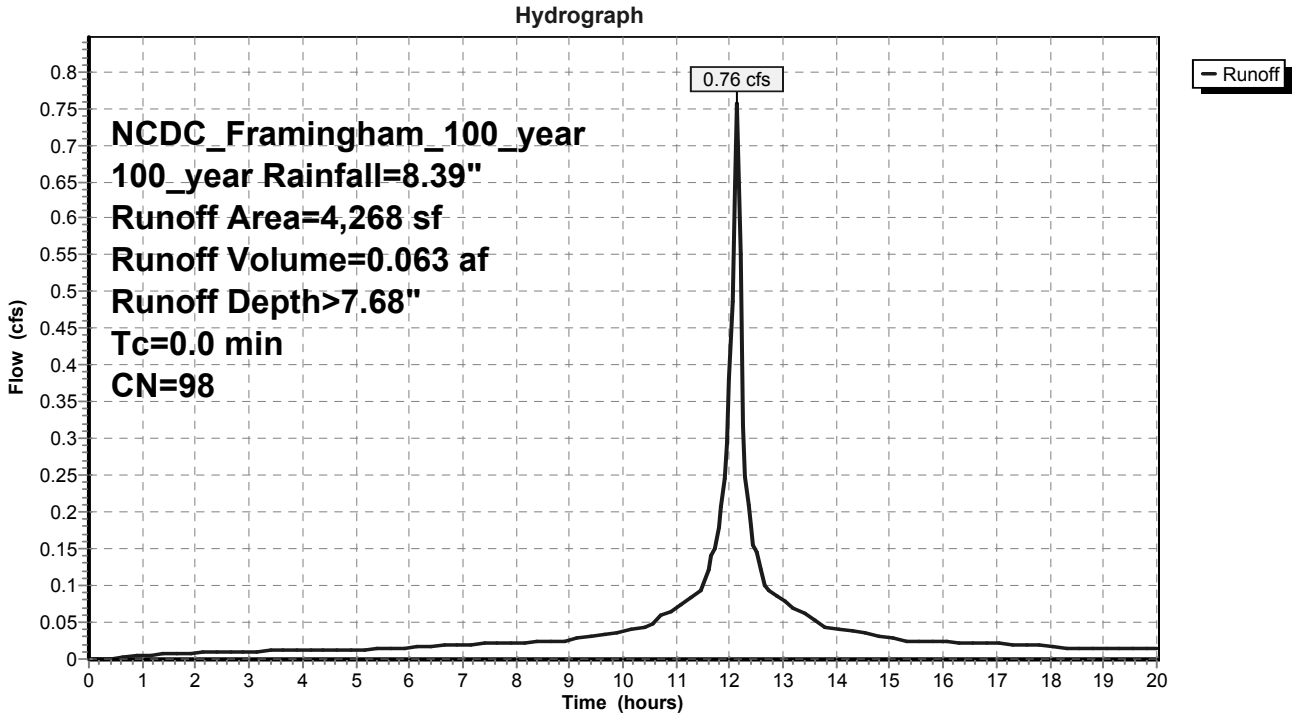
## Summary for Subcatchment ROOF-10: (blank)

Runoff = 0.76 cfs @ 12.14 hrs, Volume= 0.063 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 3,776 | 98 | ROOF, 100% imperv, HSG B |
| | 4,268 | 98 | Weighted Average |
| | 4,268 | | 100.00% Pervious Area |

## Subcatchment ROOF-10: (blank)



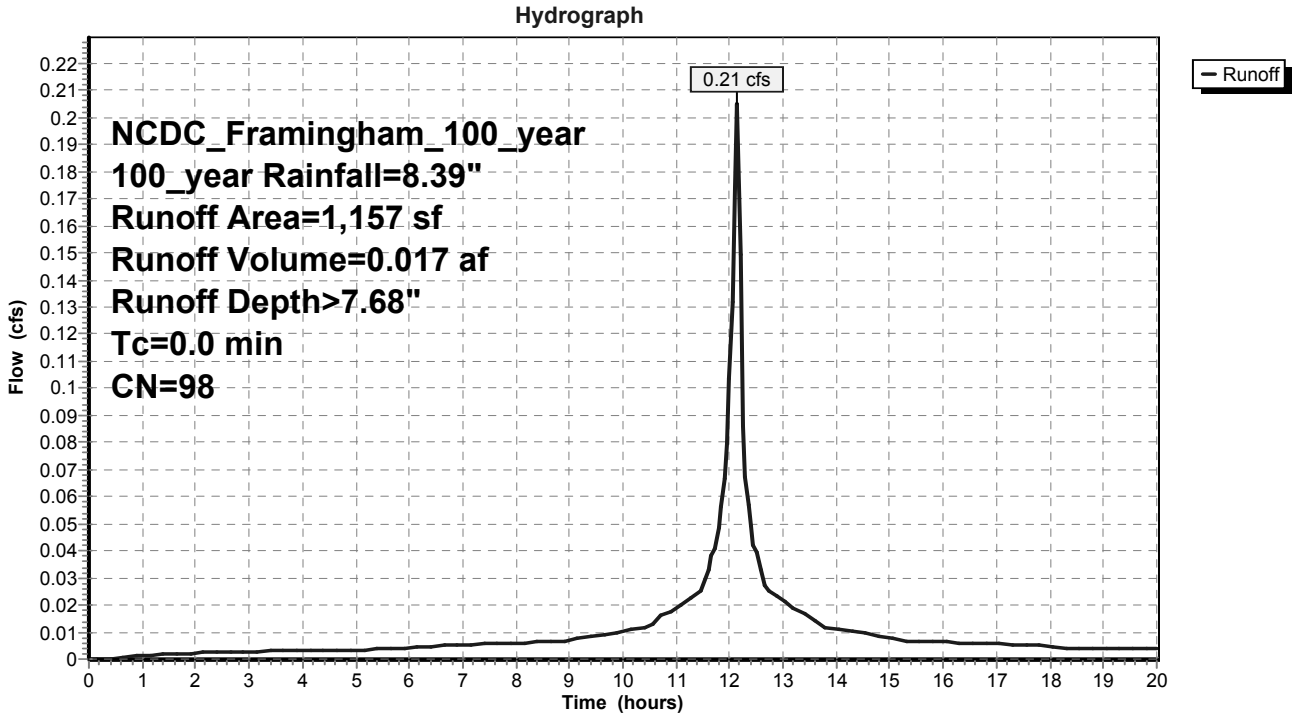
## Summary for Subcatchment ROOF-100: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-100: (blank)



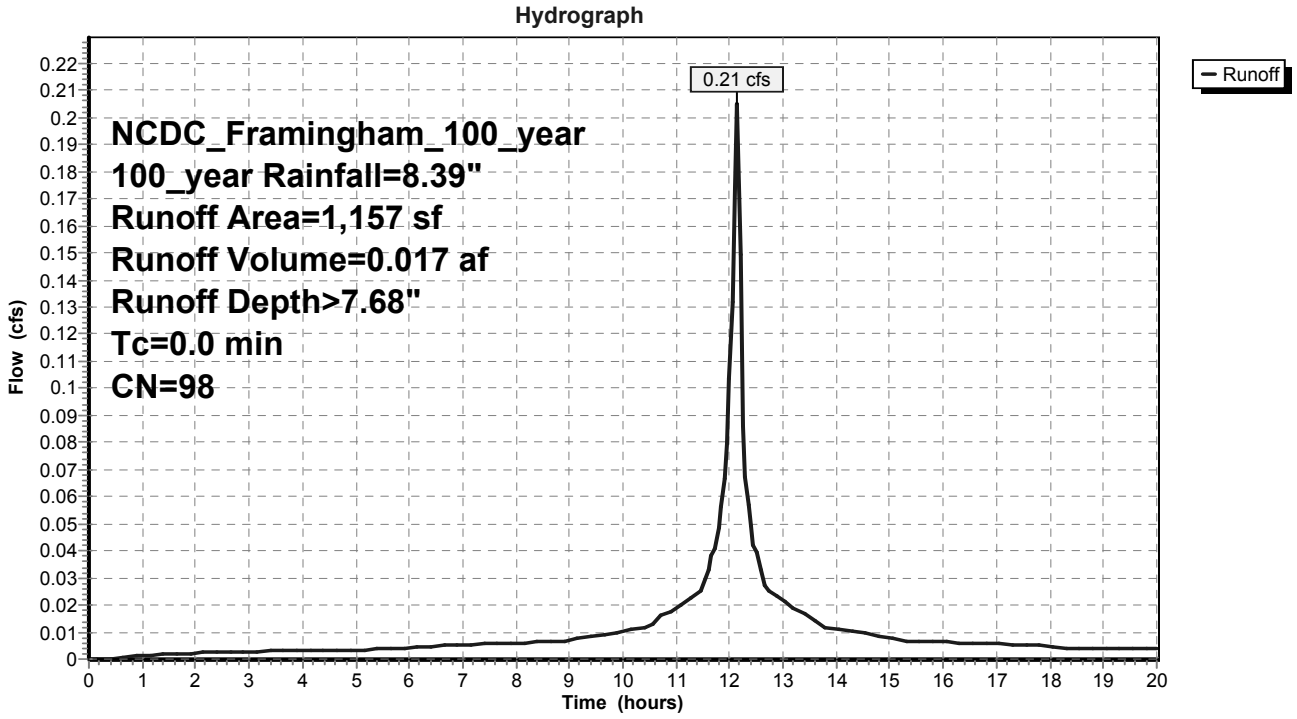
## Summary for Subcatchment ROOF-101: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-101: (blank)



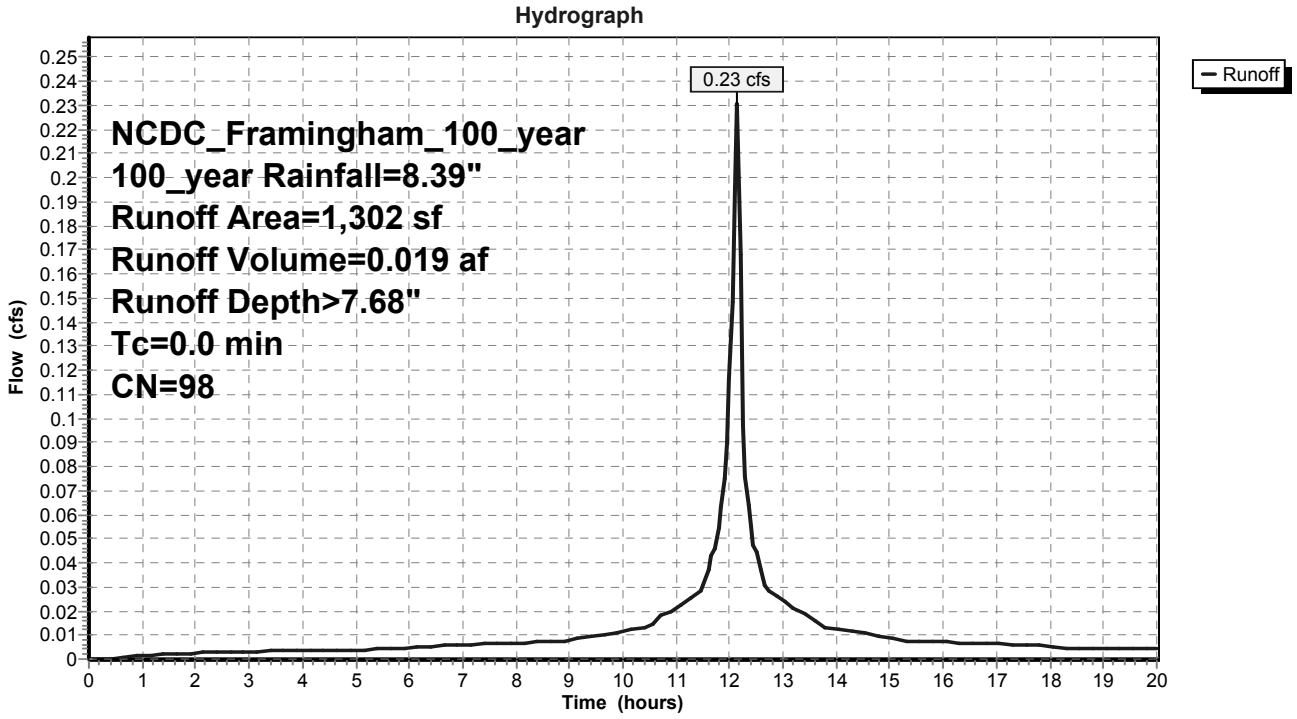
## Summary for Subcatchment ROOF-102: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-102: (blank)



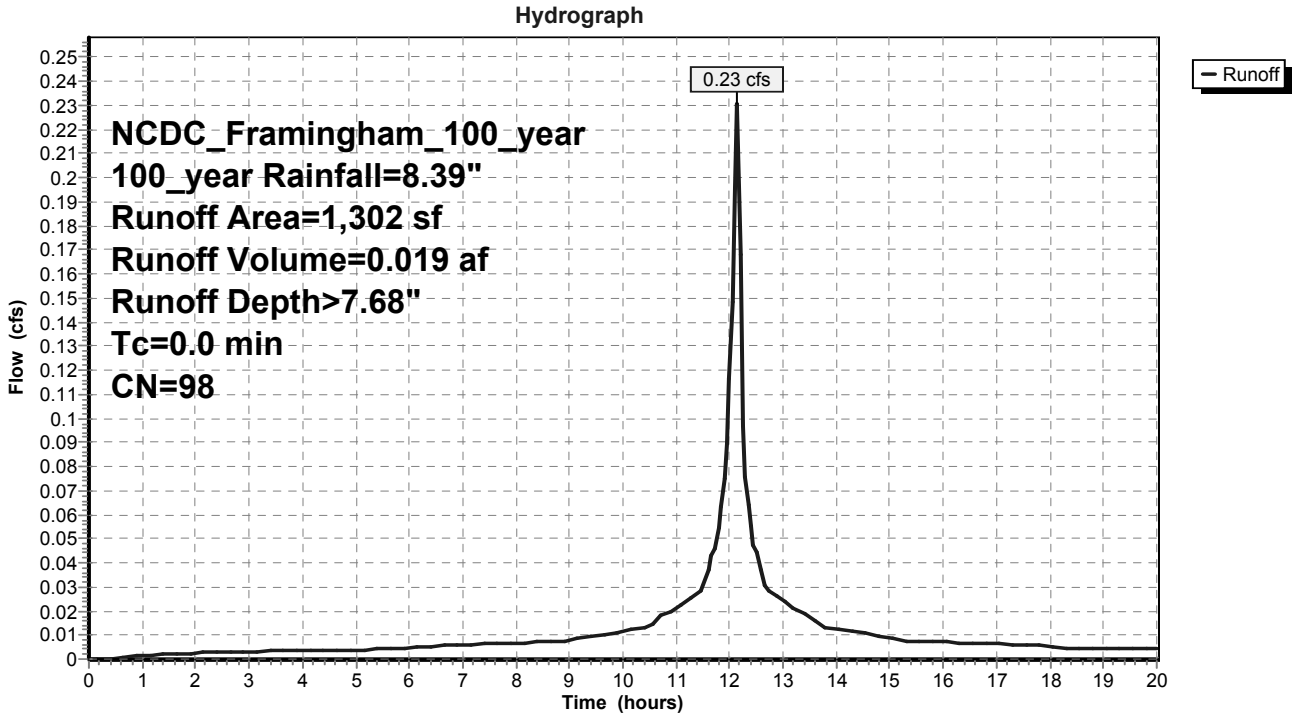
## Summary for Subcatchment ROOF-103: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-103: (blank)



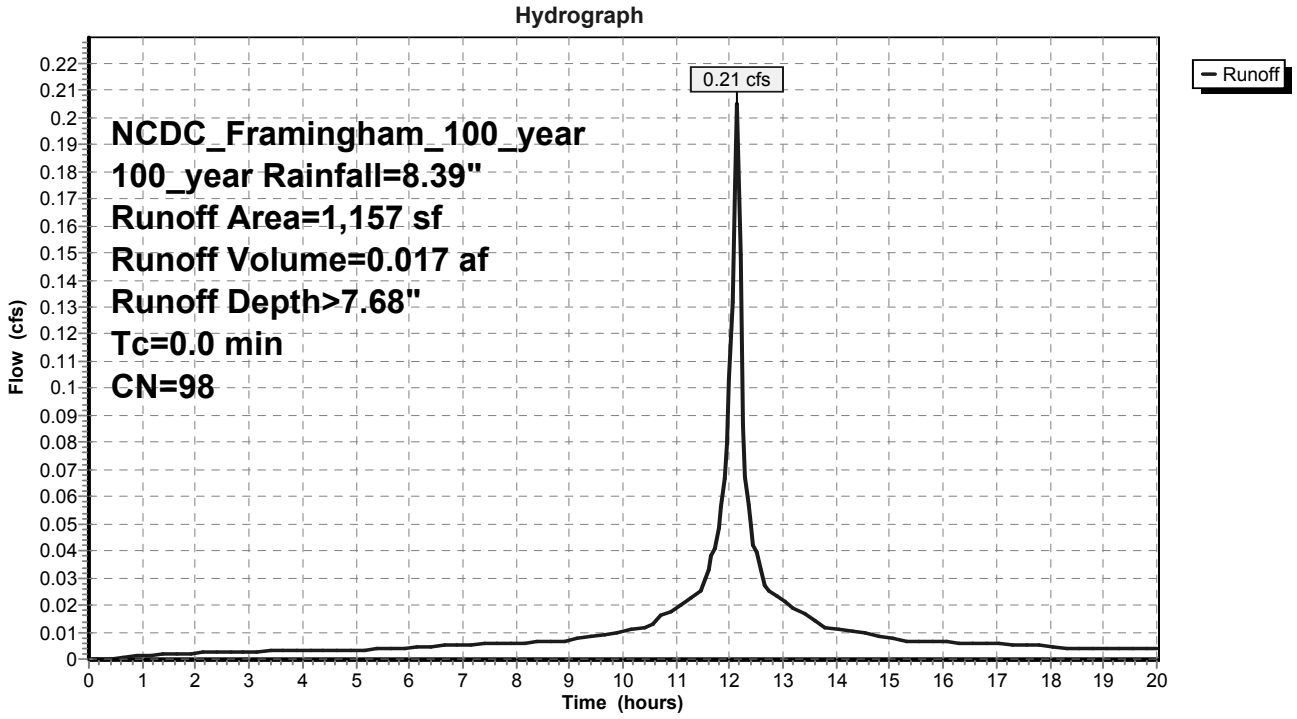
## Summary for Subcatchment ROOF-104: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-104: (blank)



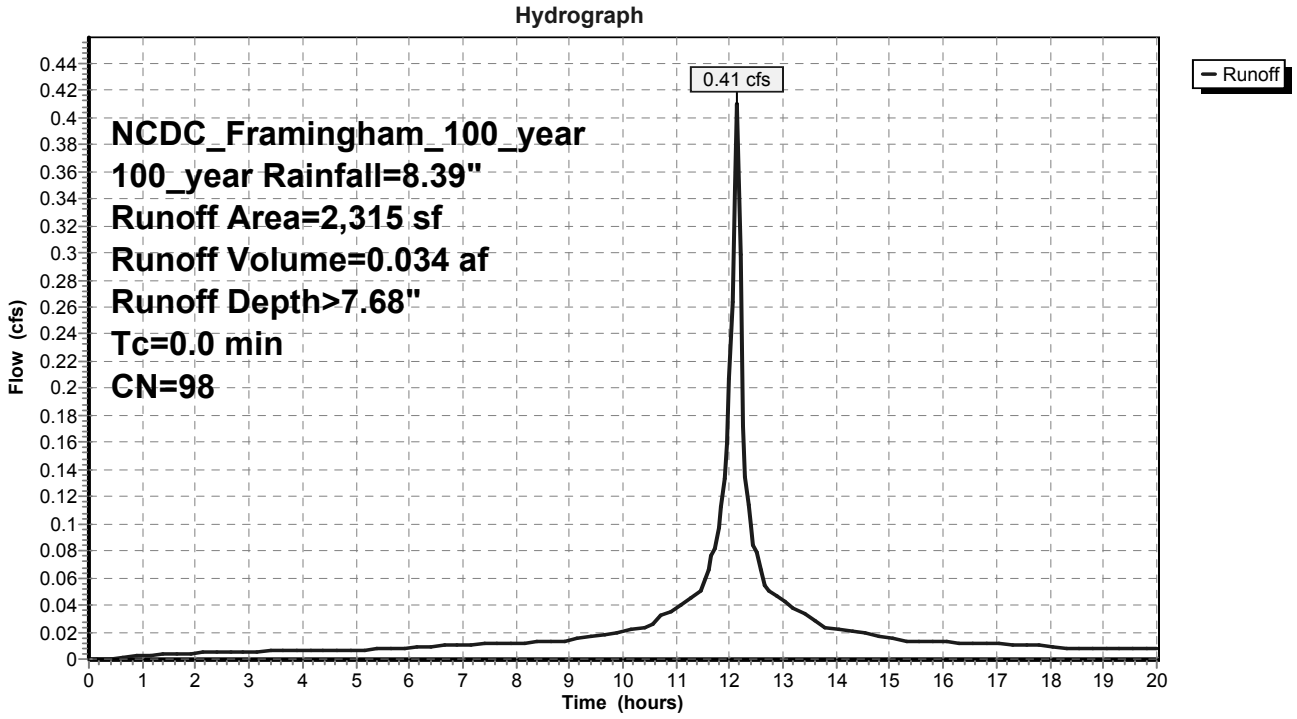
## Summary for Subcatchment ROOF-105: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-105: (blank)



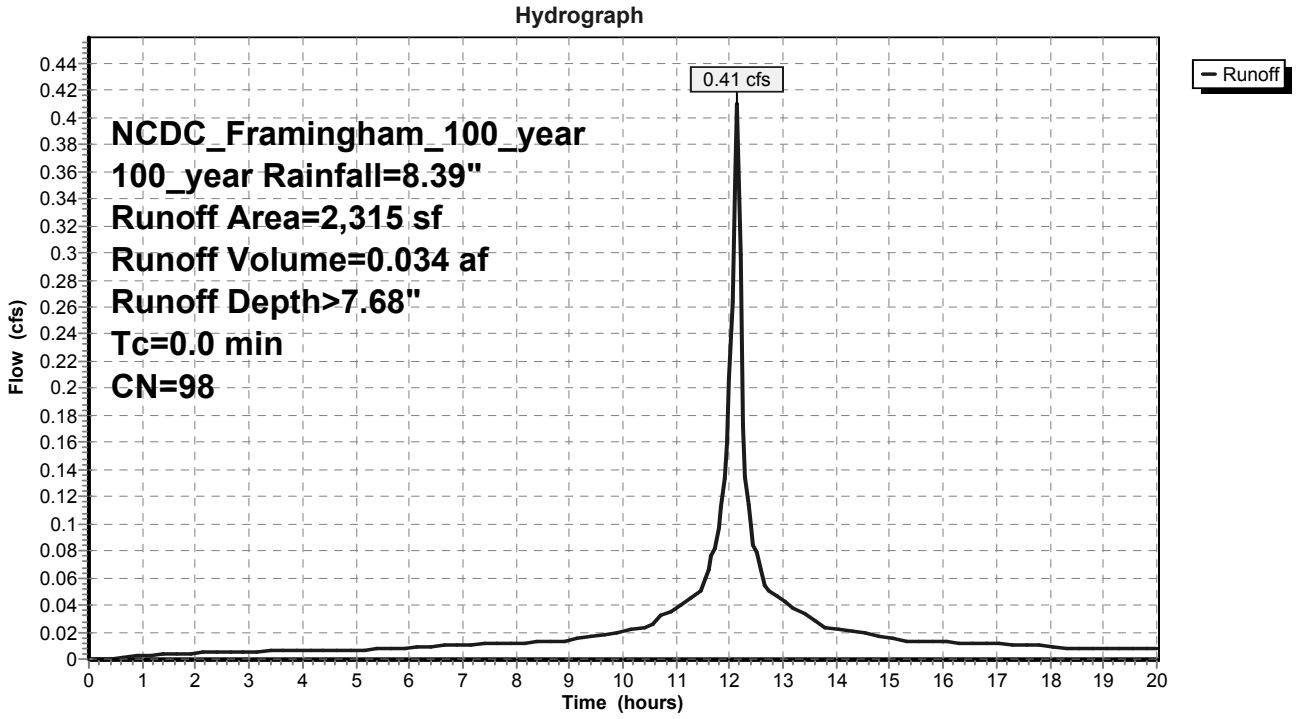
## Summary for Subcatchment ROOF-106: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-106: (blank)



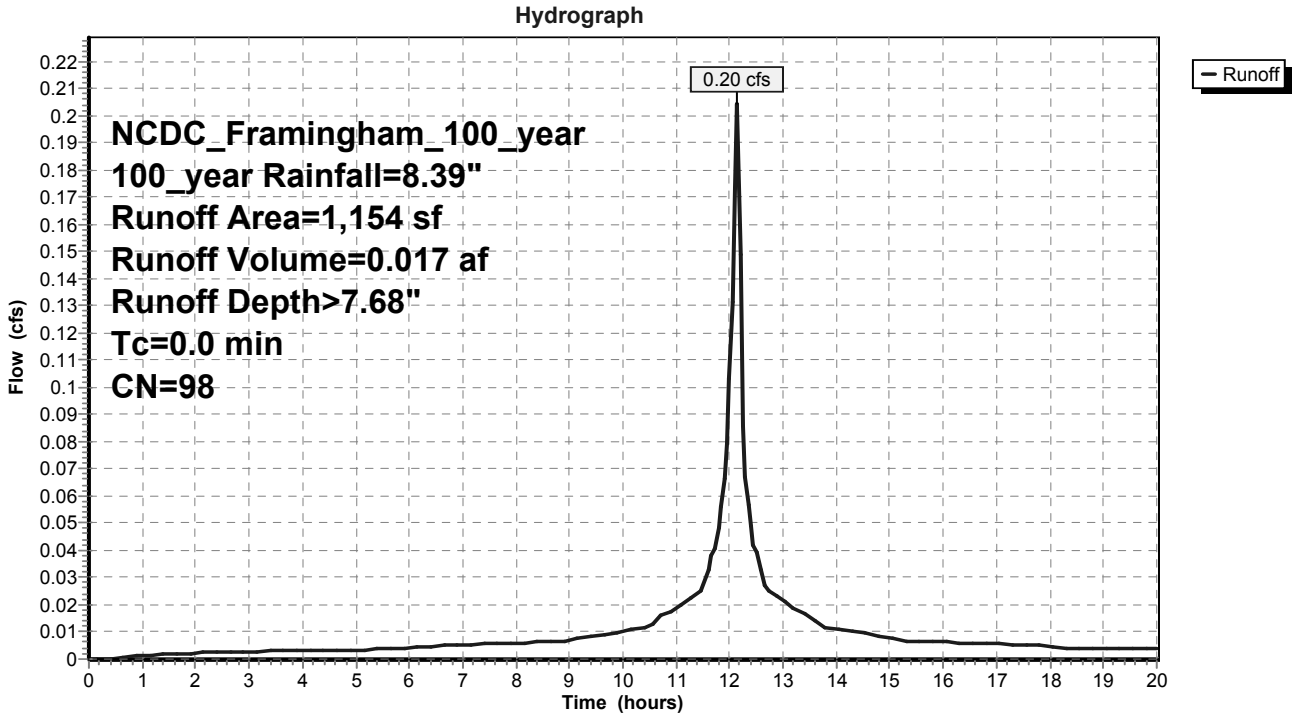
## Summary for Subcatchment ROOF-107: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,154 | 98 | ROOF, 100% imperv, HSG B |
| | 1,154 | | 100.00% Pervious Area |

## Subcatchment ROOF-107: (blank)



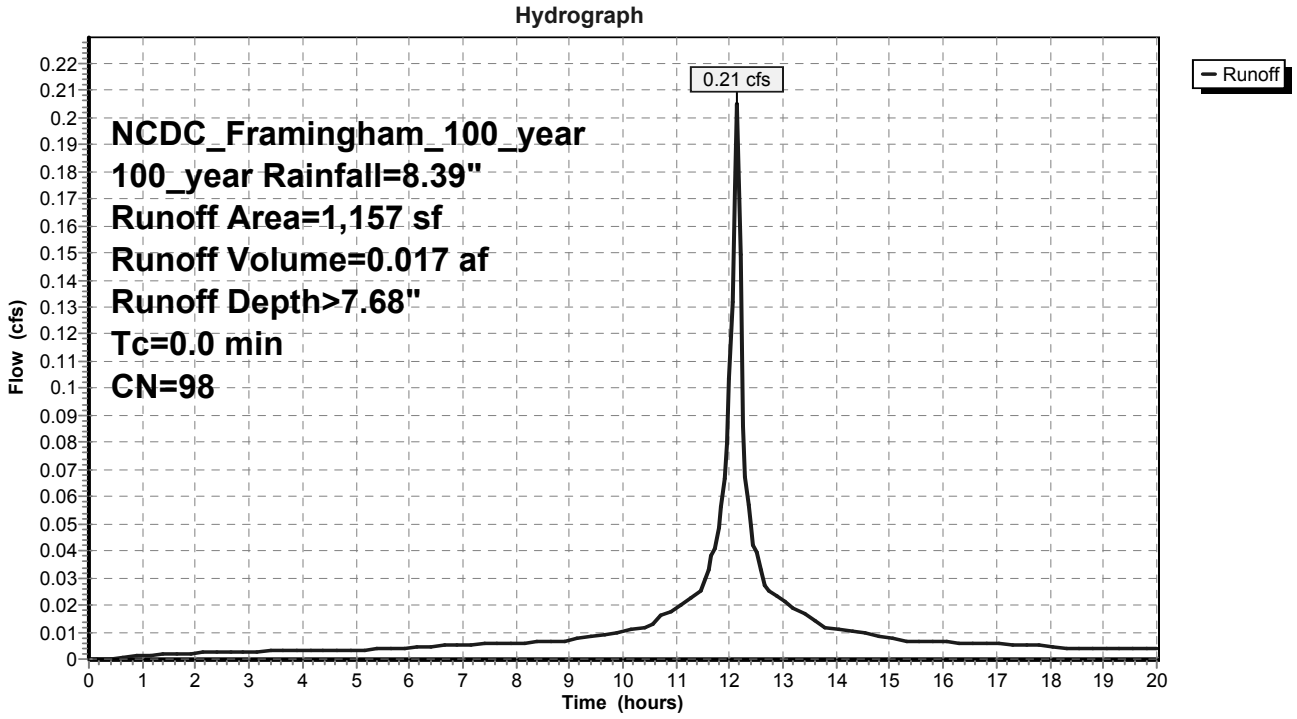
## Summary for Subcatchment ROOF-108: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-108: (blank)



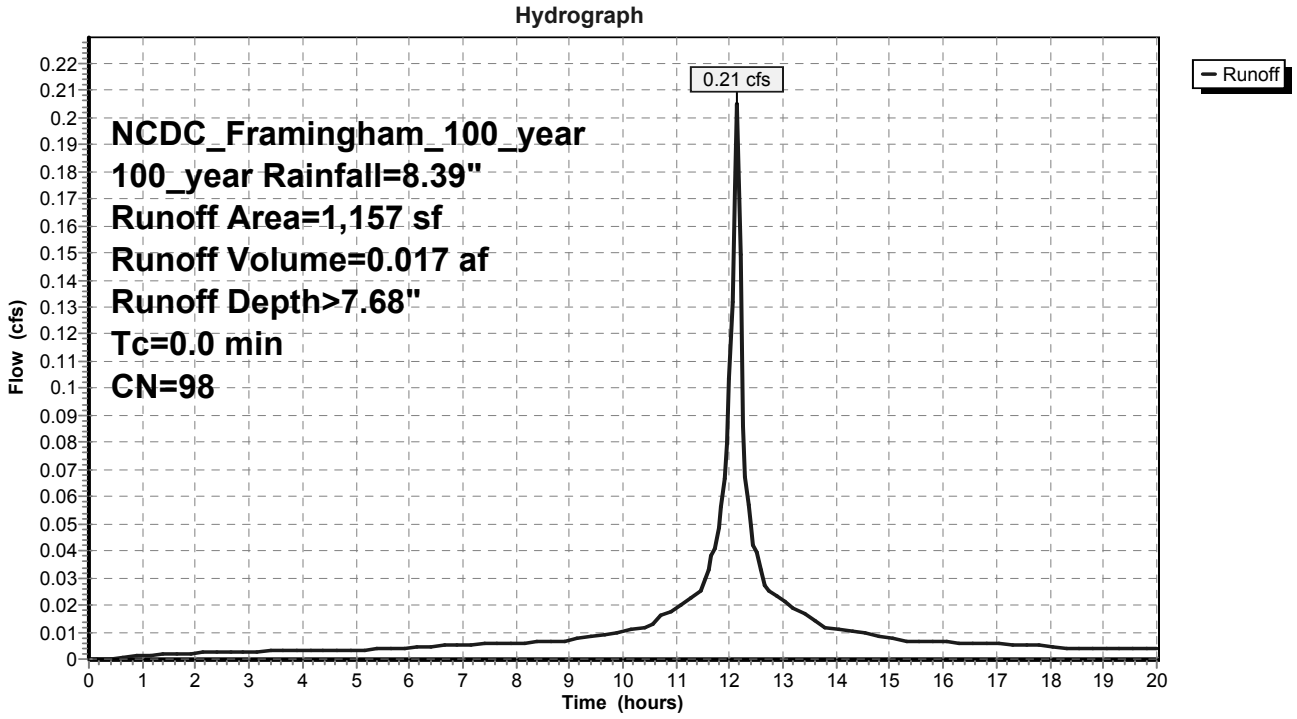
## Summary for Subcatchment ROOF-109: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-109: (blank)



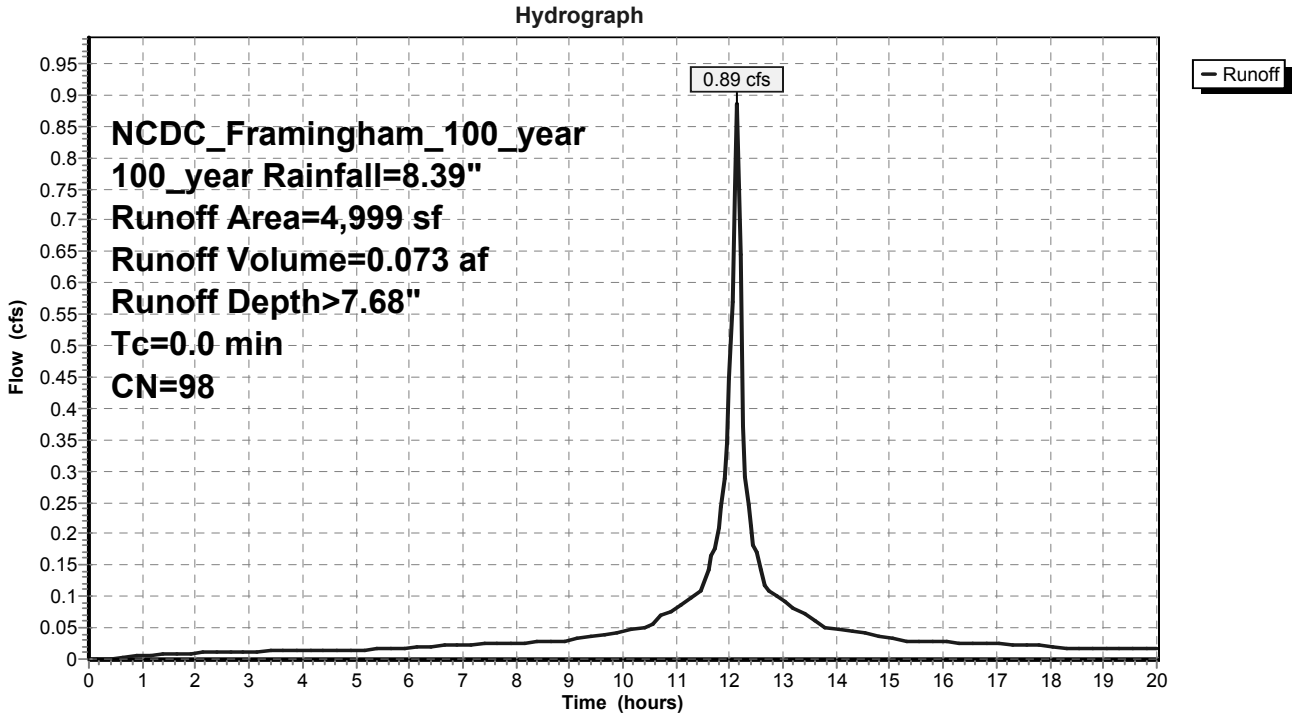
## Summary for Subcatchment ROOF-11: (blank)

Runoff = 0.89 cfs @ 12.14 hrs, Volume= 0.073 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-11: (blank)



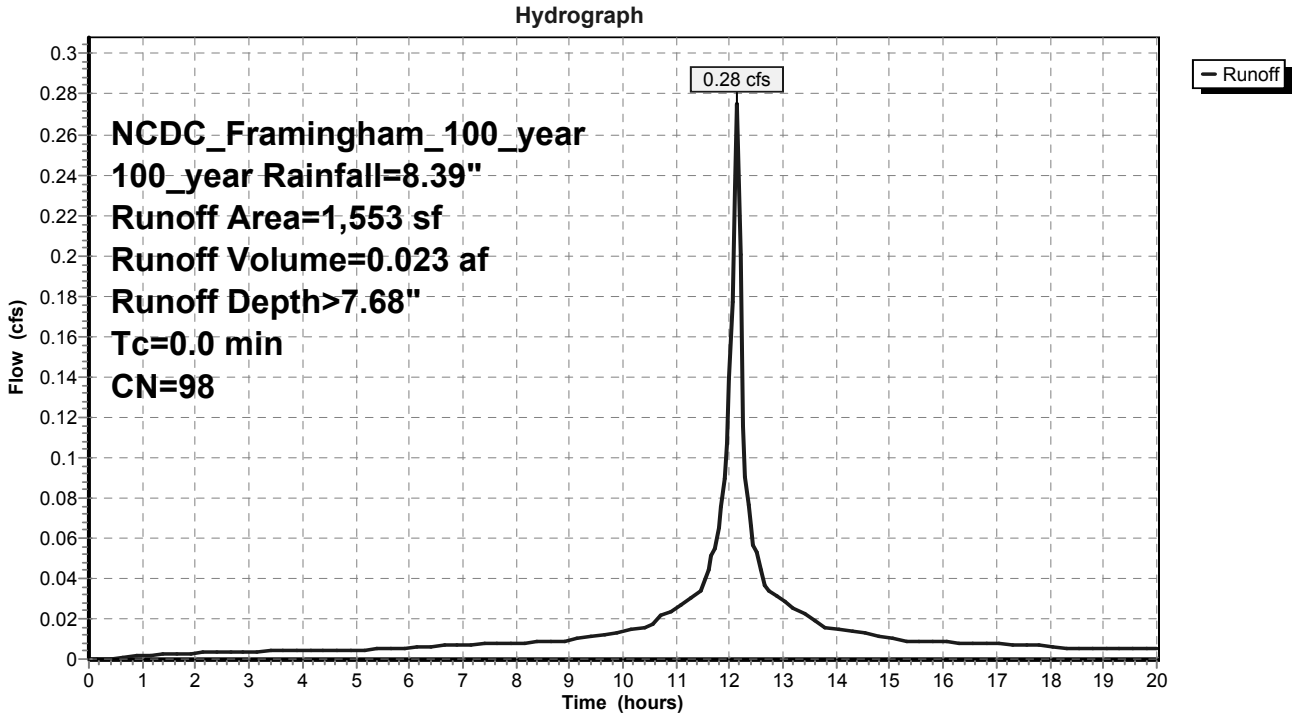
## Summary for Subcatchment ROOF-110: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-110: (blank)



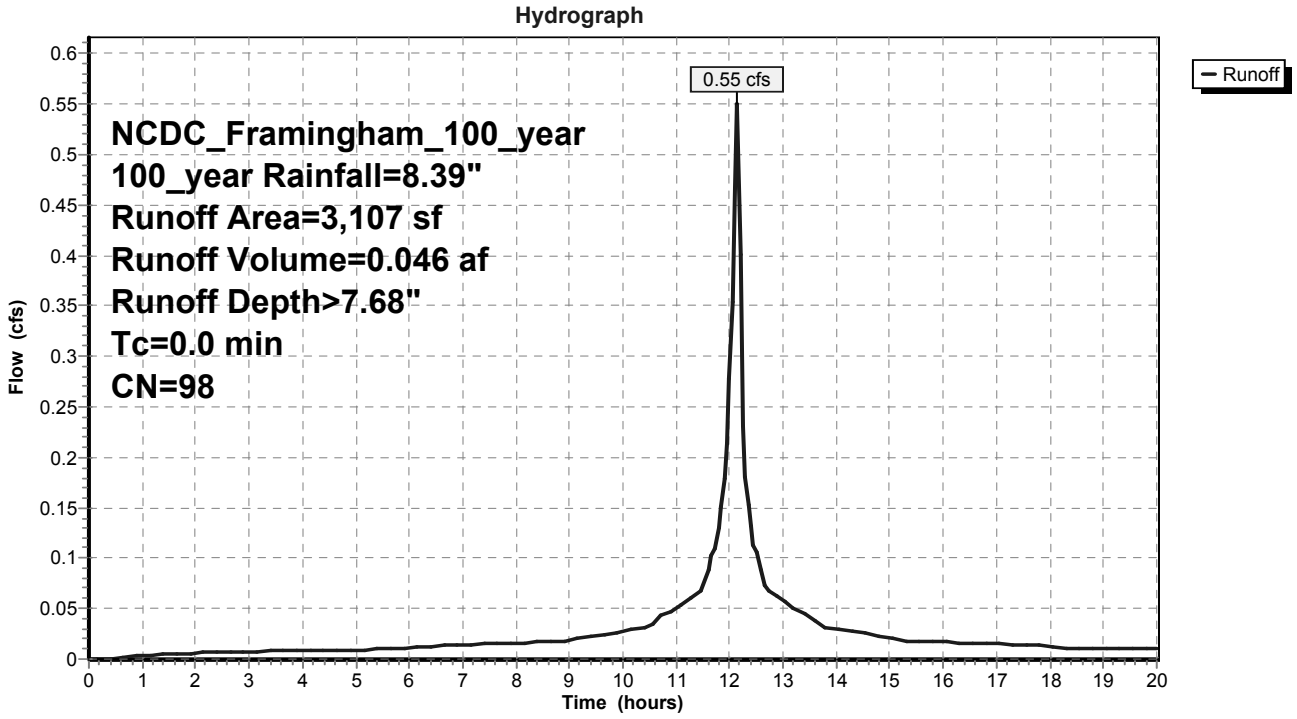
## Summary for Subcatchment ROOF-111: (blank)

Runoff = 0.55 cfs @ 12.14 hrs, Volume= 0.046 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-111: (blank)



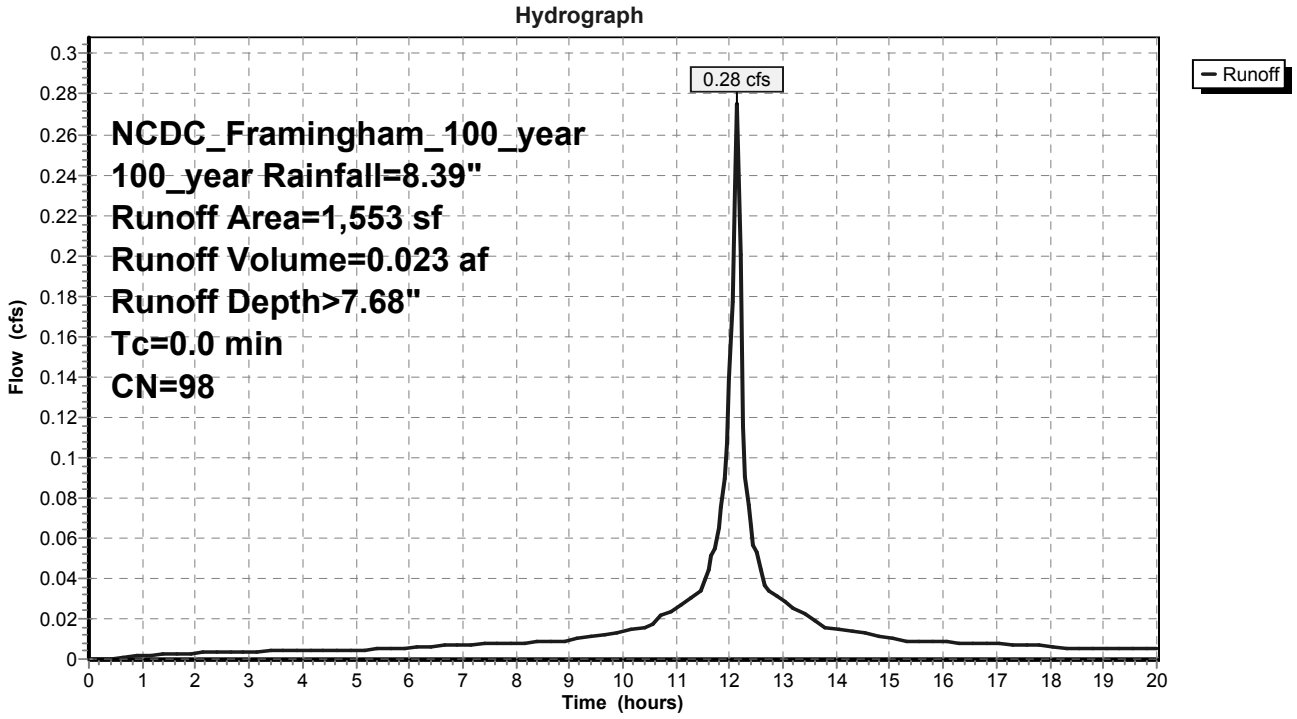
## Summary for Subcatchment ROOF-112: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-112: (blank)



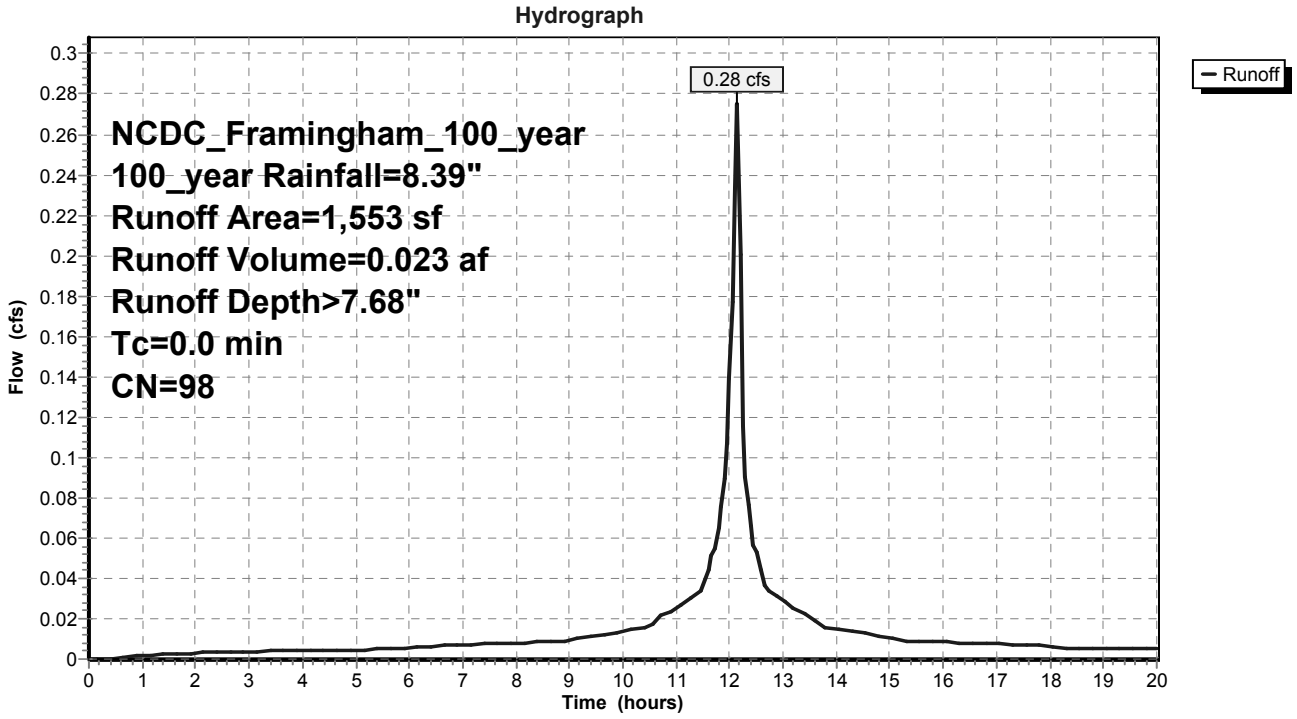
## Summary for Subcatchment ROOF-113: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-113: (blank)



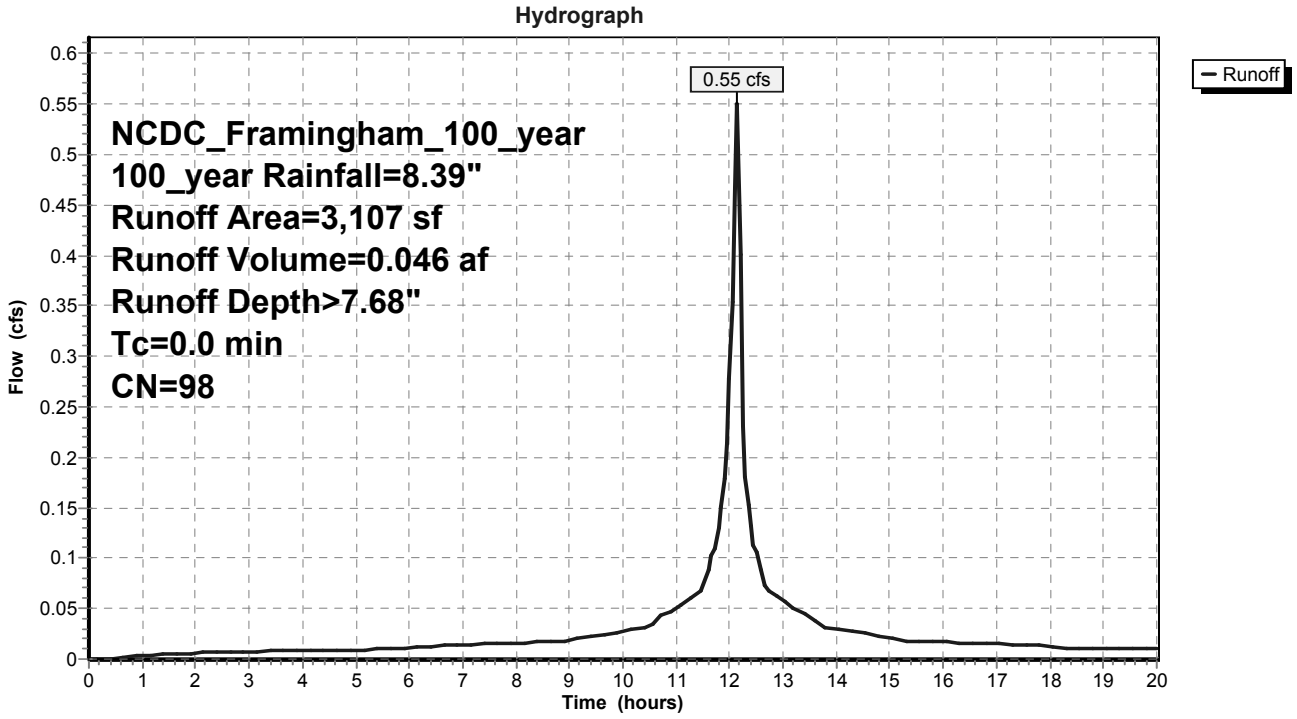
## Summary for Subcatchment ROOF-114: (blank)

Runoff = 0.55 cfs @ 12.14 hrs, Volume= 0.046 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-114: (blank)



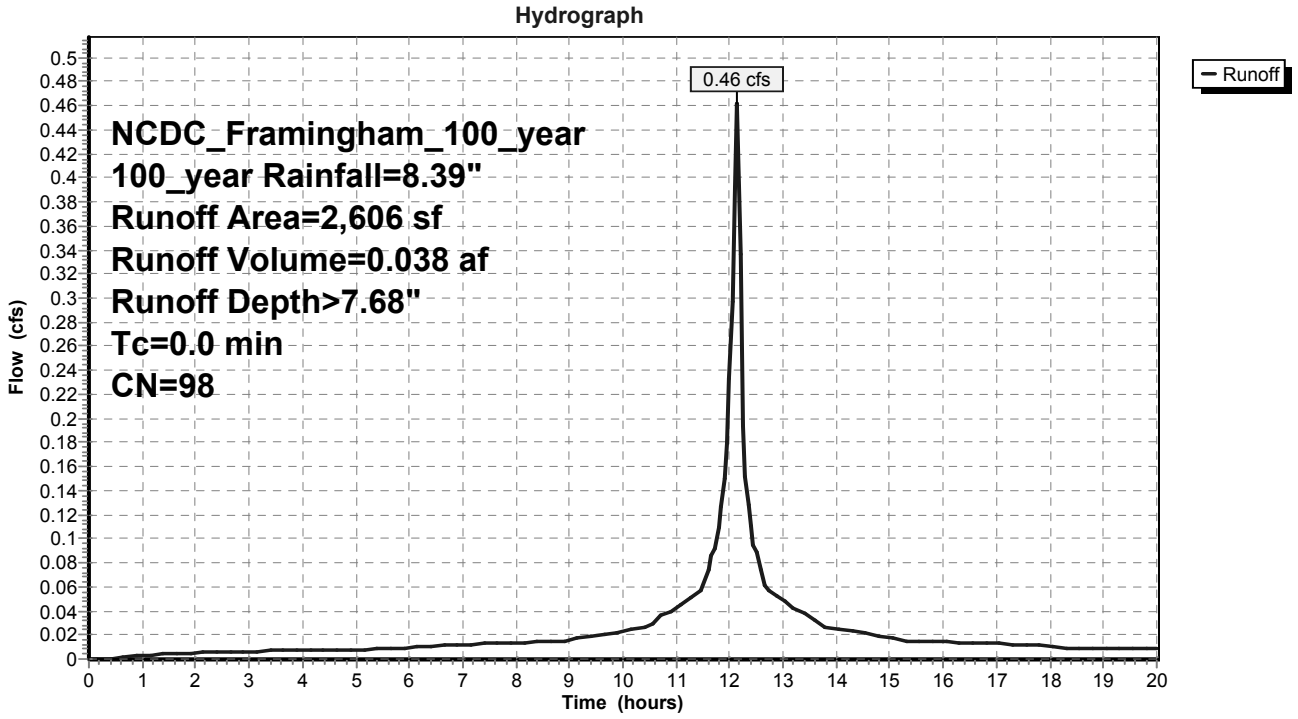
## Summary for Subcatchment ROOF-115: (blank)

Runoff = 0.46 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 5 | 61 | GRASS, 0% imperv, HSG B |
| * | 2,602 | 98 | ROOF, 100% imperv, HSG B |
| | 2,606 | 98 | Weighted Average |
| | 2,606 | | 100.00% Pervious Area |

## Subcatchment ROOF-115: (blank)



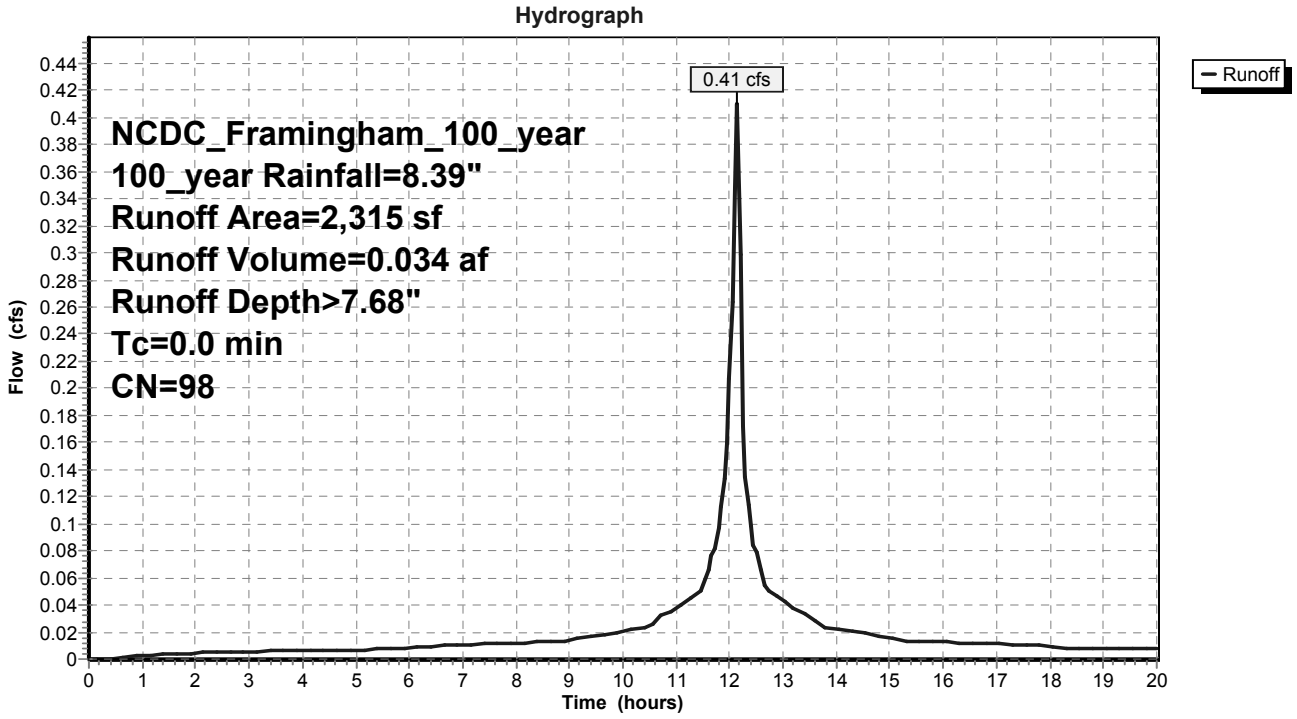
## Summary for Subcatchment ROOF-117: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-117: (blank)



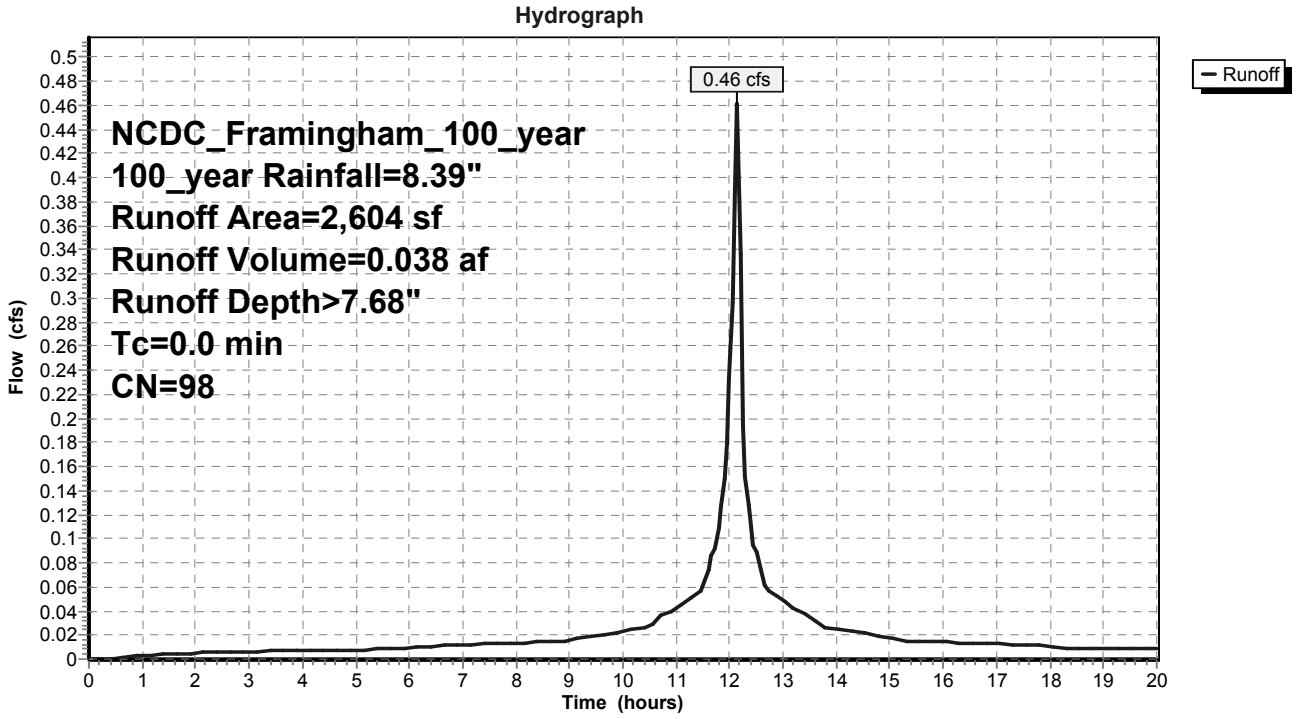
## Summary for Subcatchment ROOF-118: (blank)

Runoff = 0.46 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-118: (blank)



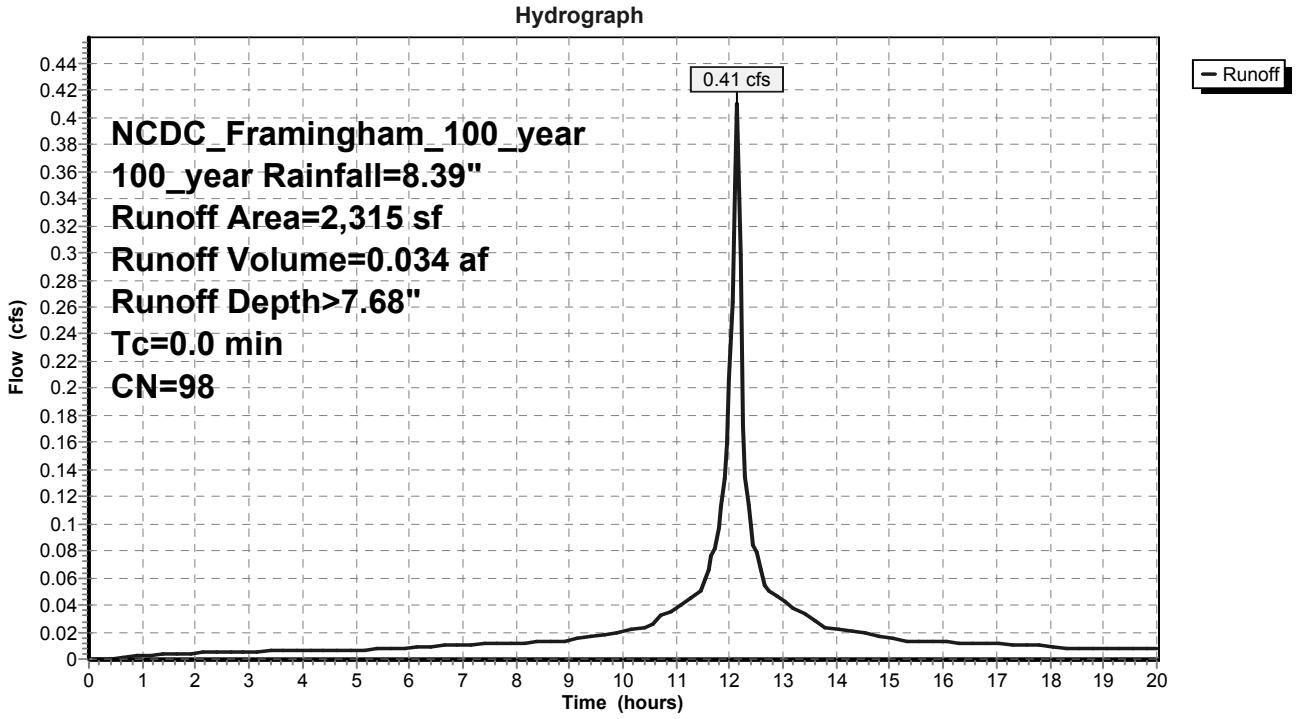
## Summary for Subcatchment ROOF-119: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-119: (blank)



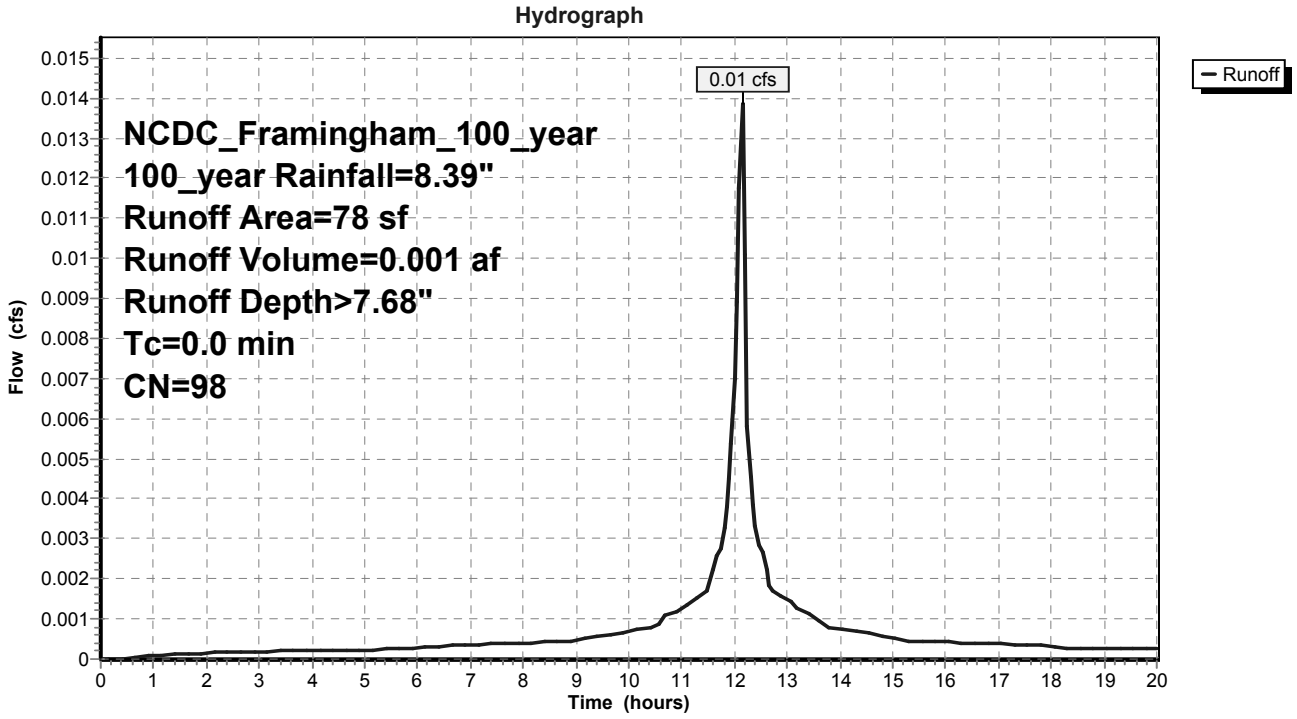
## Summary for Subcatchment ROOF-11MAIL: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-11MAIL: (blank)



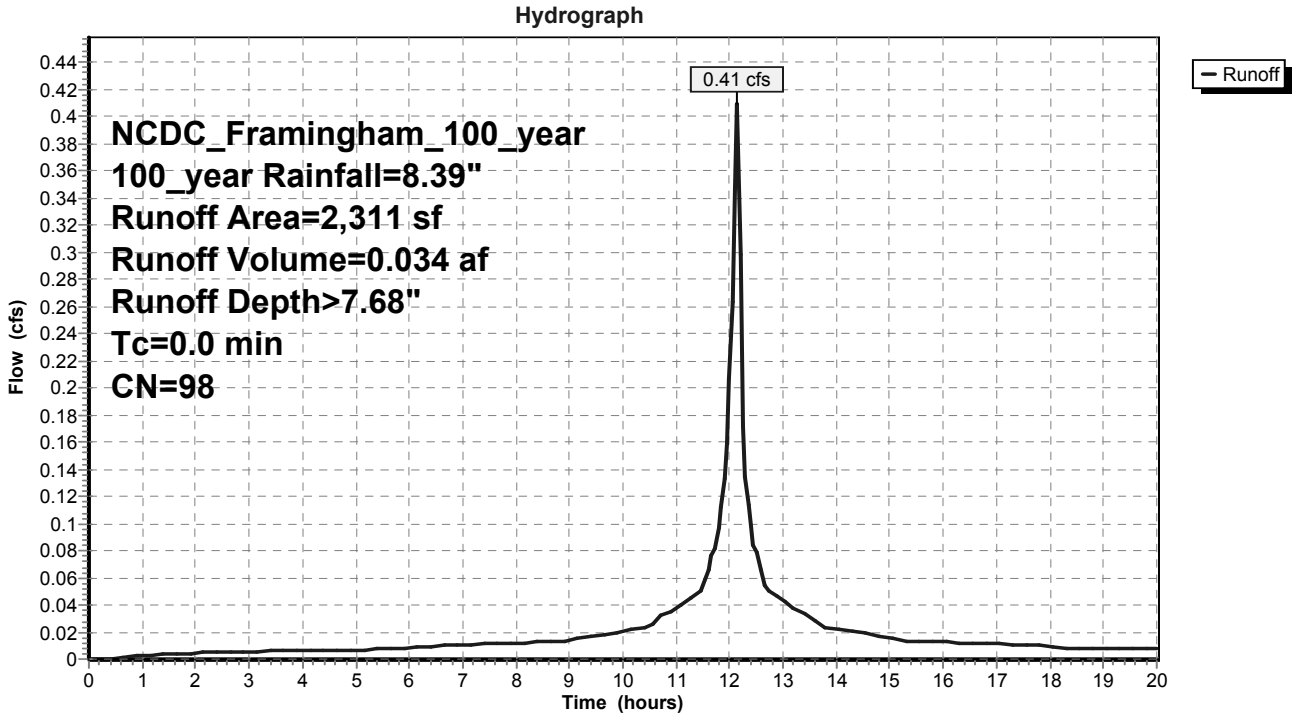
## Summary for Subcatchment ROOF-12: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,311 | 98 | ROOF, 100% imperv, HSG B |
| | 2,311 | | 100.00% Pervious Area |

## Subcatchment ROOF-12: (blank)



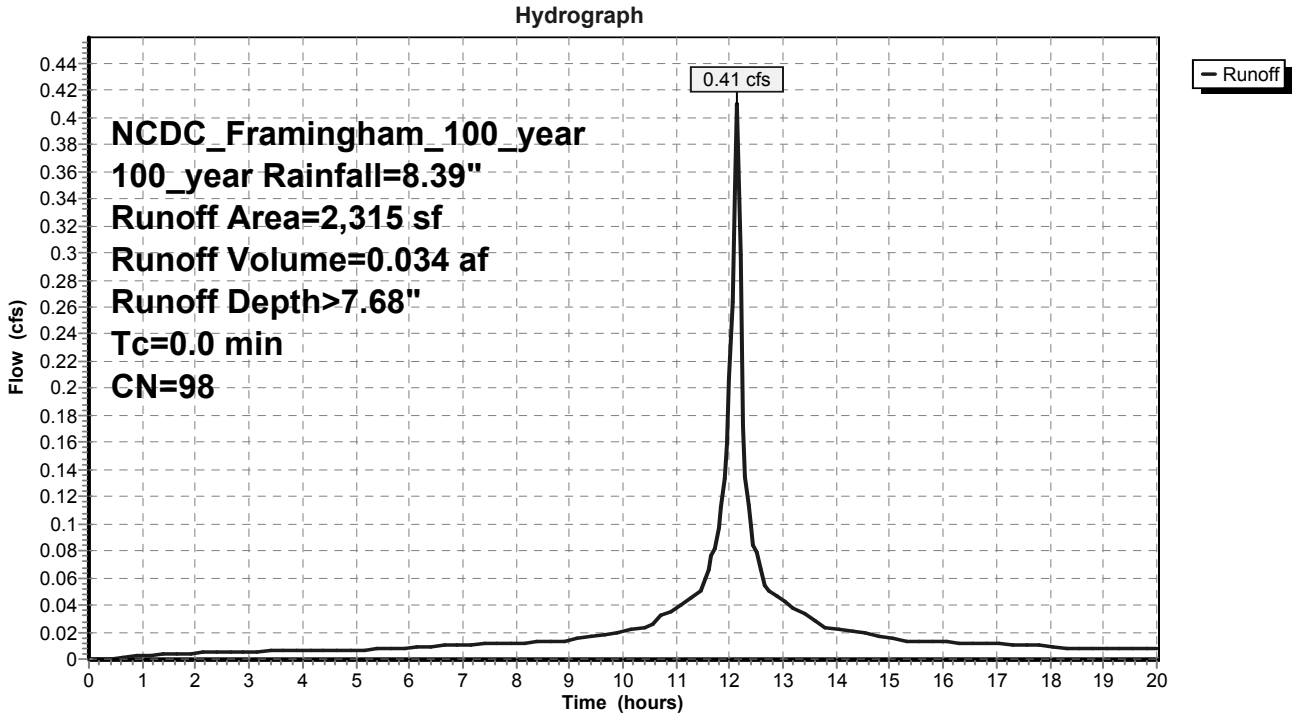
## Summary for Subcatchment ROOF-120: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-120: (blank)



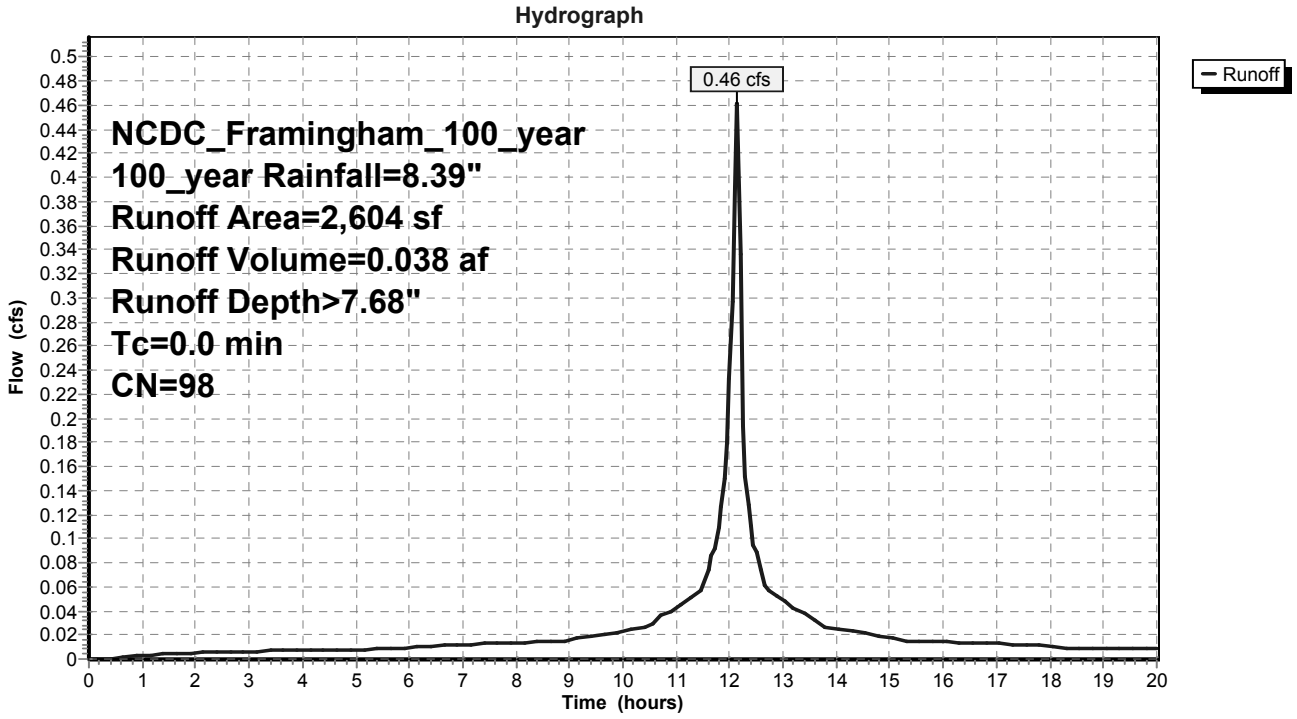
## Summary for Subcatchment ROOF-121: (blank)

Runoff = 0.46 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 138 | 98 | ROOF, 100% imperv, HSG A |
| * | 2,467 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-121: (blank)



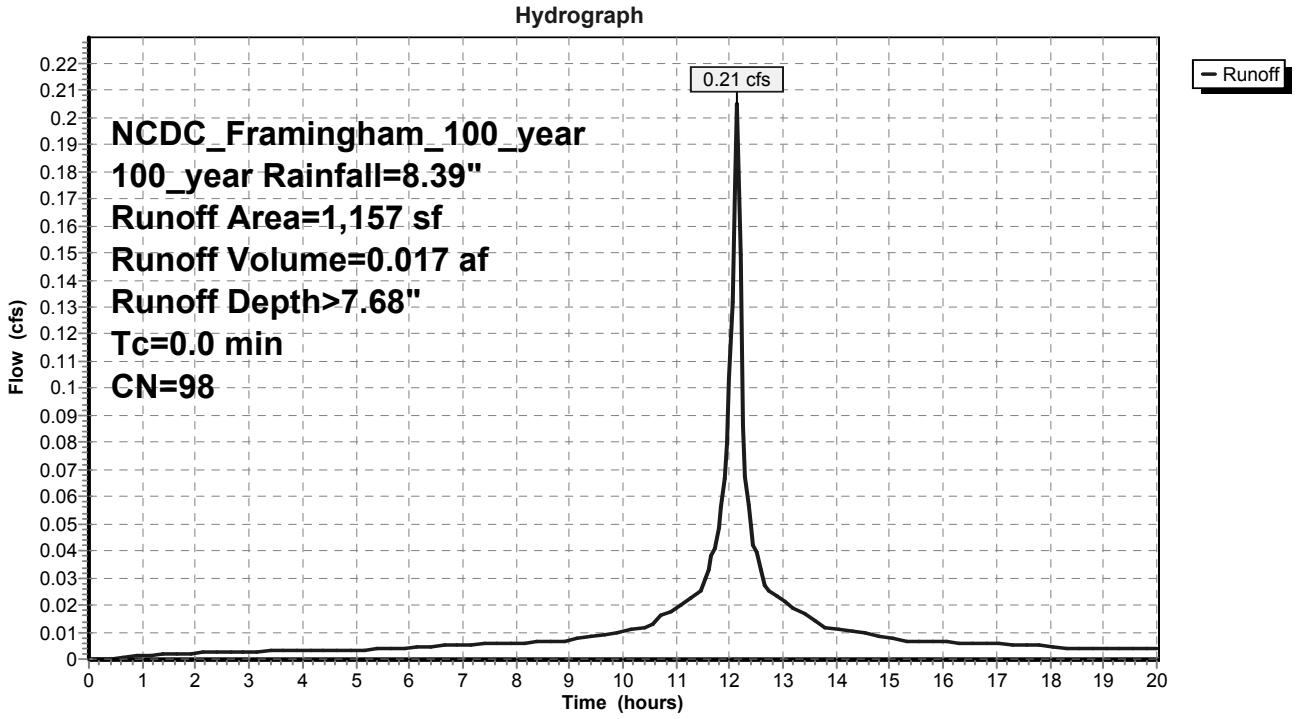
## Summary for Subcatchment ROOF-122: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-122: (blank)



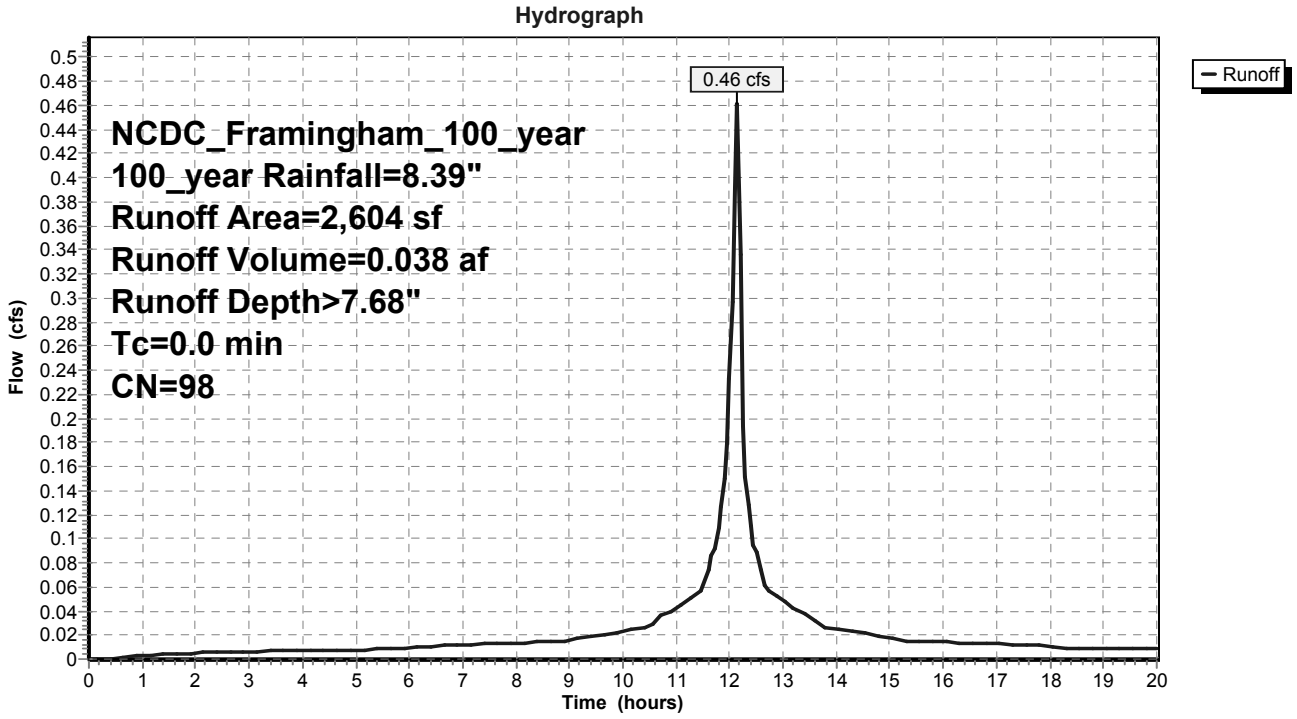
## Summary for Subcatchment ROOF-123: (blank)

Runoff = 0.46 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG A |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-123: (blank)



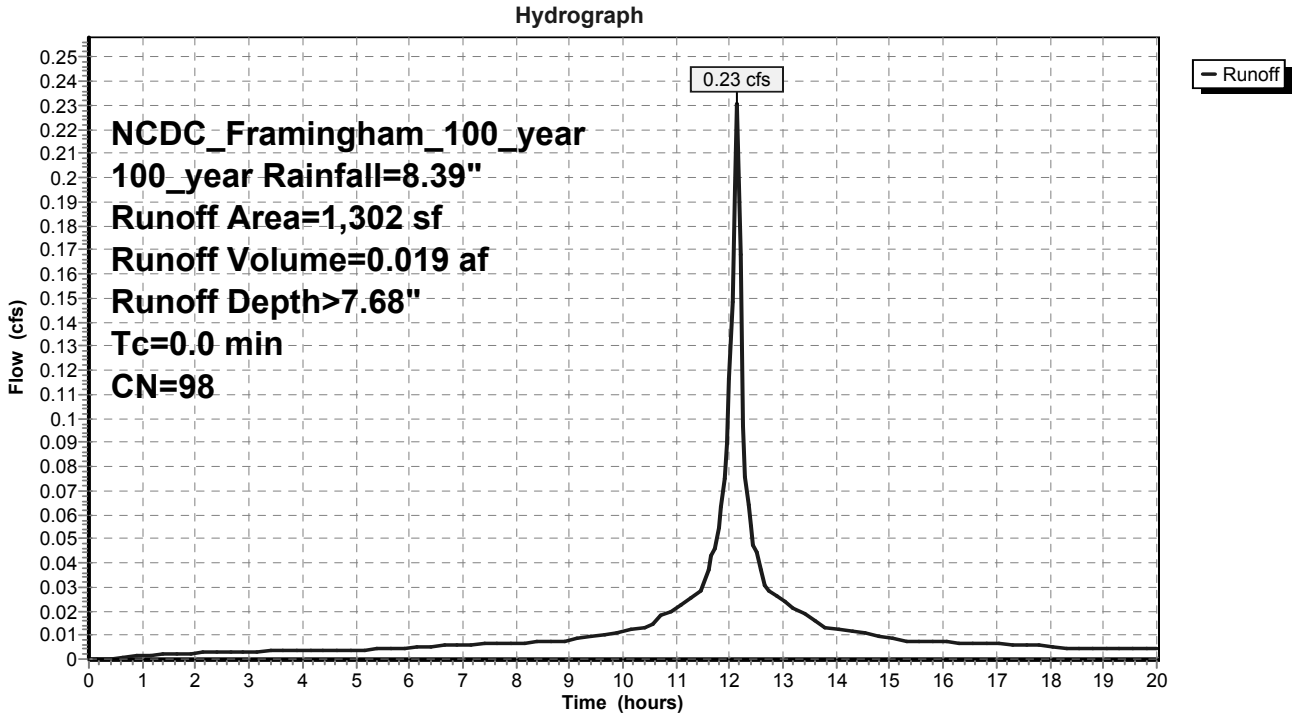
## Summary for Subcatchment ROOF-13: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-13: (blank)



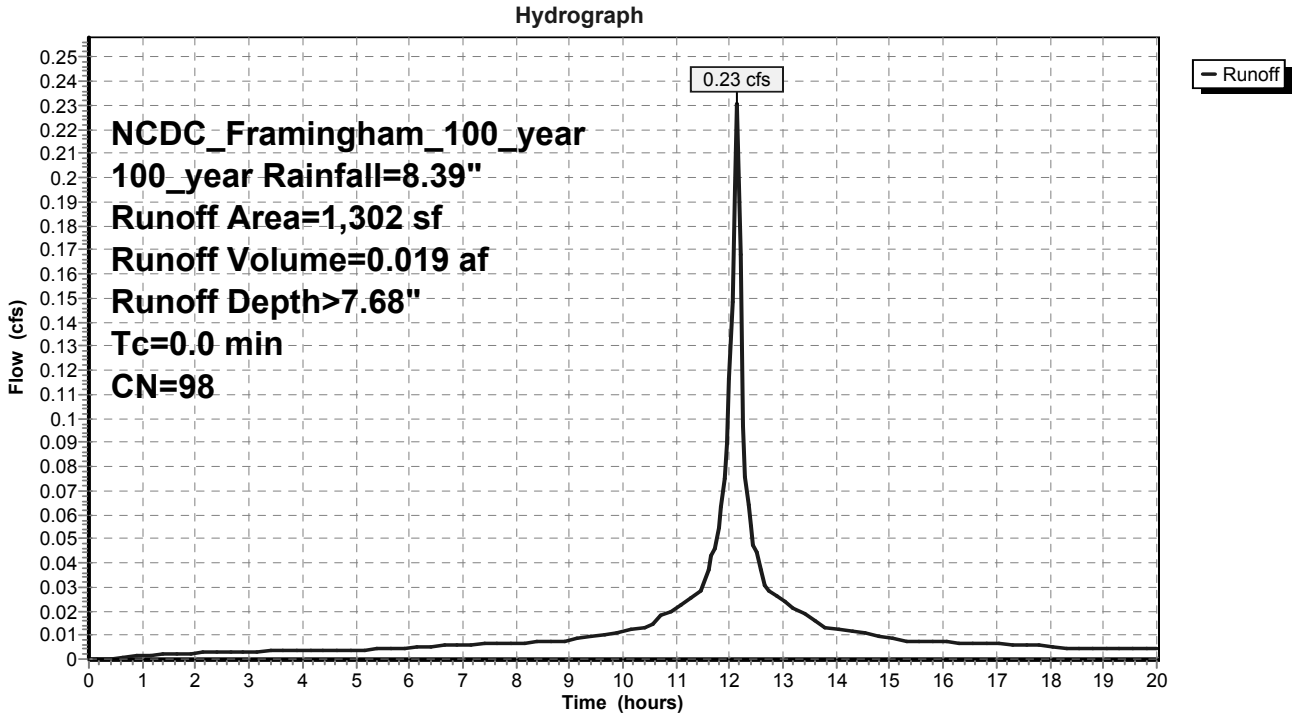
## Summary for Subcatchment ROOF-14: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-14: (blank)



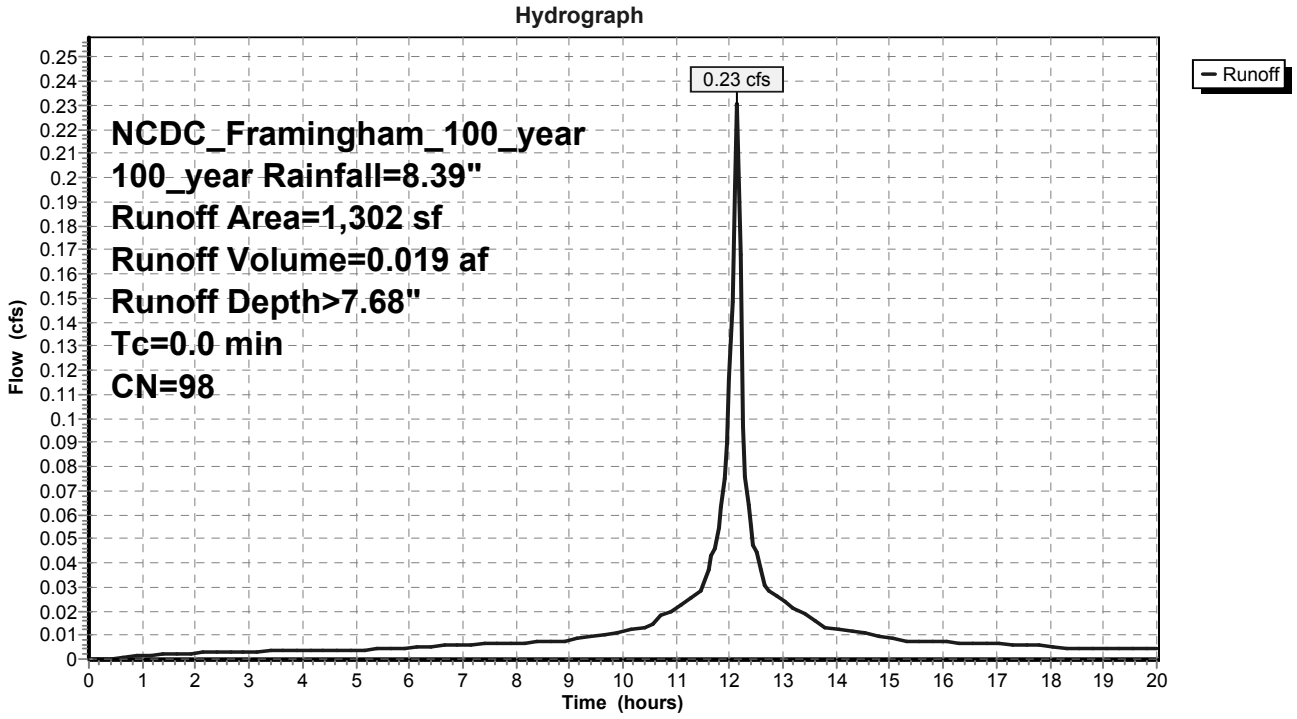
## Summary for Subcatchment ROOF-15: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-15: (blank)



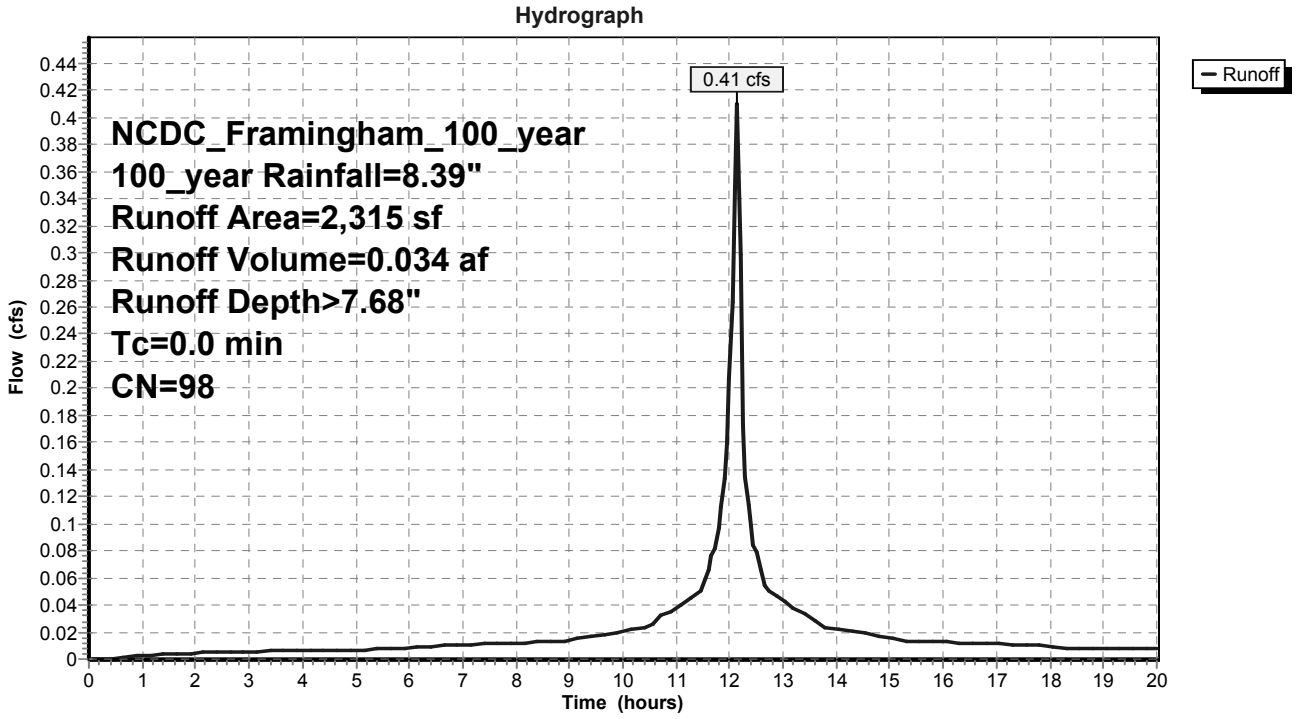
## Summary for Subcatchment ROOF-16: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-16: (blank)



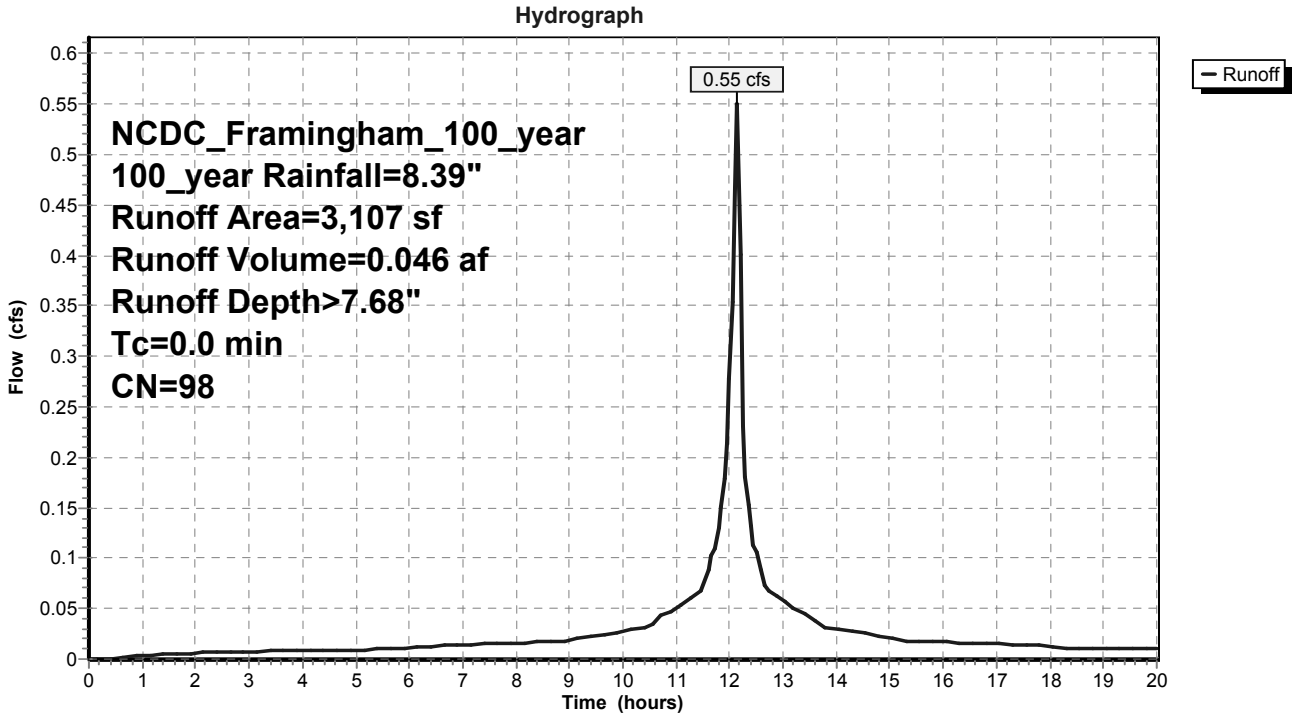
## Summary for Subcatchment ROOF-17: (blank)

Runoff = 0.55 cfs @ 12.14 hrs, Volume= 0.046 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-17: (blank)



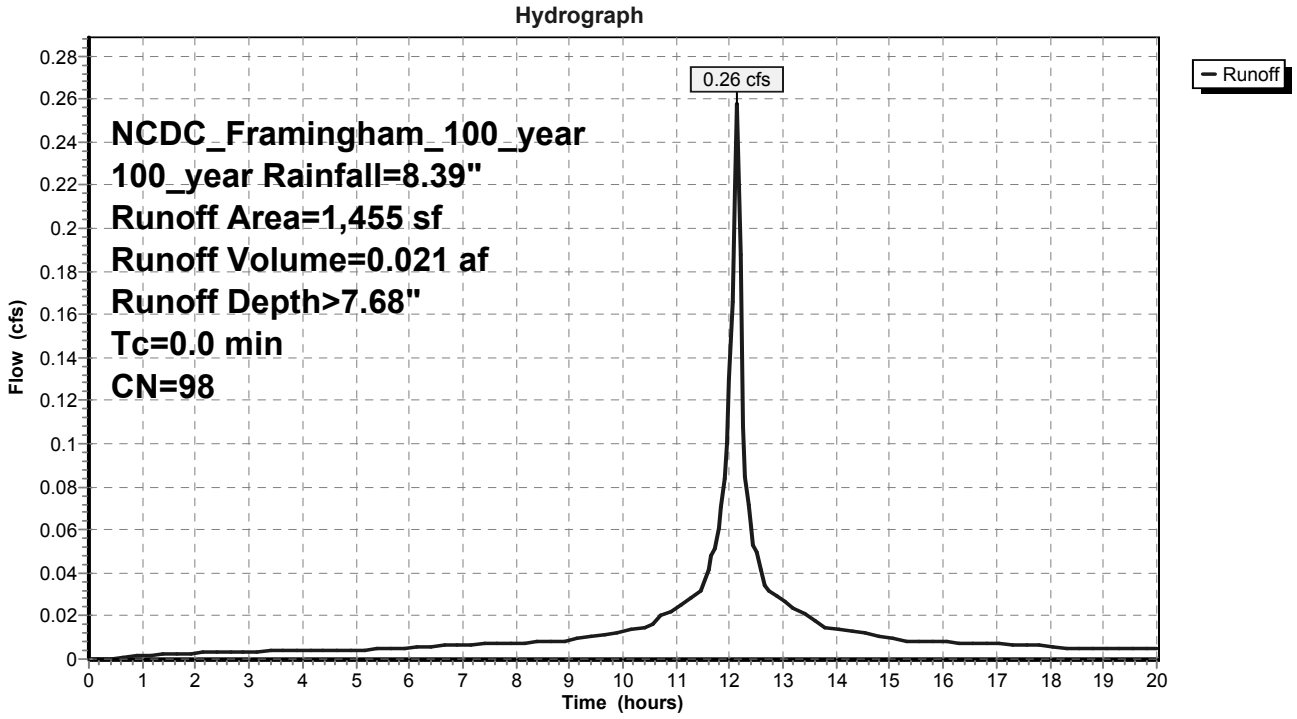
## Summary for Subcatchment ROOF-18: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-18: (blank)



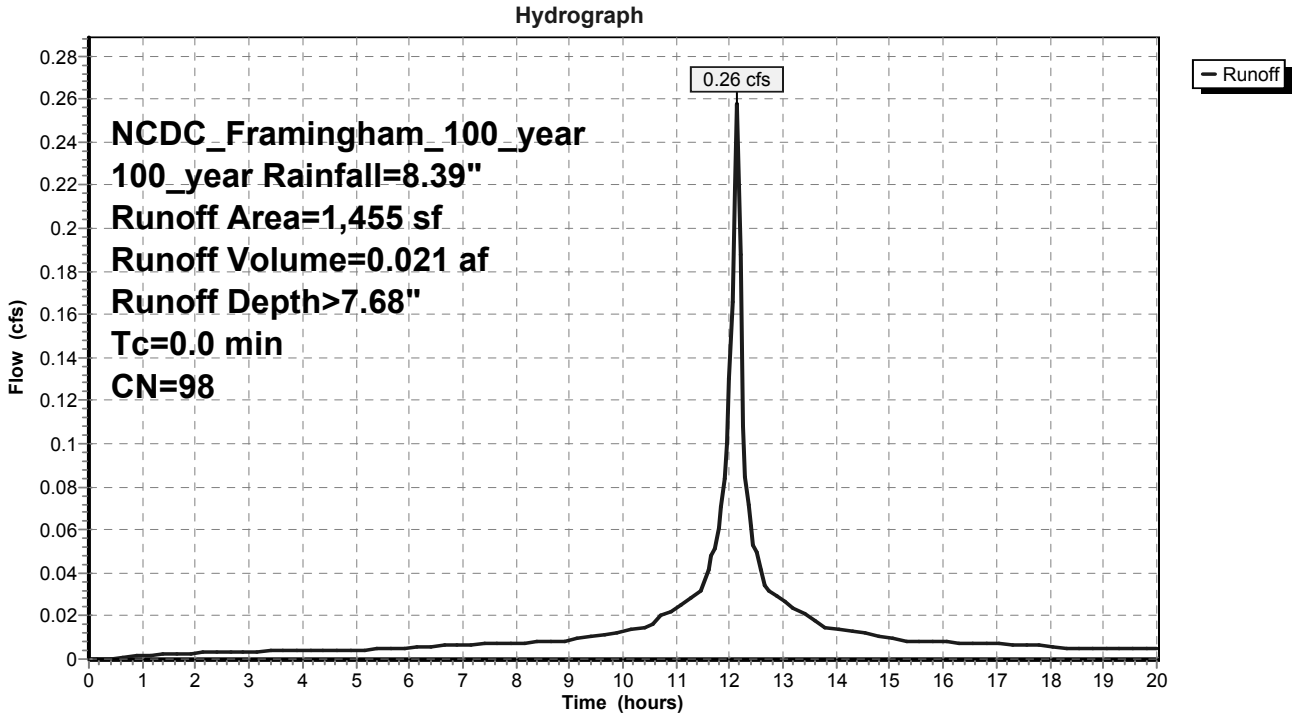
## Summary for Subcatchment ROOF-19: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-19: (blank)



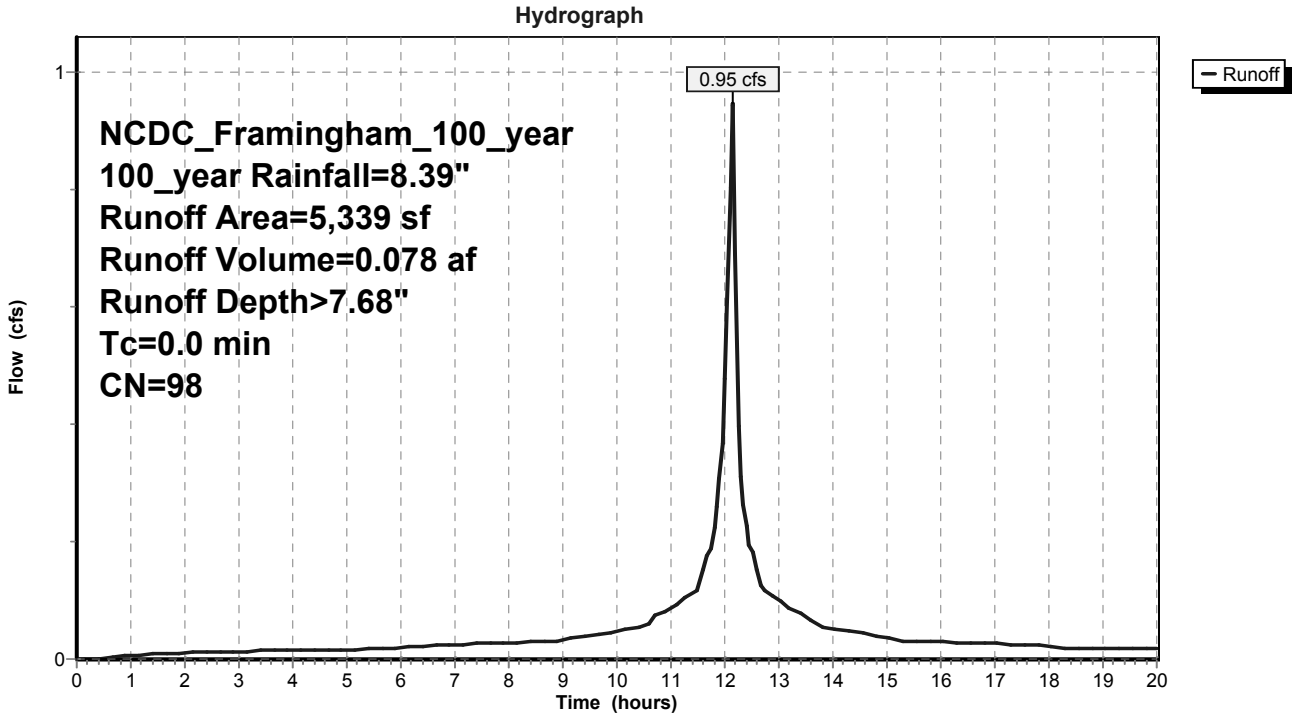
## Summary for Subcatchment ROOF-2: (blank)

Runoff = 0.95 cfs @ 12.14 hrs, Volume= 0.078 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 5,339 | 98 | ROOF, 100% imperv, HSG B |
| | 5,339 | 98 | Weighted Average |
| | 5,339 | | 100.00% Pervious Area |

## Subcatchment ROOF-2: (blank)



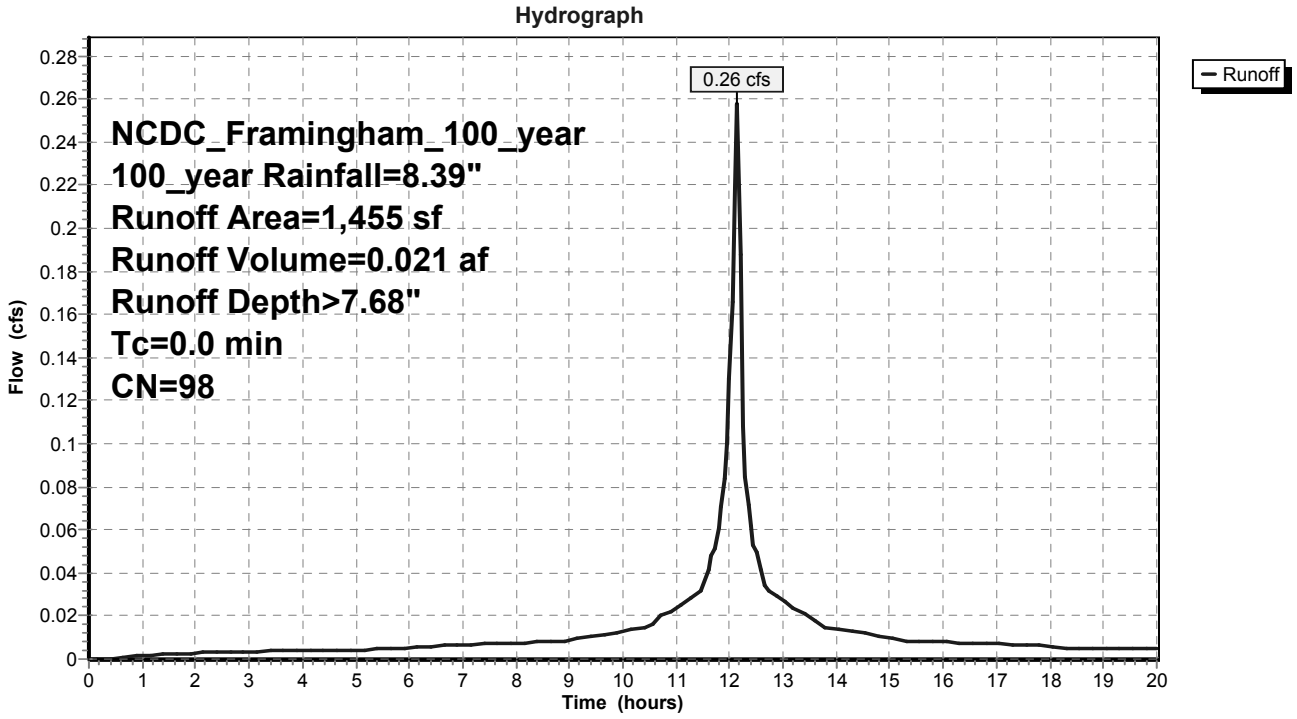
## Summary for Subcatchment ROOF-20: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-20: (blank)



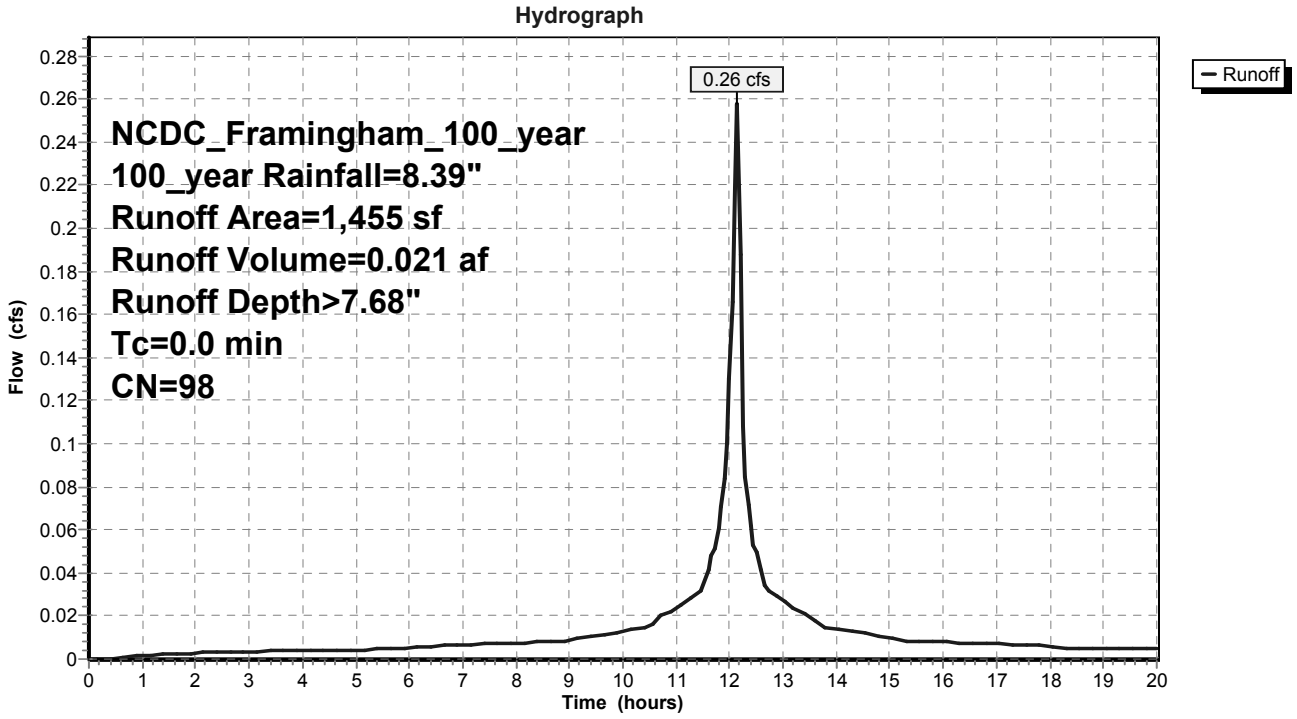
## Summary for Subcatchment ROOF-21: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-21: (blank)



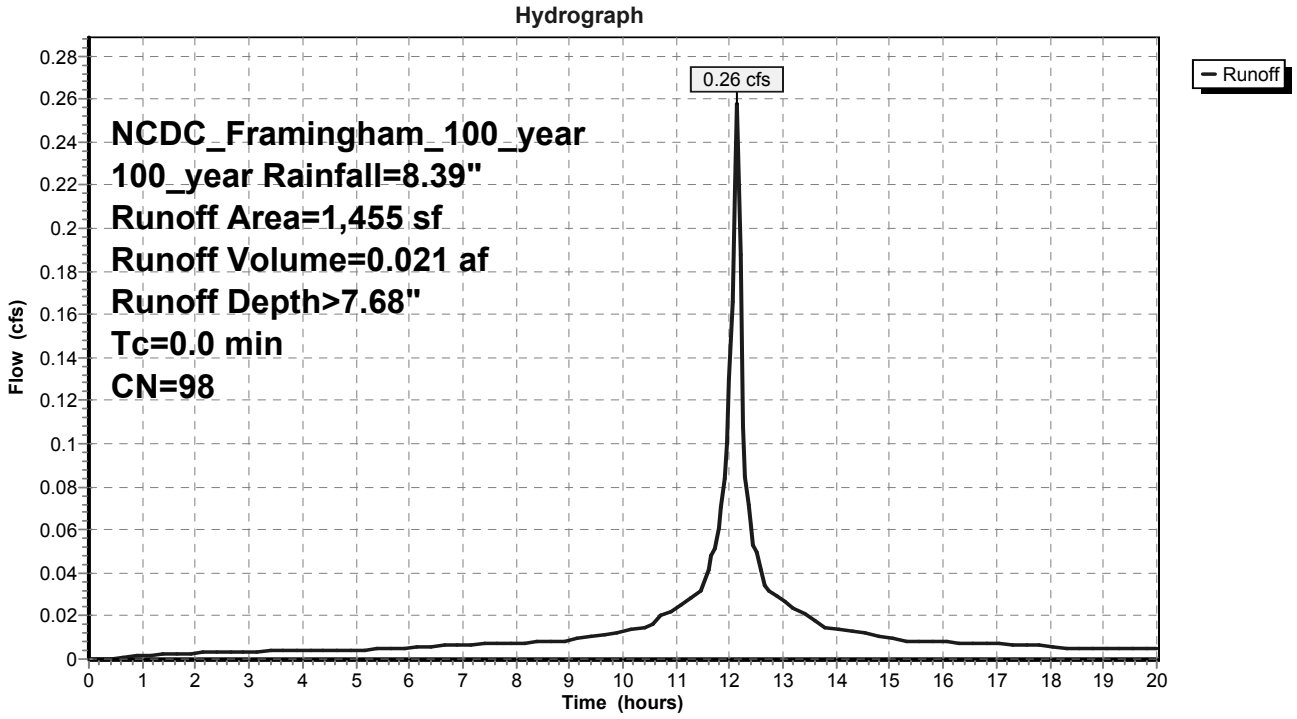
## Summary for Subcatchment ROOF-22: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-22: (blank)



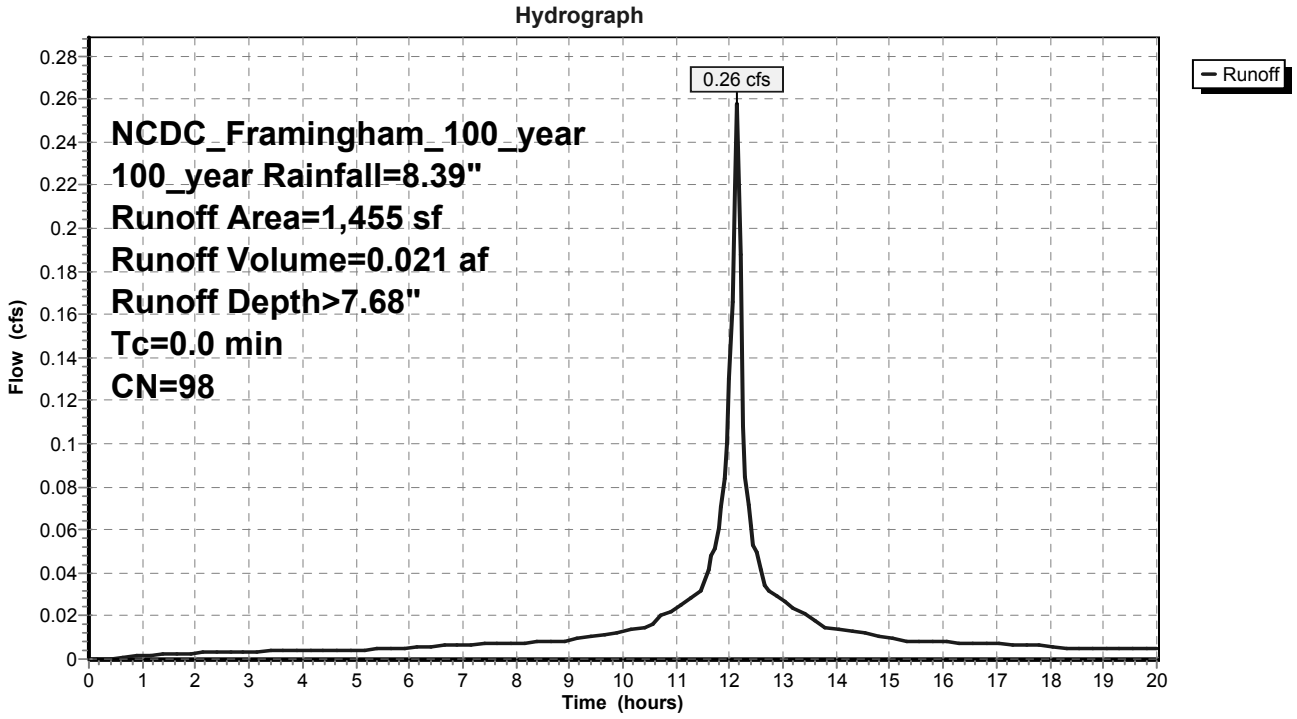
## Summary for Subcatchment ROOF-23: (blank)

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,455 | 98 | ROOF, 100% imperv, HSG B |
| | 1,455 | | 100.00% Pervious Area |

## Subcatchment ROOF-23: (blank)



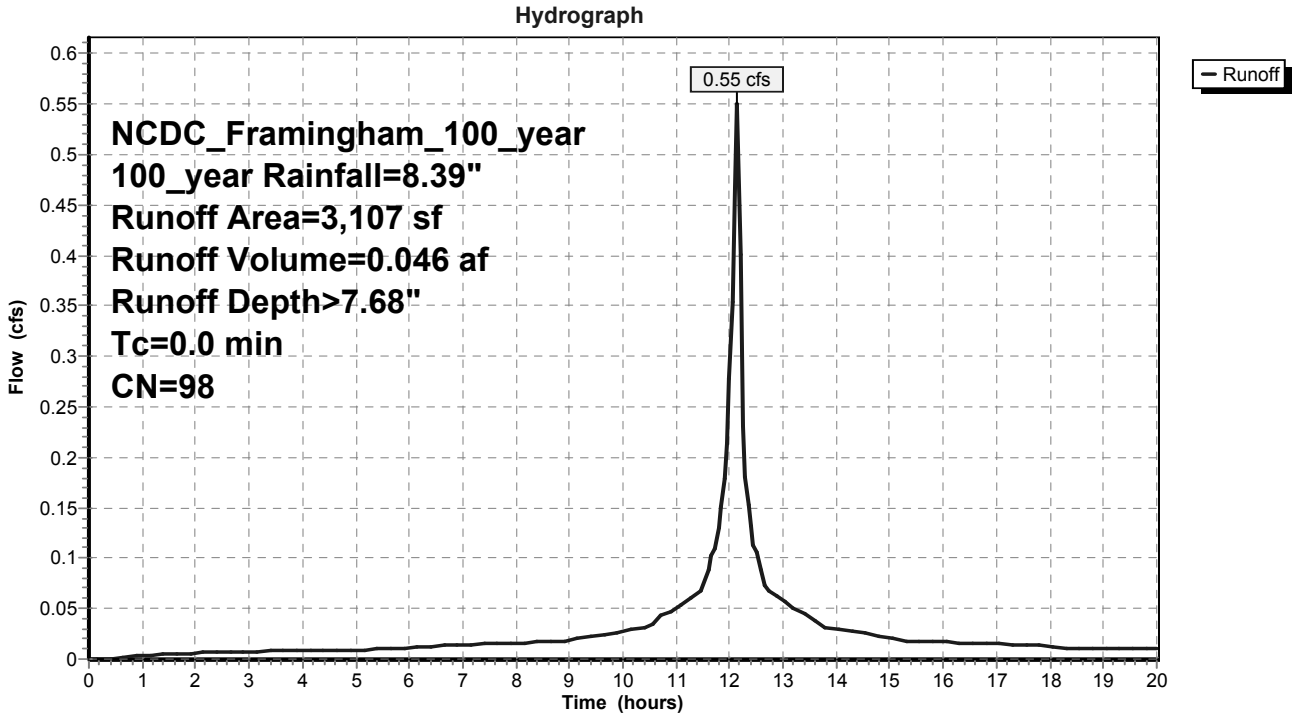
## Summary for Subcatchment ROOF-24: (blank)

Runoff = 0.55 cfs @ 12.14 hrs, Volume= 0.046 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,107 | 98 | ROOF, 100% imperv, HSG B |
| | 3,107 | | 100.00% Pervious Area |

## Subcatchment ROOF-24: (blank)



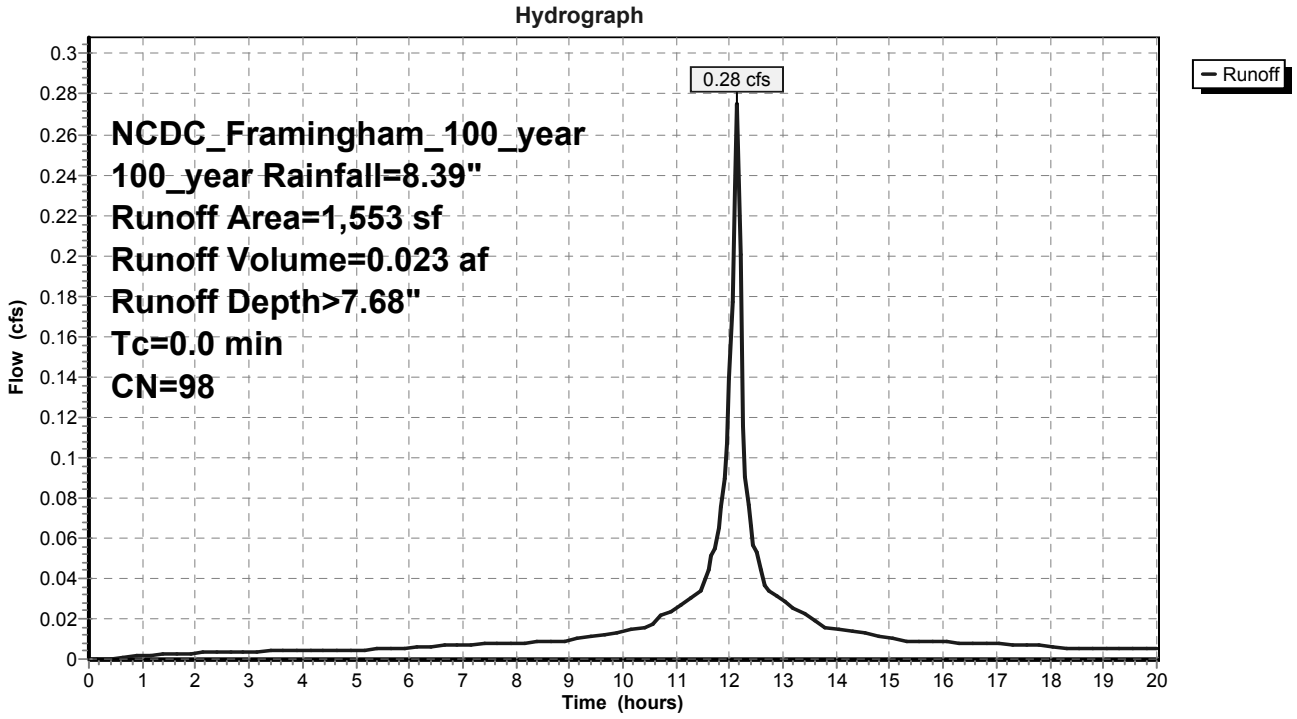
## Summary for Subcatchment ROOF-25: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-25: (blank)



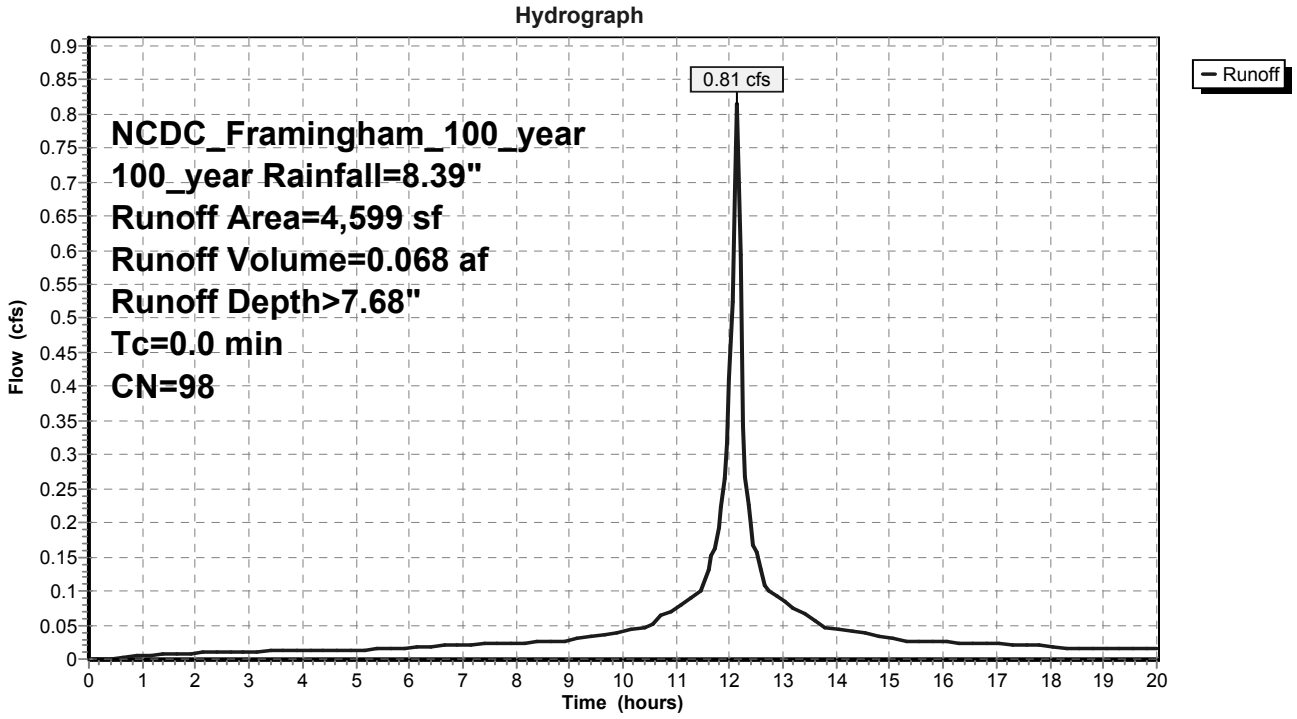
## Summary for Subcatchment ROOF-26: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-26: (blank)



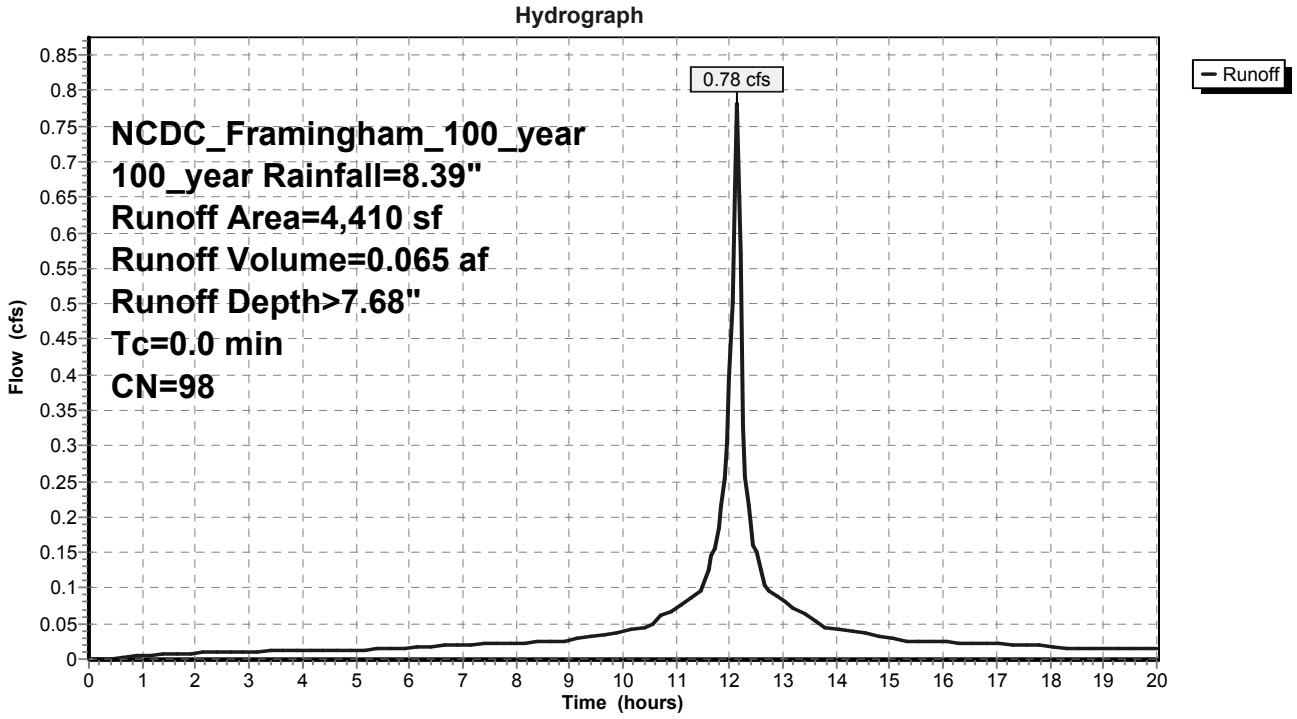
## Summary for Subcatchment ROOF-27: (blank)

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-27: (blank)



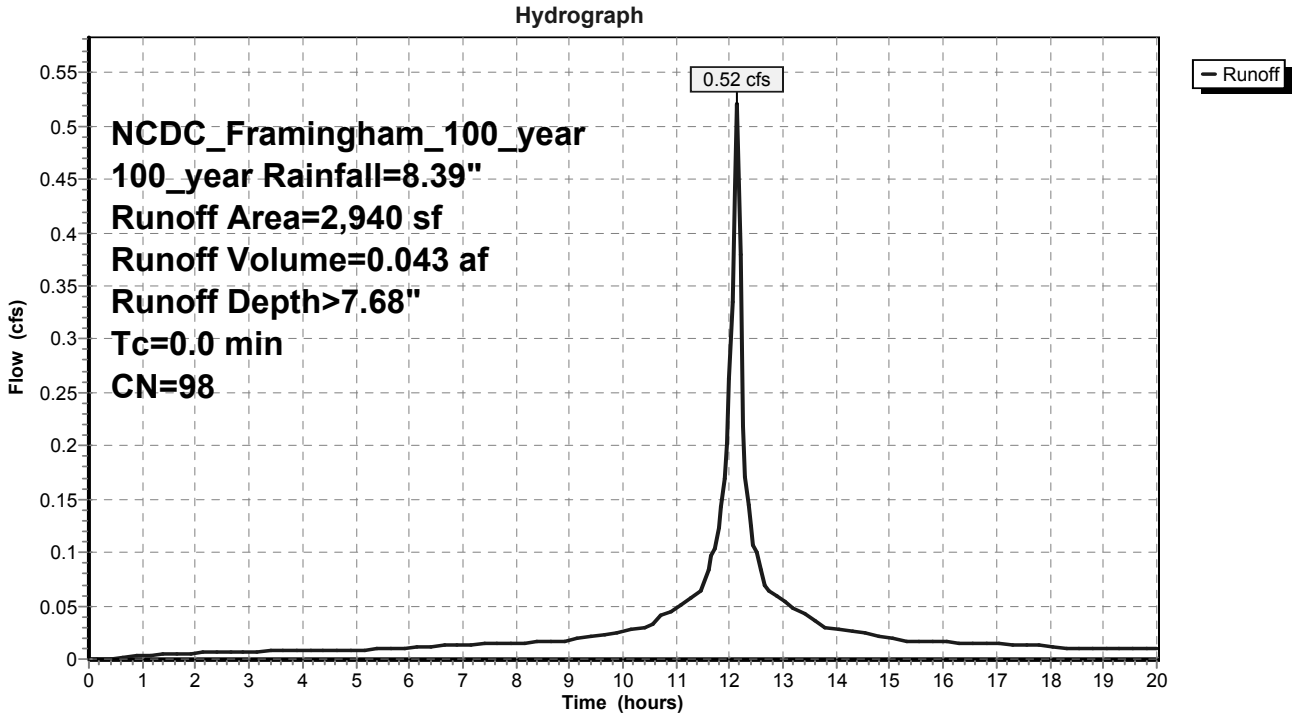
## Summary for Subcatchment ROOF-28: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-28: (blank)



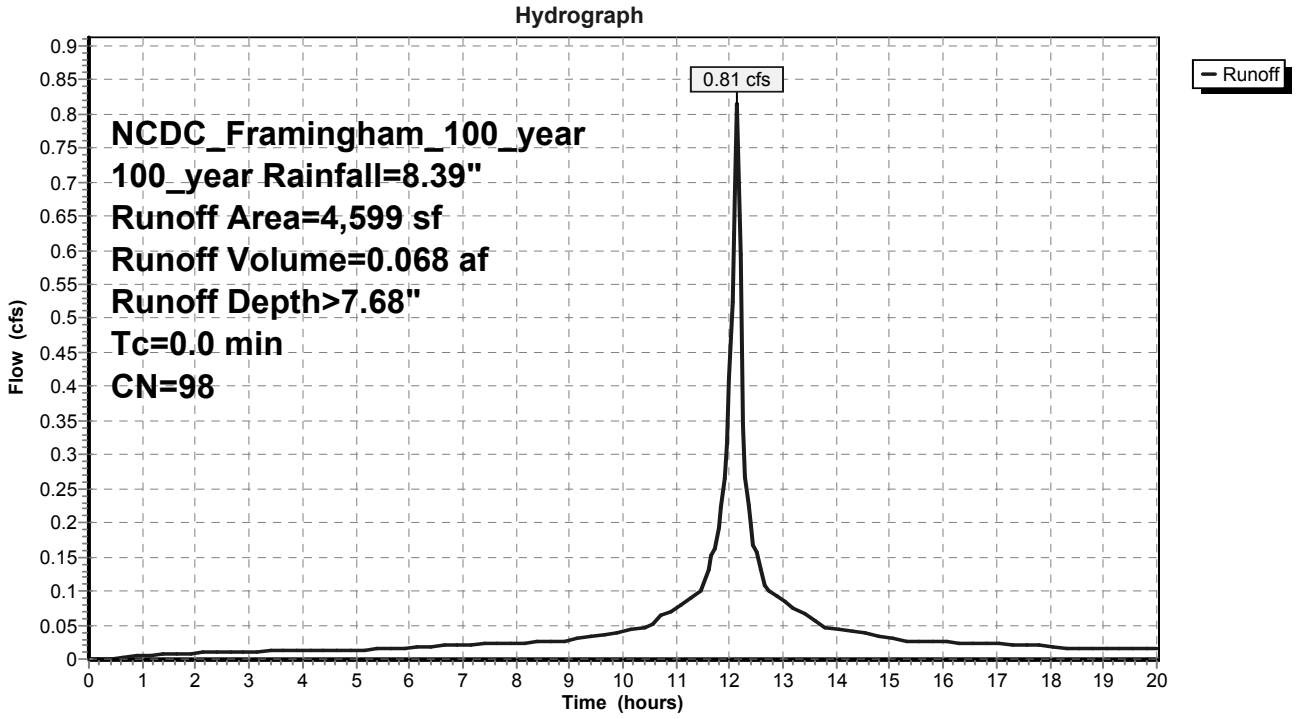
## Summary for Subcatchment ROOF-29: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-29: (blank)



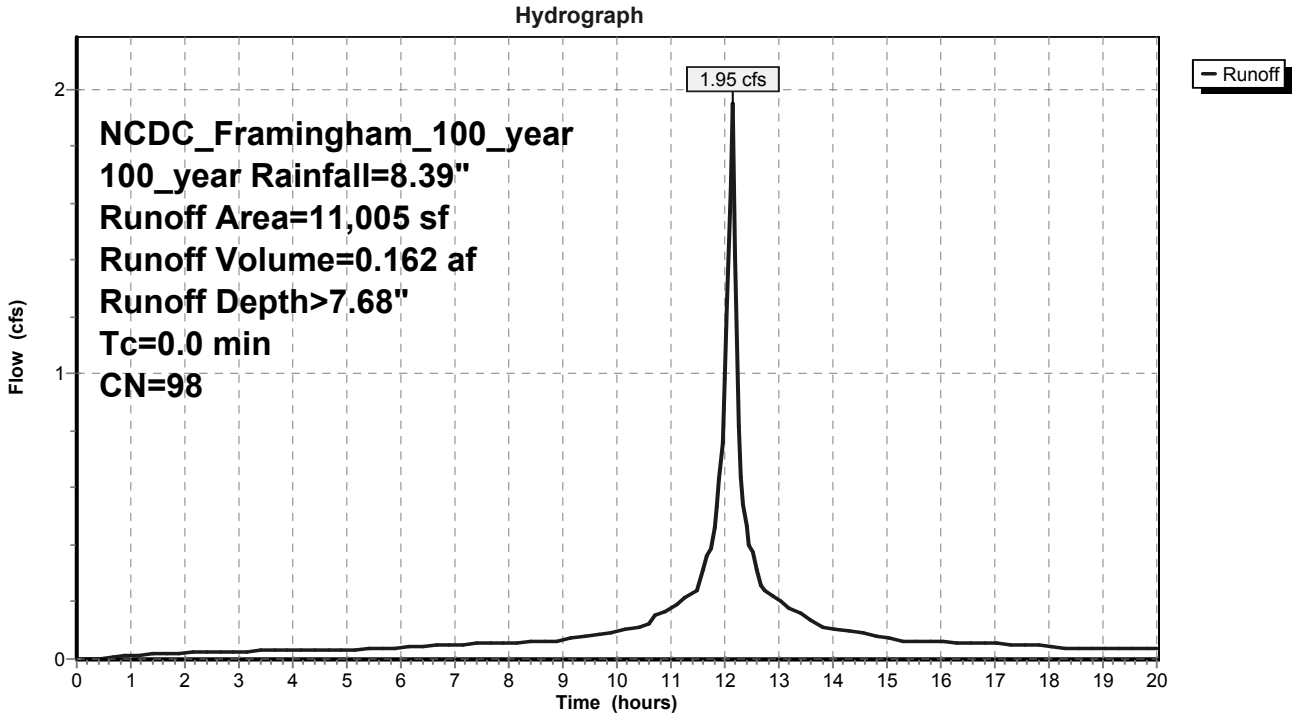
## Summary for Subcatchment ROOF-3: (blank)

Runoff = 1.95 cfs @ 12.14 hrs, Volume= 0.162 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 98 | DECK, 100% imperv, HSG B |
| * | 11,004 | 98 | ROOF, 100% imperv, HSG B |
| | 11,005 | 98 | Weighted Average |
| | 11,005 | | 100.00% Pervious Area |

## Subcatchment ROOF-3: (blank)



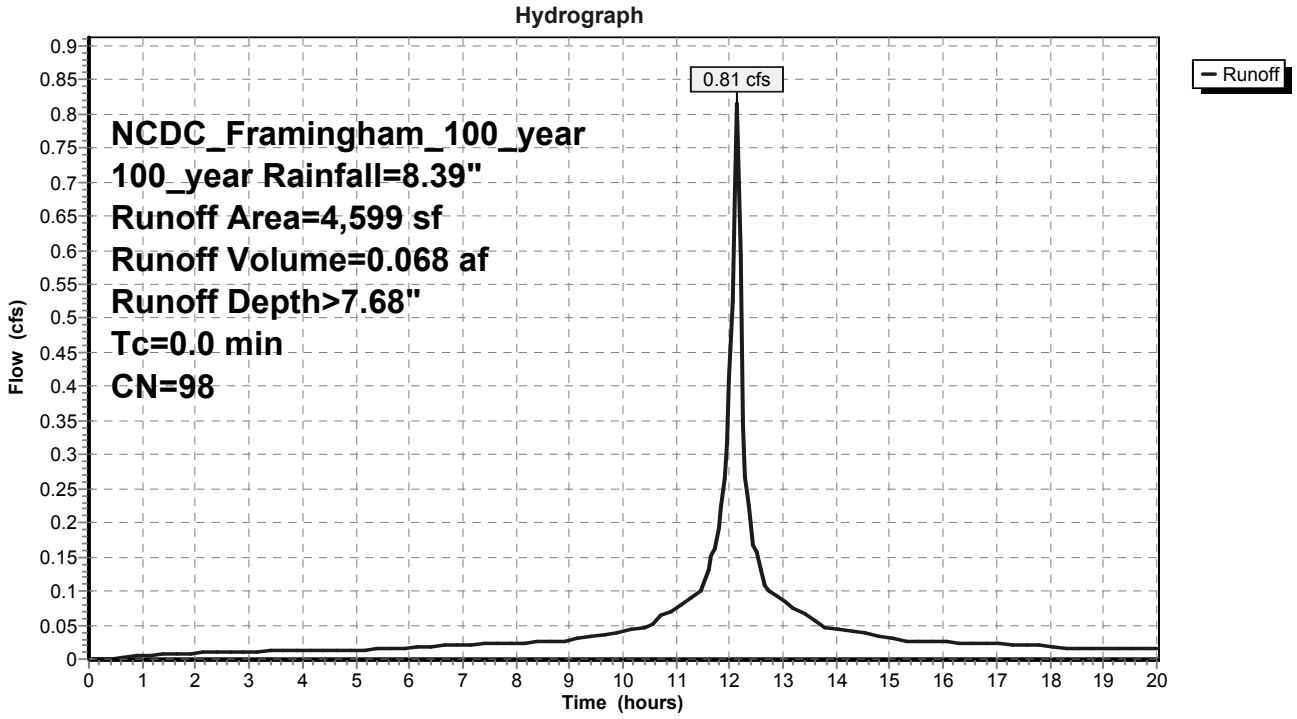
## Summary for Subcatchment ROOF-30: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-30: (blank)



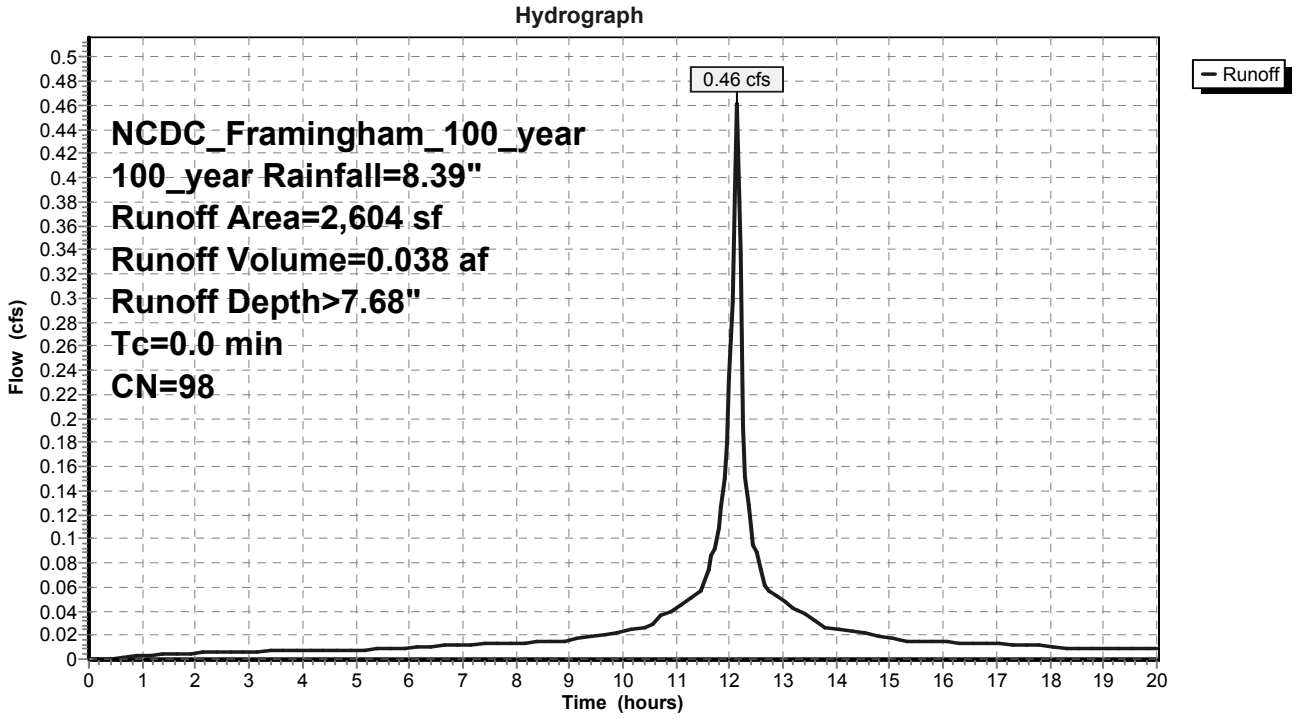
## Summary for Subcatchment ROOF-31: (blank)

Runoff = 0.46 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,604 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-31: (blank)



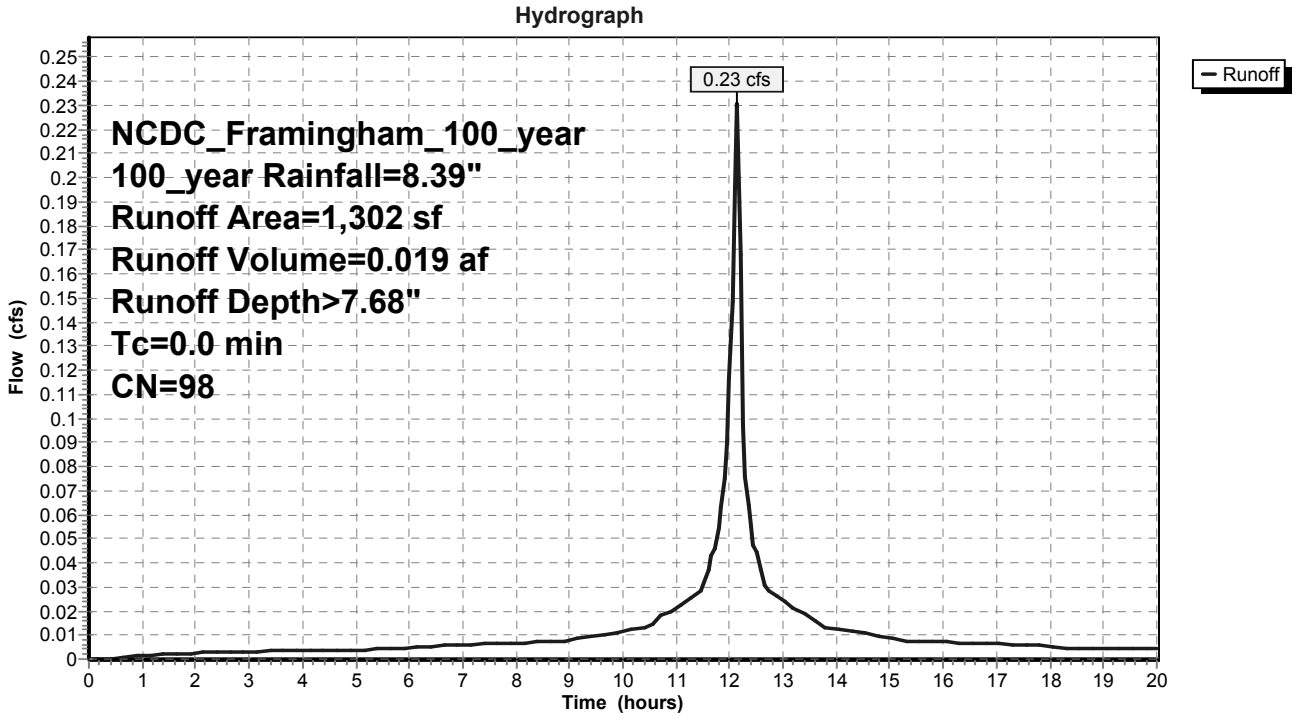
## Summary for Subcatchment ROOF-32: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-32: (blank)



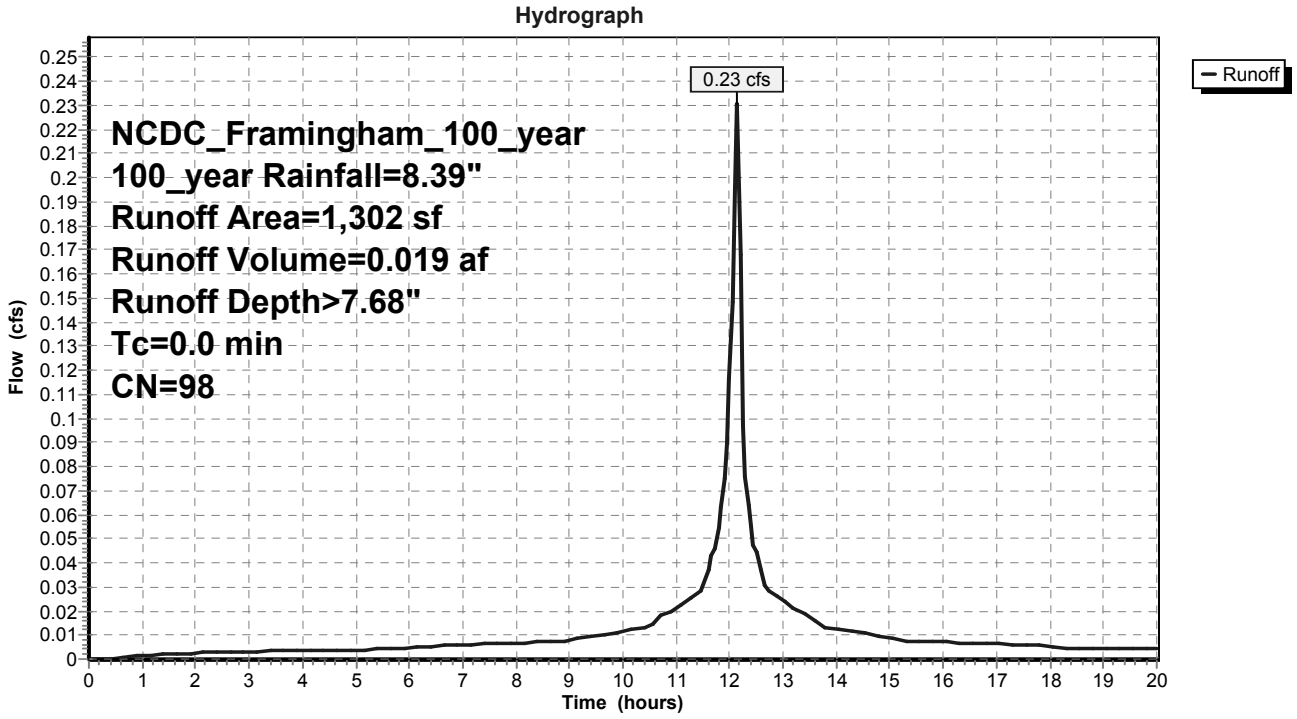
## Summary for Subcatchment ROOF-33: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-33: (blank)



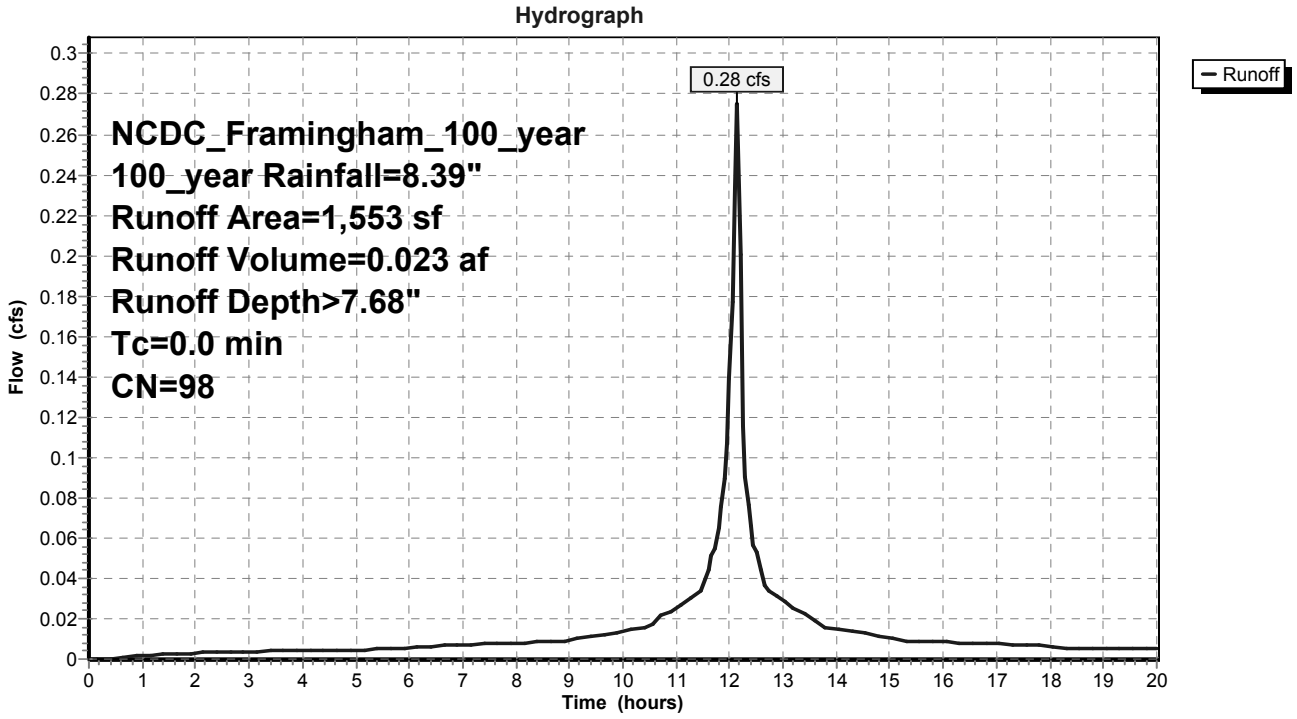
## Summary for Subcatchment ROOF-34: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-34: (blank)



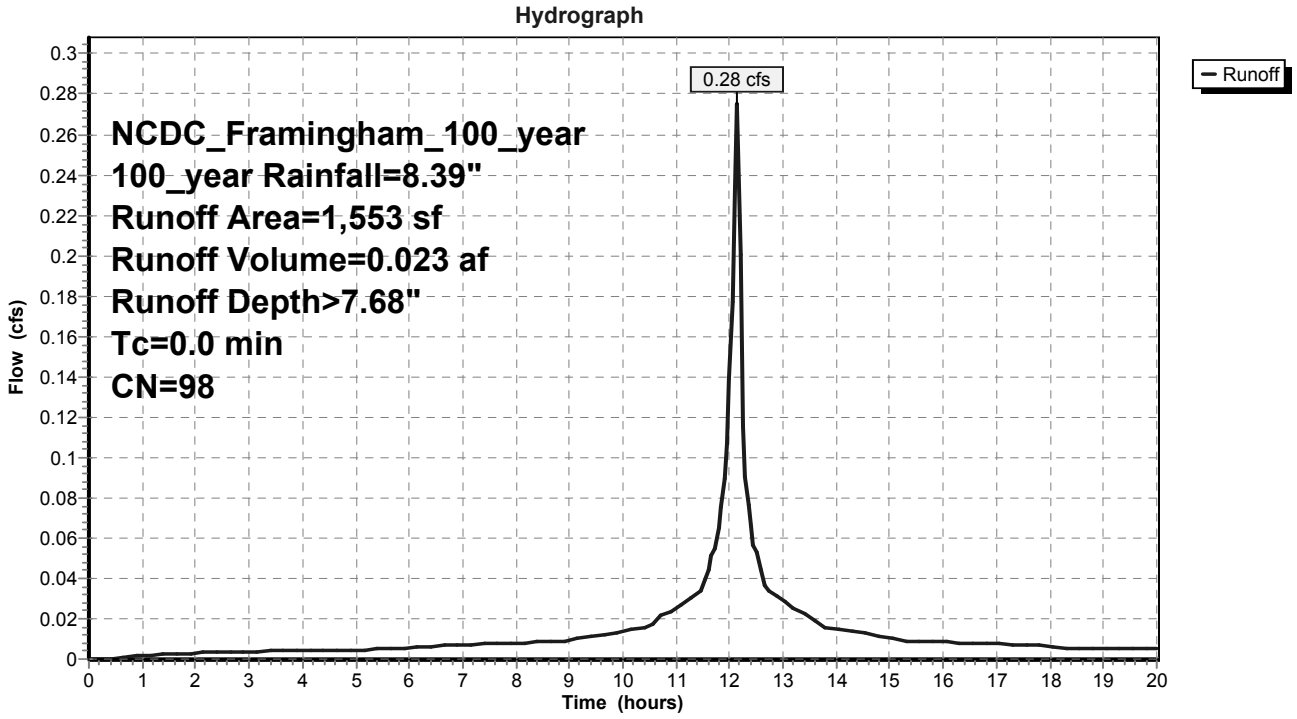
## Summary for Subcatchment ROOF-35: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-35: (blank)



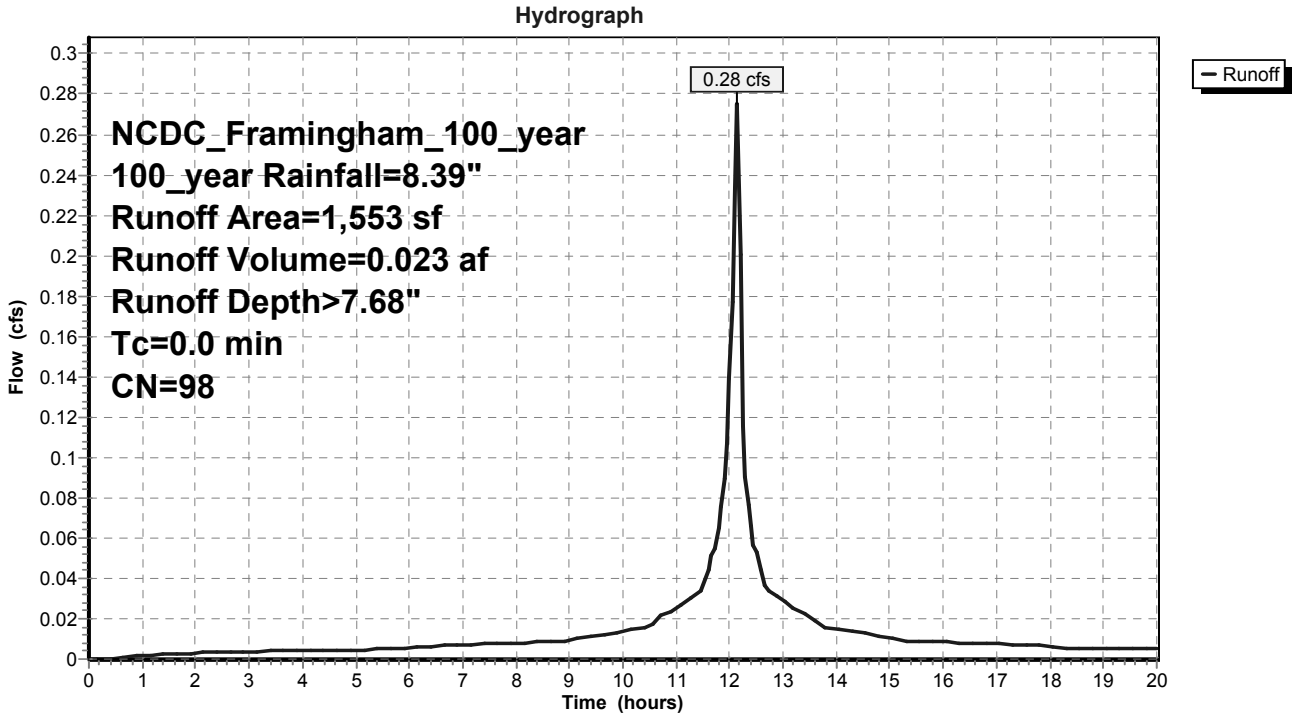
## Summary for Subcatchment ROOF-36: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,553 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-36: (blank)



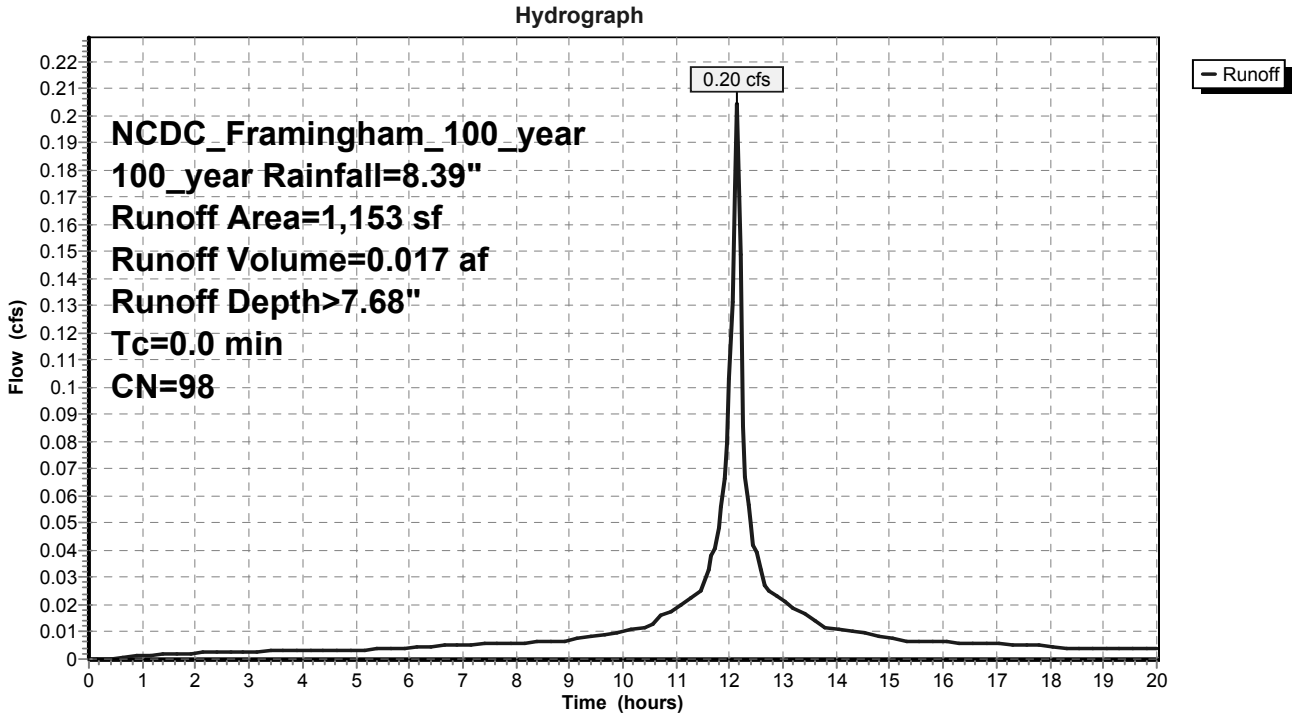
## Summary for Subcatchment ROOF-37: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,153 | 98 | ROOF, 100% imperv, HSG B |
| | 1,153 | | 100.00% Pervious Area |

## Subcatchment ROOF-37: (blank)



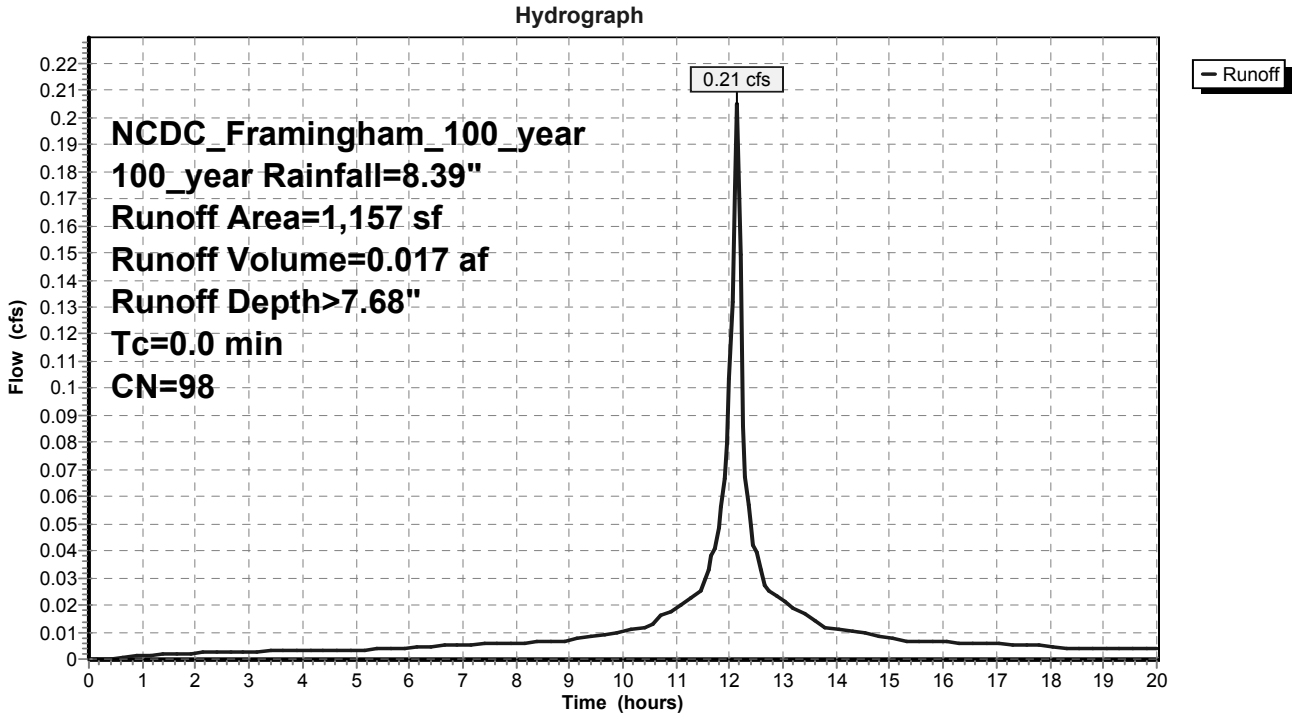
## Summary for Subcatchment ROOF-38: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-38: (blank)



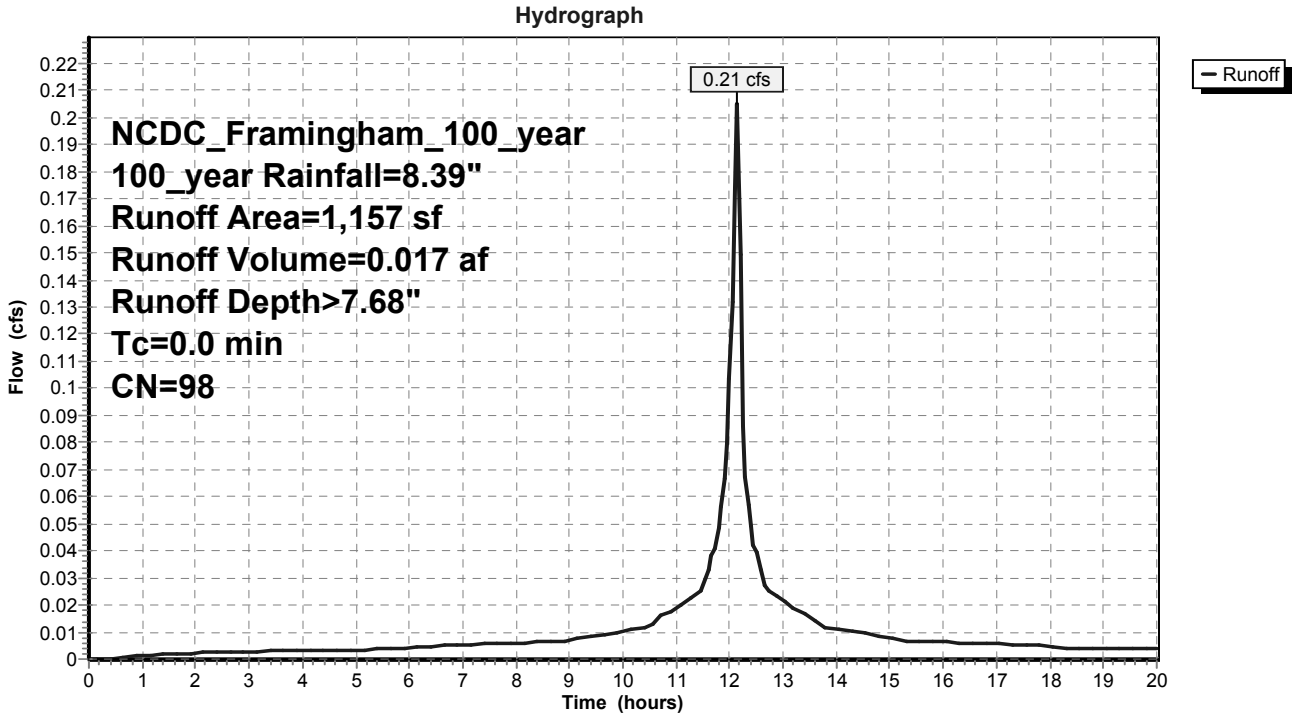
## Summary for Subcatchment ROOF-39: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-39: (blank)



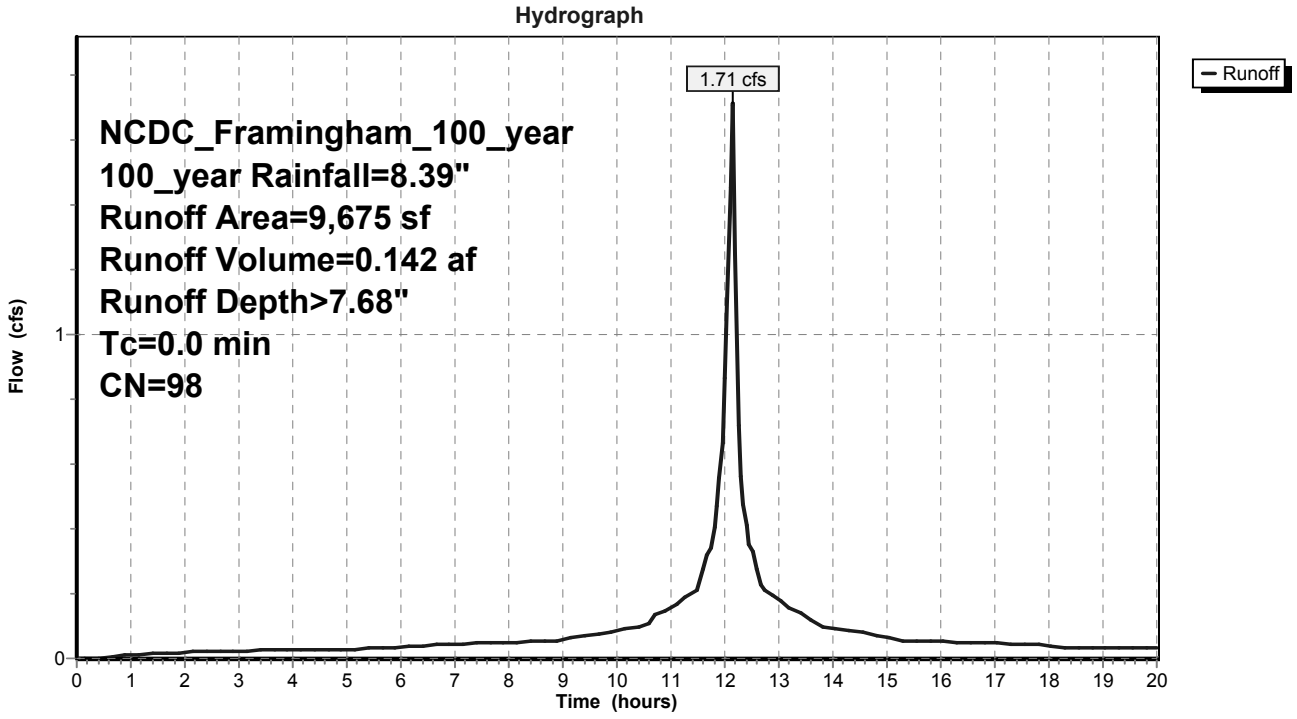
## Summary for Subcatchment ROOF-4: (blank)

Runoff = 1.71 cfs @ 12.14 hrs, Volume= 0.142 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1 | 61 | GRASS, 0% imperv, HSG B |
| * | 72 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,675 | 98 | Weighted Average |
| | 9,675 | | 100.00% Pervious Area |

## Subcatchment ROOF-4: (blank)



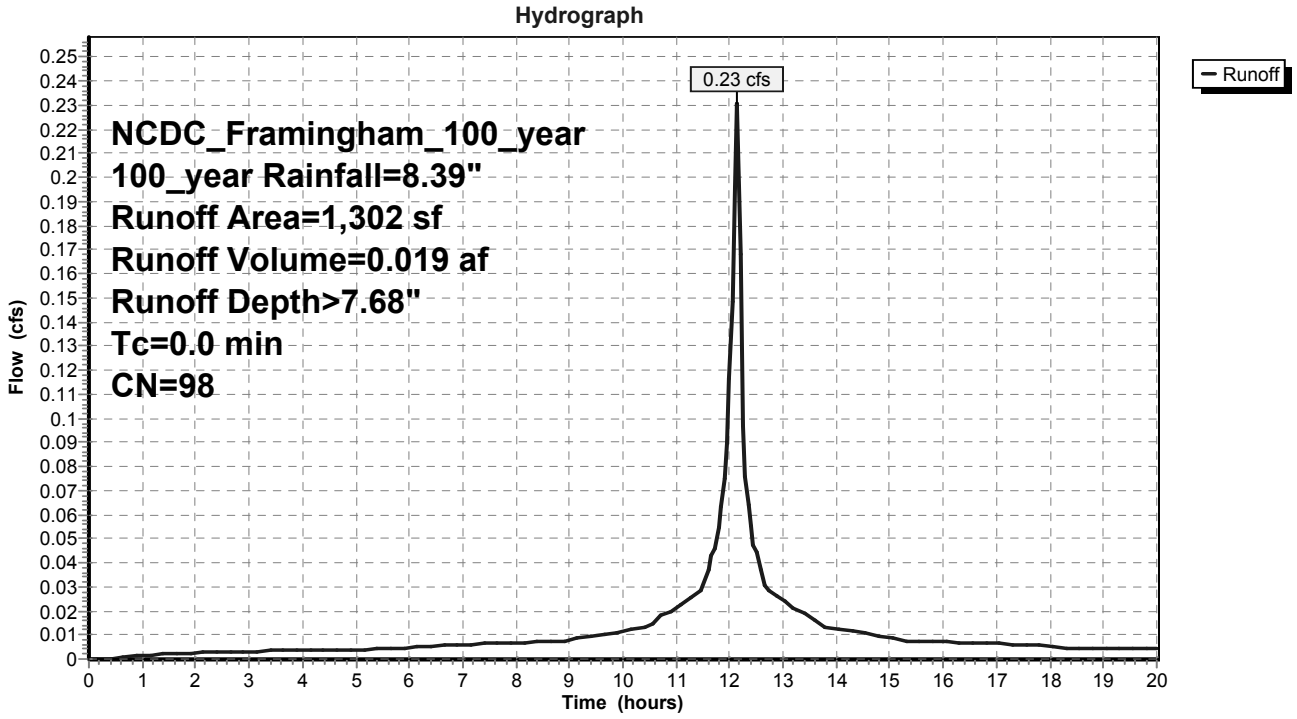
## Summary for Subcatchment ROOF-40: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 639 | 98 | ROOF, 100% imperv, HSG A |
| * | 663 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-40: (blank)



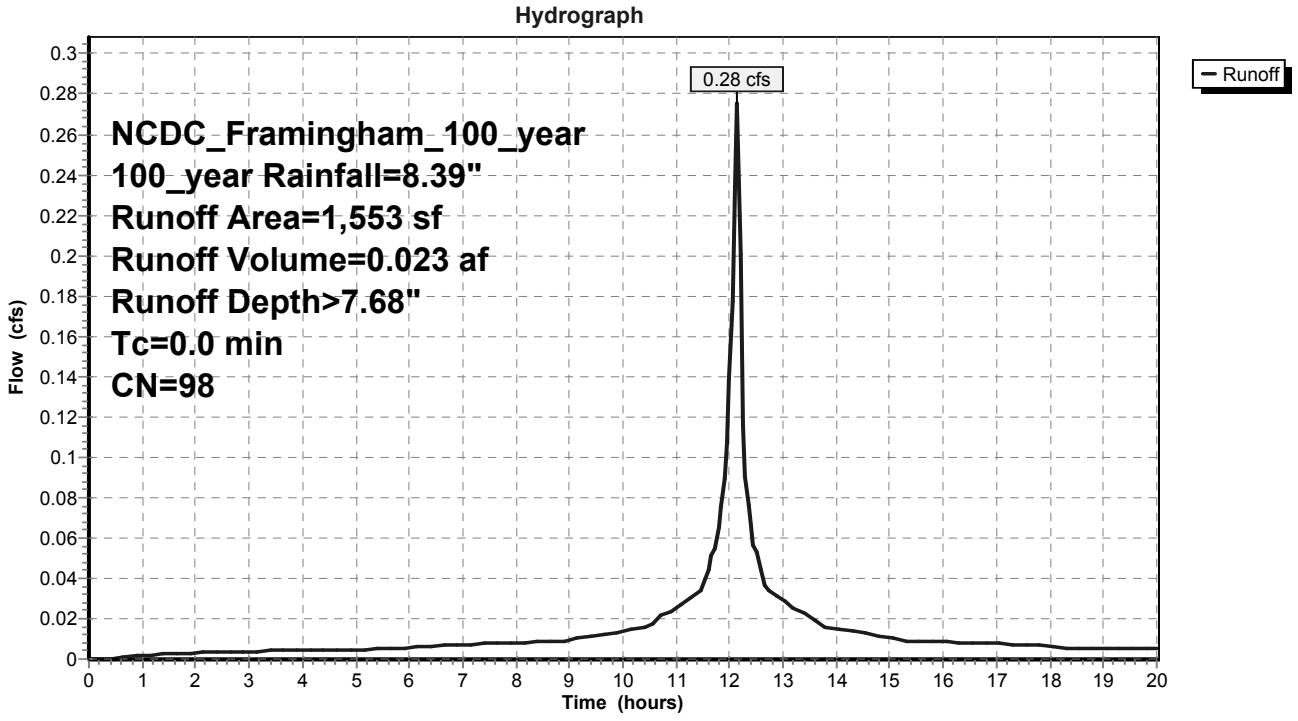
## Summary for Subcatchment ROOF-41: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,090 | 98 | ROOF, 100% imperv, HSG A |
| * | 463 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-41: (blank)



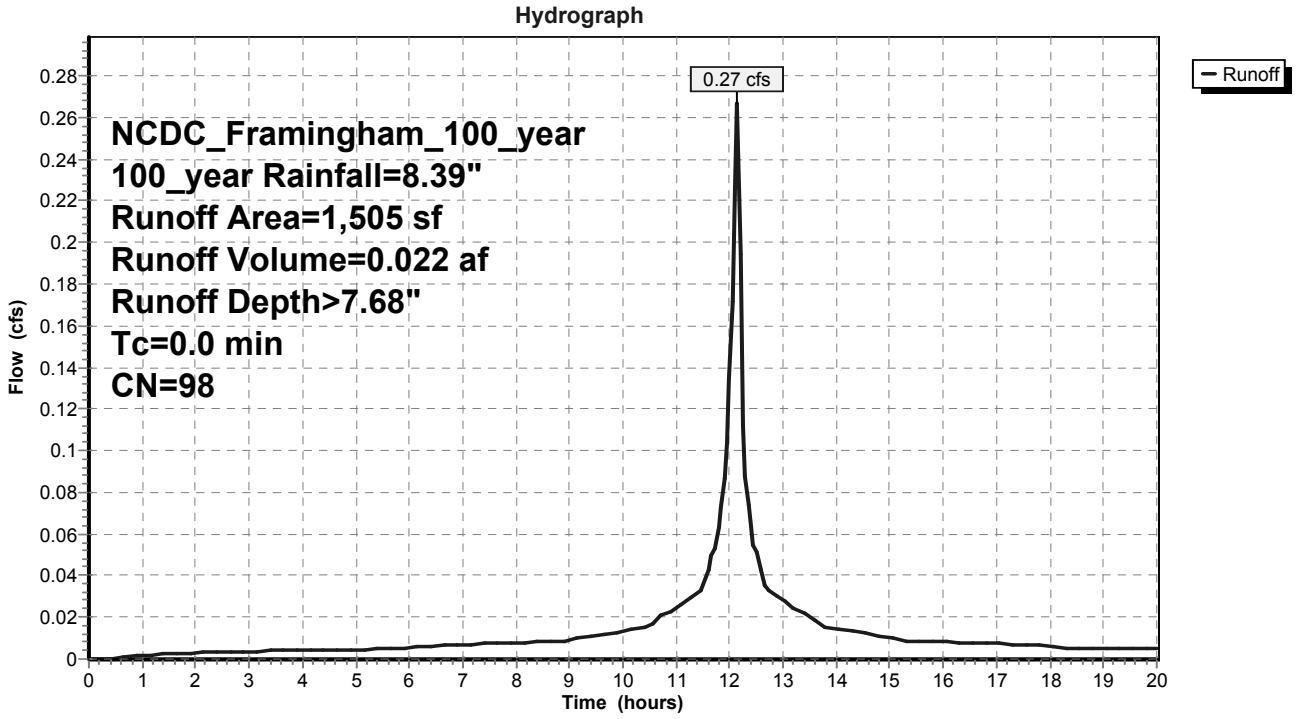
## Summary for Subcatchment ROOF-42: (blank)

Runoff = 0.27 cfs @ 12.14 hrs, Volume= 0.022 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 699 | 98 | ROOF, 100% imperv, HSG A |
| * | 806 | 98 | ROOF, 100% imperv, HSG B |
| | 1,505 | 98 | Weighted Average |
| | 1,505 | | 100.00% Pervious Area |

## Subcatchment ROOF-42: (blank)



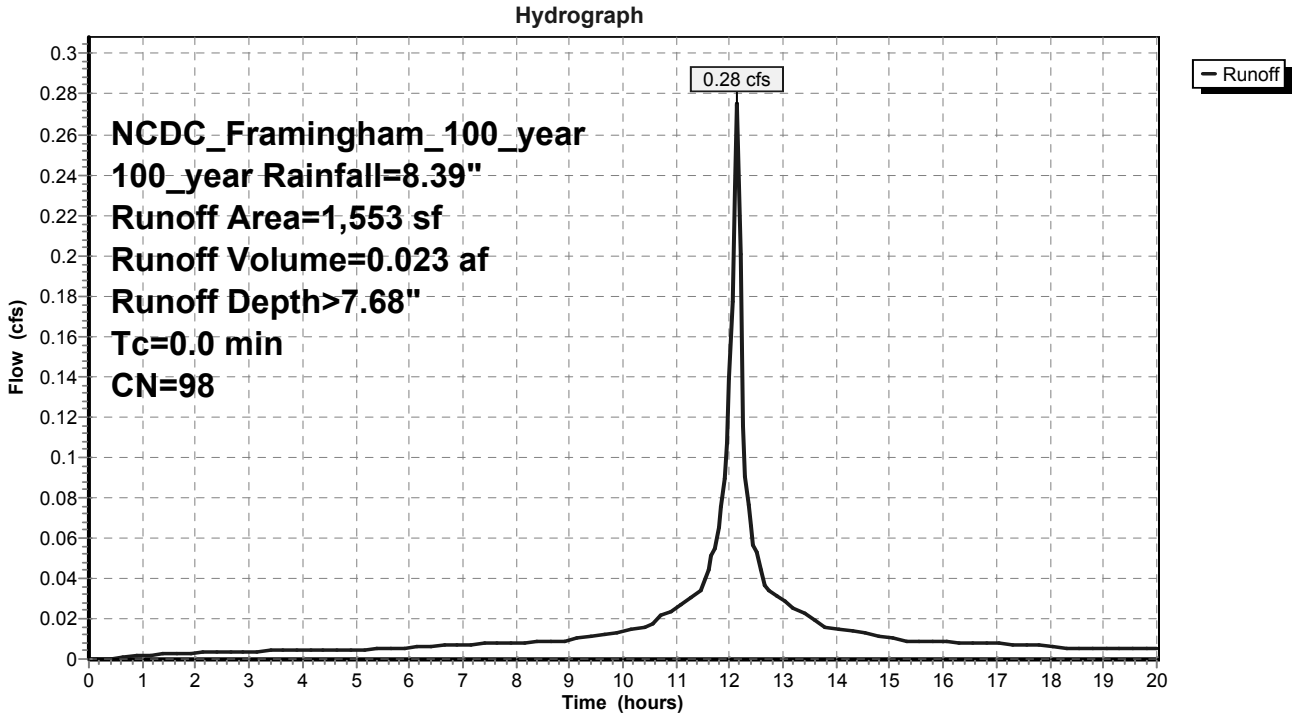
## Summary for Subcatchment ROOF-43: (blank)

Runoff = 0.28 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 486 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,067 | 98 | ROOF, 100% imperv, HSG B |
| | 1,553 | 98 | Weighted Average |
| | 1,553 | | 100.00% Pervious Area |

## Subcatchment ROOF-43: (blank)



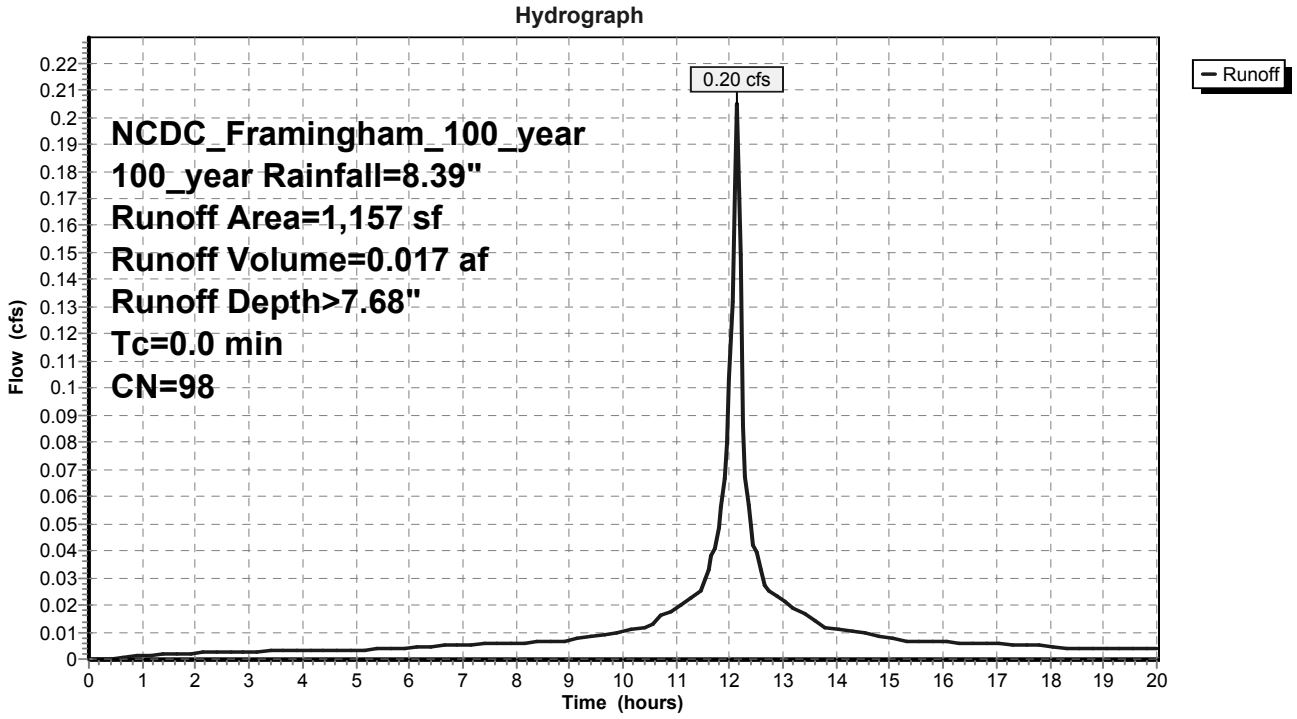
## Summary for Subcatchment ROOF-44: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-44: (blank)



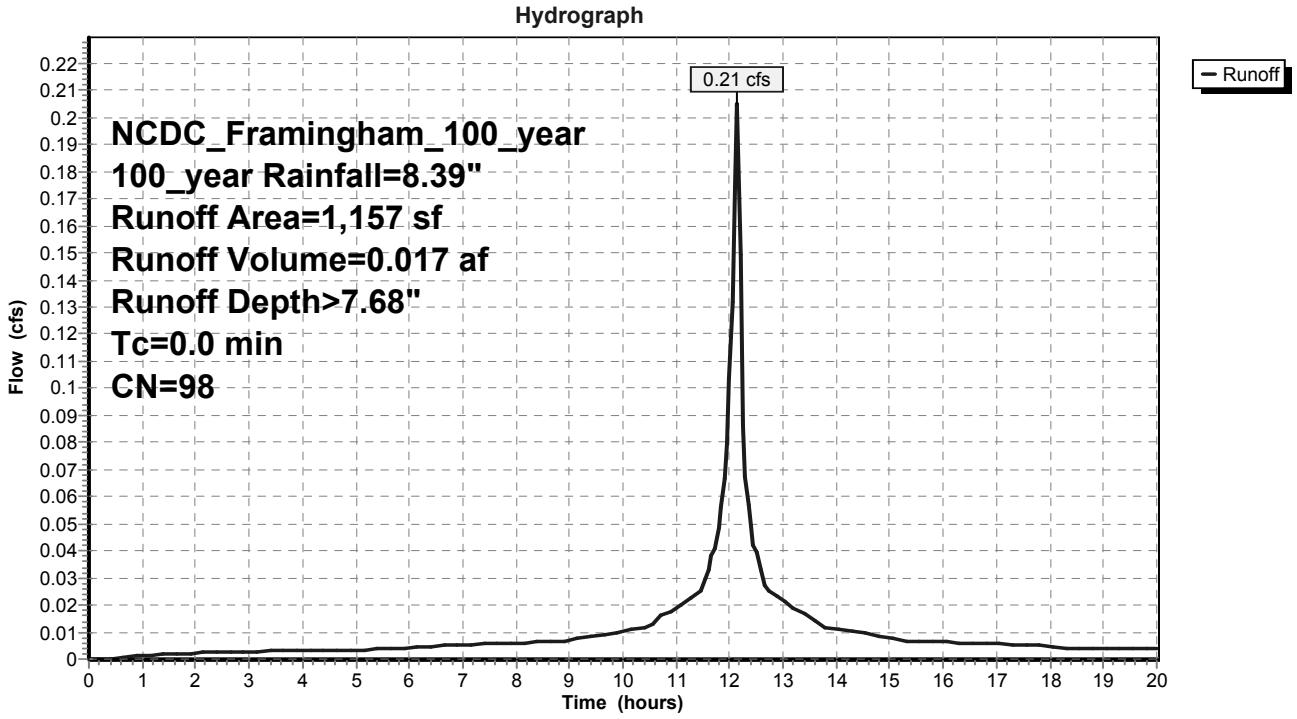
## Summary for Subcatchment ROOF-45: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-45: (blank)



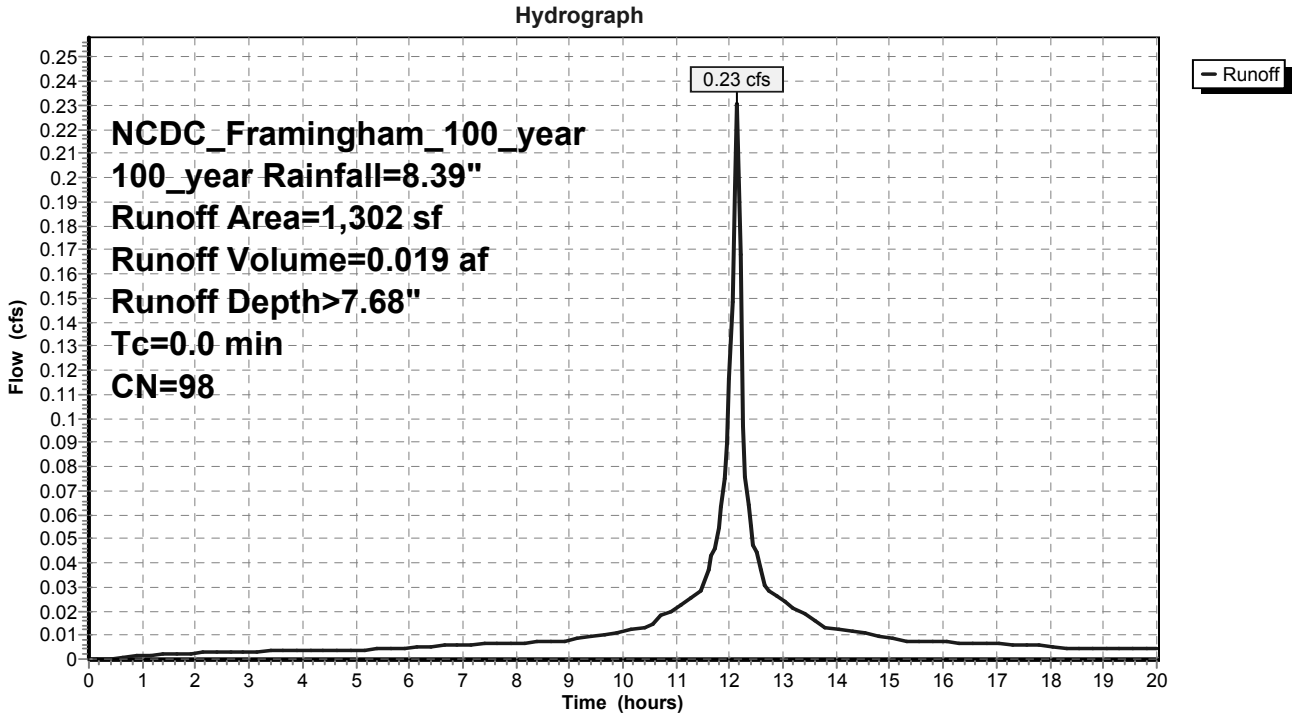
## Summary for Subcatchment ROOF-46: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-46: (blank)



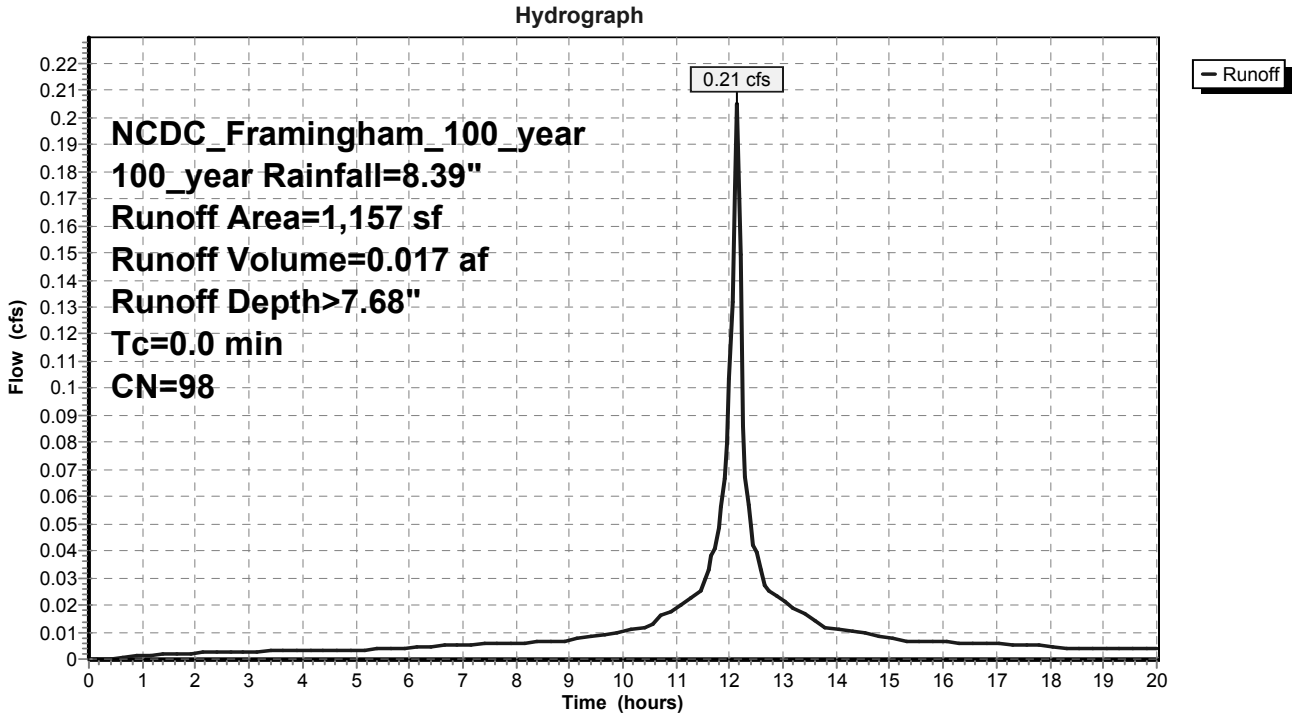
## Summary for Subcatchment ROOF-47: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-47: (blank)



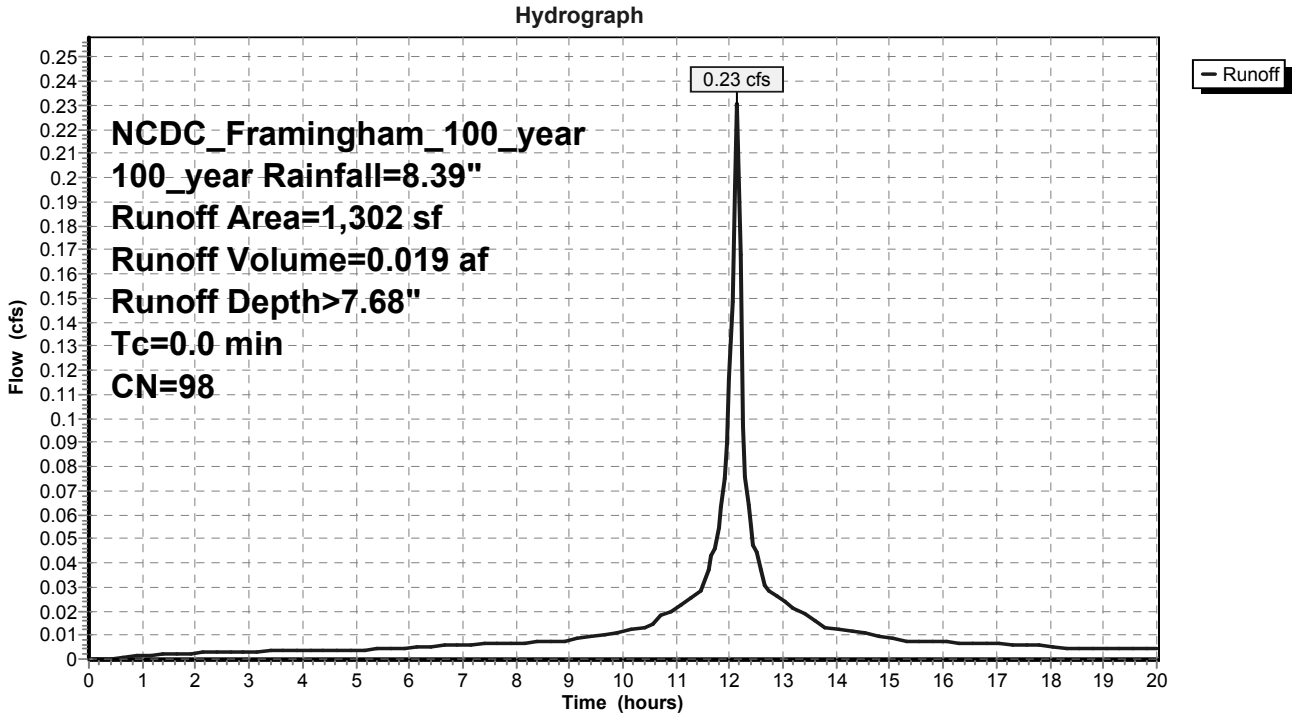
## Summary for Subcatchment ROOF-48: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-48: (blank)



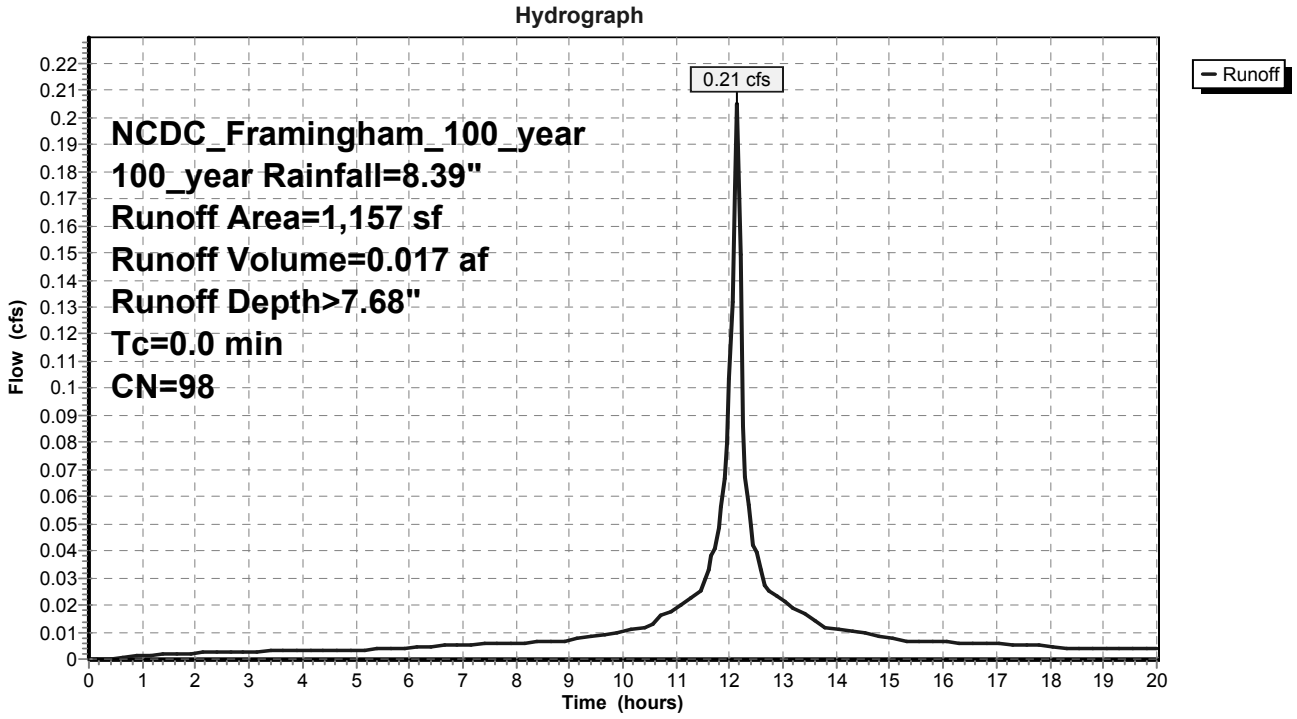
## Summary for Subcatchment ROOF-49: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-49: (blank)



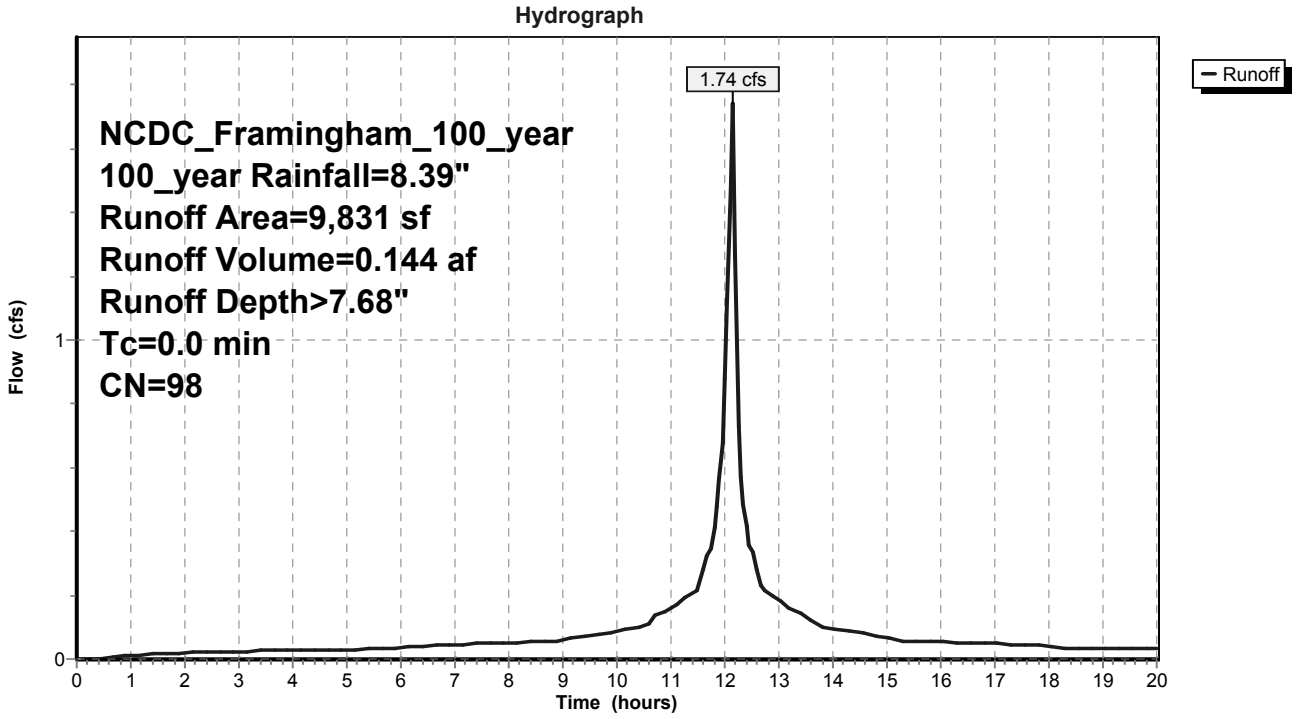
## Summary for Subcatchment ROOF-5: (blank)

Runoff = 1.74 cfs @ 12.14 hrs, Volume= 0.144 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 230 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,831 | 98 | Weighted Average |
| | 9,831 | | 100.00% Pervious Area |

## Subcatchment ROOF-5: (blank)



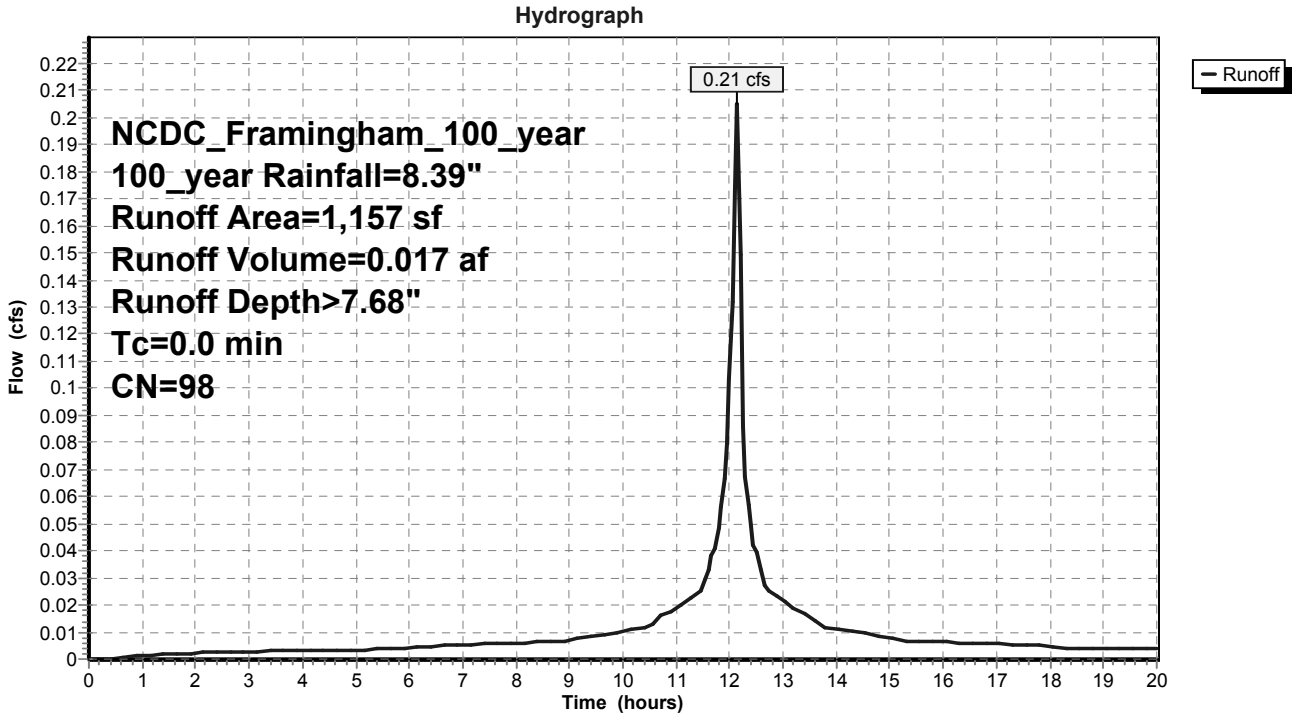
## Summary for Subcatchment ROOF-50: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-50: (blank)



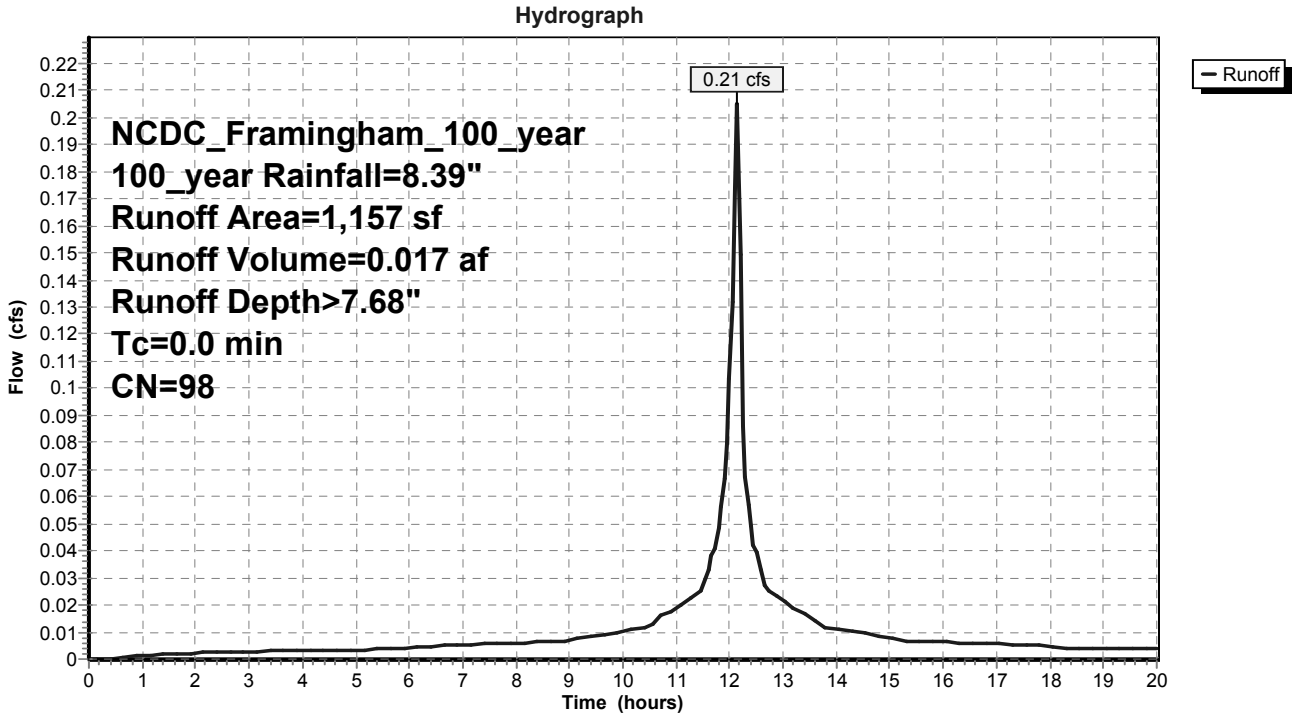
## Summary for Subcatchment ROOF-51: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-51: (blank)



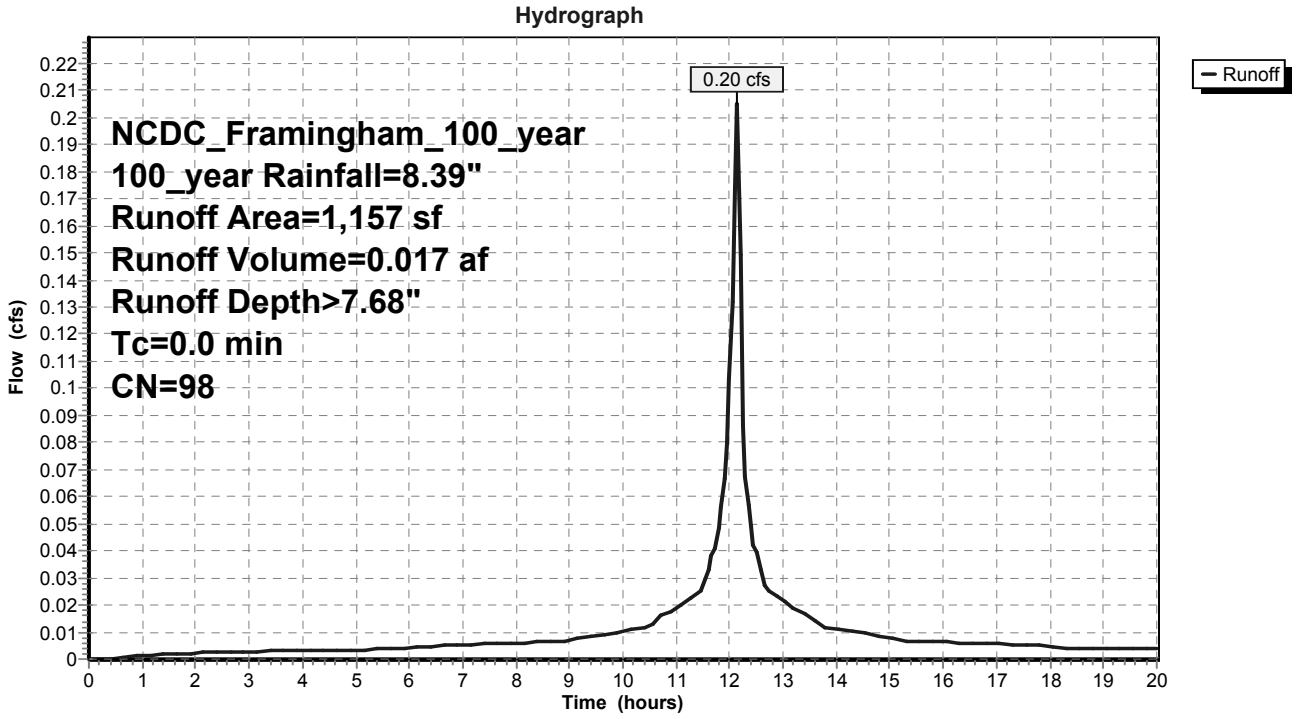
## Summary for Subcatchment ROOF-52: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-52: (blank)



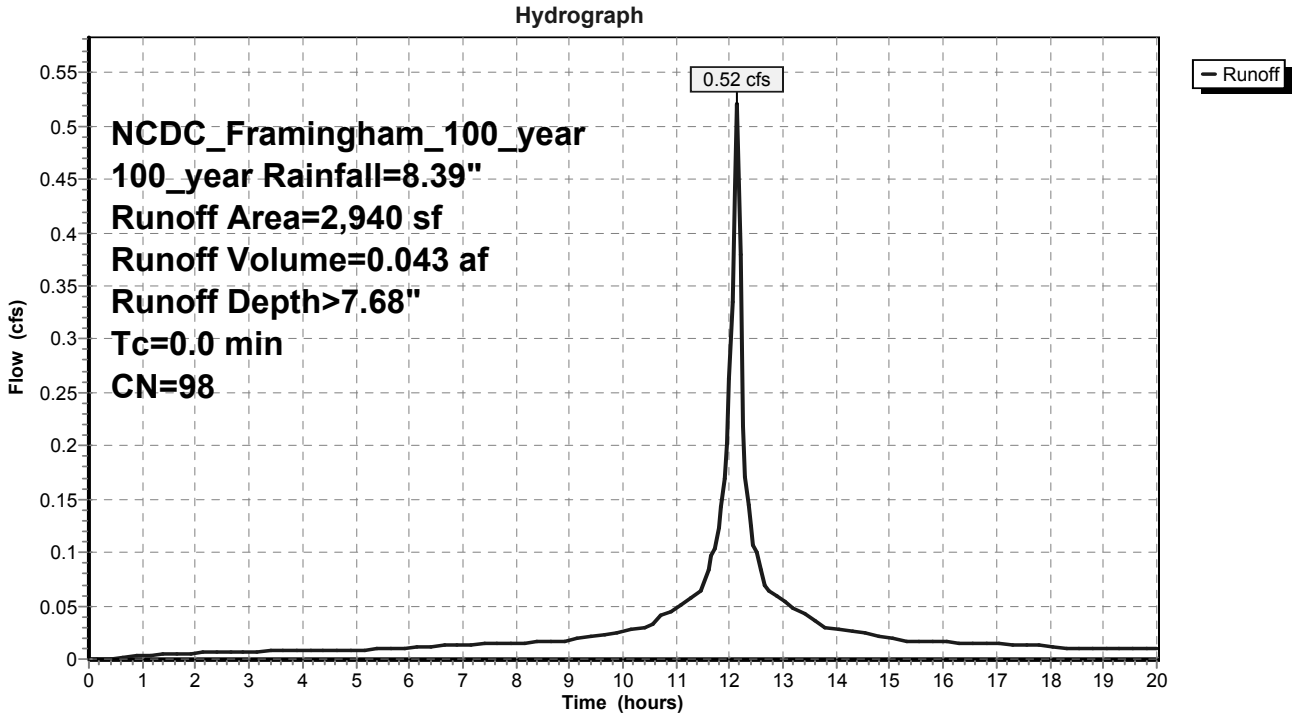
## Summary for Subcatchment ROOF-53: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-53: (blank)



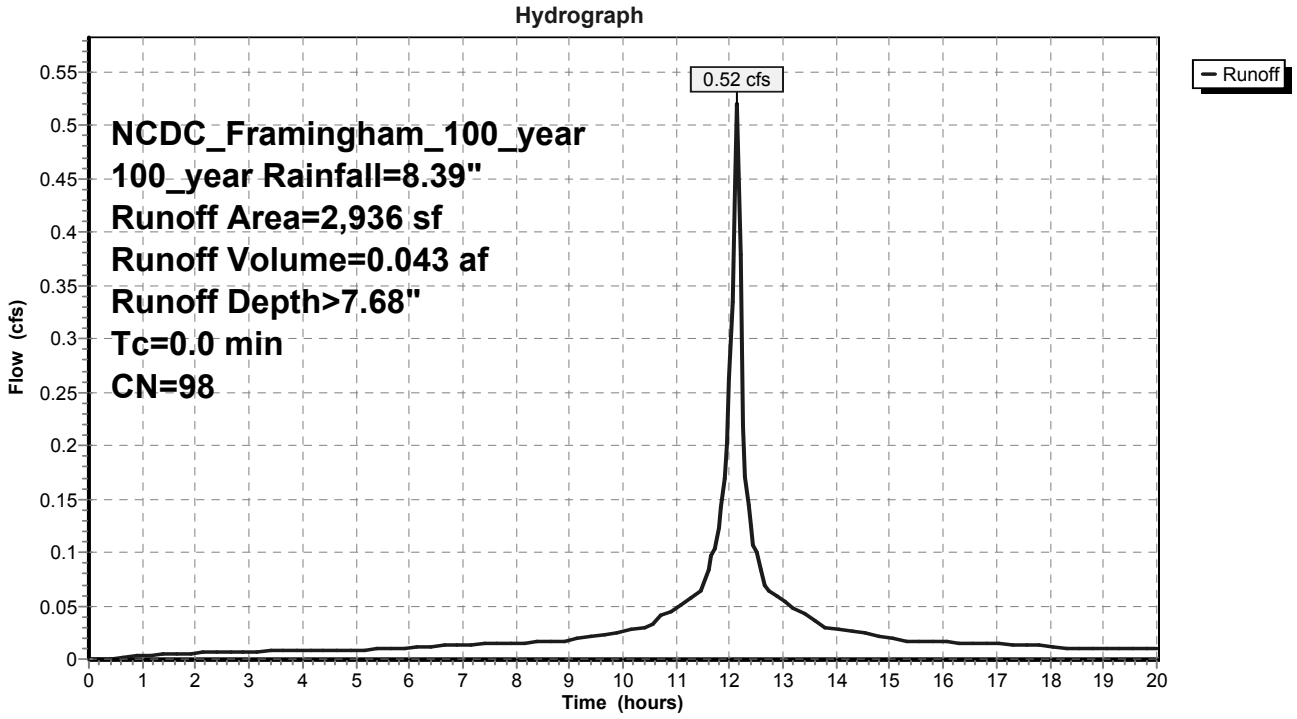
## Summary for Subcatchment ROOF-54: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,936 | 98 | ROOF, 100% imperv, HSG A |
| | 2,936 | | 100.00% Pervious Area |

## Subcatchment ROOF-54: (blank)



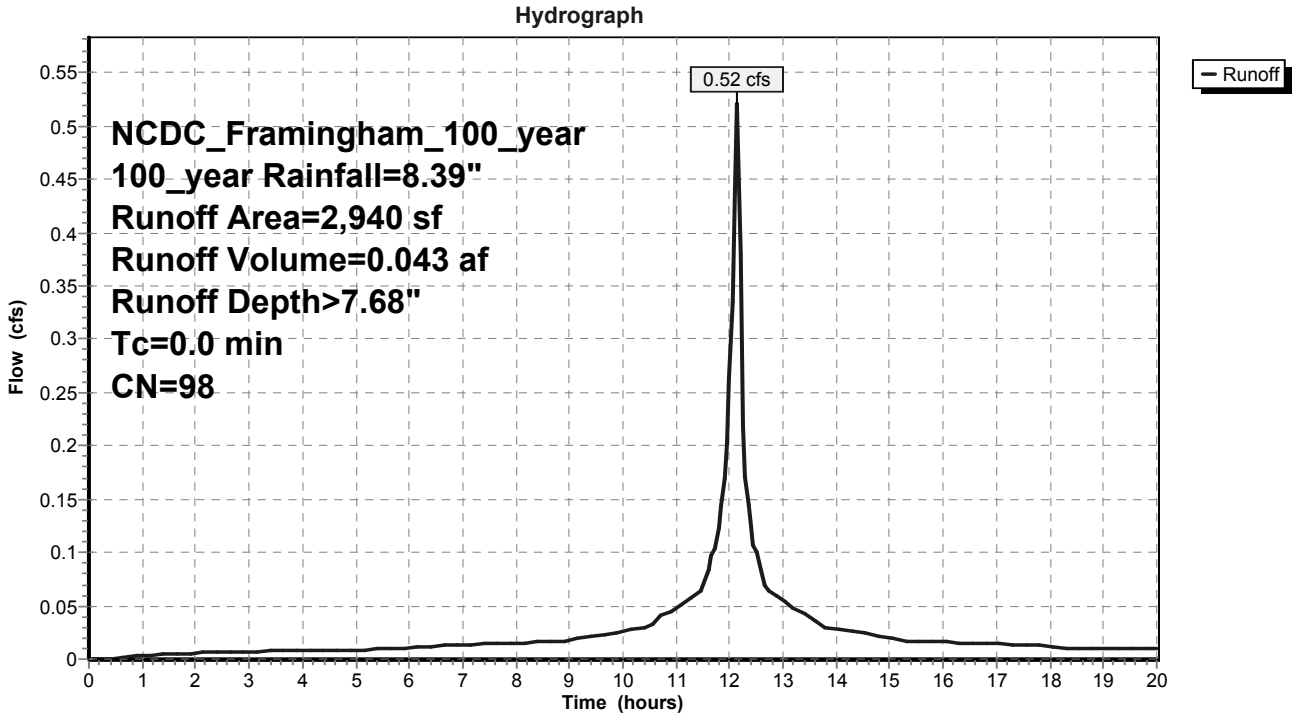
## Summary for Subcatchment ROOF-55: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-55: (blank)



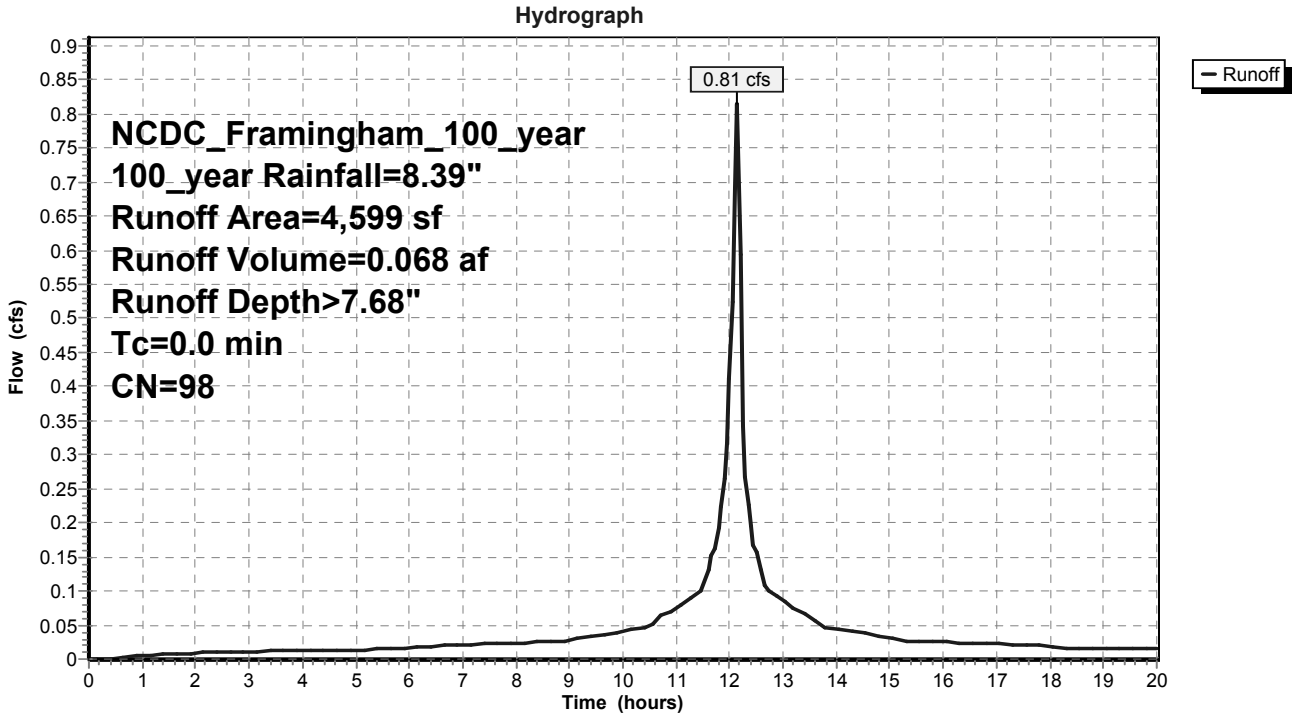
## Summary for Subcatchment ROOF-56: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG A |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-56: (blank)



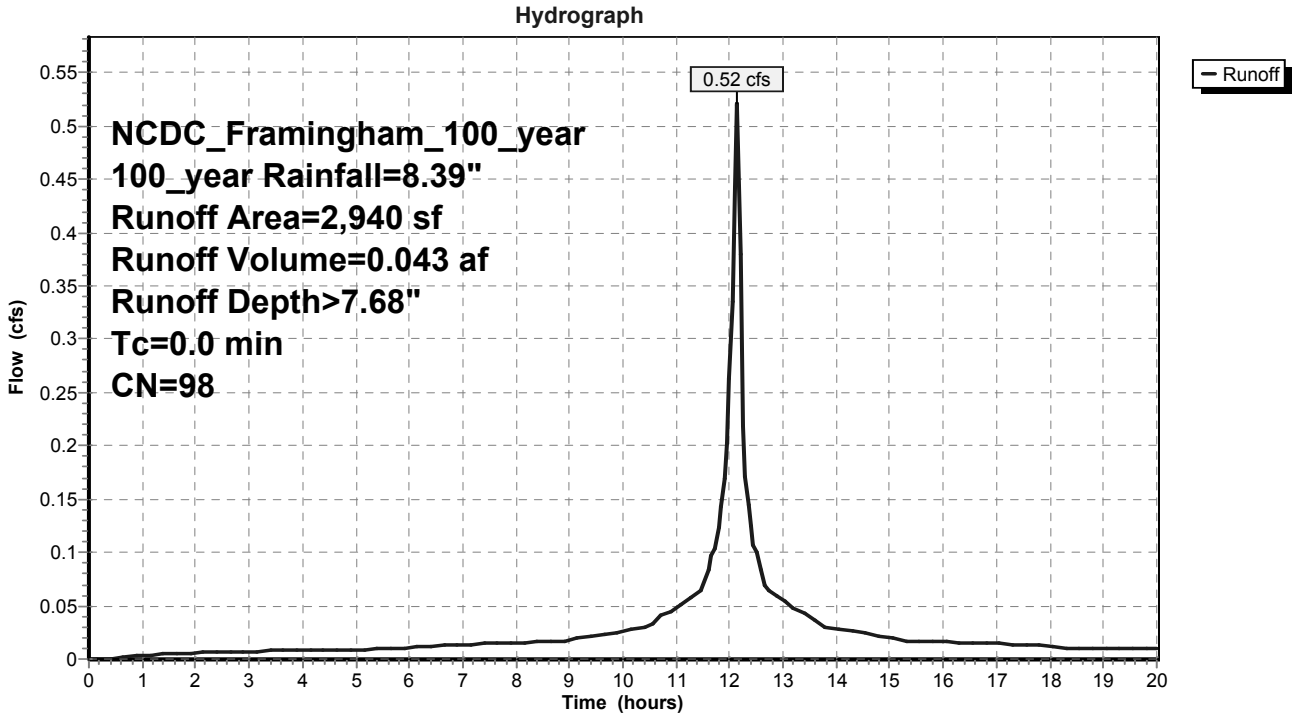
## Summary for Subcatchment ROOF-57: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,911 | 98 | ROOF, 100% imperv, HSG A |
| * | 29 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-57: (blank)



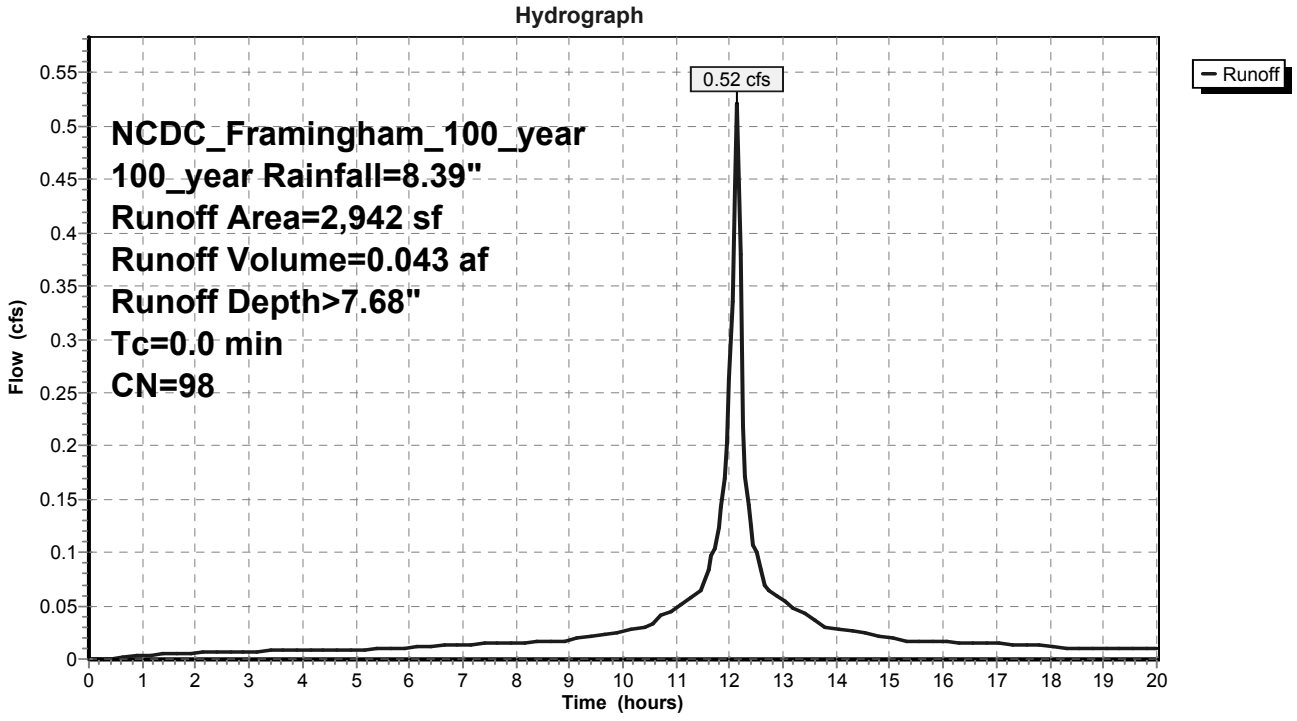
## Summary for Subcatchment ROOF-58: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22 | 98 | DECK, 100% imperv, HSG A |
| * | 2,919 | 98 | ROOF, 100% imperv, HSG A |
| | 2,942 | 98 | Weighted Average |
| | 2,942 | | 100.00% Pervious Area |

## Subcatchment ROOF-58: (blank)



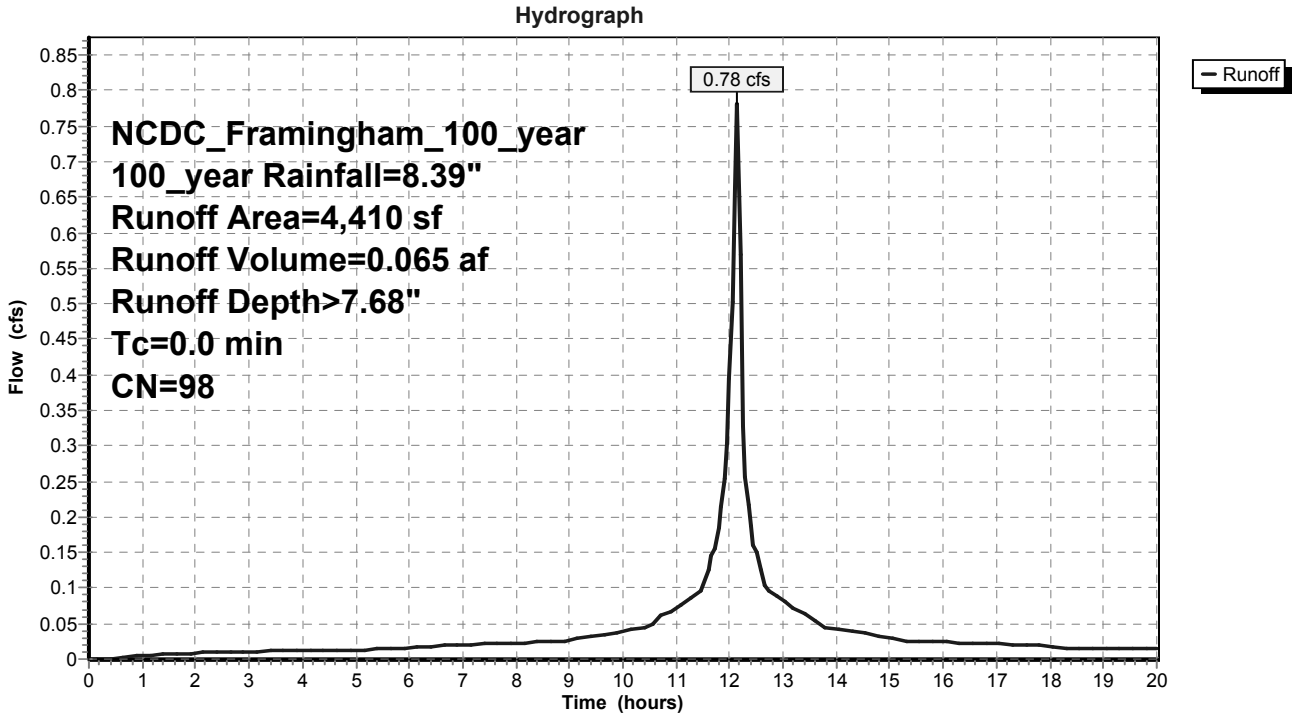
## Summary for Subcatchment ROOF-59: (blank)

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-59: (blank)



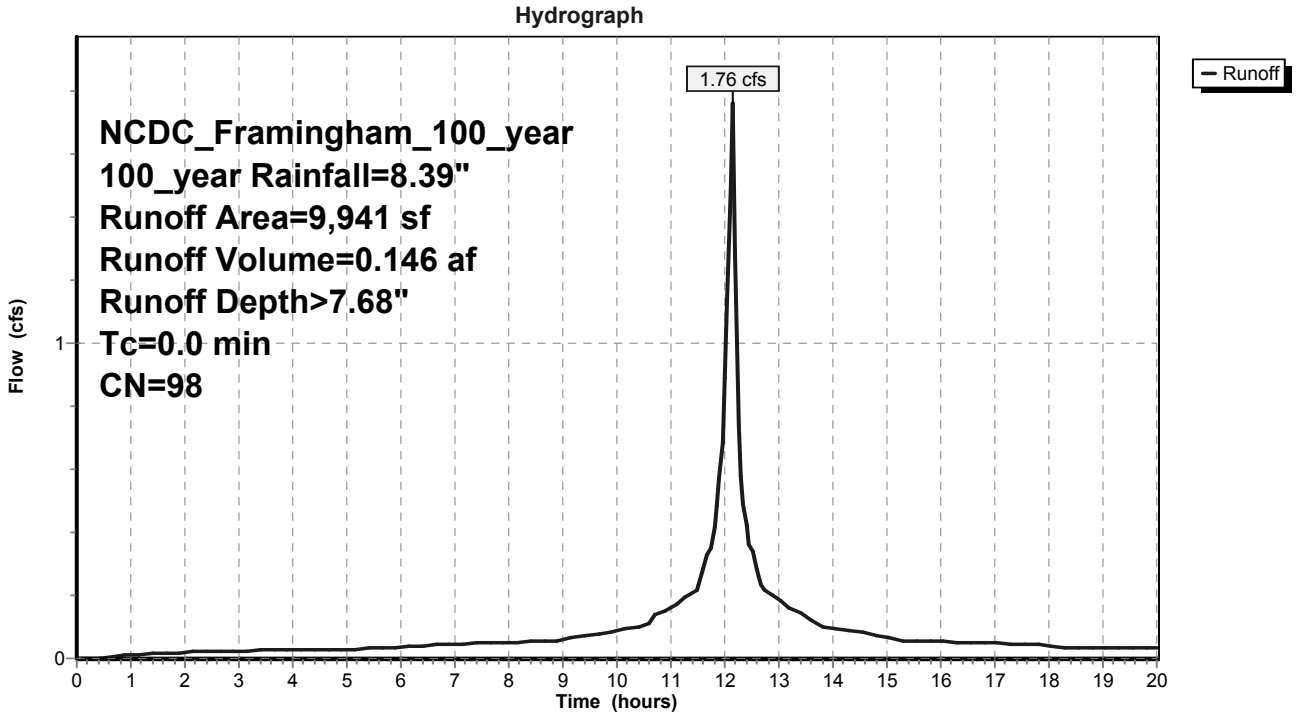
## Summary for Subcatchment ROOF-6: (blank)

Runoff = 1.76 cfs @ 12.14 hrs, Volume= 0.146 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 0 | 61 | GRASS, 0% imperv, HSG B |
| * | 340 | 98 | DECK, 100% imperv, HSG B |
| * | 9,601 | 98 | ROOF, 100% imperv, HSG B |
| | 9,941 | 98 | Weighted Average |
| | 9,941 | | 100.00% Pervious Area |

## Subcatchment ROOF-6: (blank)



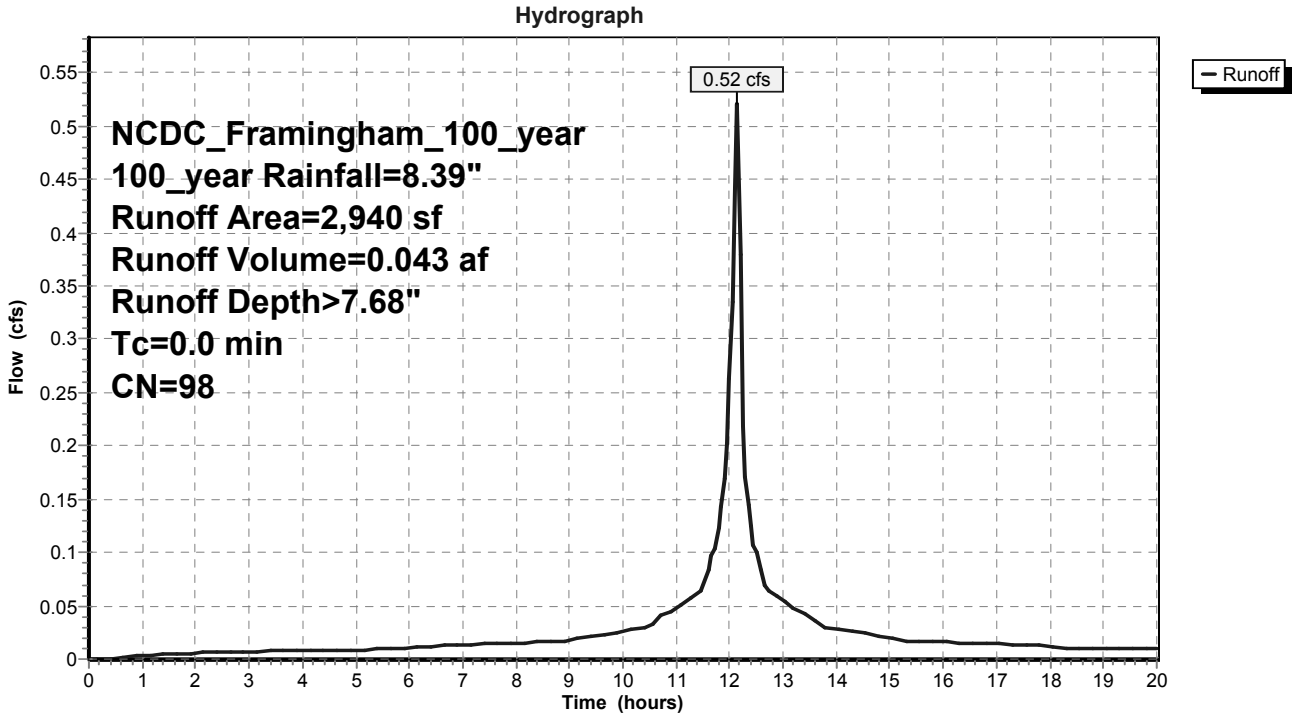
## Summary for Subcatchment ROOF-60: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-60: (blank)



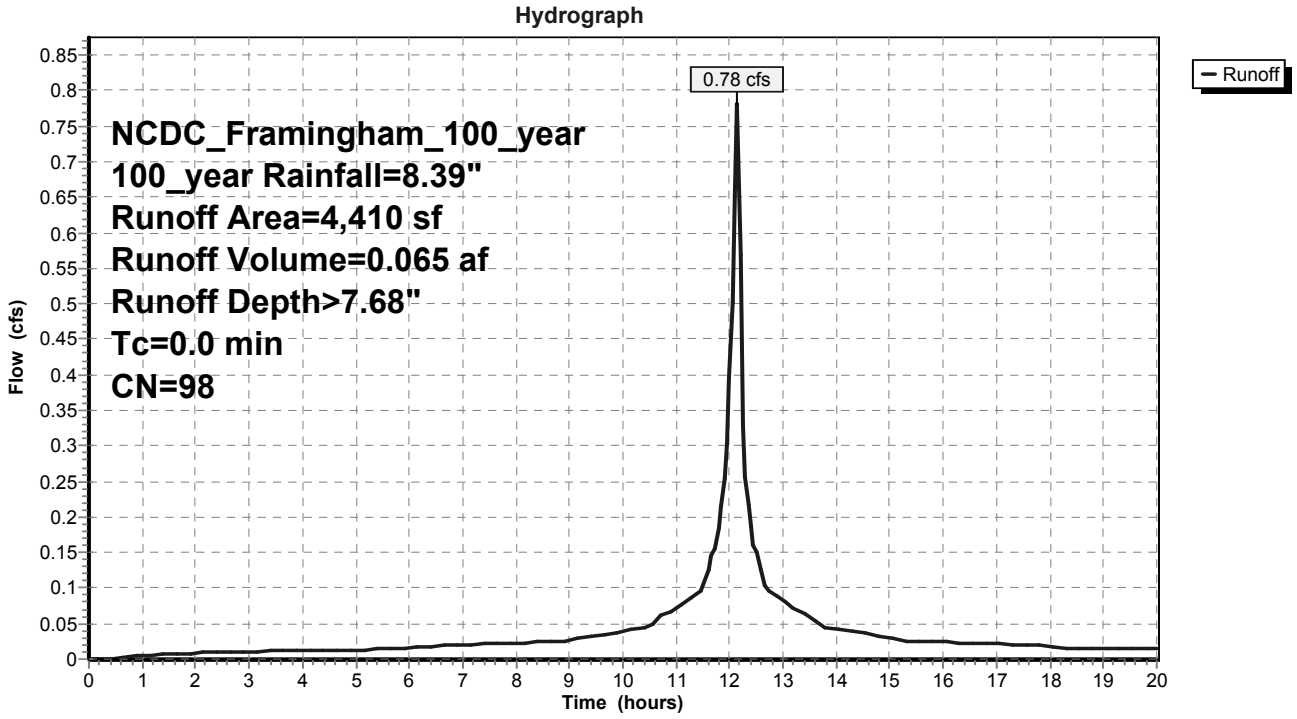
## Summary for Subcatchment ROOF-61: (blank)

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG A |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-61: (blank)



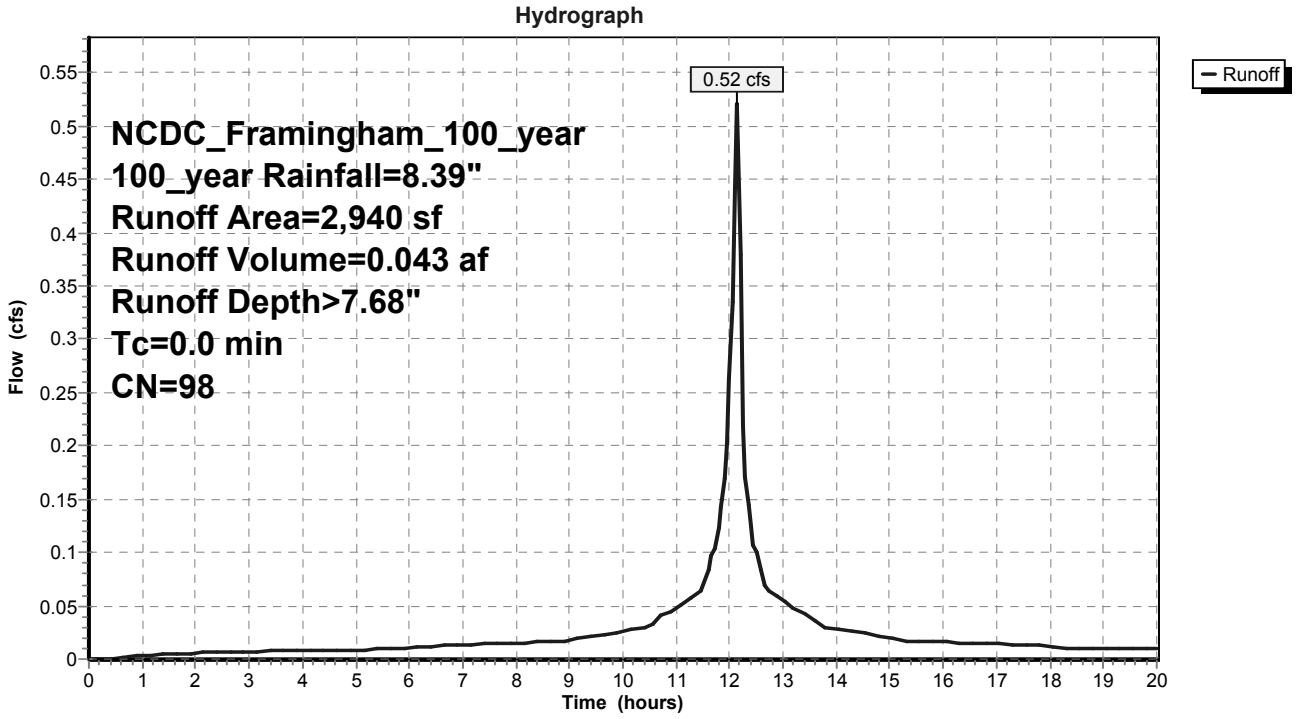
## Summary for Subcatchment ROOF-62: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-62: (blank)



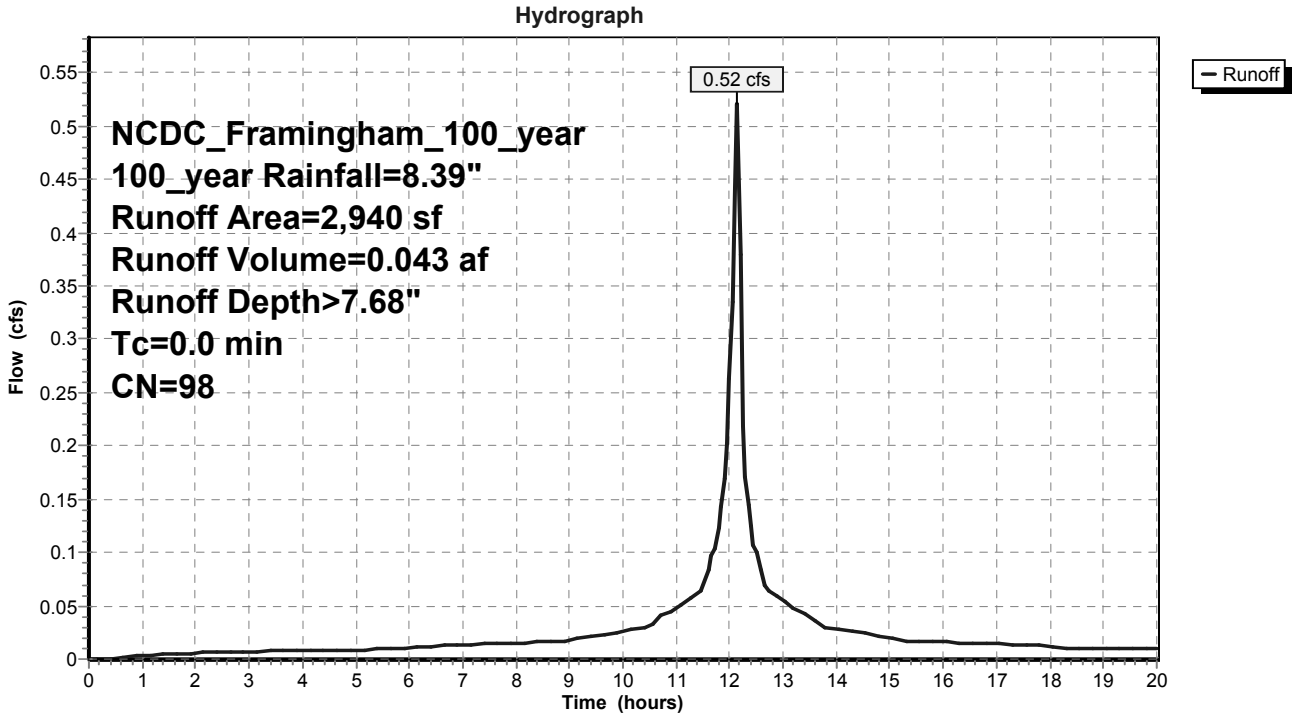
## Summary for Subcatchment ROOF-63: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-63: (blank)



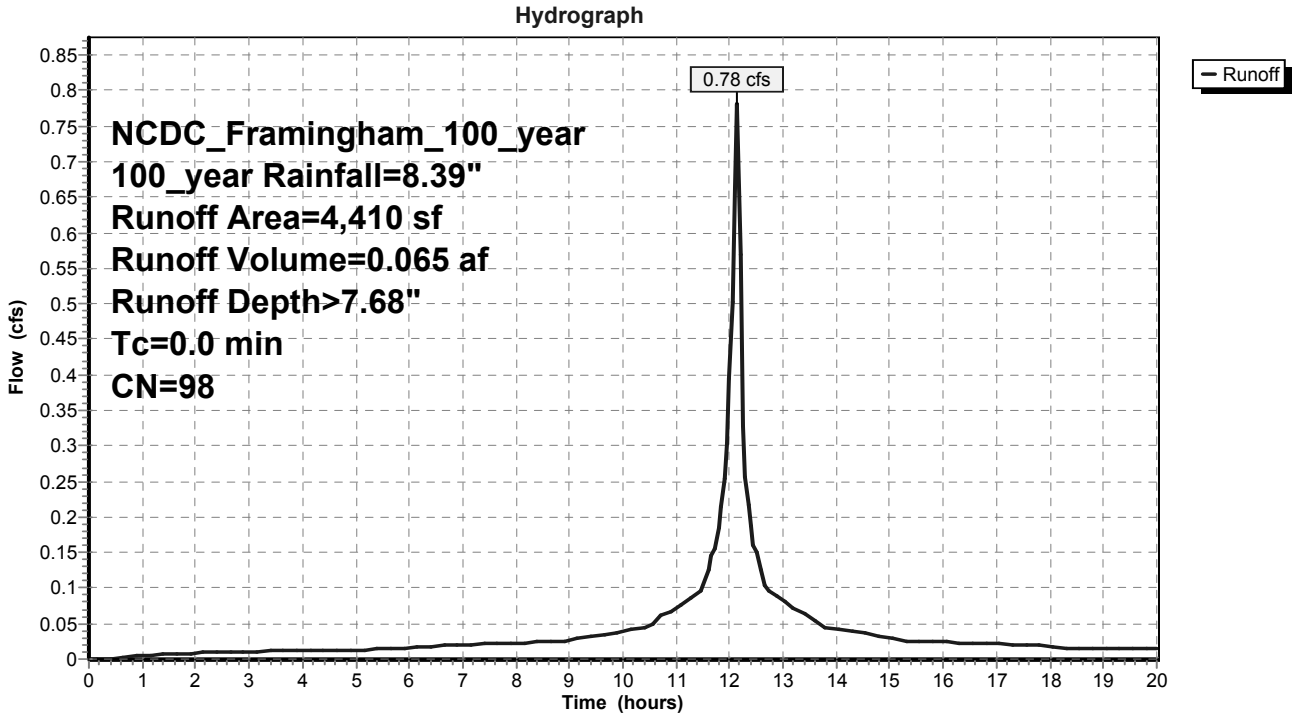
## Summary for Subcatchment ROOF-64: (blank)

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-64: (blank)



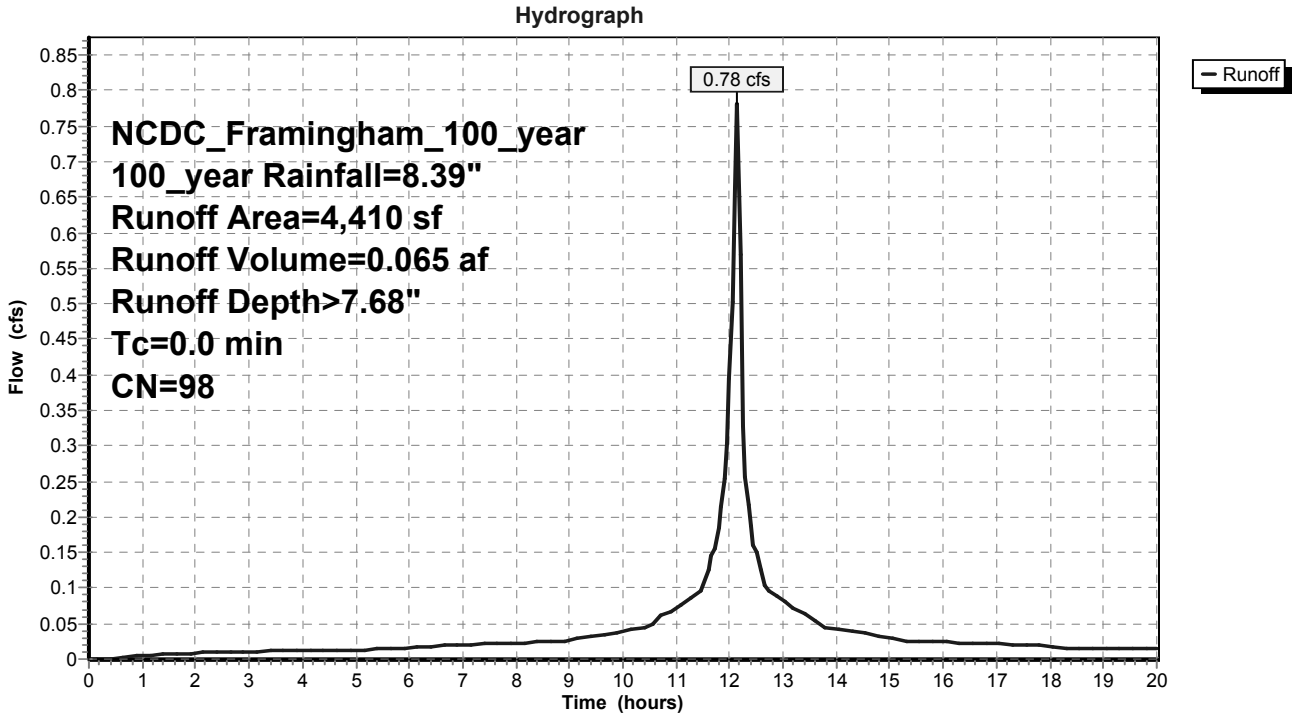
## Summary for Subcatchment ROOF-65: (blank)

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-65: (blank)



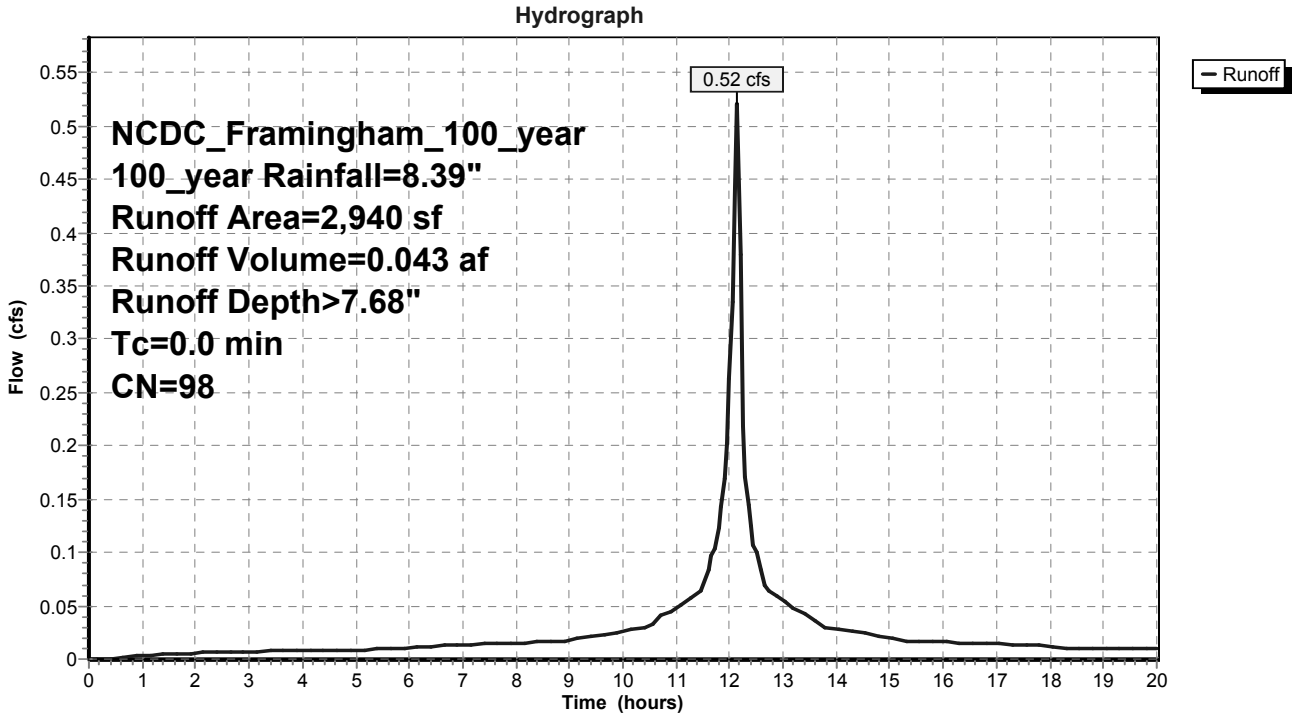
## Summary for Subcatchment ROOF-66: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-66: (blank)



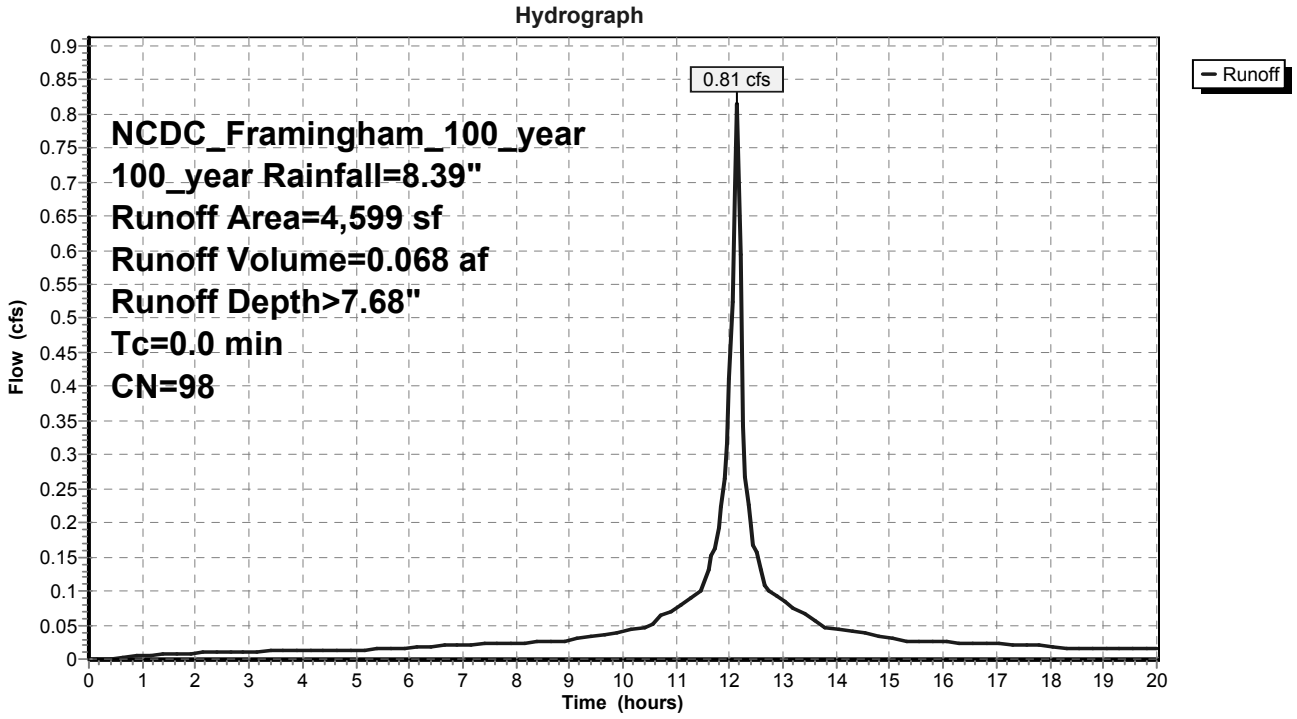
## Summary for Subcatchment ROOF-67: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-67: (blank)



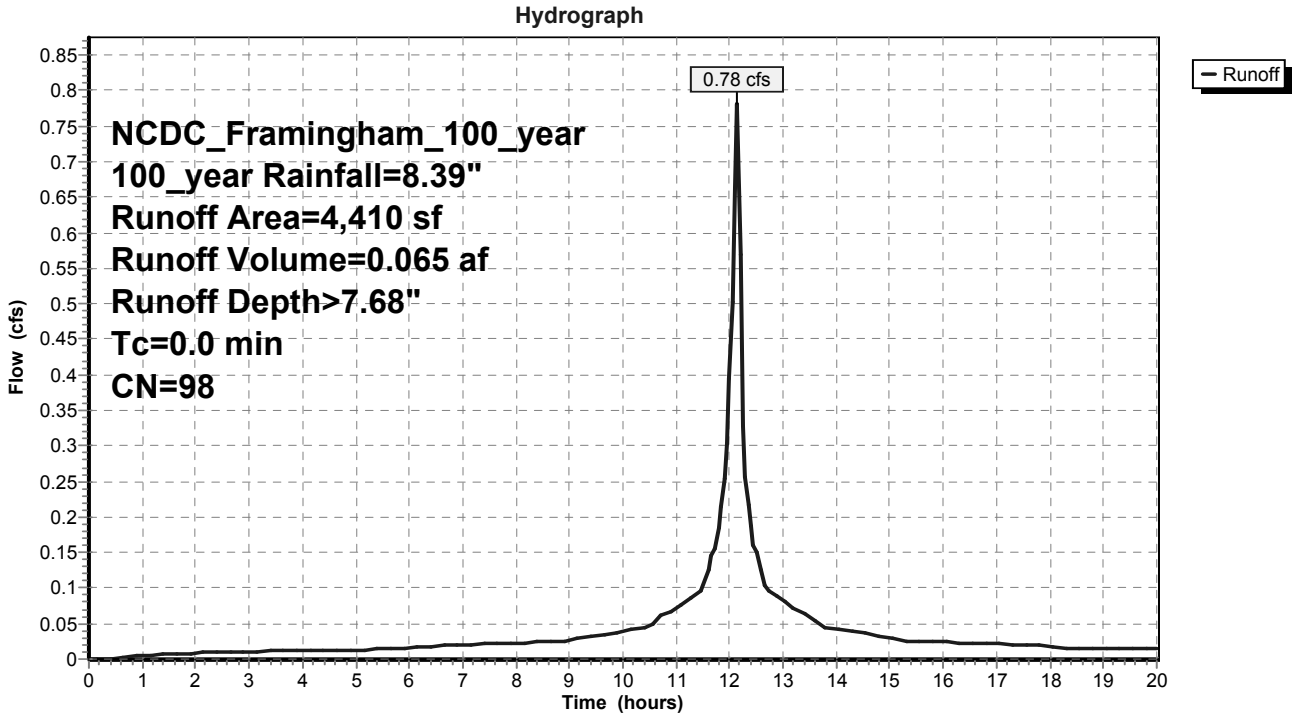
## Summary for Subcatchment ROOF-68: (blank)

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-68: (blank)



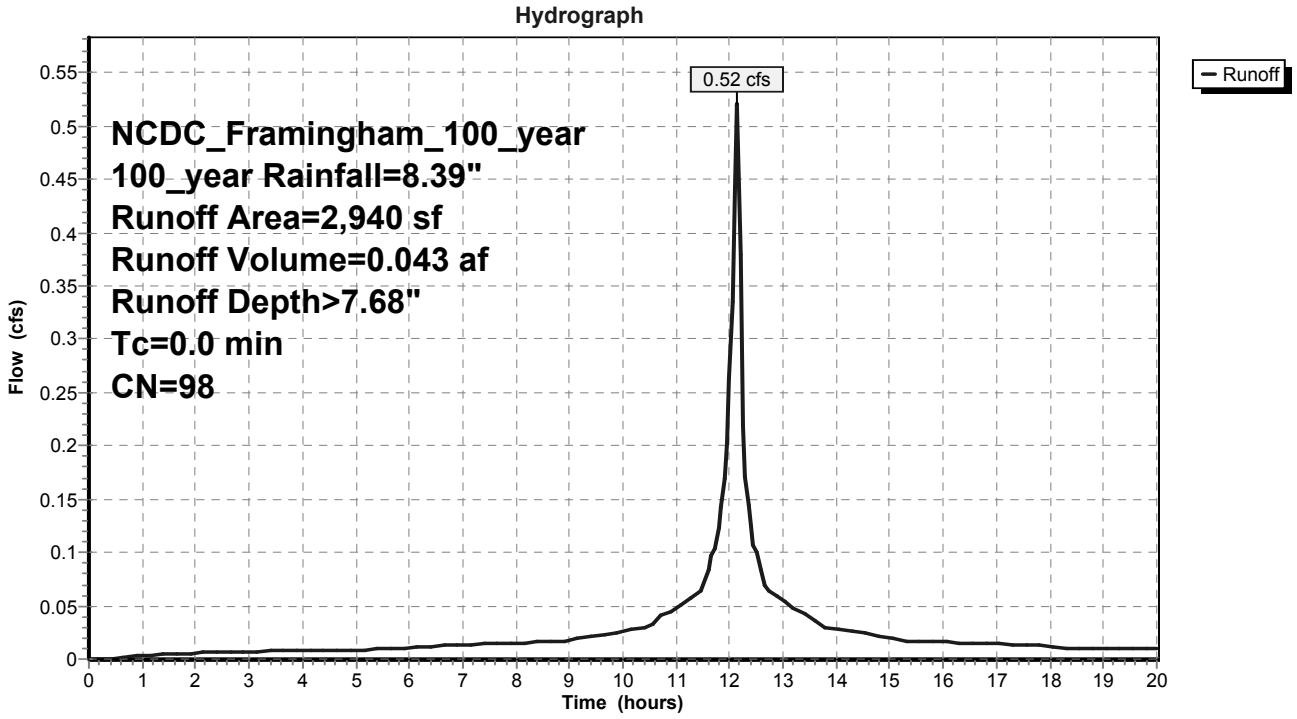
## Summary for Subcatchment ROOF-69: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-69: (blank)



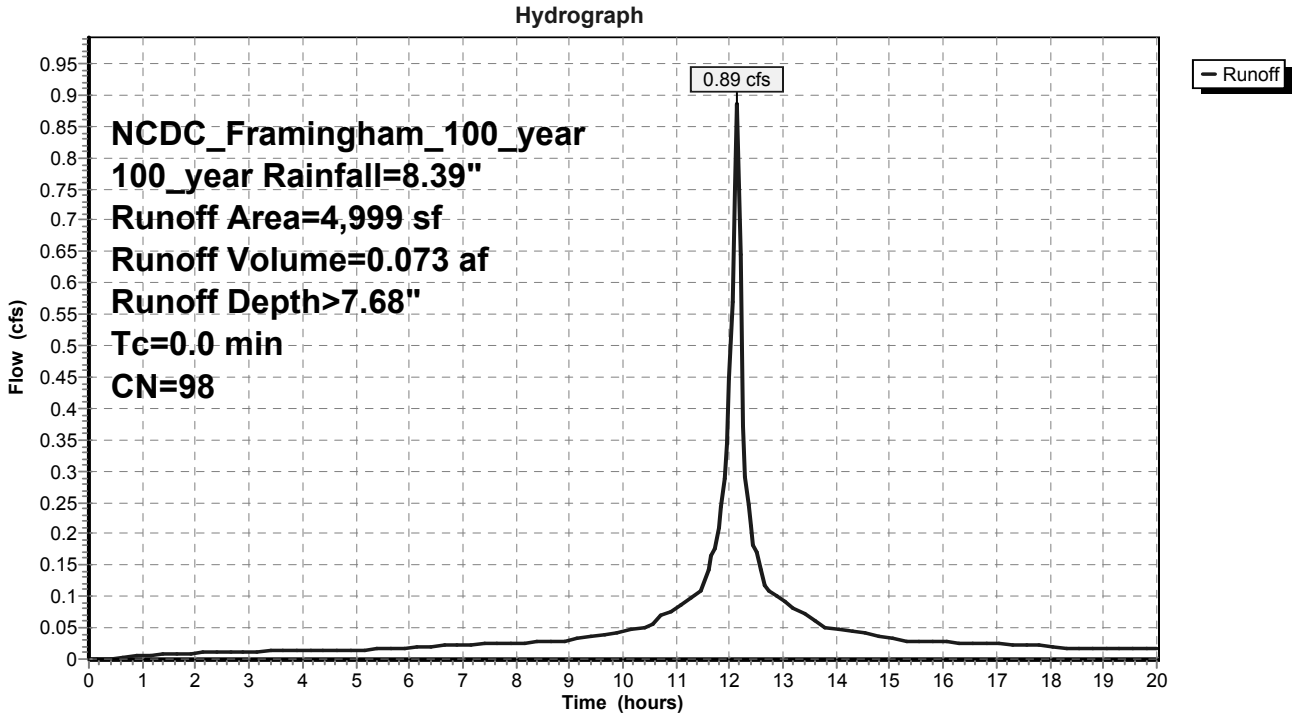
## Summary for Subcatchment ROOF-7: (blank)

Runoff = 0.89 cfs @ 12.14 hrs, Volume= 0.073 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,999 | 98 | ROOF, 100% imperv, HSG B |
| | 4,999 | | 100.00% Pervious Area |

## Subcatchment ROOF-7: (blank)



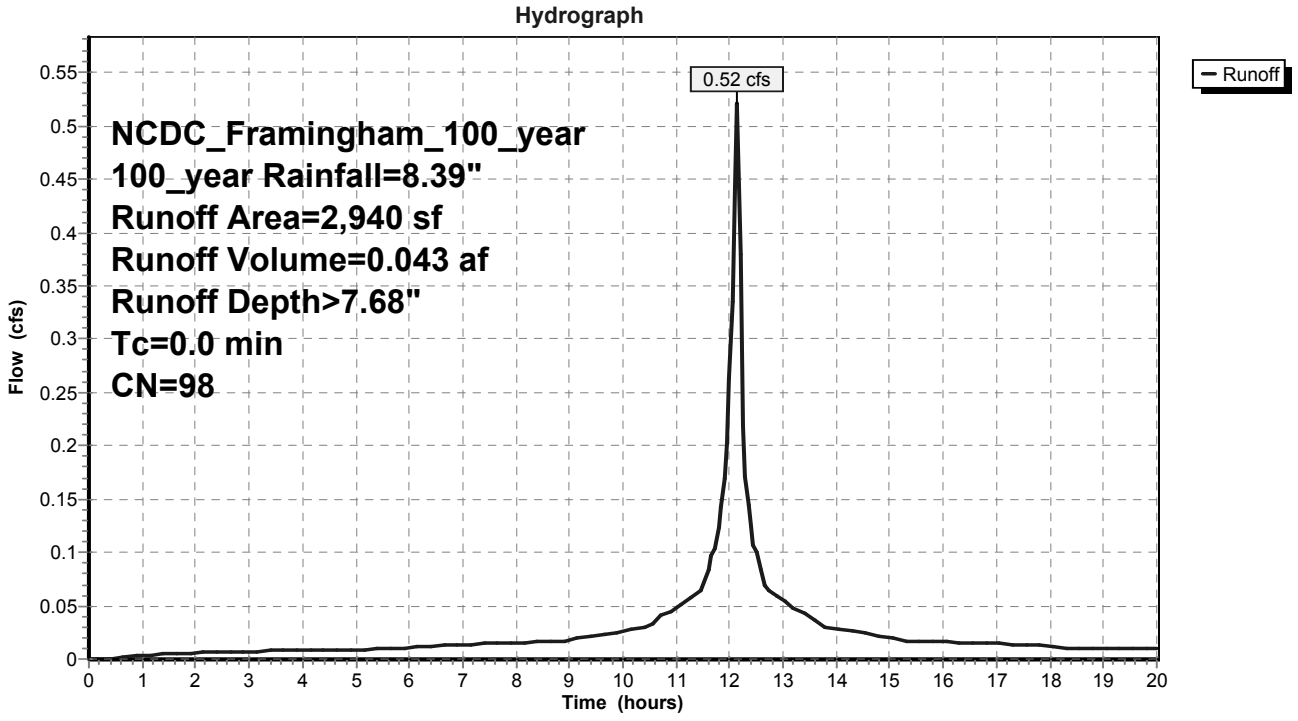
## Summary for Subcatchment ROOF-70: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,017 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,923 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-70: (blank)



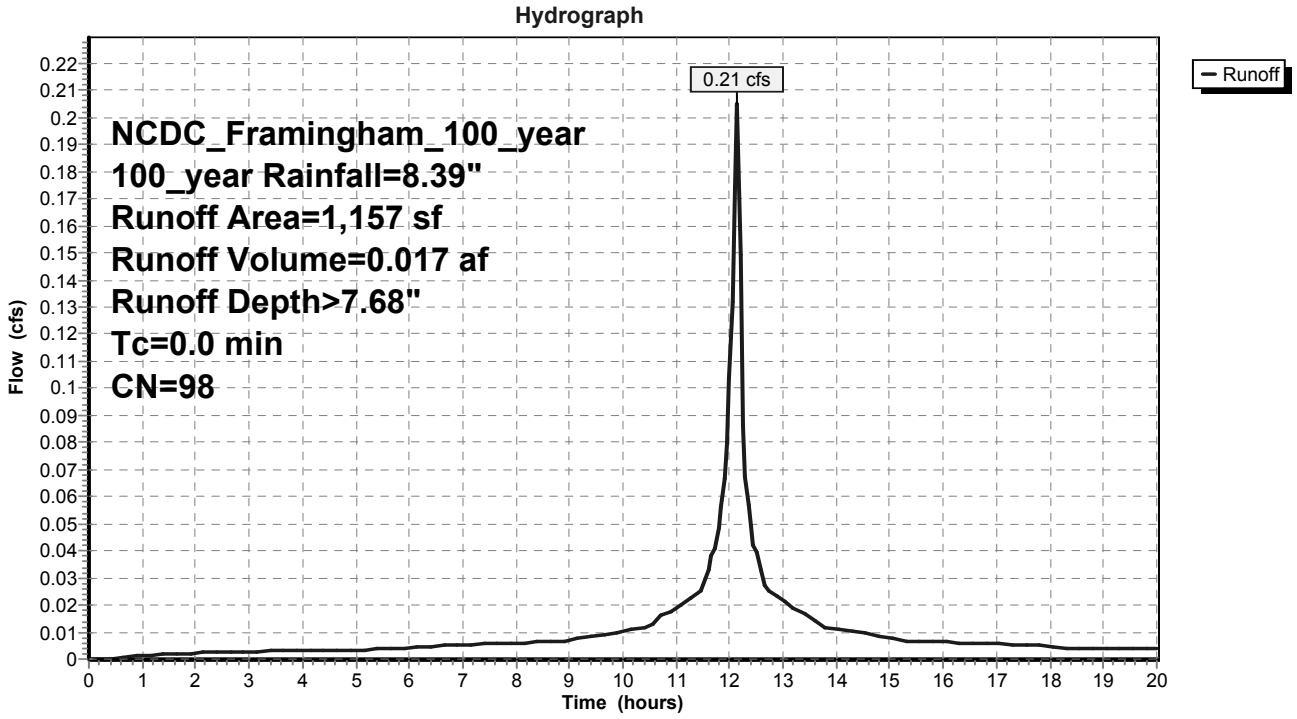
## Summary for Subcatchment ROOF-71: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-71: (blank)



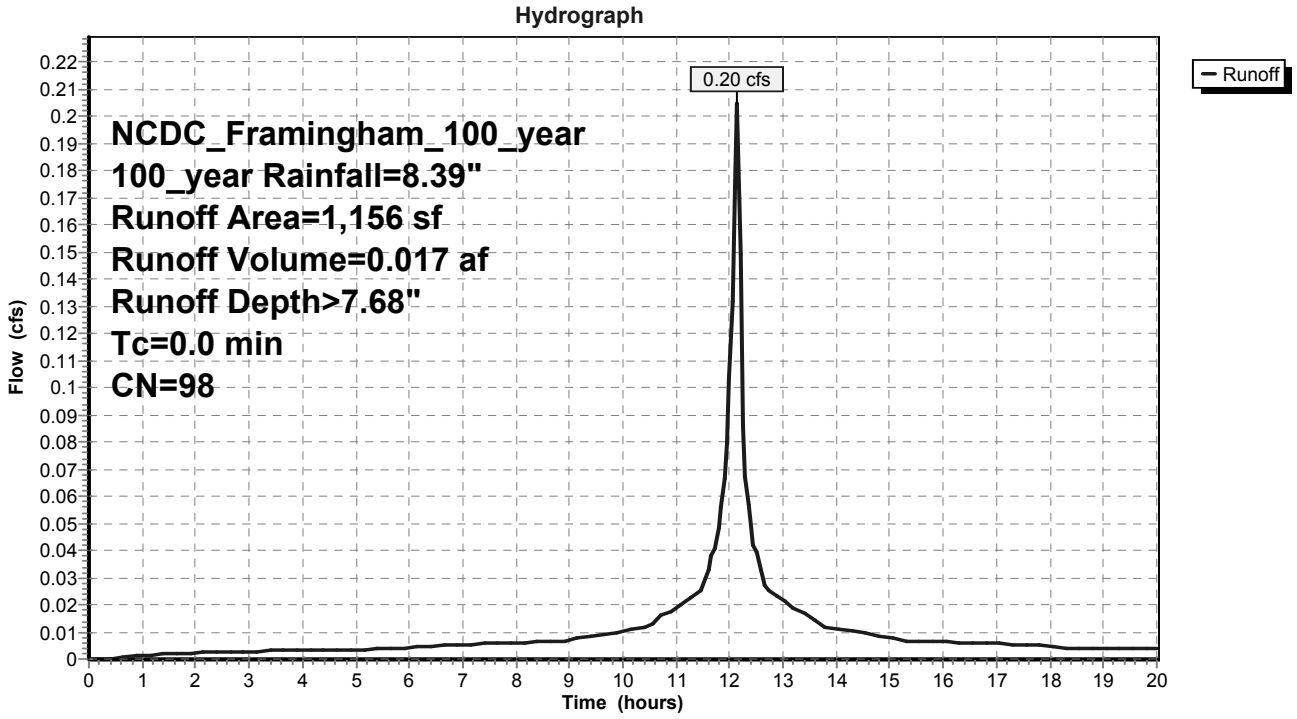
## Summary for Subcatchment ROOF-72: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 106 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,050 | 98 | ROOF, 100% imperv, HSG B |
| | 1,156 | 98 | Weighted Average |
| | 1,156 | | 100.00% Pervious Area |

## Subcatchment ROOF-72: (blank)



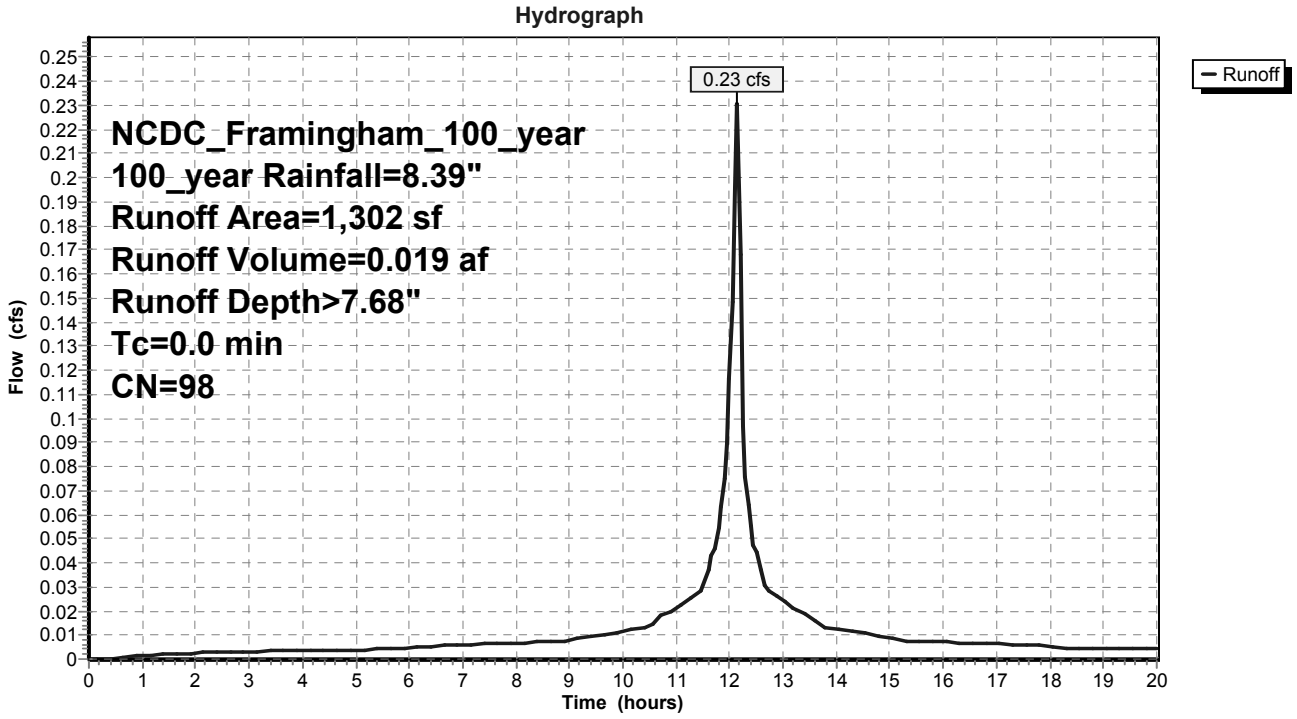
## Summary for Subcatchment ROOF-73: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-73: (blank)



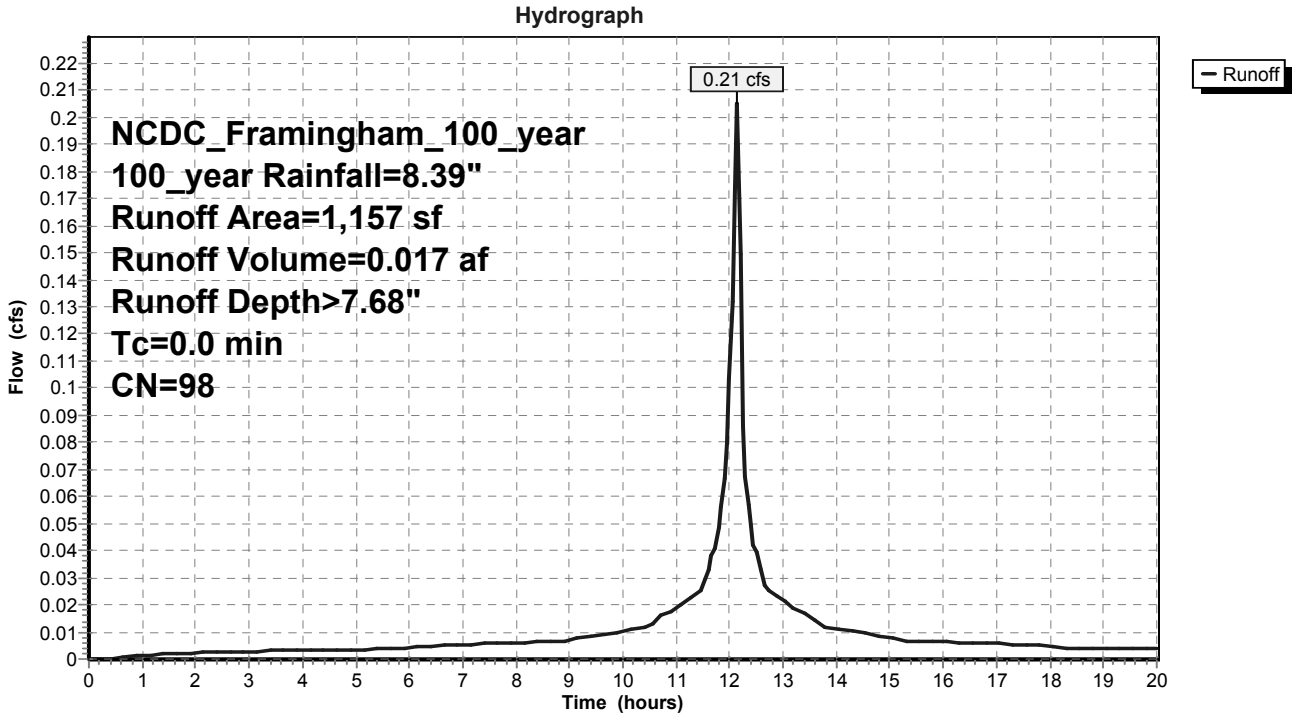
## Summary for Subcatchment ROOF-74: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 465 | 98 | ROOF, 100% imperv, HSG A |
| * | 693 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-74: (blank)



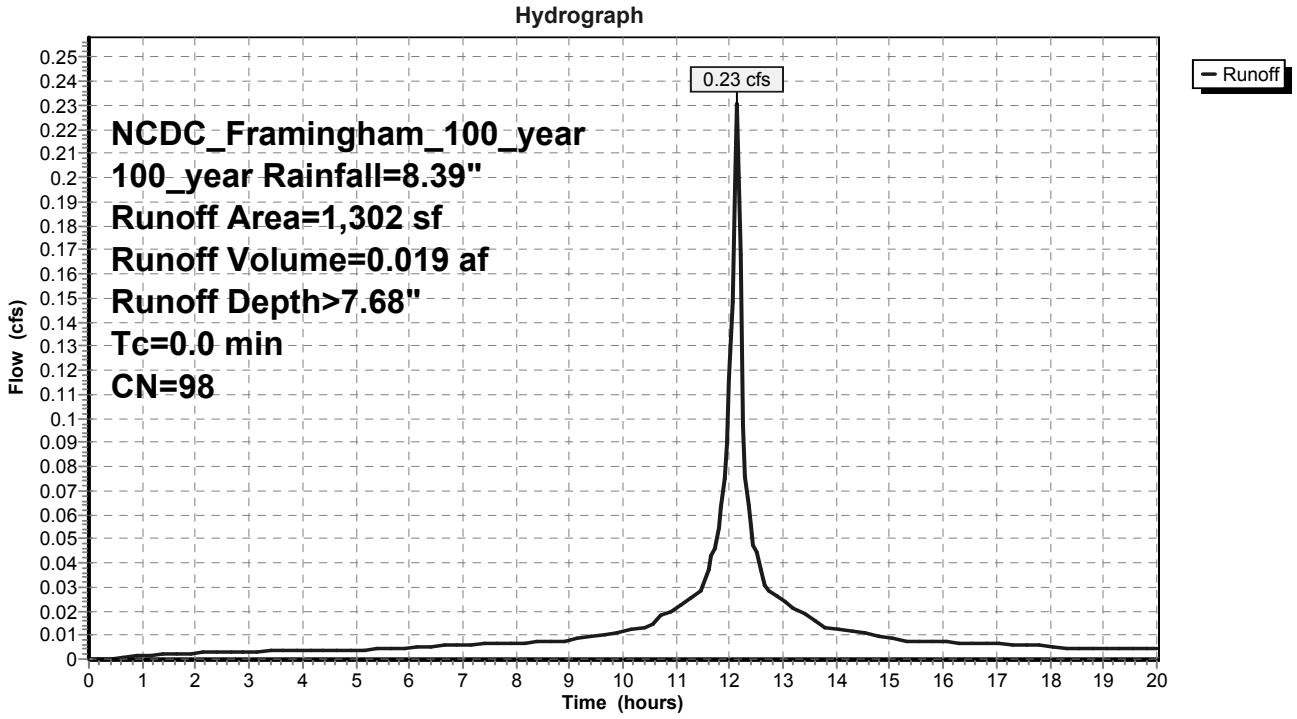
## Summary for Subcatchment ROOF-75: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-75: (blank)



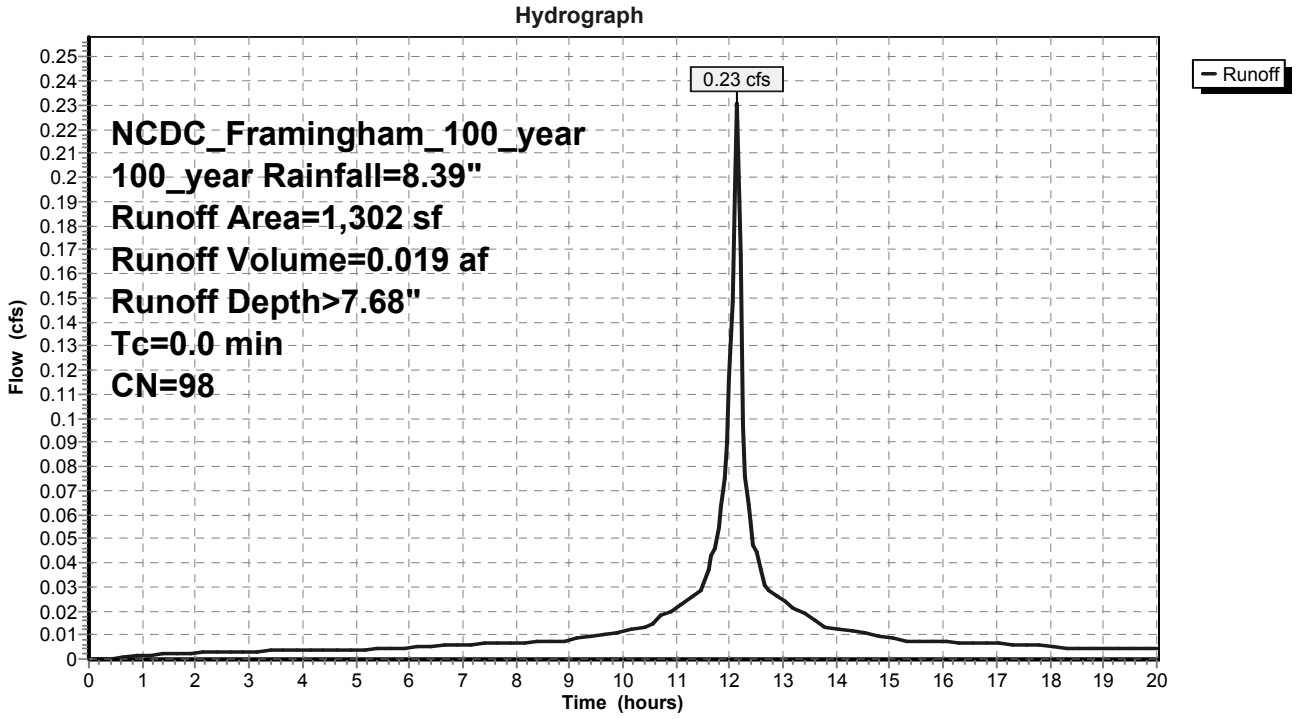
## Summary for Subcatchment ROOF-76: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 643 | 98 | ROOF, 100% imperv, HSG A |
| * | 659 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | 98 | Weighted Average |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-76: (blank)



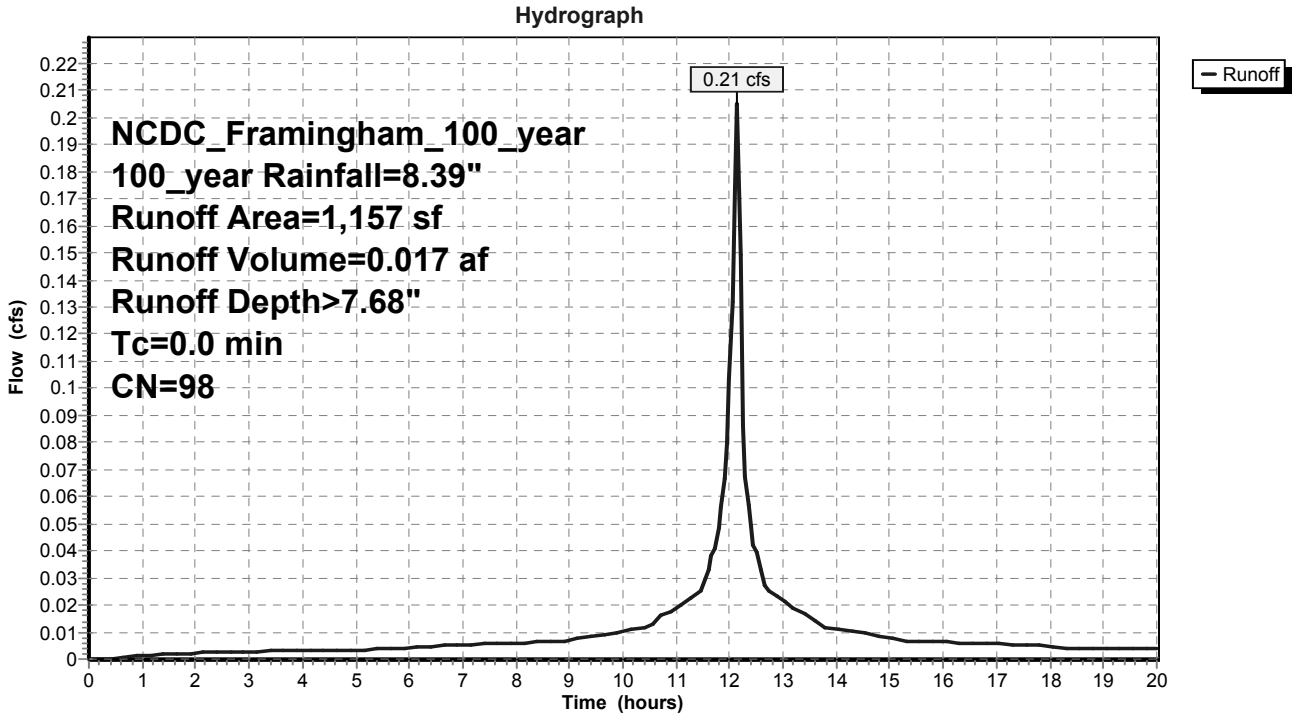
## Summary for Subcatchment ROOF-77: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-77: (blank)



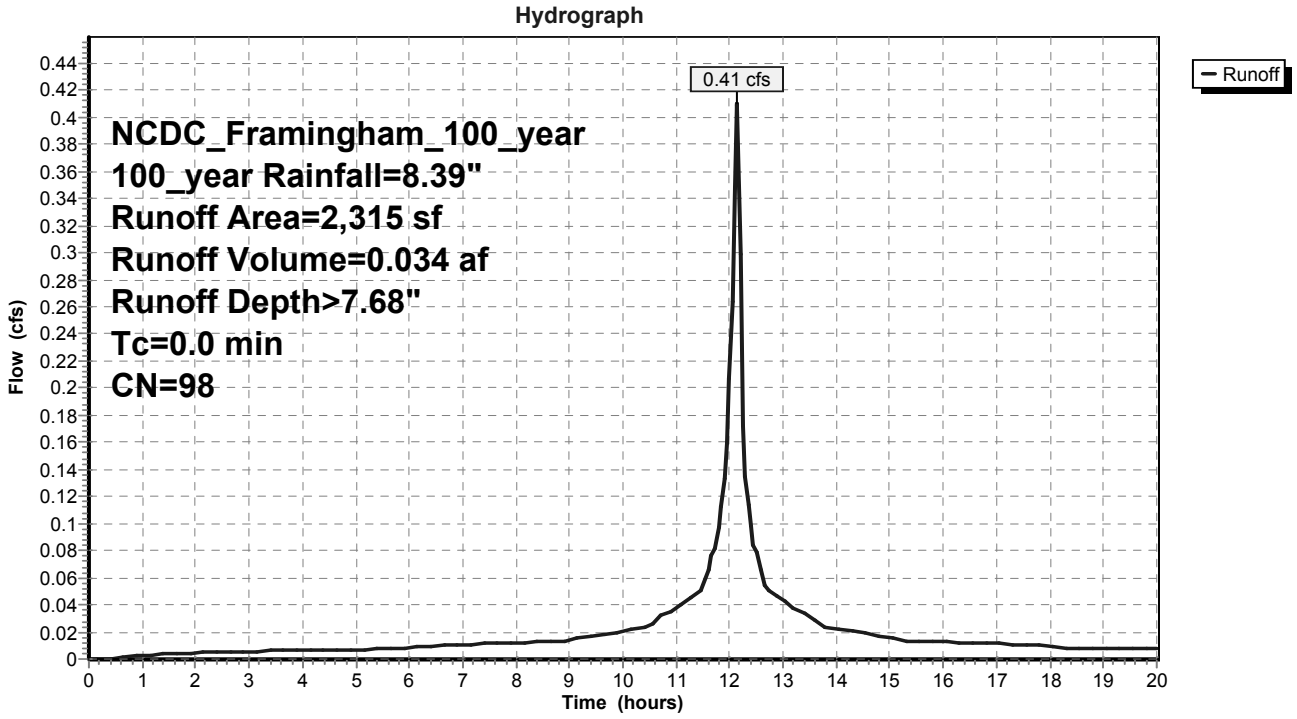
## Summary for Subcatchment ROOF-78: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,443 | 98 | ROOF, 100% imperv, HSG A |
| * | 872 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | 98 | Weighted Average |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-78: (blank)



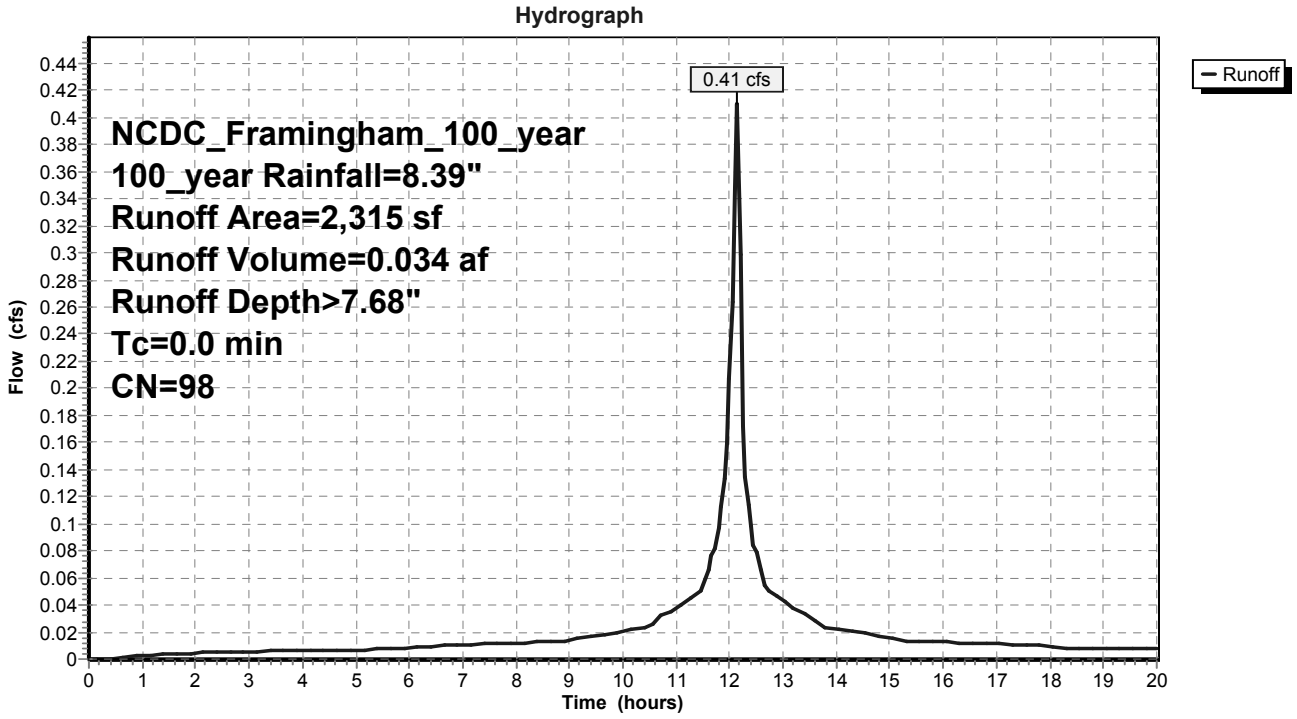
## Summary for Subcatchment ROOF-79: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG A |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-79: (blank)



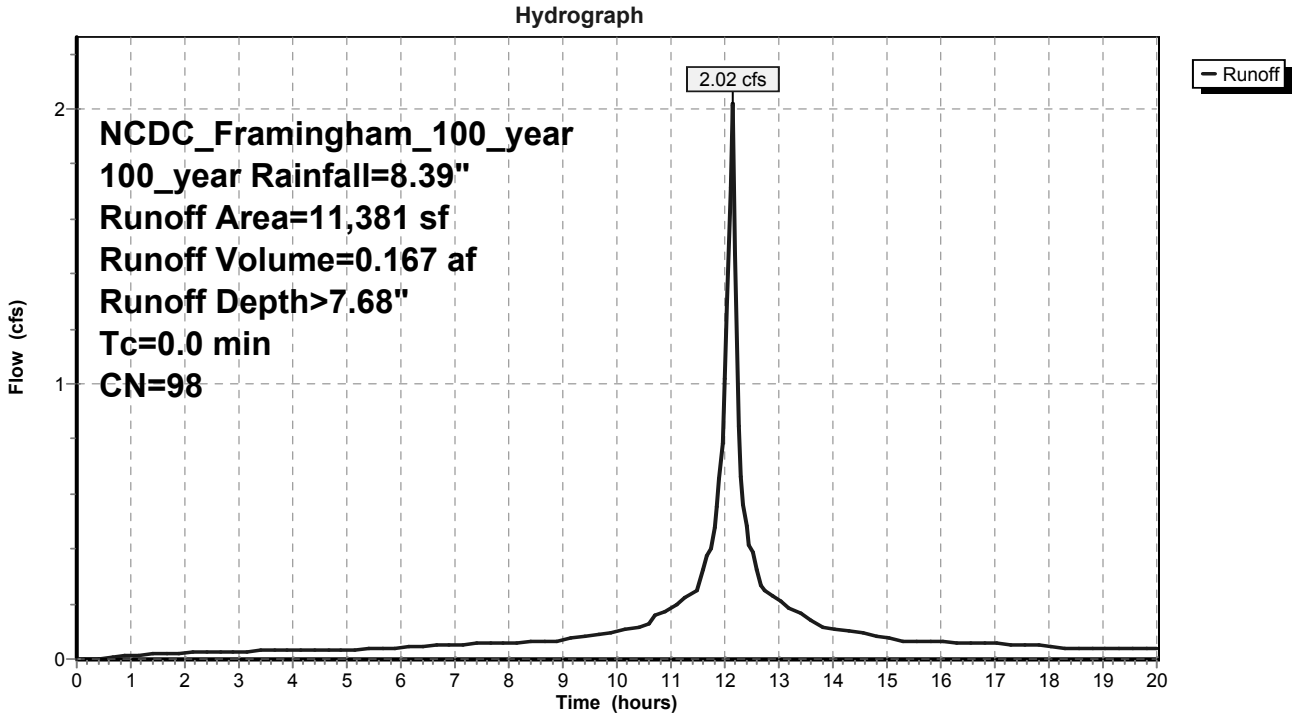
## Summary for Subcatchment ROOF-8: (blank)

Runoff = 2.02 cfs @ 12.14 hrs, Volume= 0.167 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 376 | 98 | DECK, 100% imperv, HSG B |
| * | 11,005 | 98 | ROOF, 100% imperv, HSG B |
| | 11,381 | 98 | Weighted Average |
| | 11,381 | | 100.00% Pervious Area |

## Subcatchment ROOF-8: (blank)



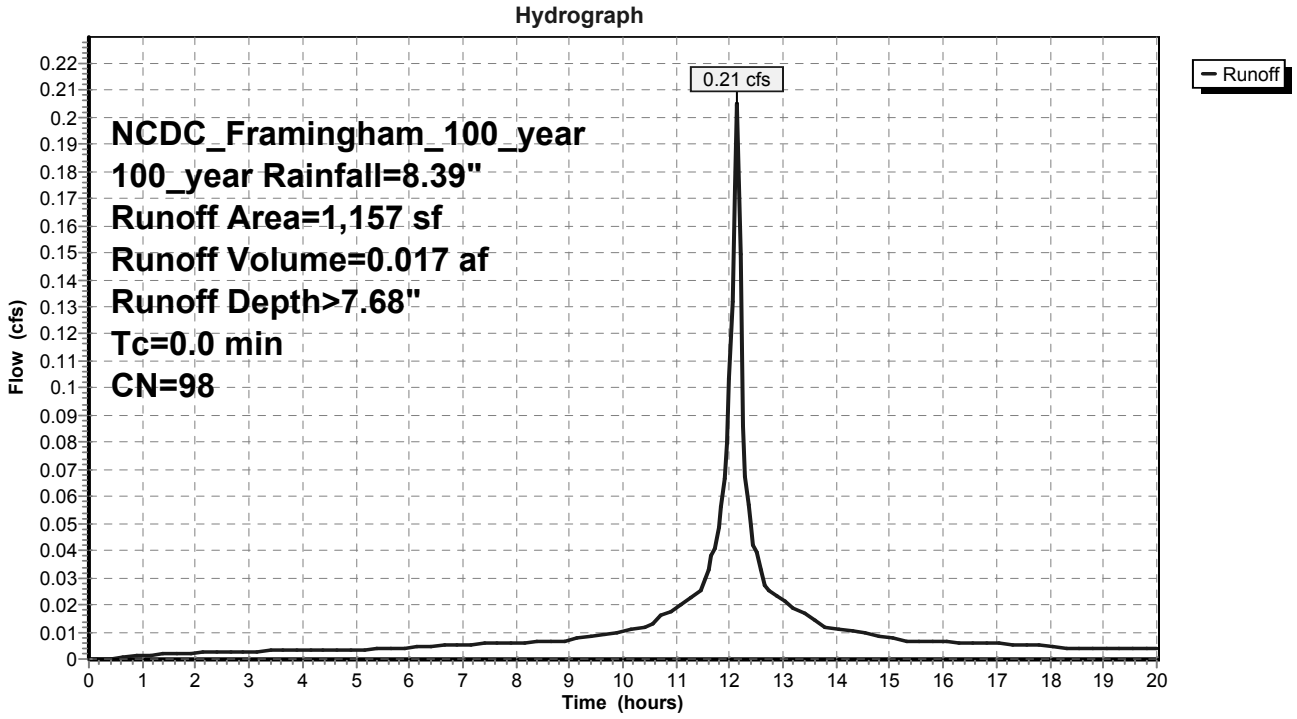
## Summary for Subcatchment ROOF-80: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 548 | 98 | ROOF, 100% imperv, HSG A |
| * | 609 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-80: (blank)



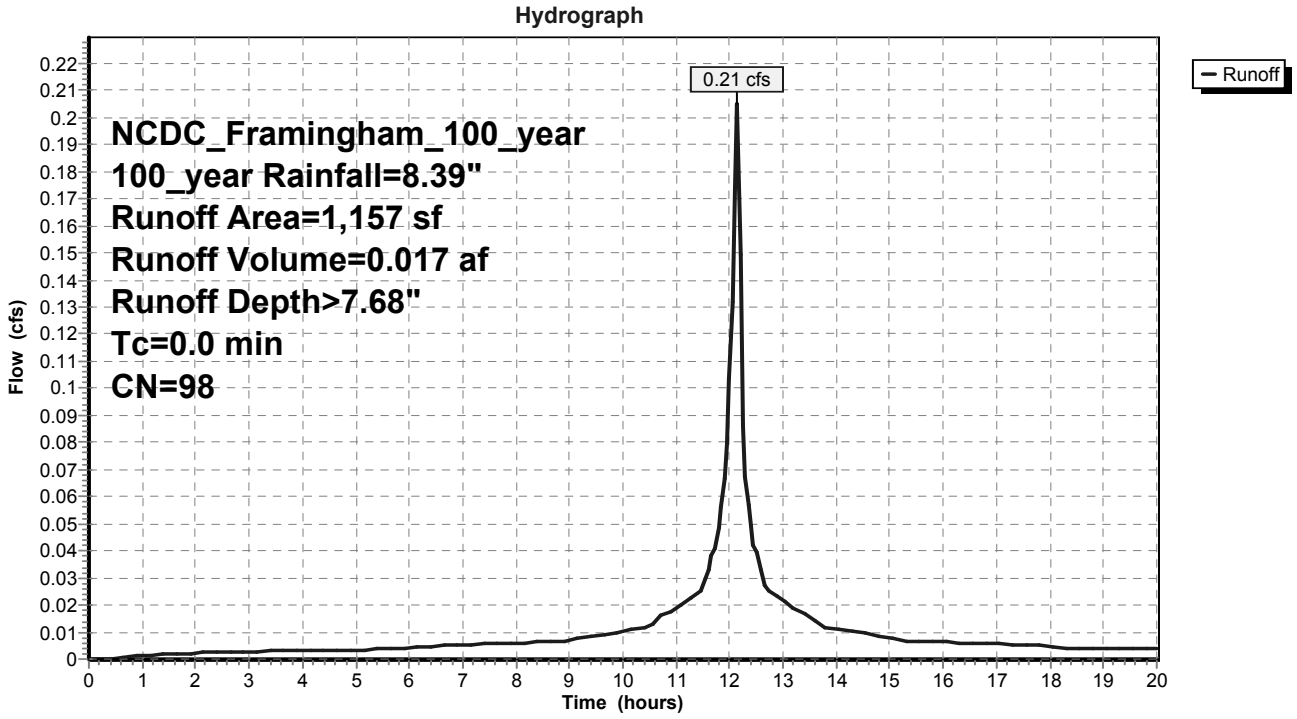
## Summary for Subcatchment ROOF-81: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-81: (blank)



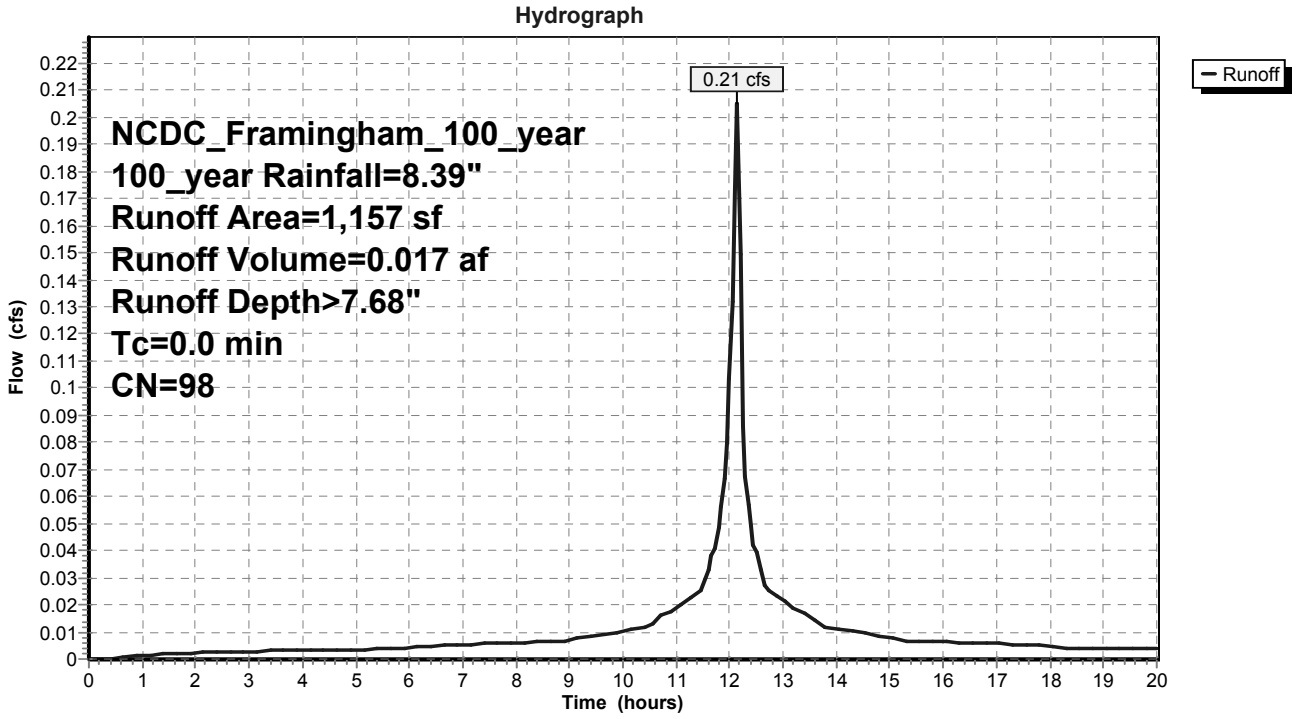
## Summary for Subcatchment ROOF-82: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 234 | 98 | ROOF, 100% imperv, HSG A |
| * | 924 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-82: (blank)



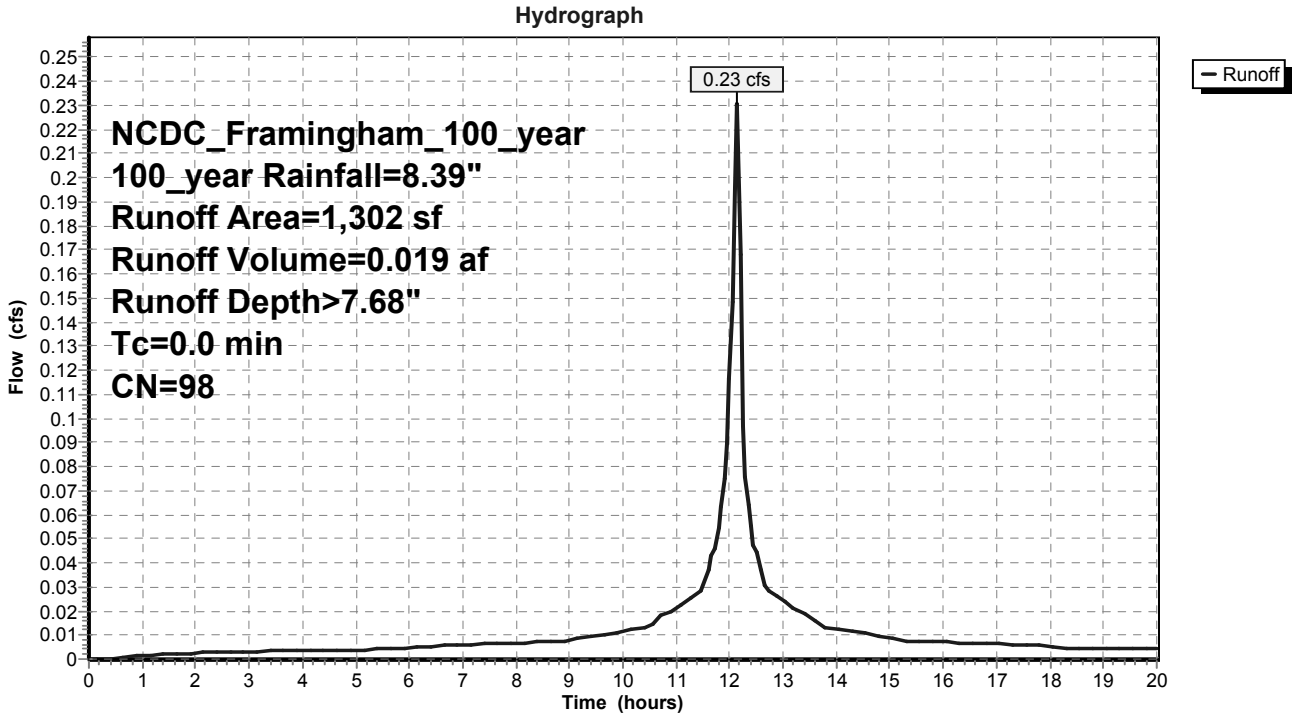
## Summary for Subcatchment ROOF-83: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG A |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-83: (blank)



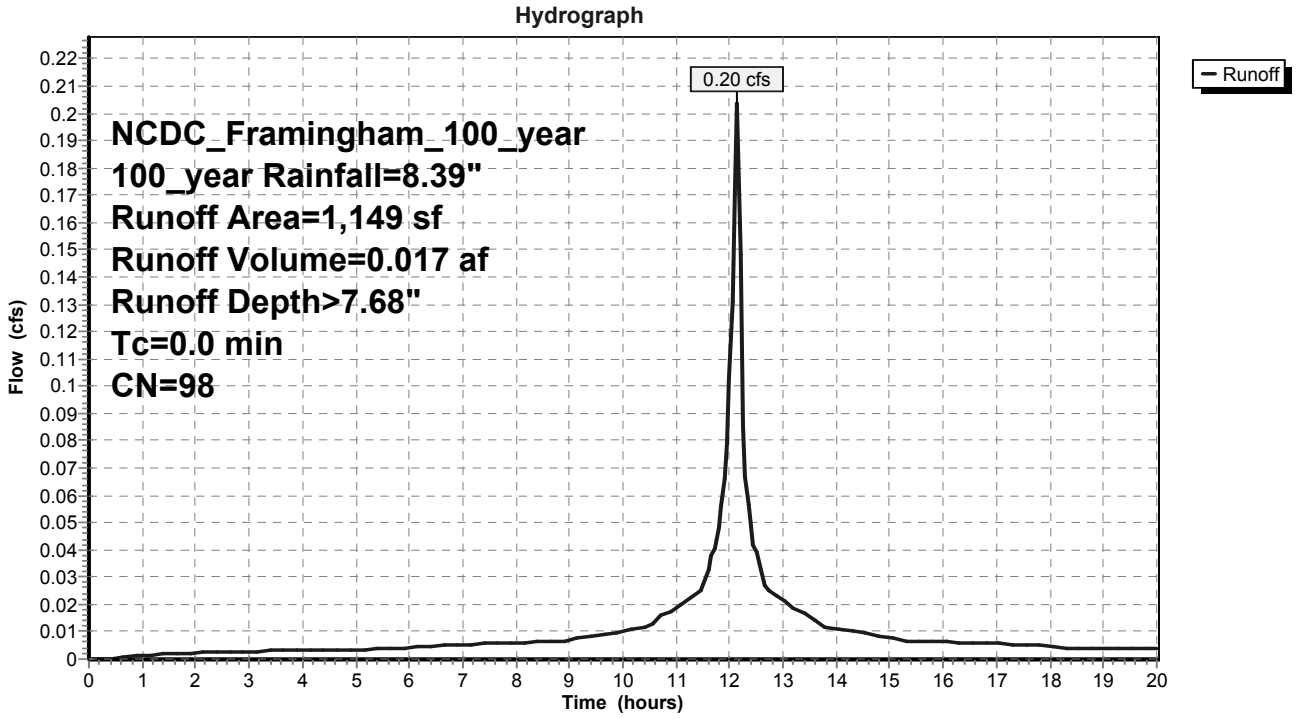
## Summary for Subcatchment ROOF-84: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 6 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,143 | 98 | ROOF, 100% imperv, HSG B |
| | 1,149 | 98 | Weighted Average |
| | 1,149 | | 100.00% Pervious Area |

## Subcatchment ROOF-84: (blank)



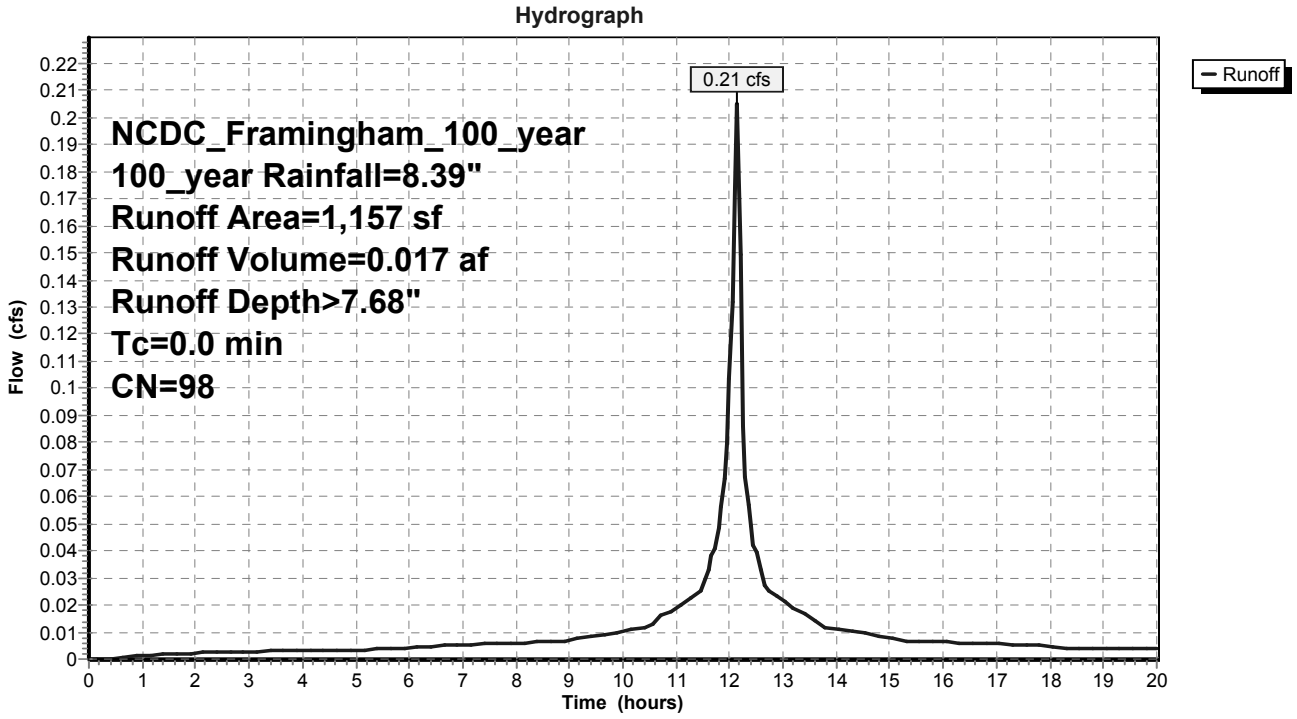
## Summary for Subcatchment ROOF-85: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-85: (blank)



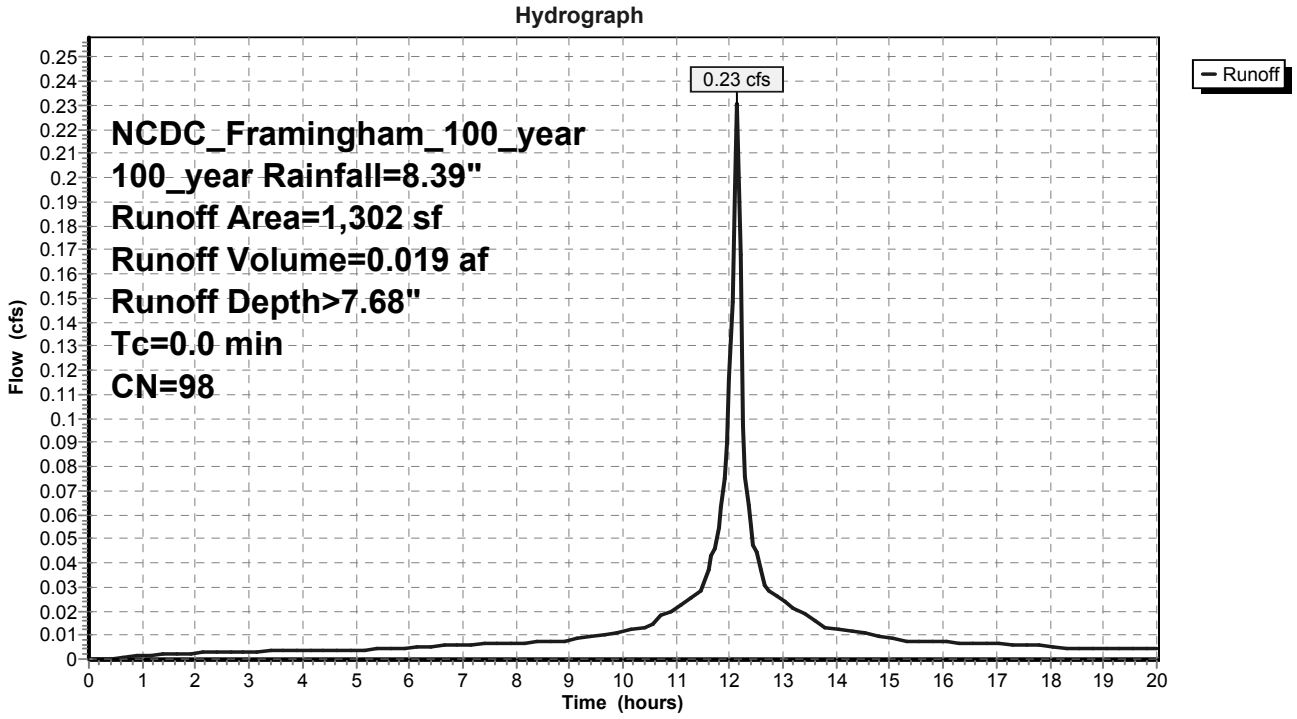
## Summary for Subcatchment ROOF-86: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-86: (blank)



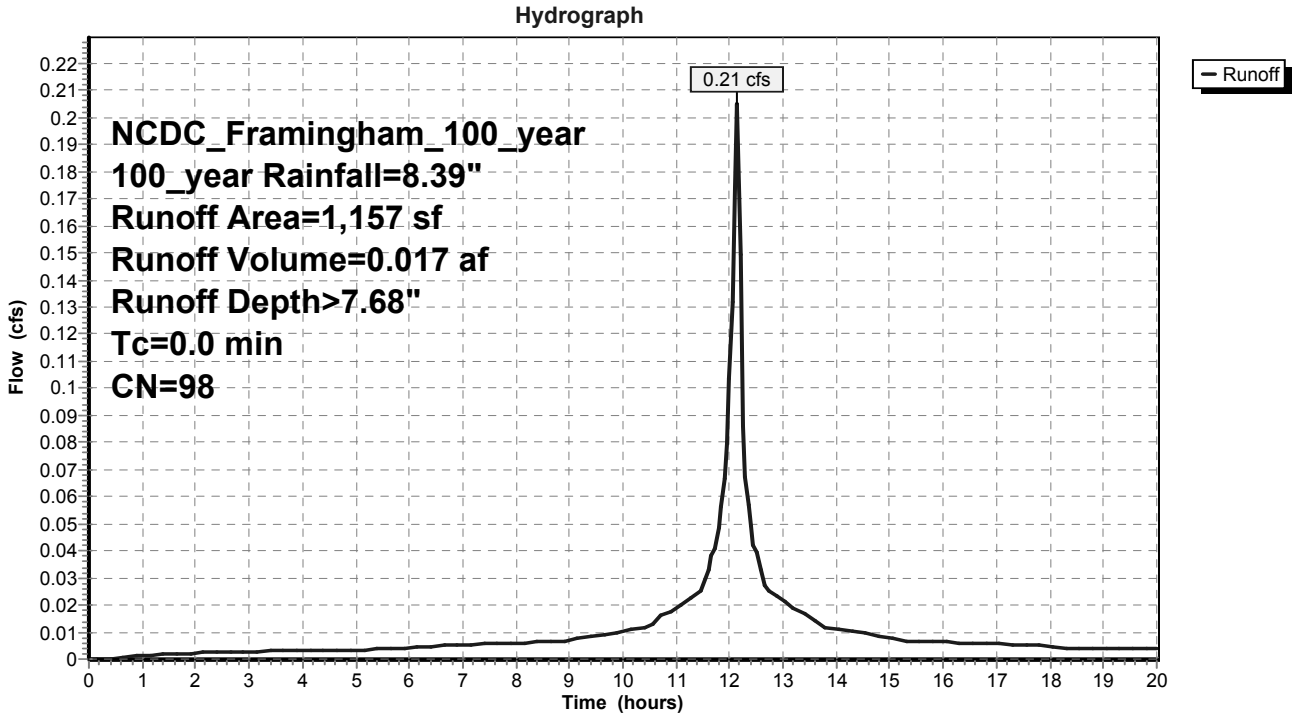
## Summary for Subcatchment ROOF-87: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG A |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-87: (blank)



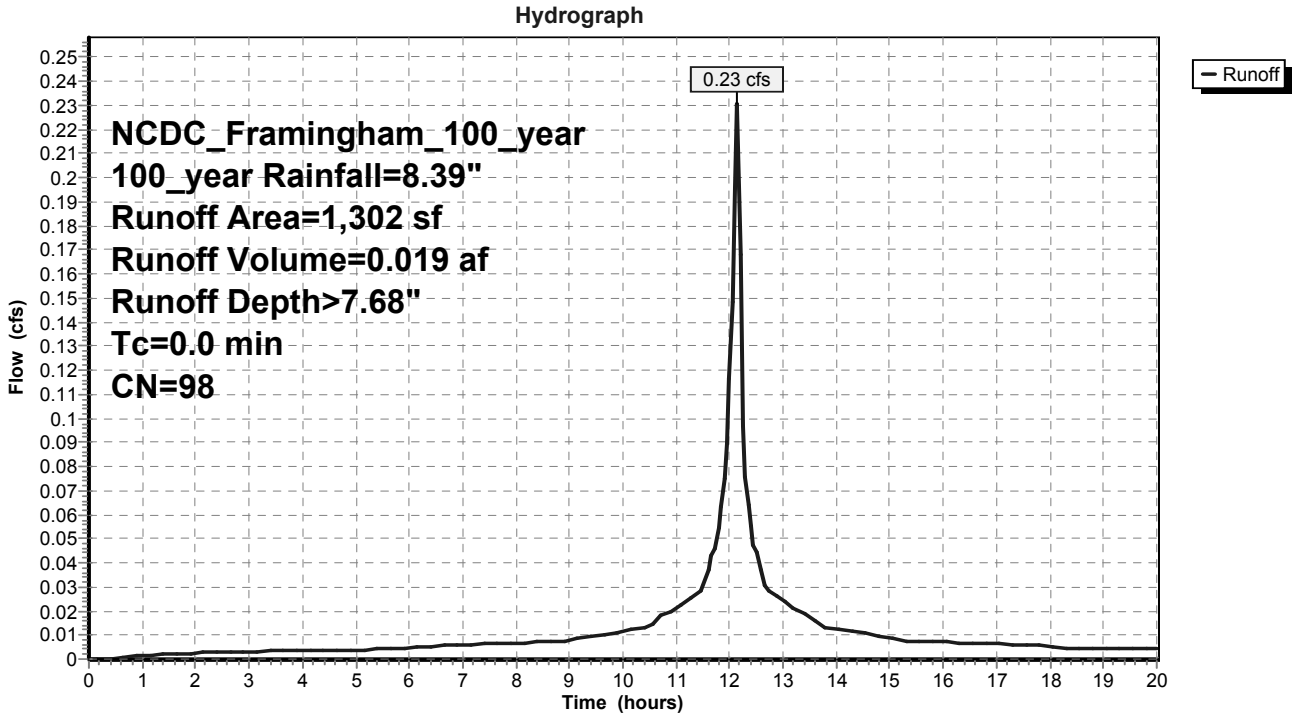
## Summary for Subcatchment ROOF-88: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,302 | 98 | ROOF, 100% imperv, HSG B |
| | 1,302 | | 100.00% Pervious Area |

## Subcatchment ROOF-88: (blank)



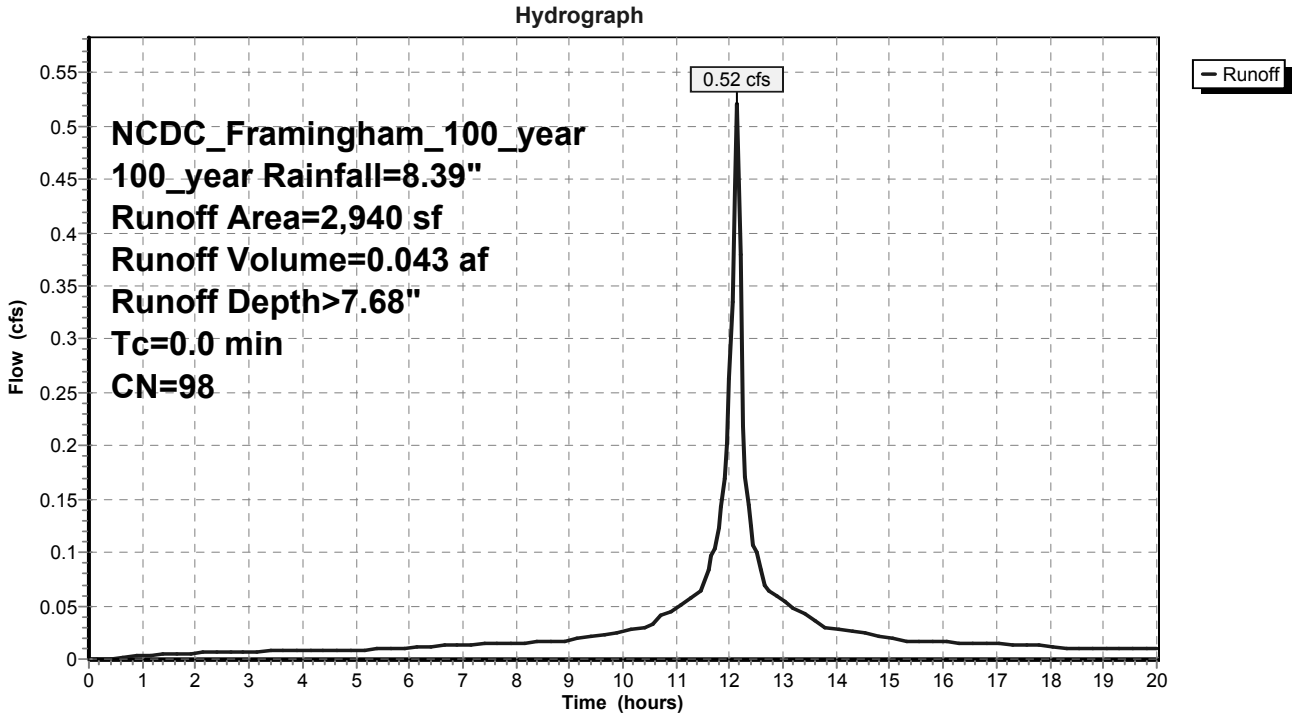
## Summary for Subcatchment ROOF-89: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,940 | 98 | ROOF, 100% imperv, HSG A |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-89: (blank)



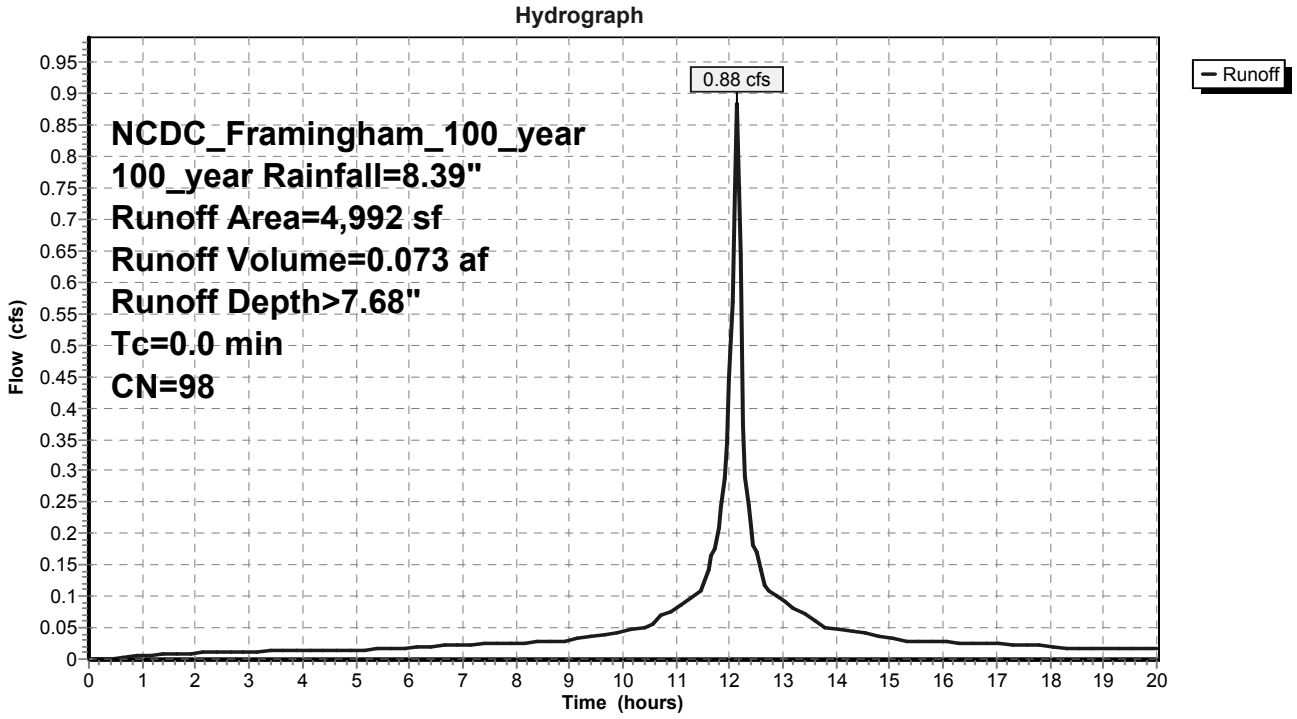
## Summary for Subcatchment ROOF-9: (blank)

Runoff = 0.88 cfs @ 12.14 hrs, Volume= 0.073 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,992 | 98 | ROOF, 100% imperv, HSG B |
| | 4,992 | | 100.00% Pervious Area |

## Subcatchment ROOF-9: (blank)



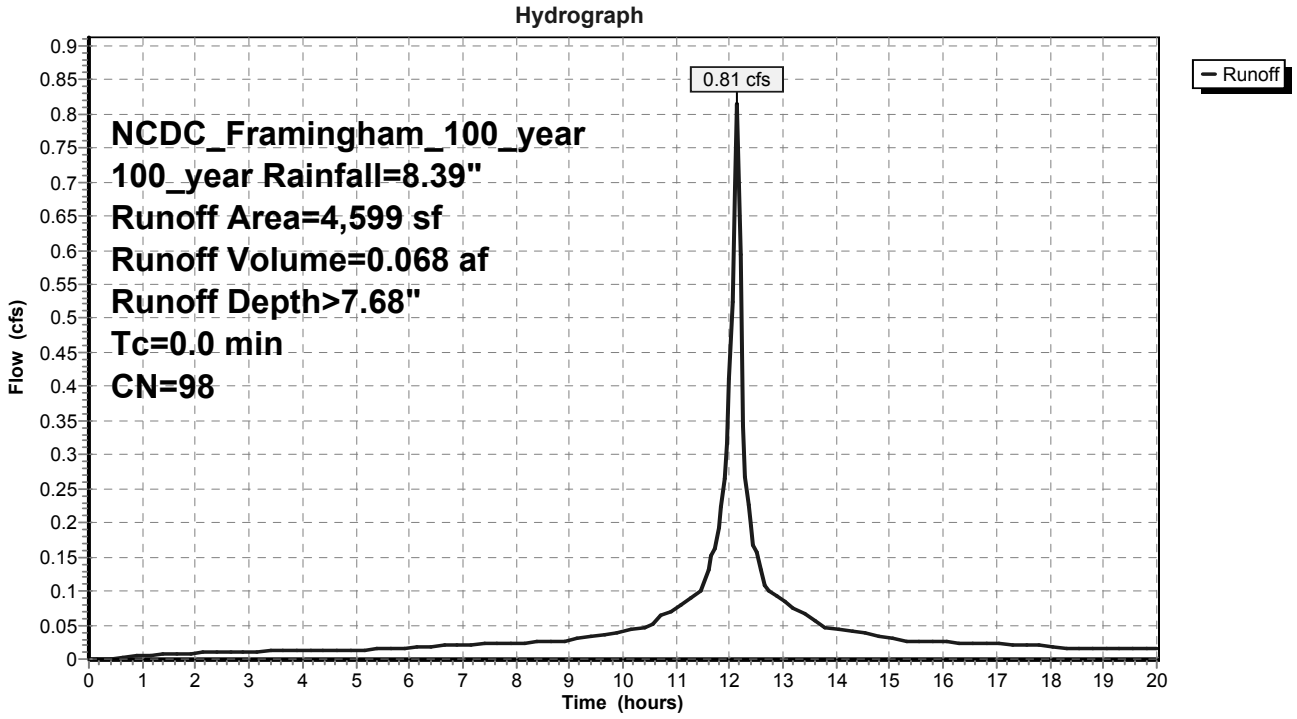
## Summary for Subcatchment ROOF-90: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-90: (blank)



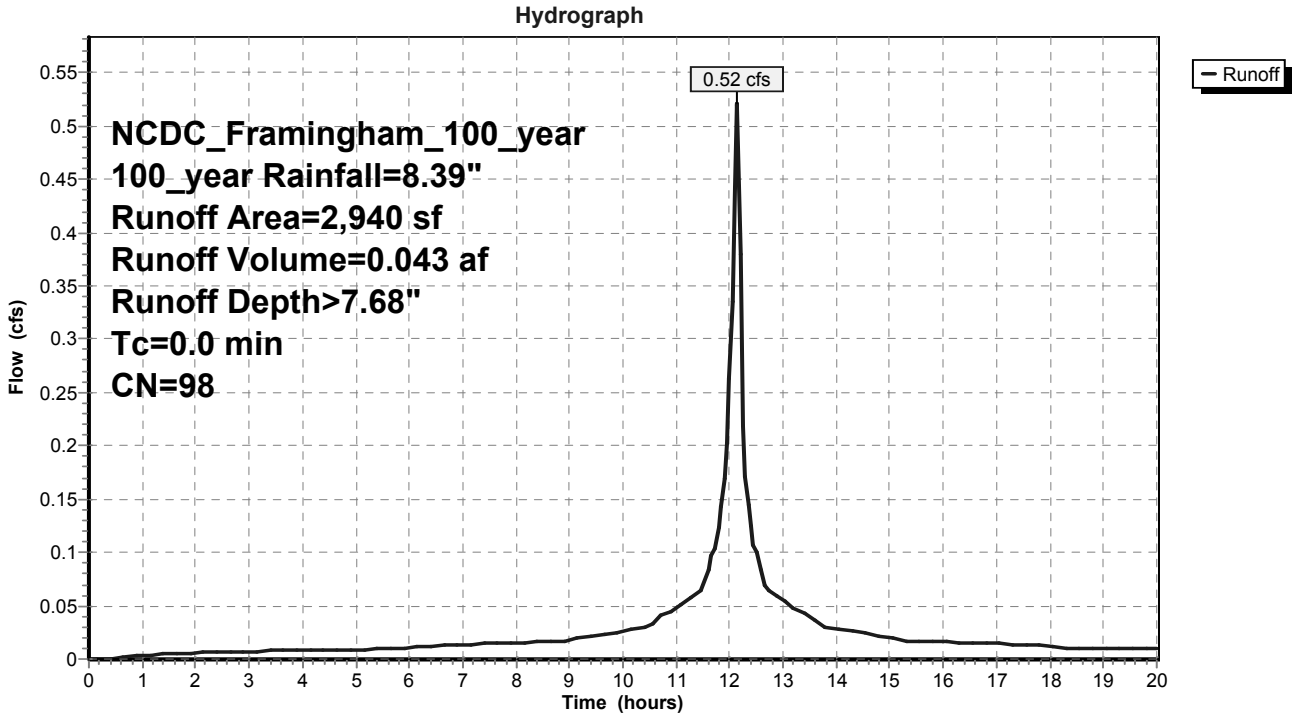
## Summary for Subcatchment ROOF-91: (blank)

Runoff = 0.52 cfs @ 12.14 hrs, Volume= 0.043 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,215 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,725 | 98 | ROOF, 100% imperv, HSG B |
| | 2,940 | 98 | Weighted Average |
| | 2,940 | | 100.00% Pervious Area |

## Subcatchment ROOF-91: (blank)



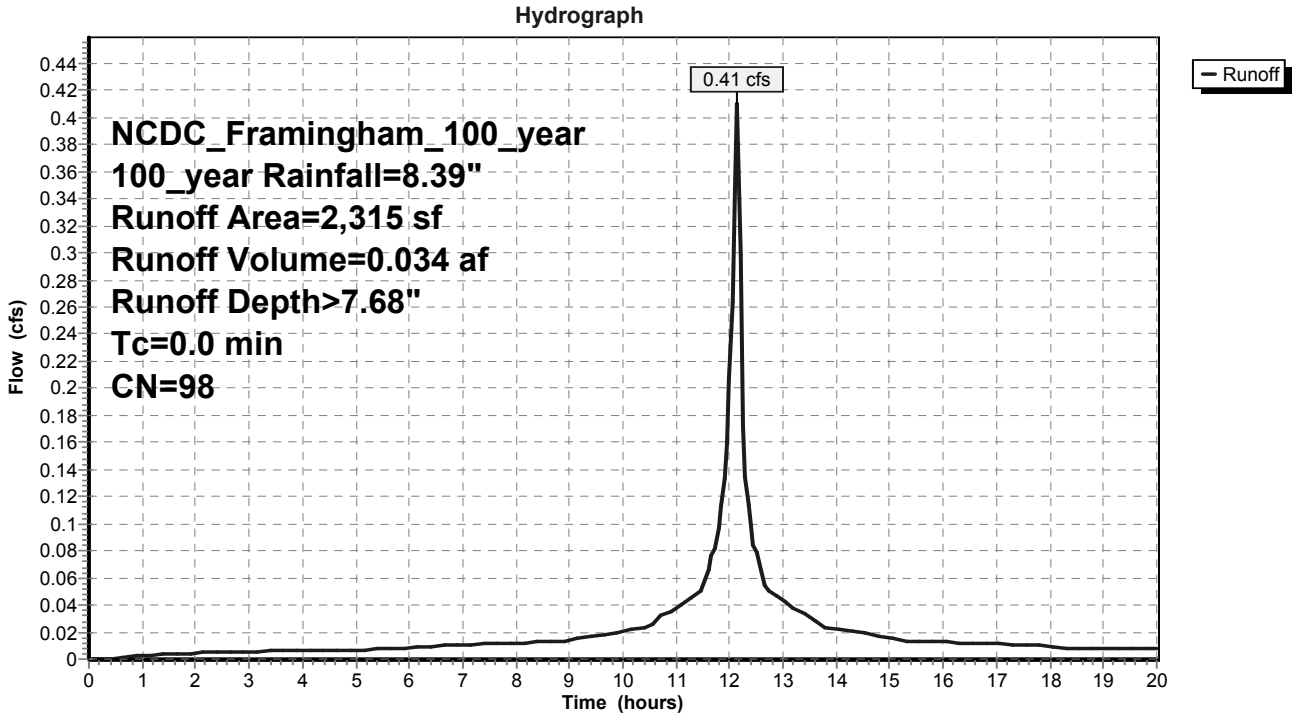
## Summary for Subcatchment ROOF-92: (blank)

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 0.034 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,315 | 98 | ROOF, 100% imperv, HSG B |
| | 2,315 | | 100.00% Pervious Area |

## Subcatchment ROOF-92: (blank)



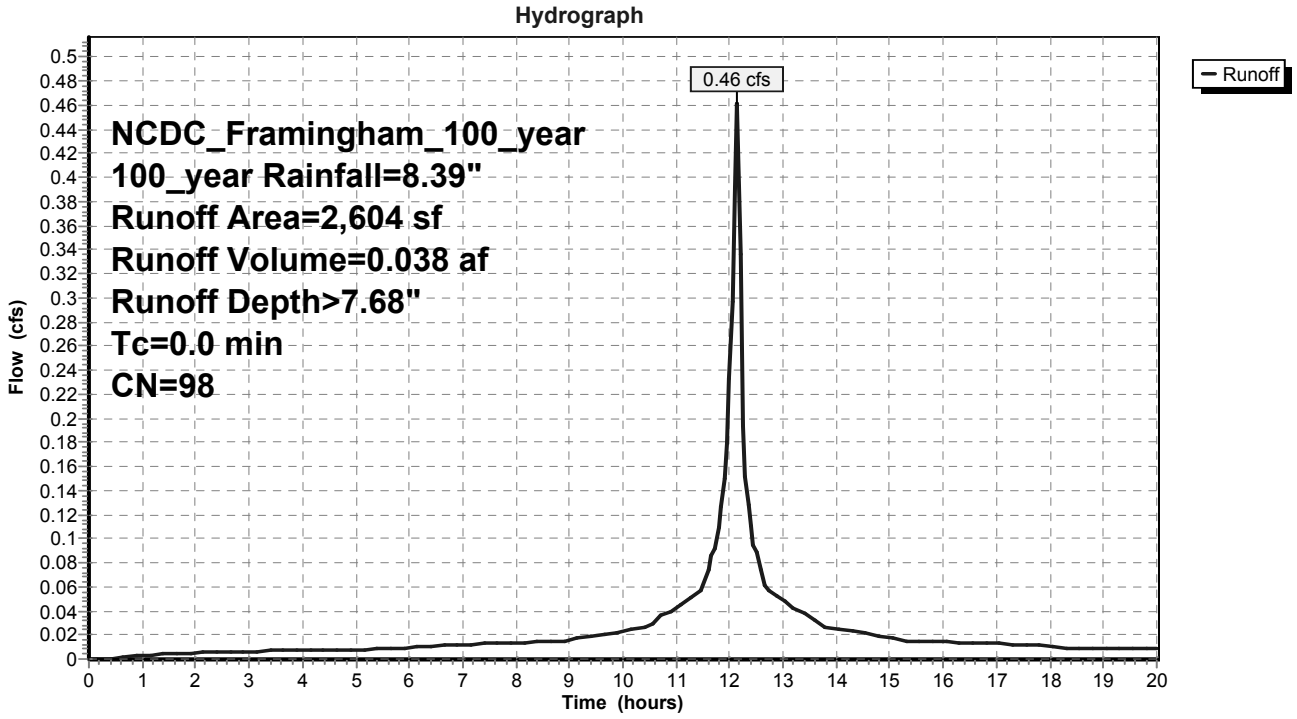
## Summary for Subcatchment ROOF-93: (blank)

Runoff = 0.46 cfs @ 12.14 hrs, Volume= 0.038 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,102 | 98 | ROOF, 100% imperv, HSG A |
| * | 1,502 | 98 | ROOF, 100% imperv, HSG B |
| | 2,604 | 98 | Weighted Average |
| | 2,604 | | 100.00% Pervious Area |

## Subcatchment ROOF-93: (blank)



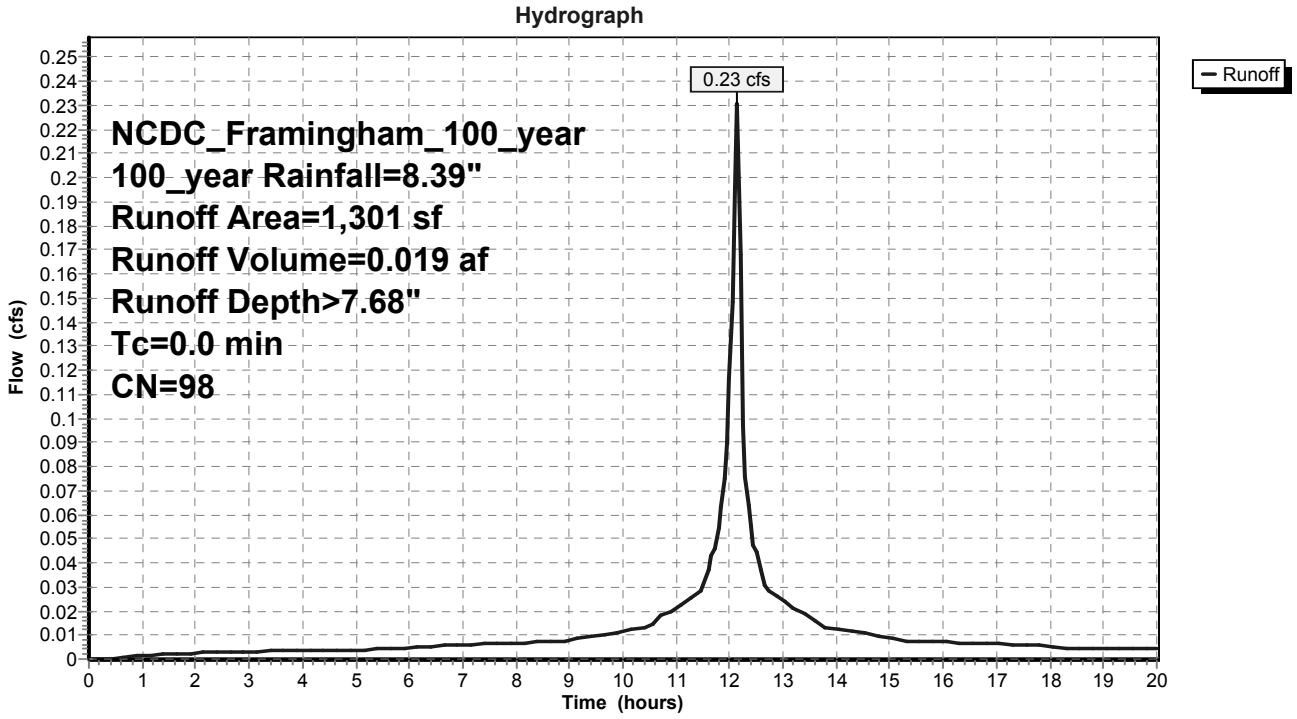
## Summary for Subcatchment ROOF-94: (blank)

Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,301 | 98 | ROOF, 100% imperv, HSG B |
| | 1,301 | | 100.00% Pervious Area |

## Subcatchment ROOF-94: (blank)



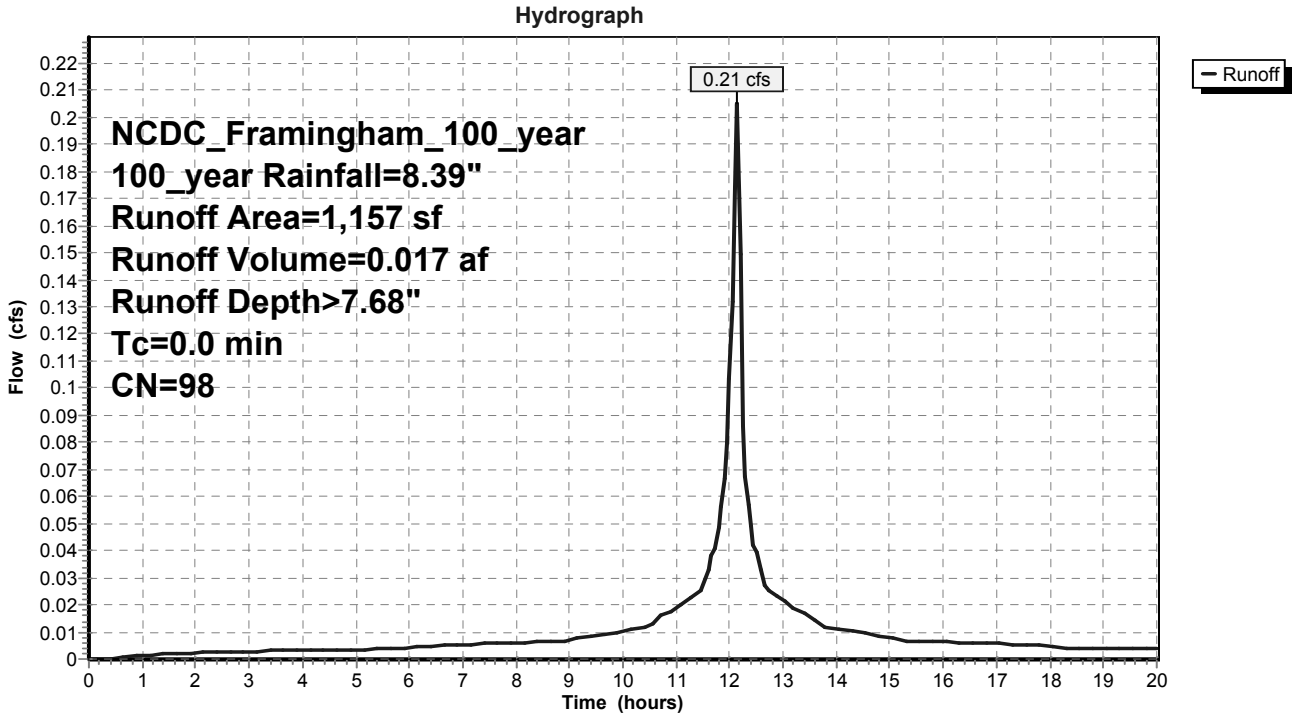
## Summary for Subcatchment ROOF-95: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 986 | 98 | ROOF, 100% imperv, HSG A |
| * | 171 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | 98 | Weighted Average |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-95: (blank)



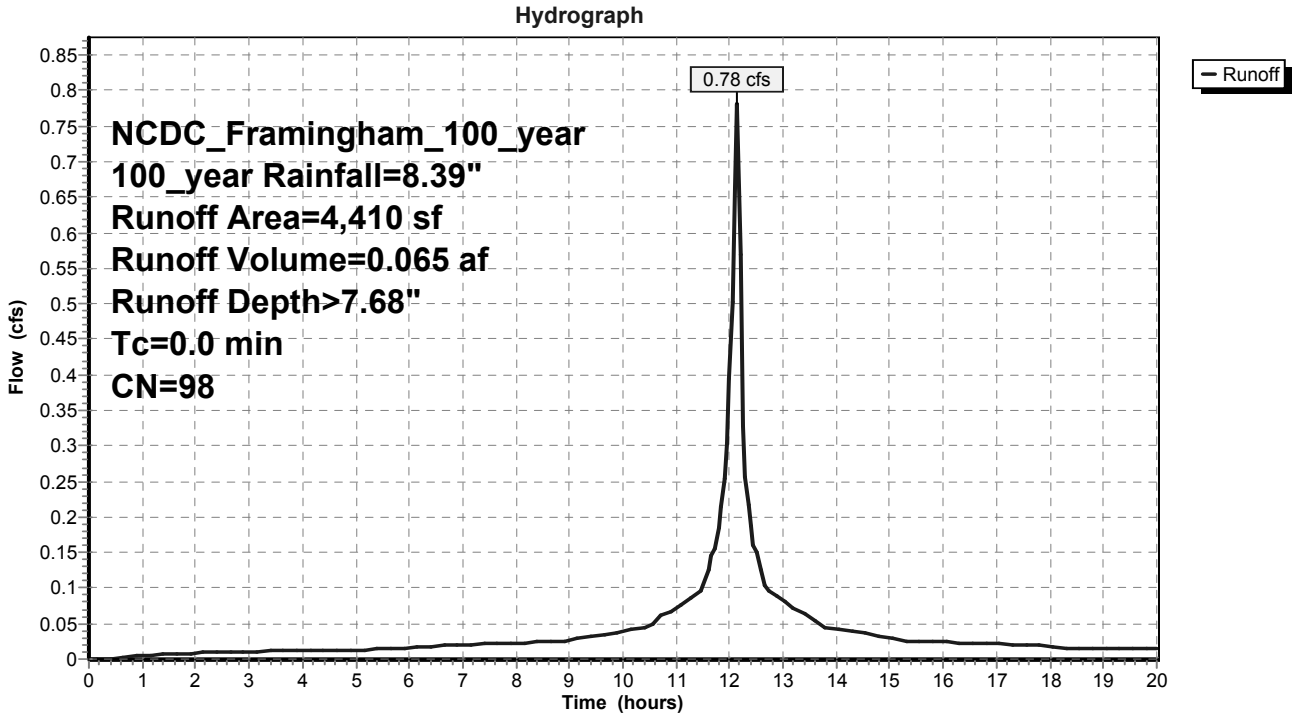
## Summary for Subcatchment ROOF-96: (blank)

Runoff = 0.78 cfs @ 12.14 hrs, Volume= 0.065 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,410 | 98 | ROOF, 100% imperv, HSG B |
| | 4,410 | | 100.00% Pervious Area |

## Subcatchment ROOF-96: (blank)



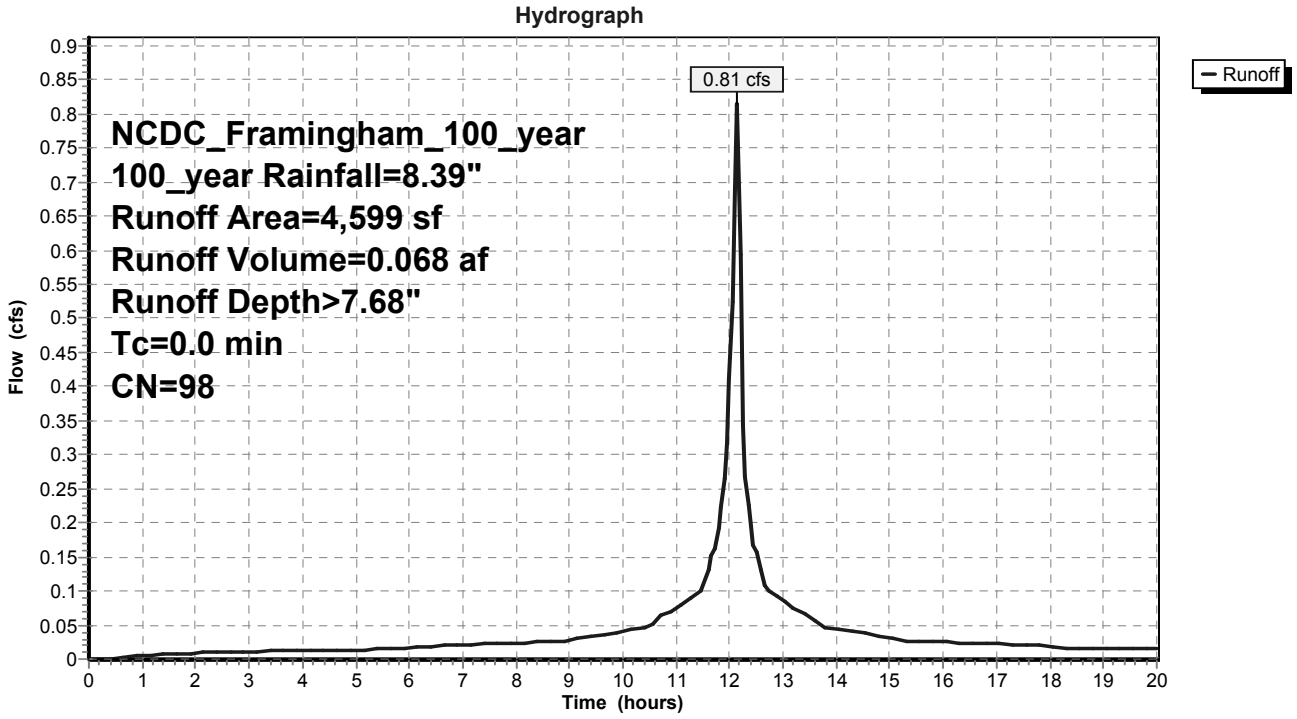
## Summary for Subcatchment ROOF-97: (blank)

Runoff = 0.81 cfs @ 12.14 hrs, Volume= 0.068 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,599 | 98 | ROOF, 100% imperv, HSG B |
| | 4,599 | | 100.00% Pervious Area |

## Subcatchment ROOF-97: (blank)



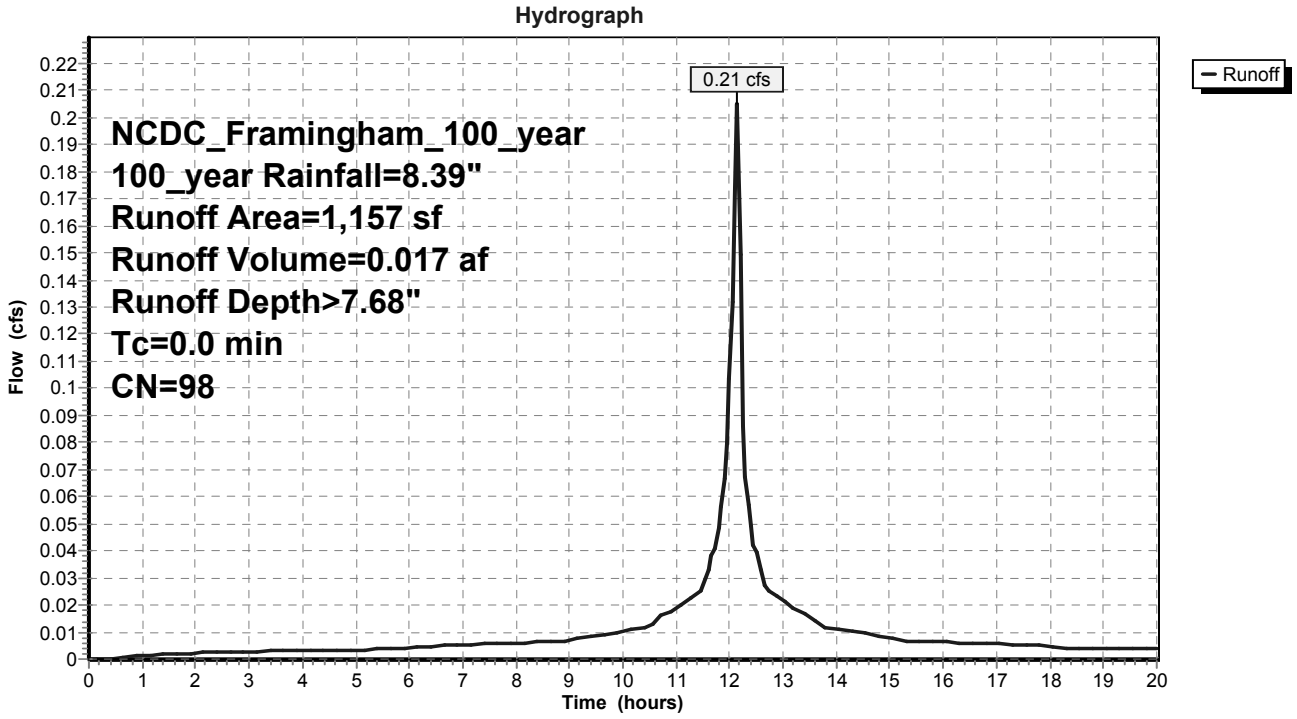
## Summary for Subcatchment ROOF-98: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-98: (blank)



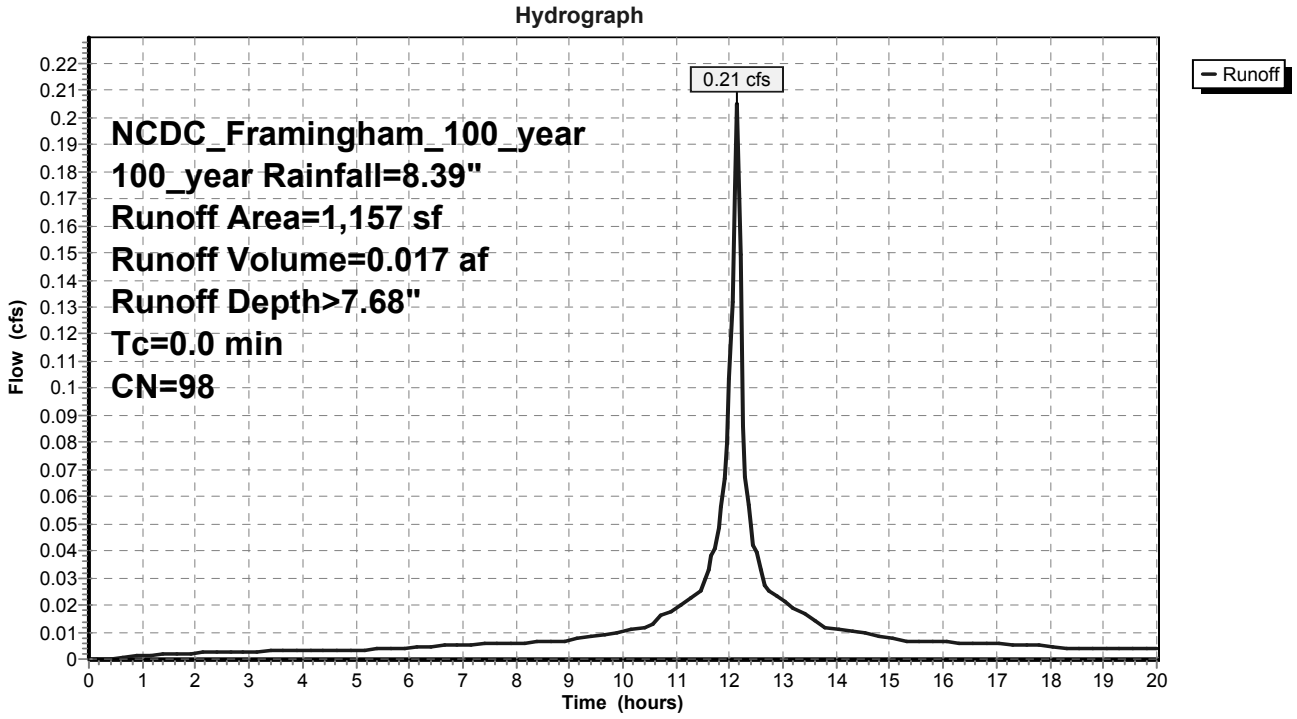
## Summary for Subcatchment ROOF-99: (blank)

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.017 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,157 | 98 | ROOF, 100% imperv, HSG B |
| | 1,157 | | 100.00% Pervious Area |

## Subcatchment ROOF-99: (blank)



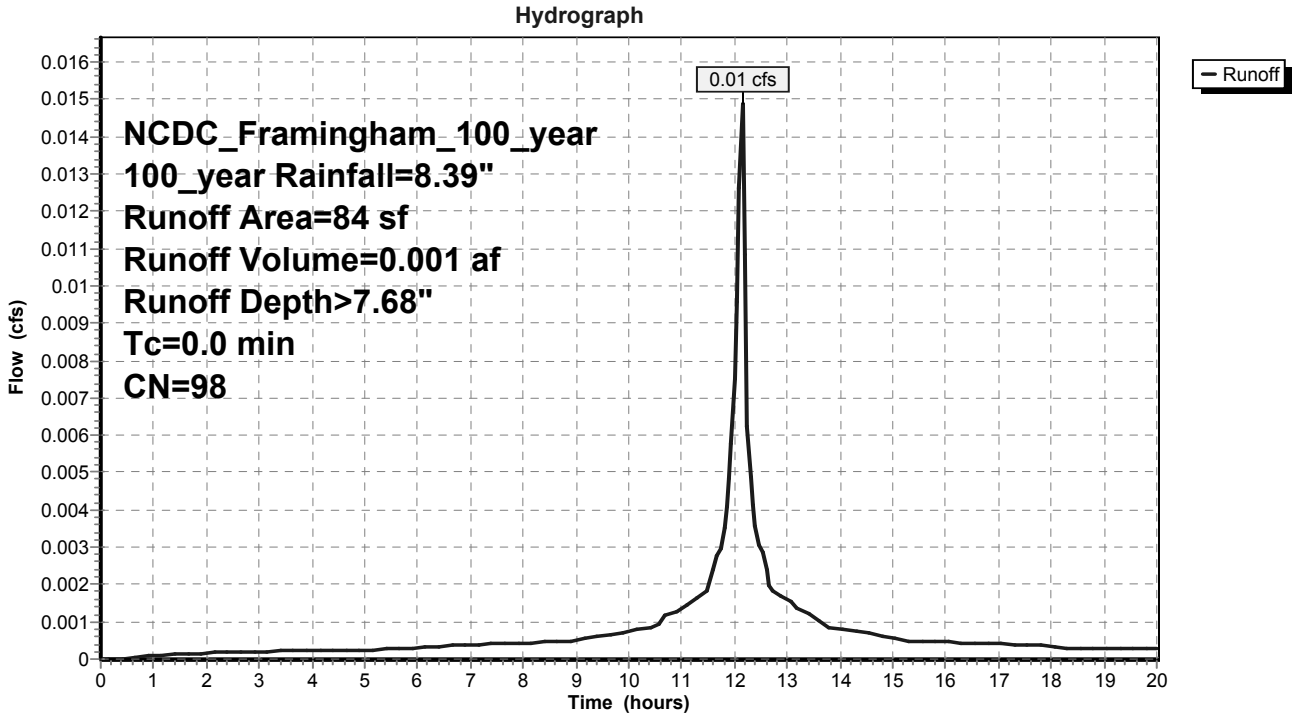
## Summary for Subcatchment ROOF-BS1: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 84 | 98 | ROOF, 100% imperv, HSG B |
| | 84 | | 100.00% Pervious Area |

## Subcatchment ROOF-BS1: (blank)



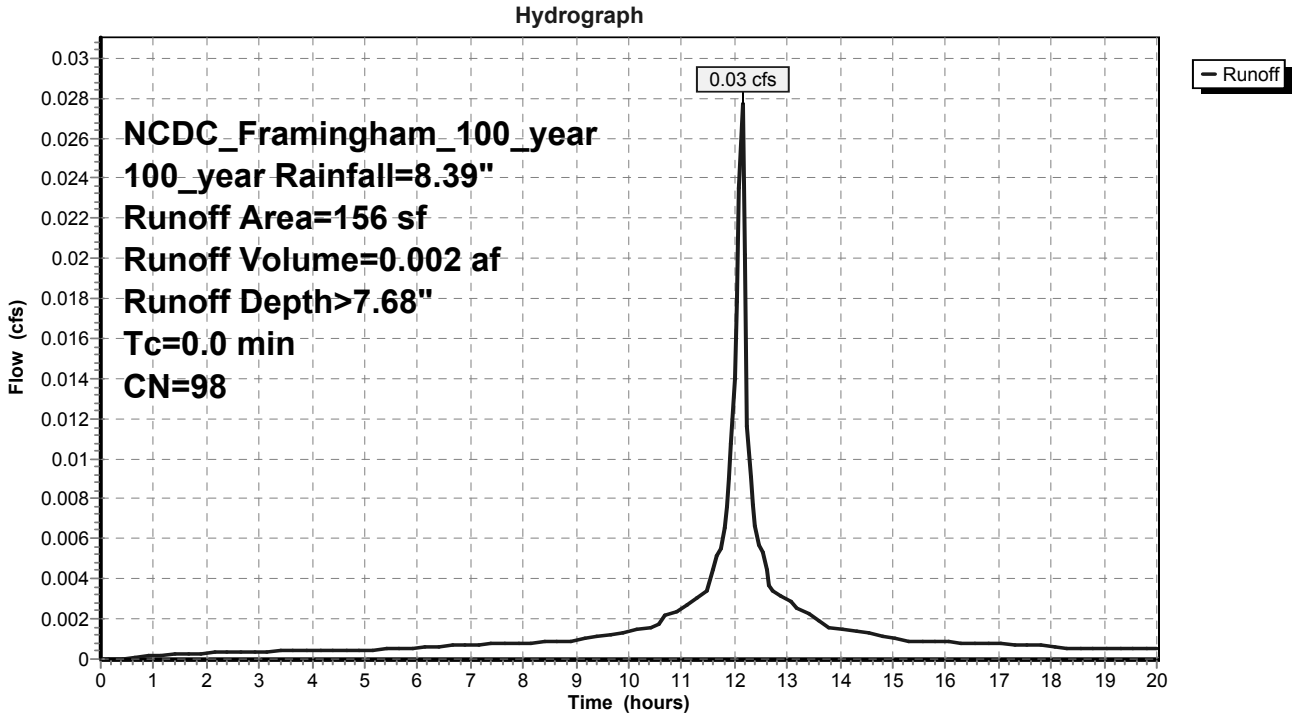
## Summary for Subcatchment ROOF-MAIL20: (blank)

Runoff = 0.03 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL20: (blank)



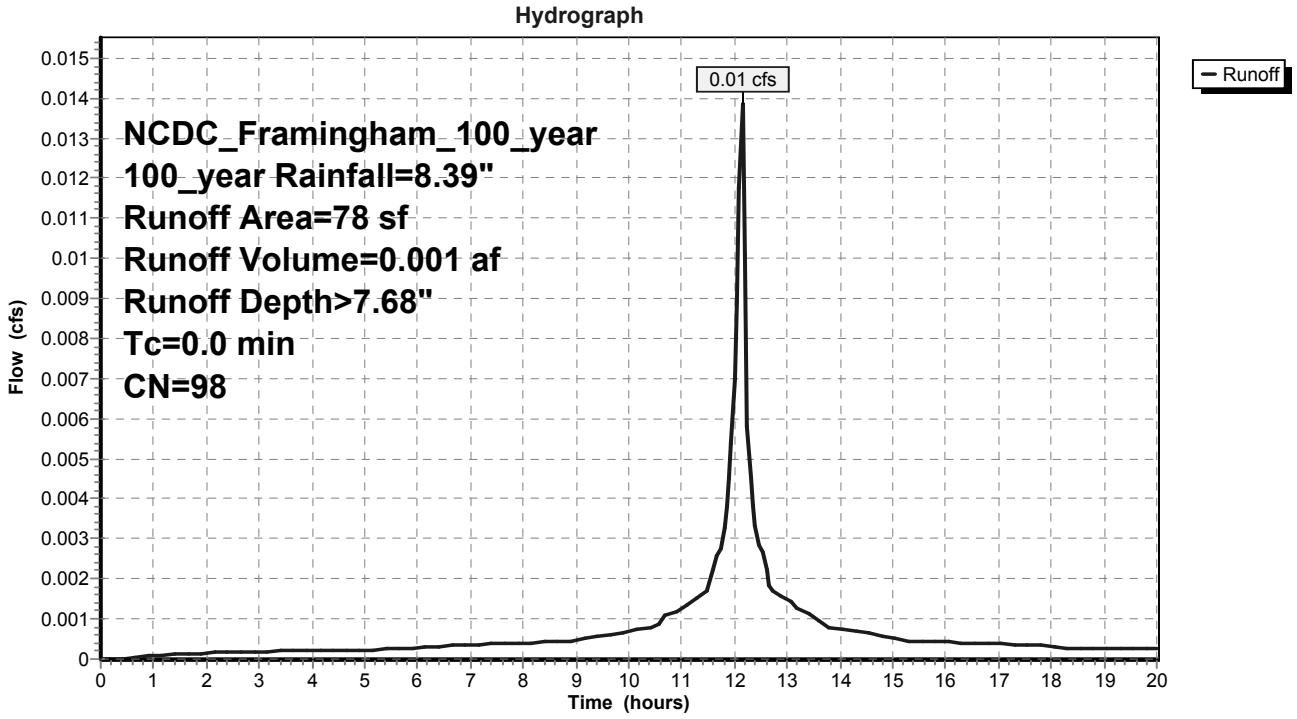
## Summary for Subcatchment ROOF-MAIL29: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL29: (blank)



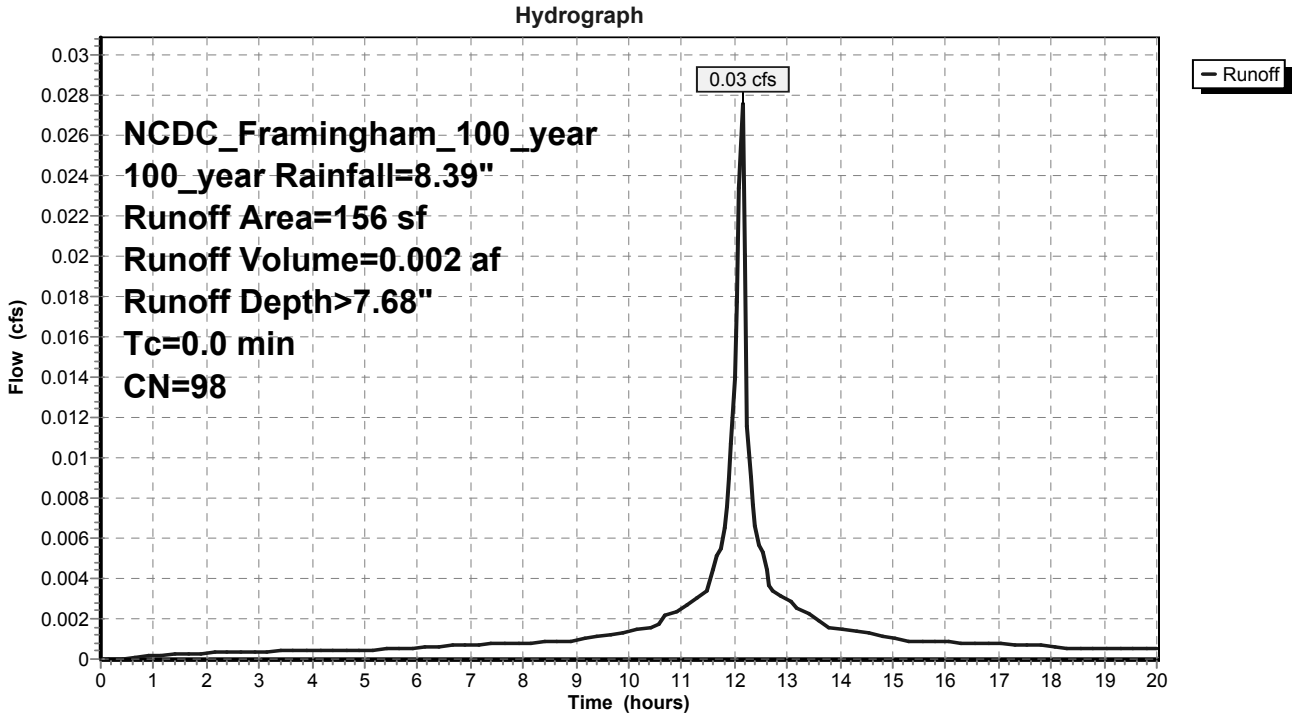
## Summary for Subcatchment ROOF-MAIL5: (blank)

Runoff = 0.03 cfs @ 12.14 hrs, Volume= 0.002 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 156 | 98 | ROOF, 100% imperv, HSG B |
| | 156 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL5: (blank)



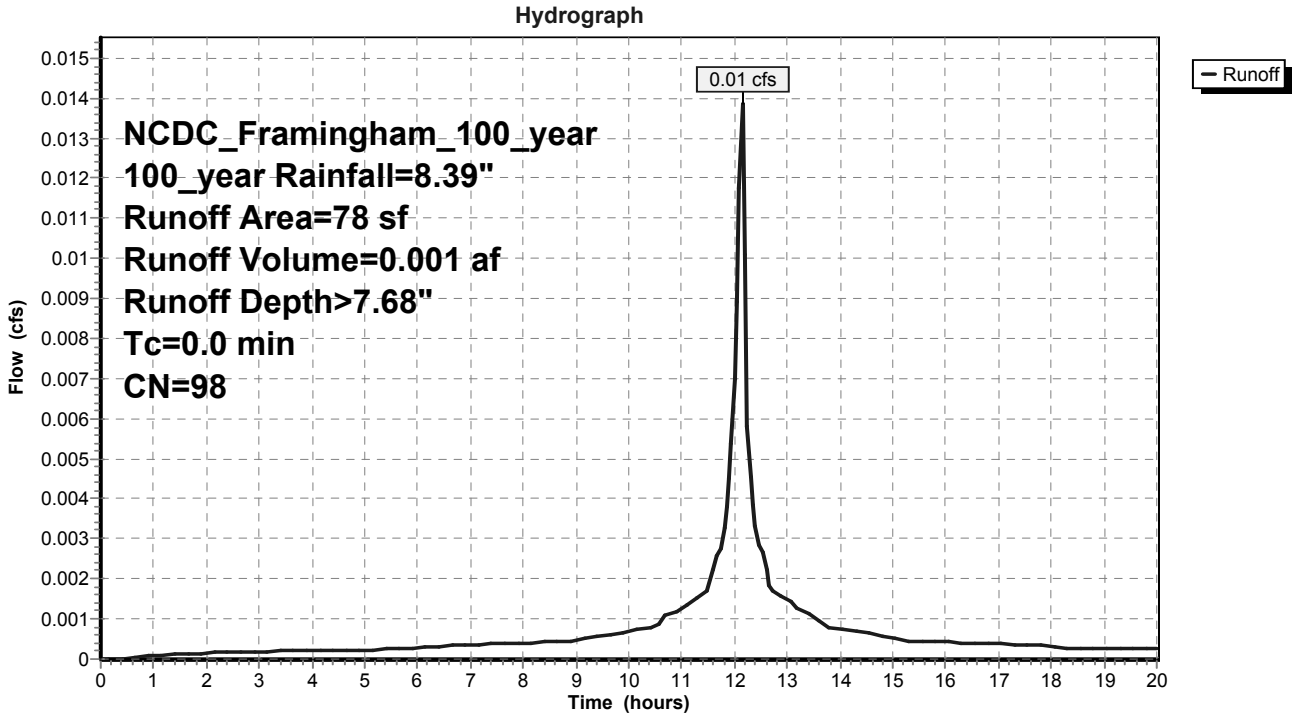
## Summary for Subcatchment ROOF-MAIL64: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL64: (blank)



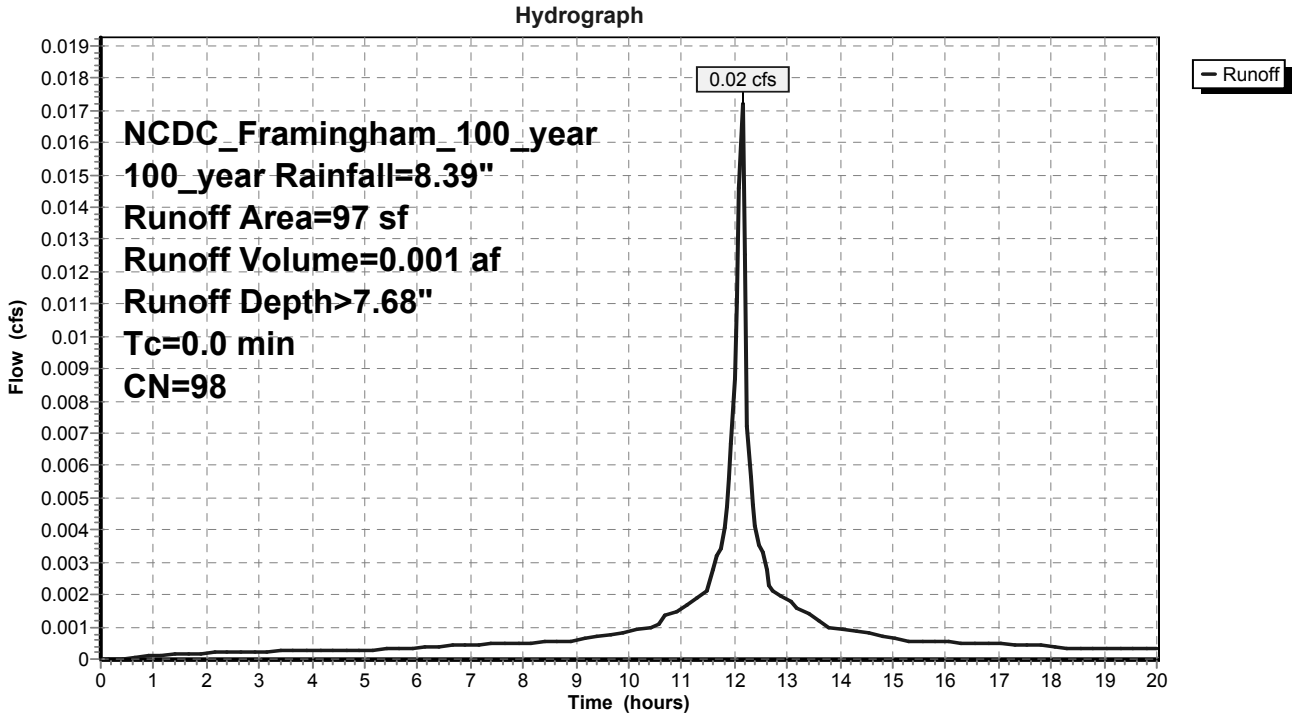
## Summary for Subcatchment ROOF-MAIL8: (blank)

Runoff = 0.02 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 97 | 98 | ROOF, 100% imperv, HSG B |
| | 97 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL8: (blank)



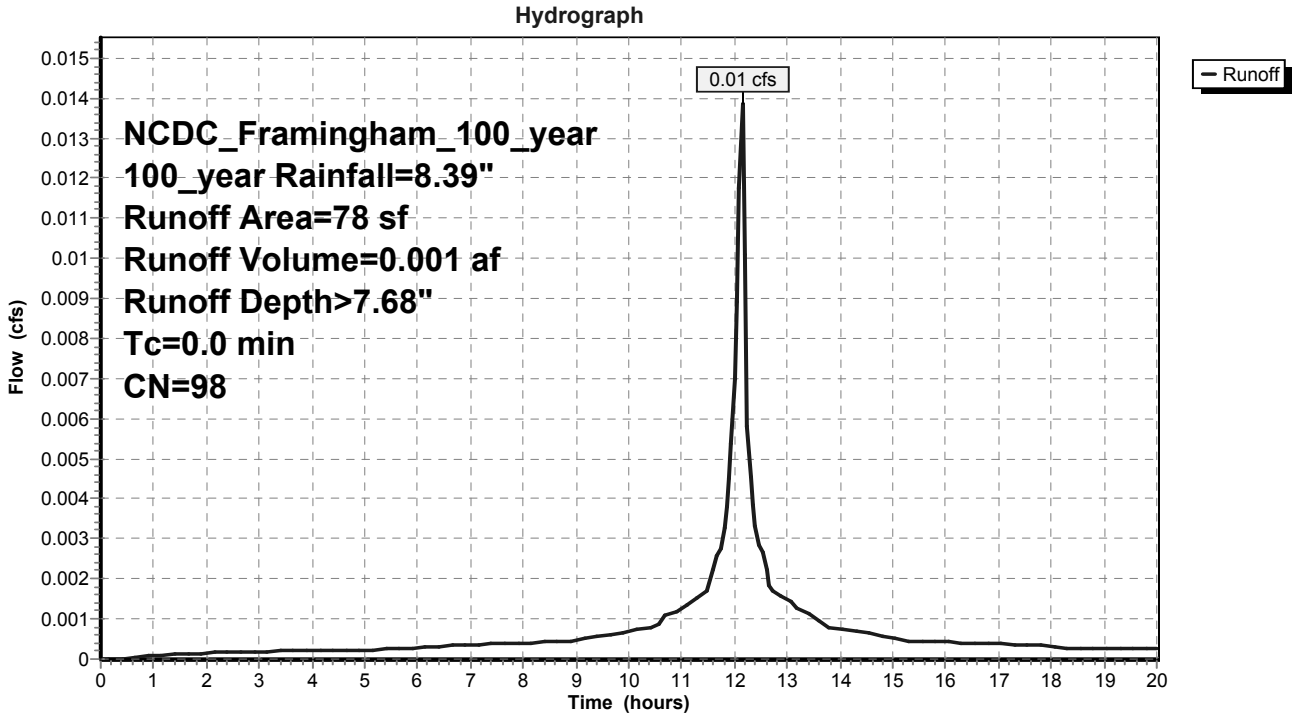
## Summary for Subcatchment ROOF-MAIL91: (blank)

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 0.001 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| | 78 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAIL91: (blank)



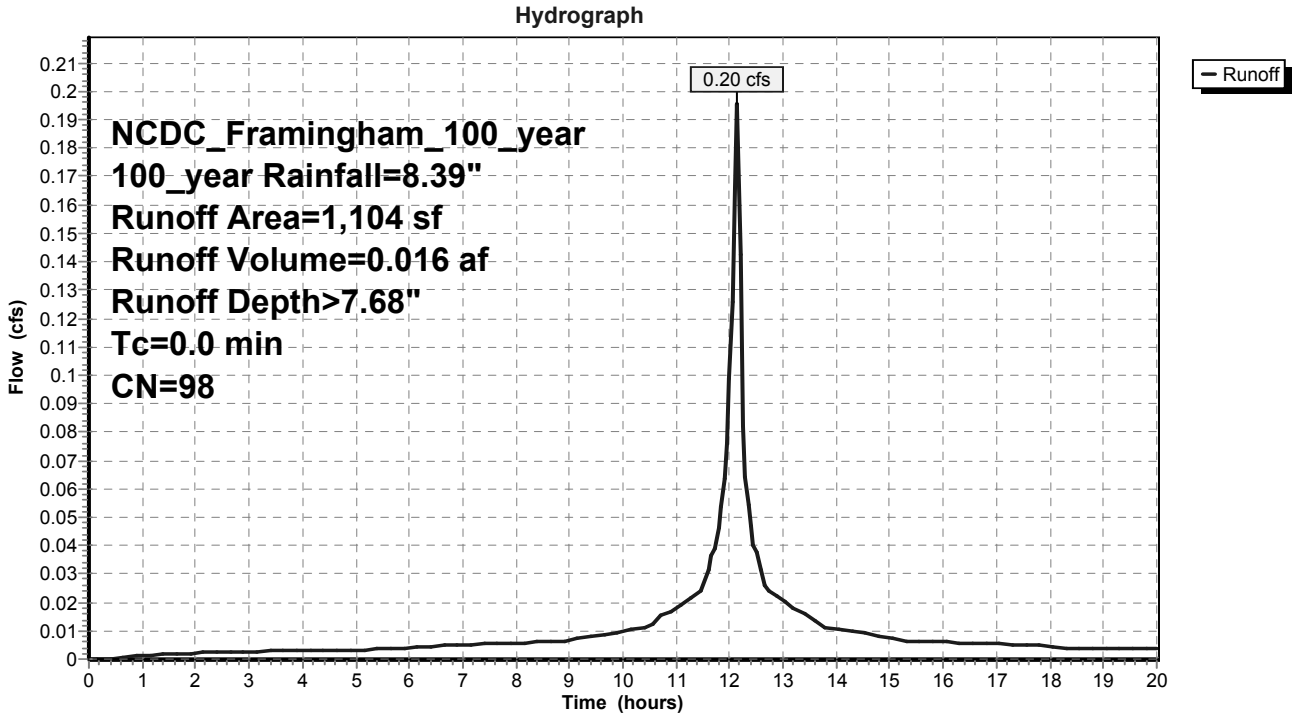
## Summary for Subcatchment ROOF-MAINT11: (blank)

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.016 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,104 | 98 | ROOF, 100% imperv, HSG B |
| | 1,104 | | 100.00% Pervious Area |

## Subcatchment ROOF-MAINT11: (blank)



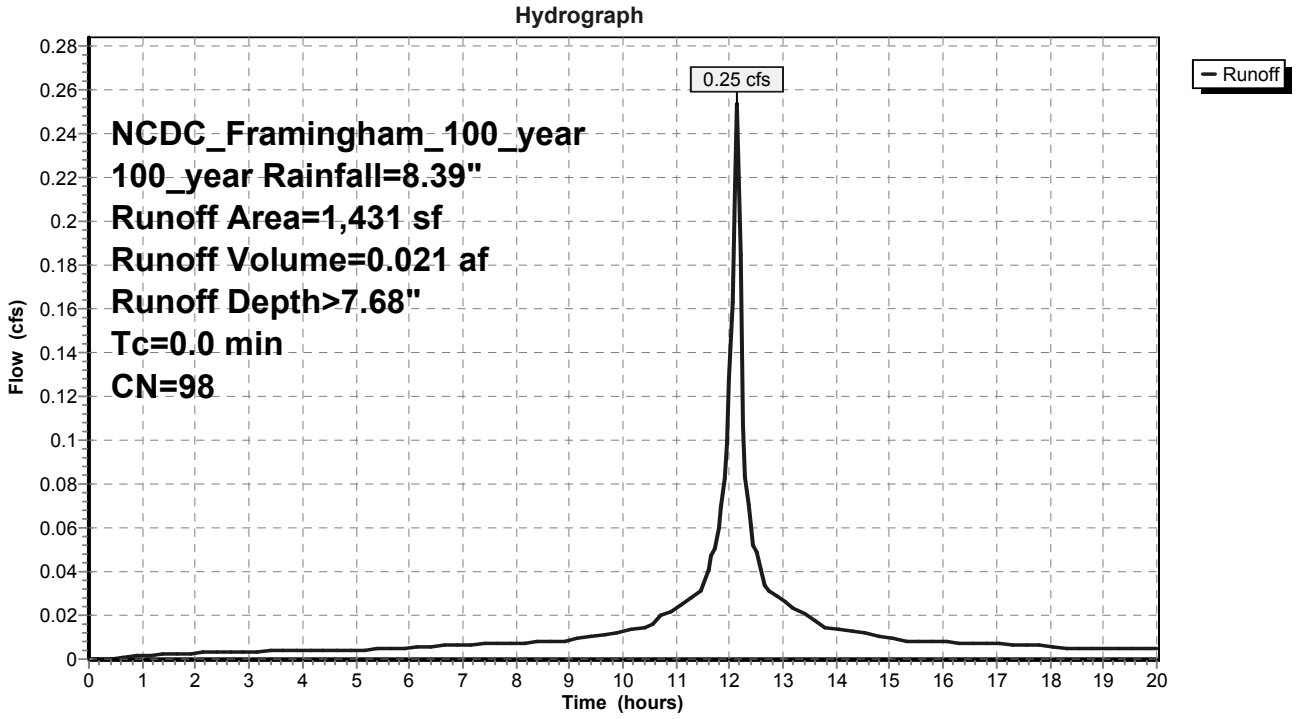
## Summary for Subcatchment ROOF-PL11: (blank)

Runoff = 0.25 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,431 | 98 | ROOF, 100% imperv, HSG B |
| | 1,431 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL11: (blank)



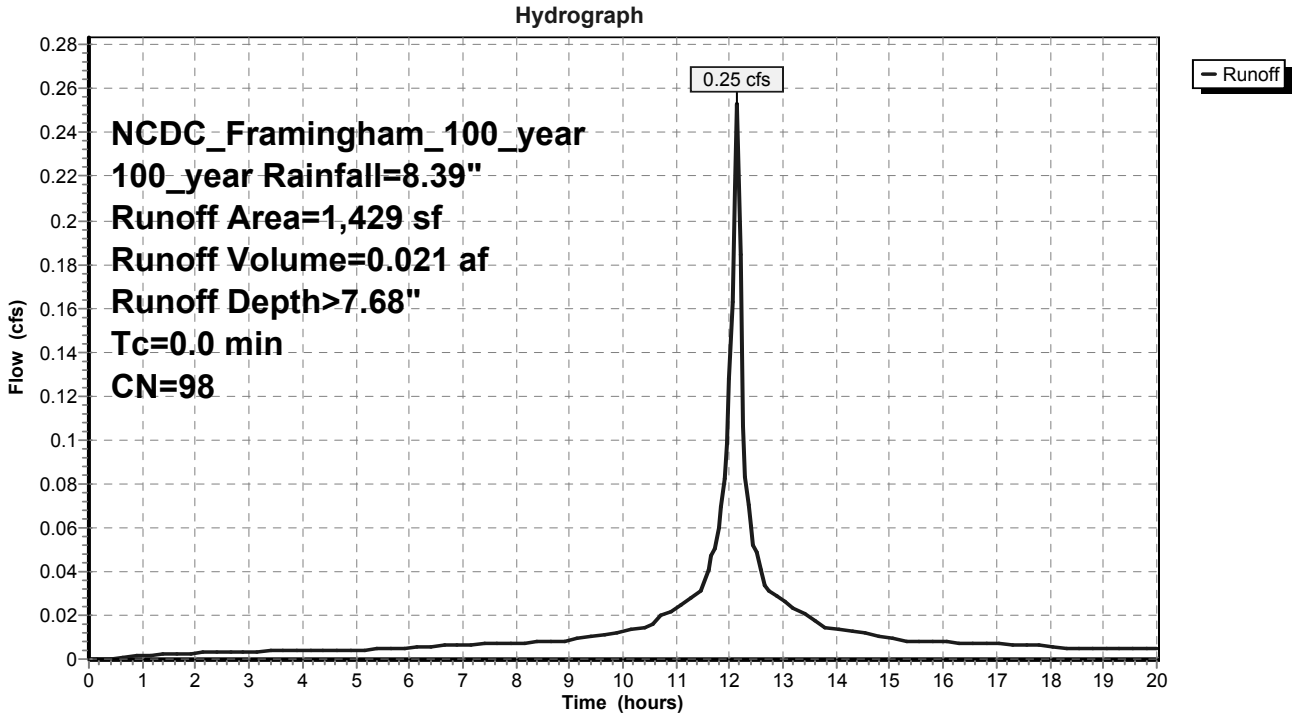
## Summary for Subcatchment ROOF-PL6: (blank)

Runoff = 0.25 cfs @ 12.14 hrs, Volume= 0.021 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,429 | 98 | ROOF, 100% imperv, HSG B |
| | 1,429 | | 100.00% Pervious Area |

## Subcatchment ROOF-PL6: (blank)



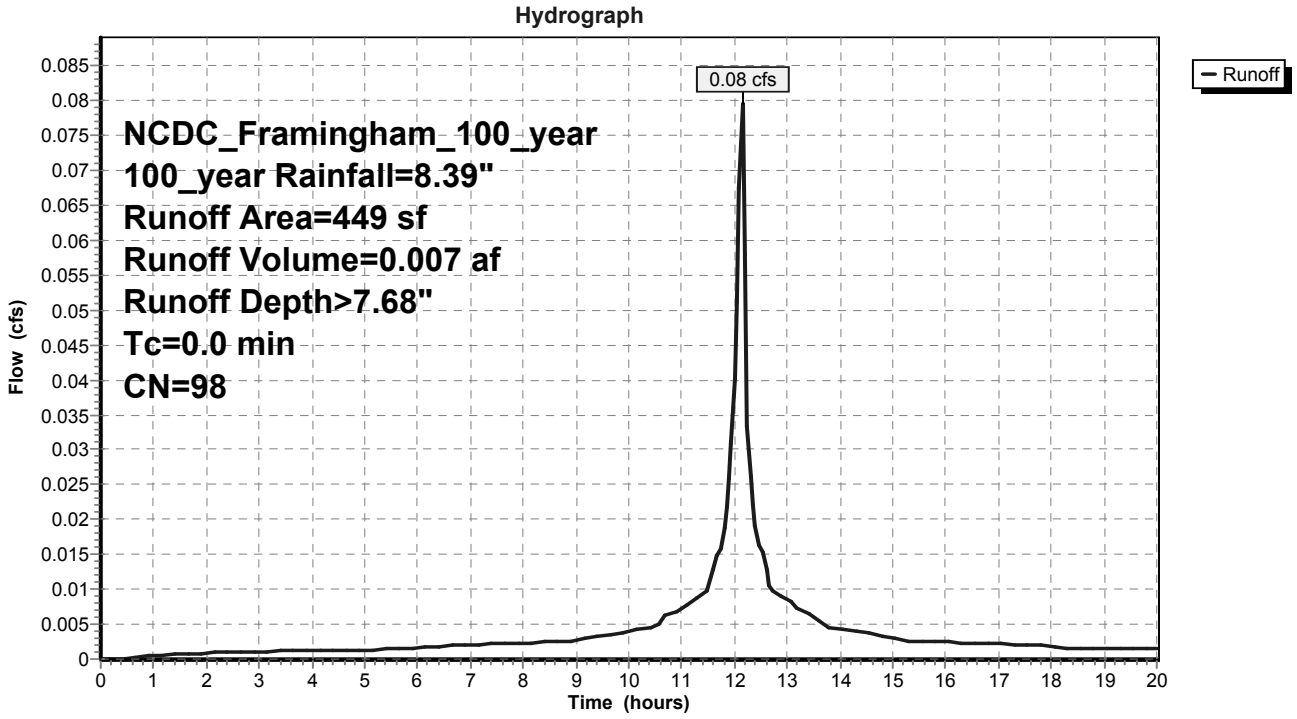
## Summary for Subcatchment ROOF-POOL: (blank)

Runoff = 0.08 cfs @ 12.14 hrs, Volume= 0.007 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 449 | 98 | ROOF, 100% imperv, HSG B |
| | 449 | | 100.00% Pervious Area |

## Subcatchment ROOF-POOL: (blank)



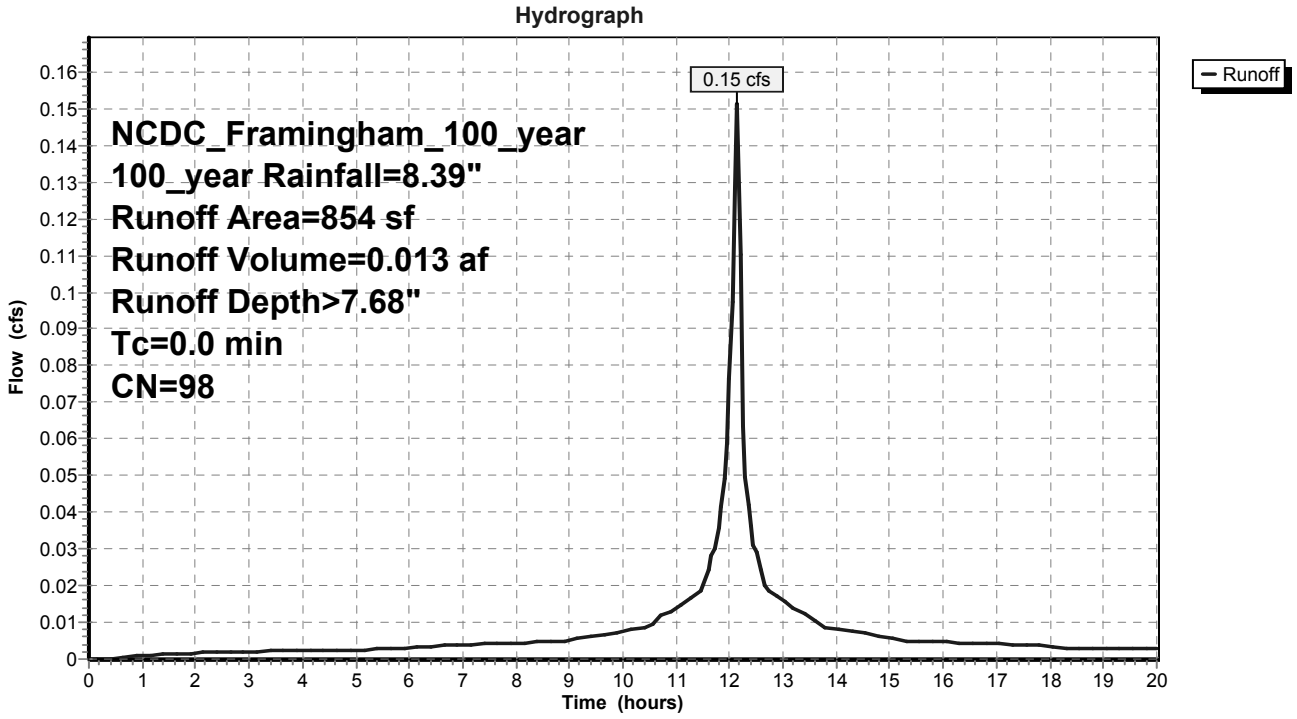
## Summary for Subcatchment ROOF-RECY: (blank)

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 7.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 854 | 98 | ROOF, 100% imperv, HSG B |
| | 854 | | 100.00% Pervious Area |

## Subcatchment ROOF-RECY: (blank)



## Summary for Subcatchment S-CB-E-1: (blank)

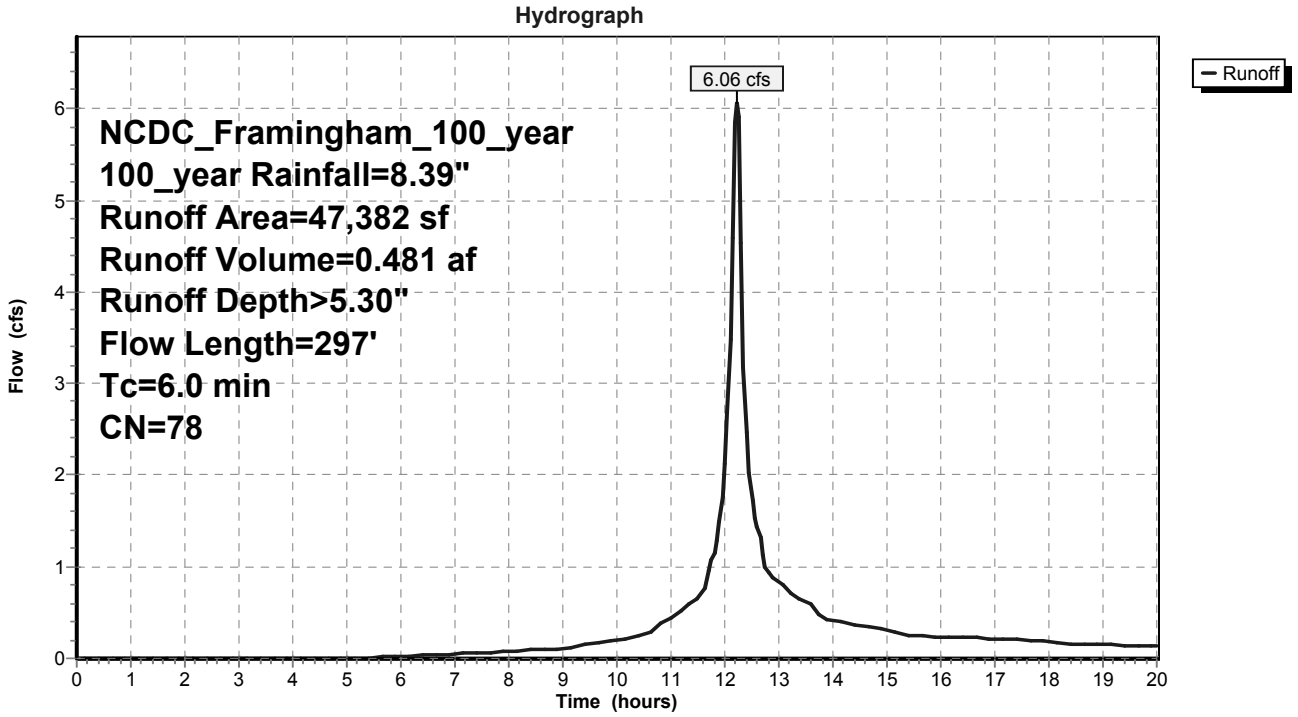
Runoff = 6.06 cfs @ 12.23 hrs, Volume= 0.481 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 25,031 | 61 | GRASS, 0% imperv, HSG B |
| * | 416 | 98 | DECK, 100% imperv, HSG B |
| * | 19,714 | 98 | IMP, 100% imperv, HSG B |
| * | 5 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,215 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 47,382 | 78 | Weighted Average |
| | 47,382 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.3 | 50 | 0.0437 | 0.20 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.7 | 91 | 0.0903 | 2.10 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 68 | 0.0186 | 2.77 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0363 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0791 | 5.71 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 7 | 0.0208 | 1.01 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 4 | 0.0200 | 0.99 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 29 | 0.0291 | 3.46 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0216 | 1.03 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 6.0 | 297 | Total | | | |

## Subcatchment S-CB-E-1: (blank)



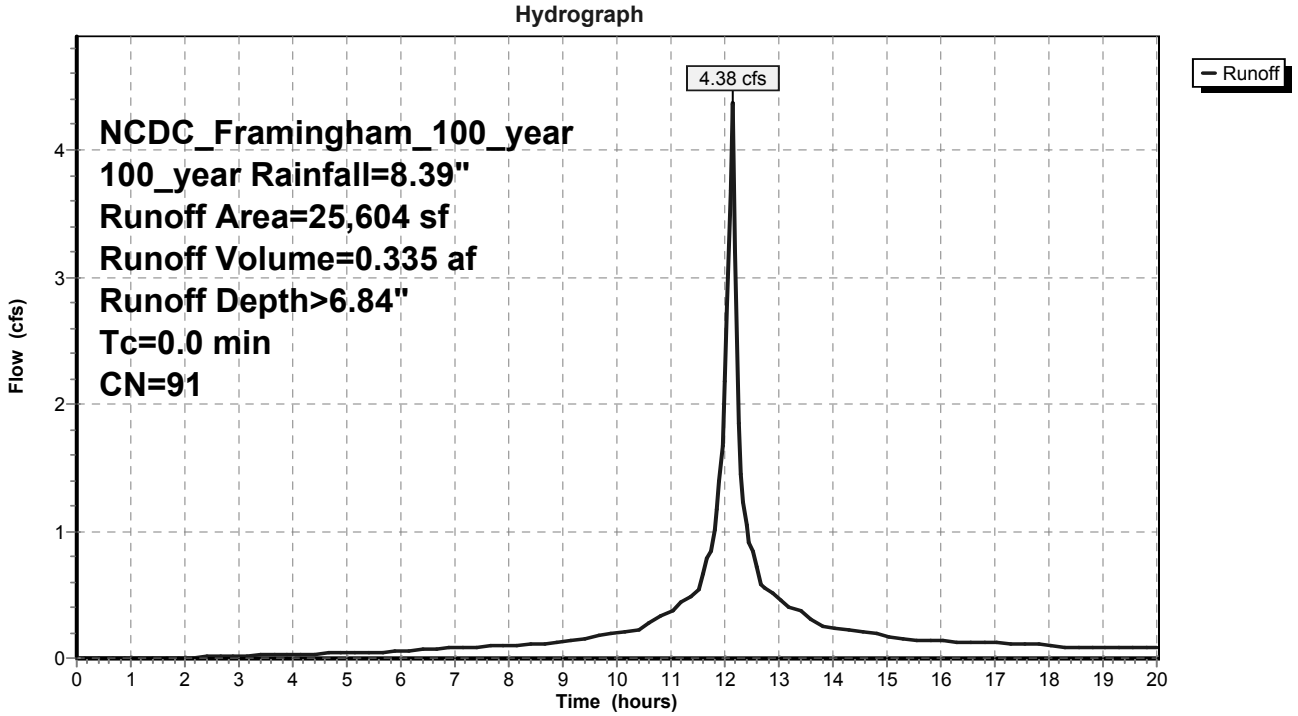
## Summary for Subcatchment S-CB-INF-E-3: (blank)

Runoff = 4.38 cfs @ 12.14 hrs, Volume= 0.335 af, Depth> 6.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,743 | 61 | GRASS, 0% imperv, HSG B |
| * | 437 | 98 | DECK, 100% imperv, HSG B |
| * | 18,687 | 98 | IMP, 100% imperv, HSG B |
| * | 1,737 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,604 | 91 | Weighted Average |
| | 25,604 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-3: (blank)



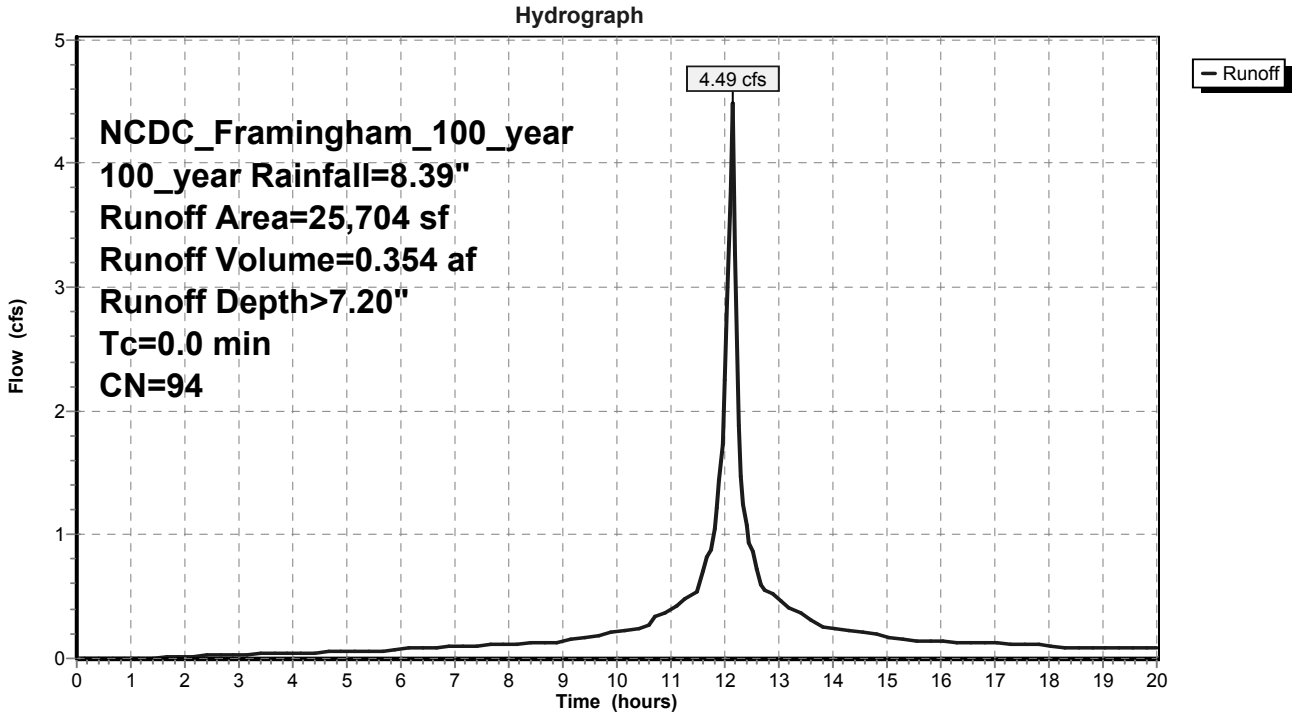
## Summary for Subcatchment S-CB-INF-E-4A: (blank)

Runoff = 4.49 cfs @ 12.14 hrs, Volume= 0.354 af, Depth> 7.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,473 | 61 | GRASS, 0% imperv, HSG B |
| * | 23,055 | 98 | IMP, 100% imperv, HSG B |
| * | 175 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 25,704 | 94 | Weighted Average |
| | 25,704 | | 100.00% Pervious Area |

## Subcatchment S-CB-INF-E-4A: (blank)



## Summary for Subcatchment S-DET-1: (blank)

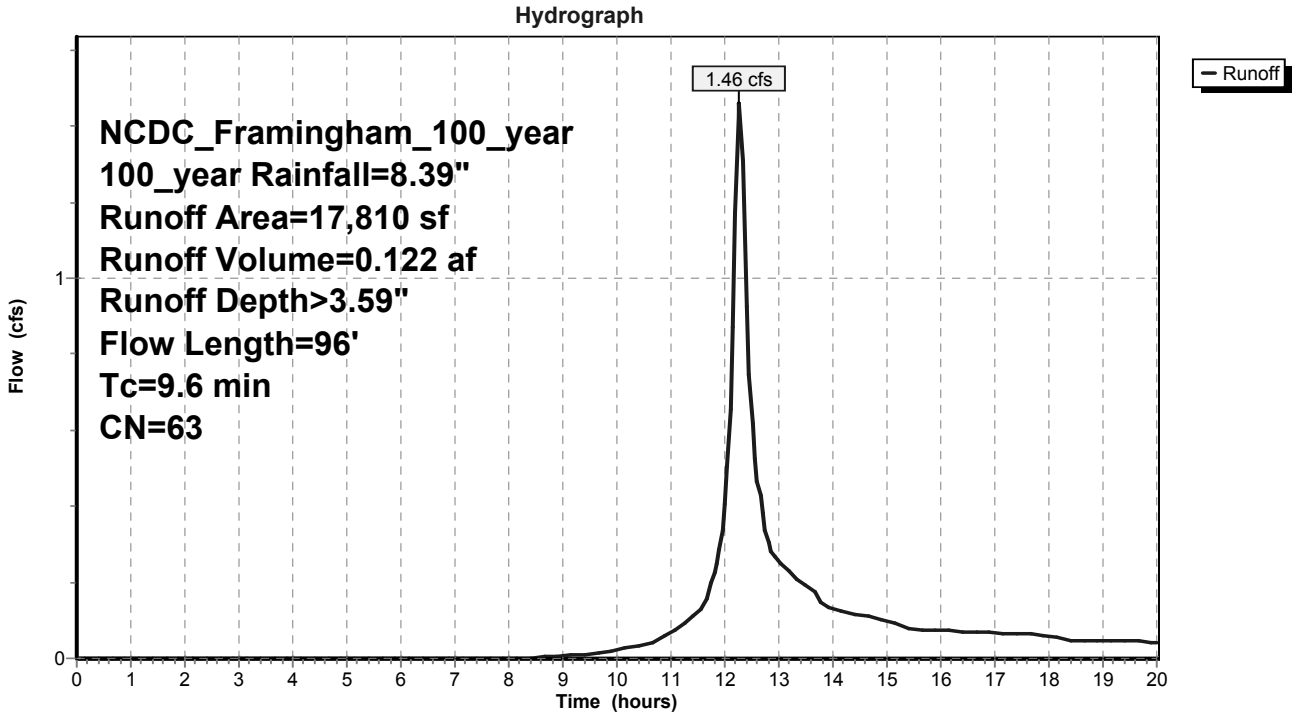
Runoff = 1.46 cfs @ 12.27 hrs, Volume= 0.122 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 16,881 | 61 | GRASS, 0% imperv, HSG B |
| * | 49 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 111 | 98 | DECK, 100% imperv, HSG B |
| * | 769 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,810 | 63 | Weighted Average |
| | 17,778 | | 99.82% Pervious Area |
| | 32 | | 0.18% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.4 | 11 | 0.0021 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.6 | 9 | 0.0010 | 0.25 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 4.1 | 29 | 0.0169 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 46 | 0.0536 | 1.62 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 9.6 | 96 | Total | | | |

## Subcatchment S-DET-1: (blank)



## Summary for Subcatchment S-DET-3: (blank)

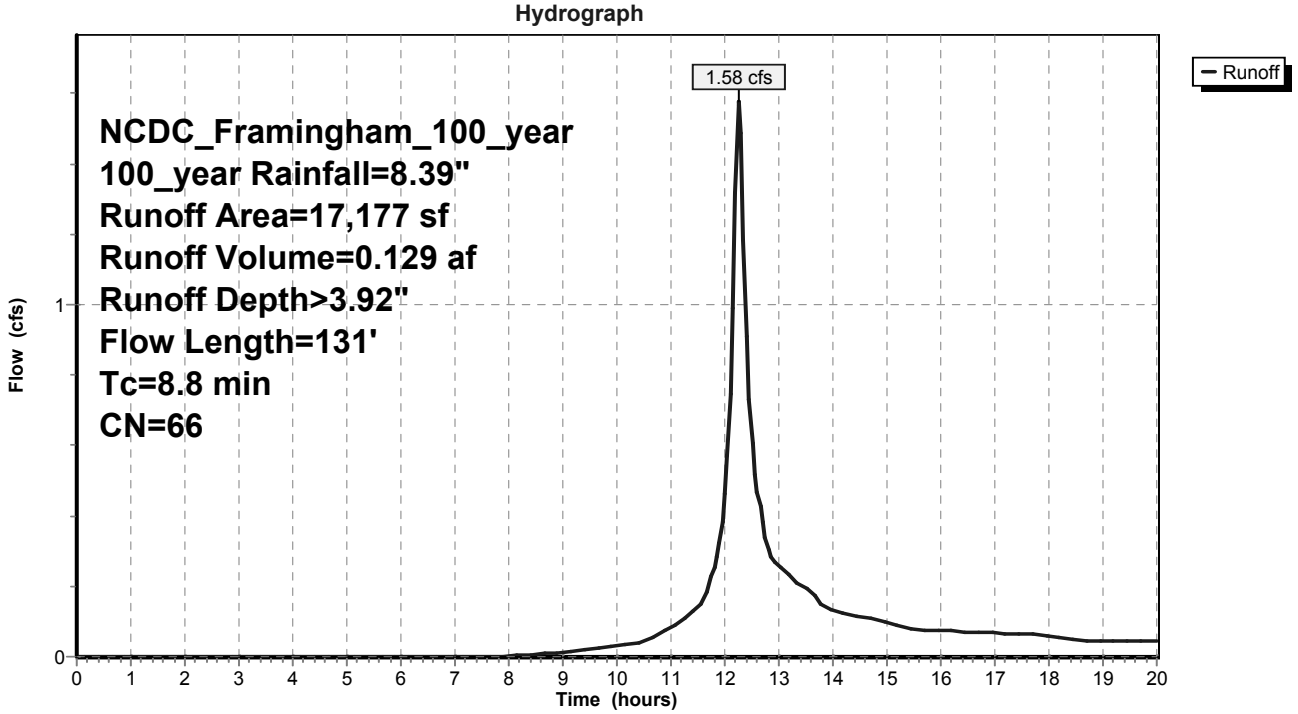
Runoff = 1.58 cfs @ 12.26 hrs, Volume= 0.129 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 14,639 | 61 | GRASS, 0% imperv, HSG B |
| * | 579 | 98 | DECK, 100% imperv, HSG B |
| * | 56 | 98 | IMP, 100% imperv, HSG B |
| * | 0 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,904 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 17,177 | 66 | Weighted Average |
| | 17,177 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.1 | 81 | 0.0332 | 1.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.7 | 50 | 0.0100 | 0.11 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 8.8 | 131 | Total | | | |

## Subcatchment S-DET-3: (blank)



## Summary for Subcatchment S-INF-E-1: (blank)

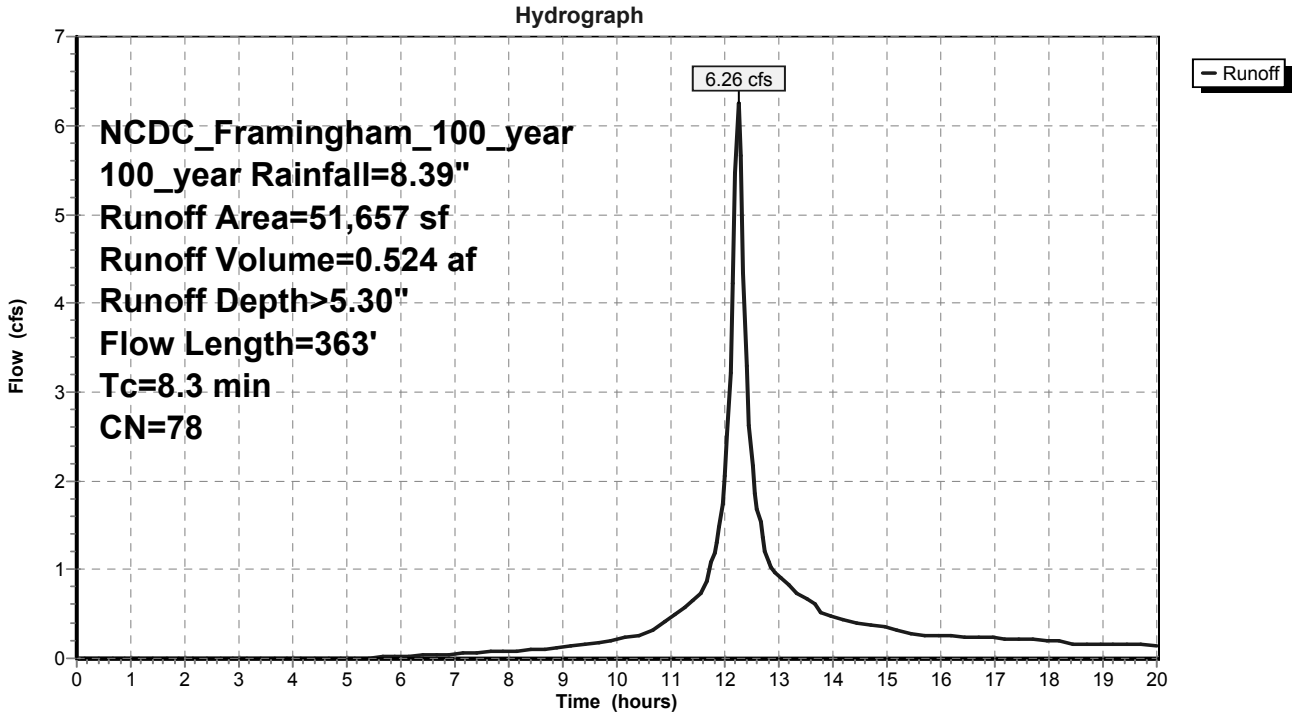
Runoff = 6.26 cfs @ 12.25 hrs, Volume= 0.524 af, Depth> 5.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 27,205 | 61 | GRASS, 0% imperv, HSG B |
| * | 40 | 55 | WOODS, 0% imperv, HSG B |
| * | 1,150 | 98 | DECK, 100% imperv, HSG B |
| * | 21,115 | 98 | IMP, 100% imperv, HSG B |
| * | 2,147 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 51,657 | 78 | Weighted Average |
| | 51,657 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.3 | 29 | 0.0280 | 0.15 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.5 | 21 | 0.0091 | 0.71 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.7 | 107 | 0.0148 | 2.47 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 8 | 0.0347 | 1.30 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 15 | 0.0087 | 1.90 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 25 | 0.0062 | 0.55 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0234 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 30 | 0.0213 | 2.96 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.4 | 86 | 0.0074 | 0.60 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 8 | 0.0161 | 2.58 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 29 | 0.0113 | 2.16 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.3 | 363 | Total | | | |

## Subcatchment S-INF-E-1: (blank)



## Summary for Subcatchment S-INF-E-2: (blank)

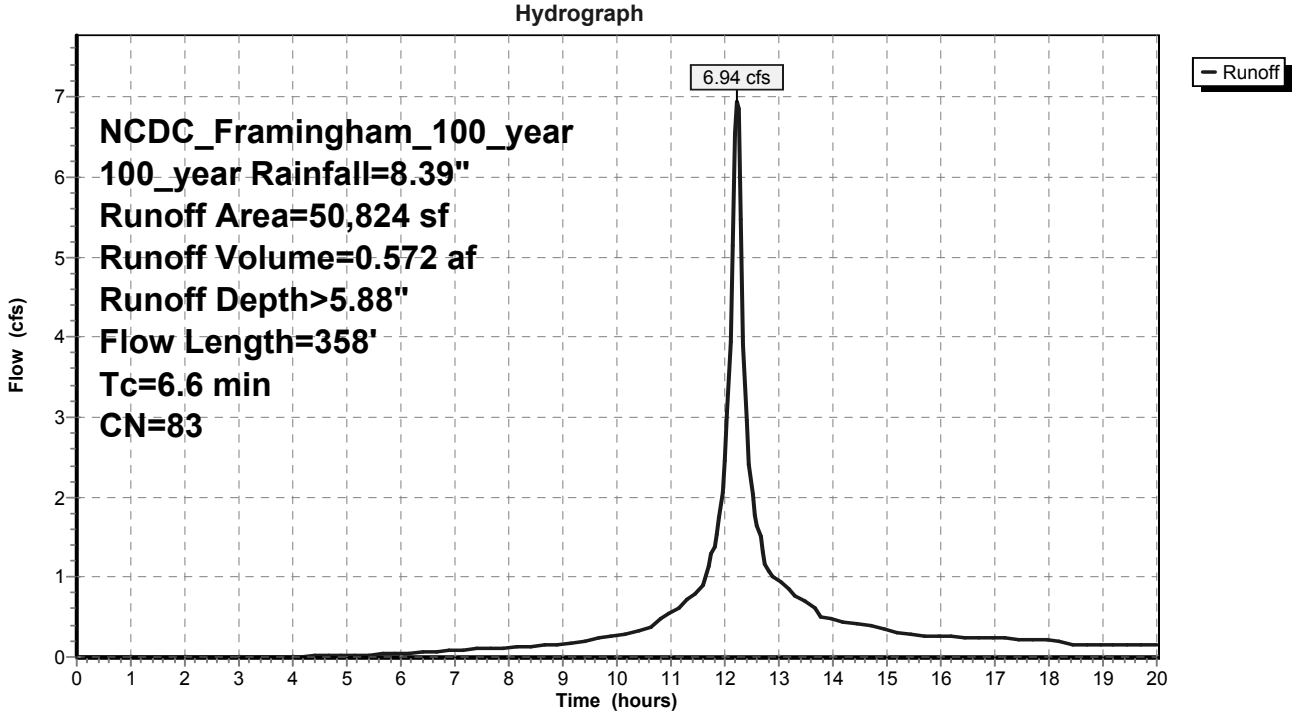
Runoff = 6.94 cfs @ 12.23 hrs, Volume= 0.572 af, Depth> 5.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 20,826 | 61 | GRASS, 0% imperv, HSG B |
| * | 902 | 98 | DECK, 100% imperv, HSG B |
| * | 23,637 | 98 | IMP, 100% imperv, HSG B |
| * | 5,459 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 50,824 | 83 | Weighted Average |
| | 50,824 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 33 | 0.0259 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 2.3 | 17 | 0.0222 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 114 | 0.0156 | 0.87 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 1.6 | 194 | 0.0103 | 2.06 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 6.6 | 358 | Total | | | |

## Subcatchment S-INF-E-2: (blank)



## Summary for Subcatchment S-INF-E-3: (blank)

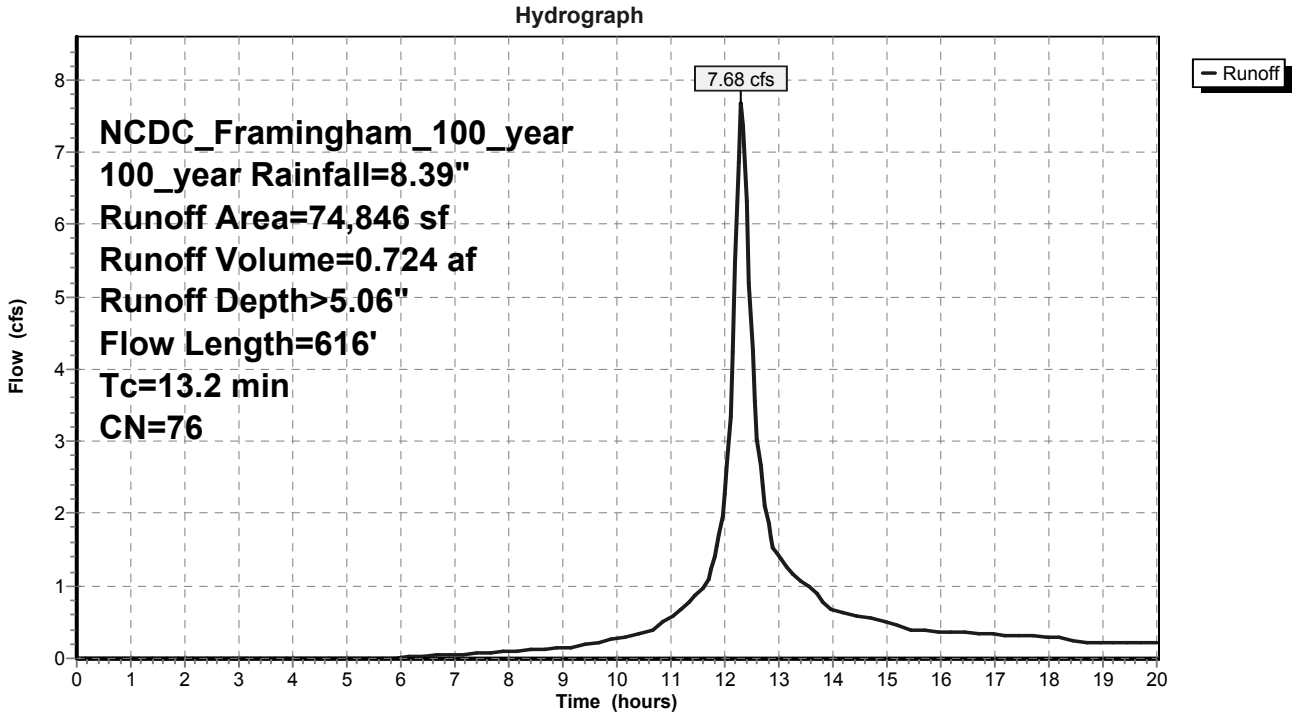
Runoff = 7.68 cfs @ 12.31 hrs, Volume= 0.724 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 43,506 | 61 | GRASS, 0% imperv, HSG B |
| * | 493 | 98 | DECK, 100% imperv, HSG B |
| * | 28,089 | 98 | IMP, 100% imperv, HSG B |
| * | 78 | 98 | ROOF, 100% imperv, HSG B |
| * | 2,680 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,846 | 76 | Weighted Average |
| | 74,846 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 50 | 0.0660 | 0.23 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 1.0 | 91 | 0.0499 | 1.56 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0303 | 3.53 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 3 | 0.0301 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 12 | 0.0280 | 3.40 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.7 | 57 | 0.0360 | 1.33 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.5 | 42 | 0.0479 | 1.53 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 11 | 0.0100 | 2.03 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 12 | 0.0013 | 0.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 48 | 0.0206 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 4 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 32 | 0.0235 | 3.11 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.3 | 18 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 5 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 34 | 0.0100 | 0.70 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.6 | 162 | 0.0071 | 0.59 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 25 | 0.0200 | 2.87 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 13.2 | 616 | Total | | | |

## Subcatchment S-INF-E-3: (blank)



## Summary for Subcatchment S-LD-1: (blank)

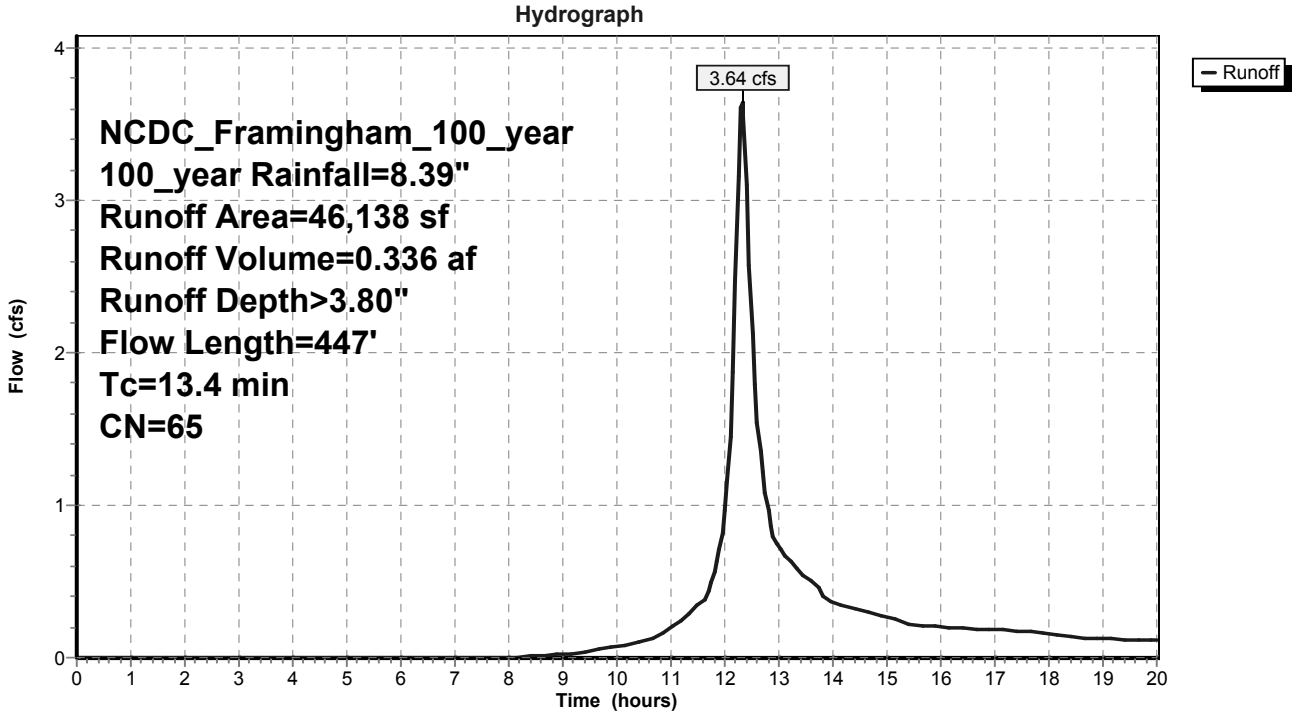
Runoff = 3.64 cfs @ 12.32 hrs, Volume= 0.336 af, Depth> 3.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 38,137 | 61 | GRASS, 0% imperv, HSG B |
| * | 1,396 | 55 | WOODS, 0% imperv, HSG B |
| * | 3,015 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 1,228 | 98 | DECK, 100% imperv, HSG B |
| * | 1,712 | 98 | IMP, 100% imperv, HSG B |
| * | 650 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 46,138 | 65 | Weighted Average |
| | 44,178 | | 95.75% Pervious Area |
| | 1,960 | | 4.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.8 | 50 | 0.0135 | 0.12 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 6.6 | 397 | 0.0205 | 1.00 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 13.4 | 447 | Total | | | |

## Subcatchment S-LD-1: (blank)



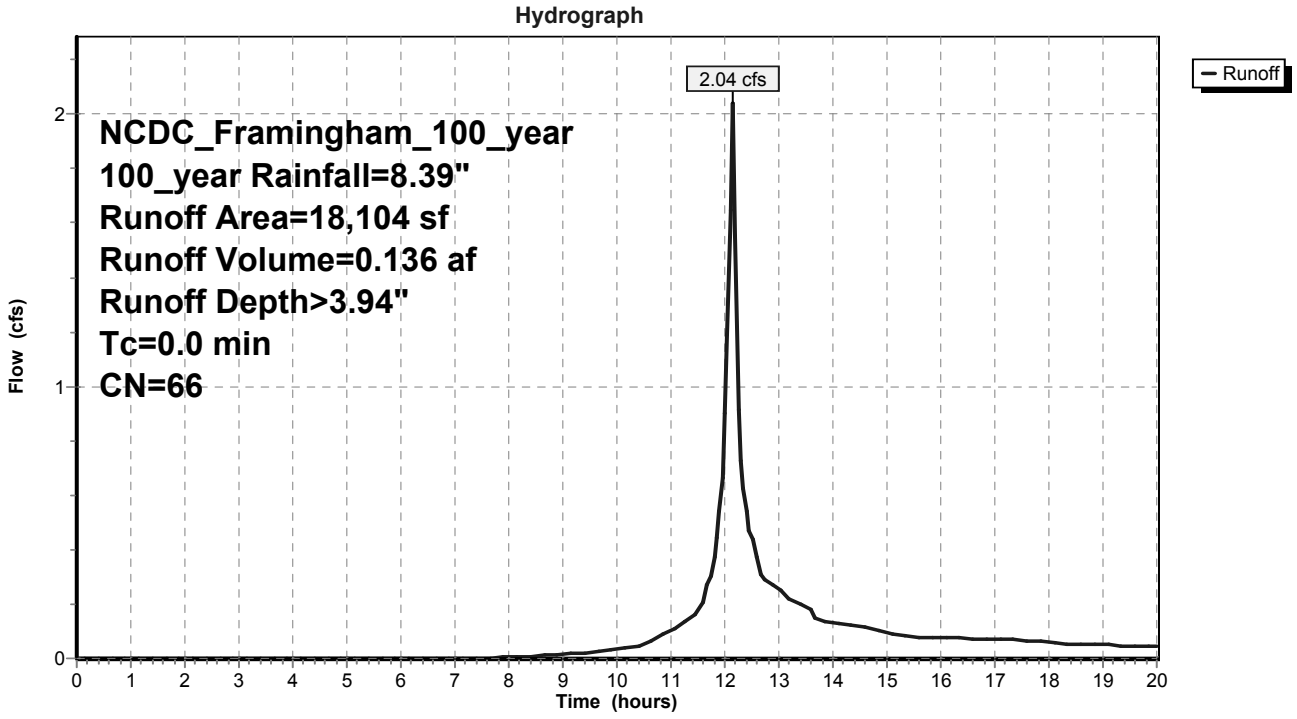
## Summary for Subcatchment S-LD-11: (blank)

Runoff = 2.04 cfs @ 12.15 hrs, Volume= 0.136 af, Depth> 3.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 15,426 | 61 | GRASS, 0% imperv, HSG B |
| * | 439 | 98 | DECK, 100% imperv, HSG B |
| * | 2,239 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 18,104 | 66 | Weighted Average |
| | 18,104 | | 100.00% Pervious Area |

## Subcatchment S-LD-11: (blank)



## Summary for Subcatchment S-LD-2: (blank)

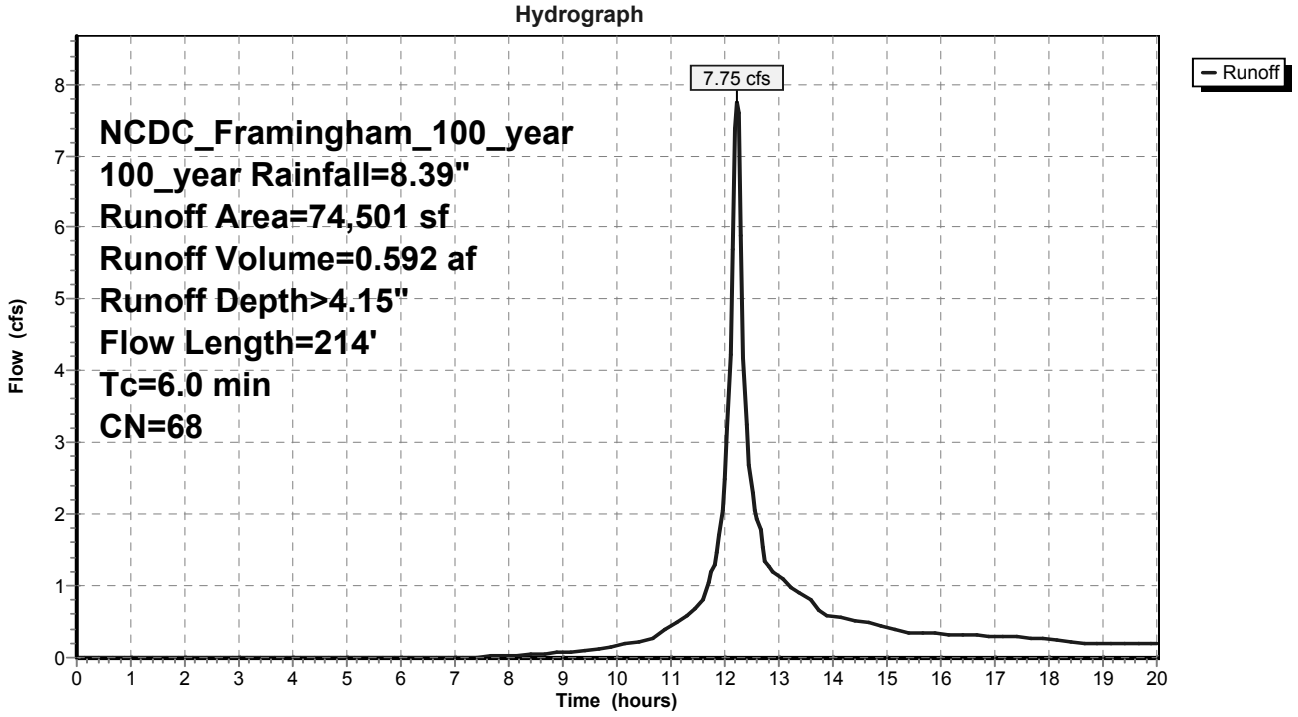
Runoff = 7.75 cfs @ 12.23 hrs, Volume= 0.592 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 57,181 | 61 | GRASS, 0% imperv, HSG B |
| * | 396 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,542 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 803 | 98 | DECK, 100% imperv, HSG B |
| * | 4,508 | 98 | IMP, 100% imperv, HSG B |
| * | 1,071 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 74,501 | 68 | Weighted Average |
| | 67,649 | | 90.80% Pervious Area |
| | 6,852 | | 9.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2134 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 2.2 | 164 | 0.0313 | 1.24 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.5 | 214 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment S-LD-2: (blank)



## Summary for Subcatchment S-LD-4: (blank)

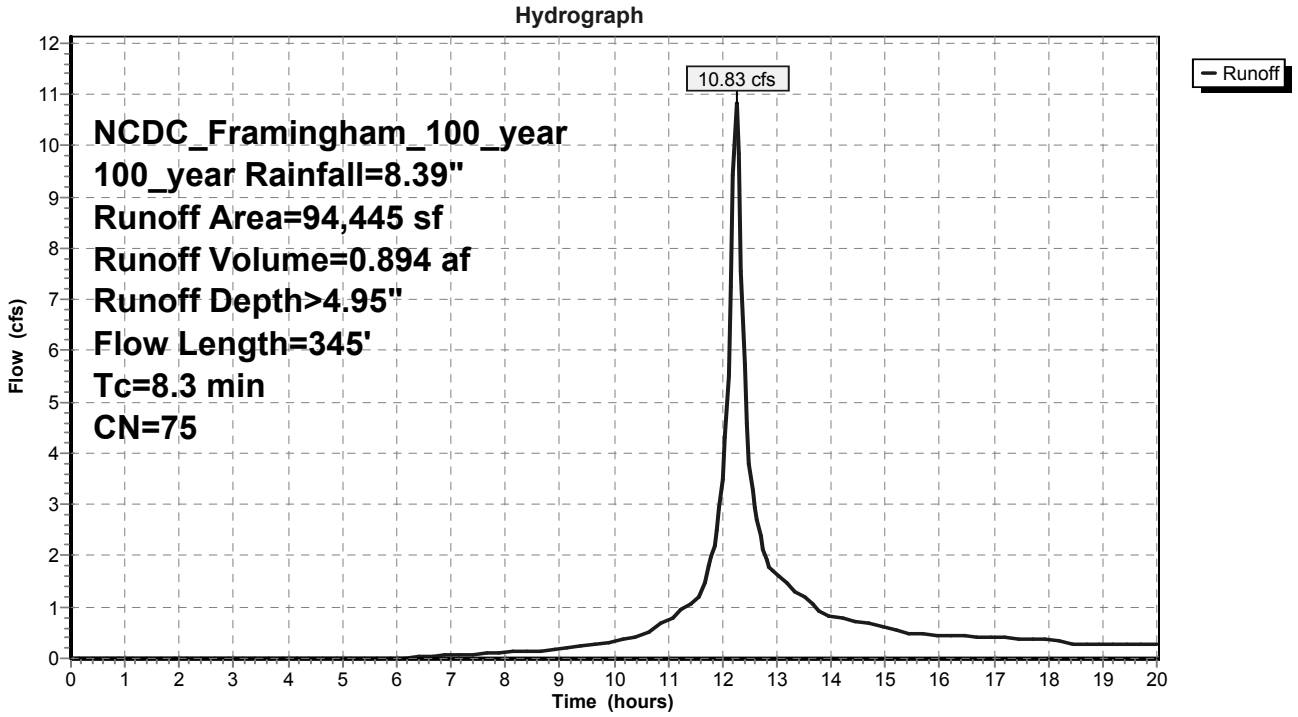
Runoff = 10.83 cfs @ 12.25 hrs, Volume= 0.894 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 53,813 | 61 | GRASS, 0% imperv, HSG B |
| * | 14,316 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 486 | 98 | DECK, 100% imperv, HSG B |
| * | 25,119 | 98 | IMP, 100% imperv, HSG B |
| * | 710 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 94,445 | 75 | Weighted Average |
| | 85,139 | | 90.15% Pervious Area |
| | 9,306 | | 9.85% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.9 | 50 | 0.0309 | 0.17 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.4 | 288 | 0.0398 | 1.40 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.0 | 6 | 0.0194 | 2.83 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.0 | 0 | 0.0182 | 0.94 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.3 | 345 | Total | | | |

## Subcatchment S-LD-4: (blank)



## Summary for Subcatchment W 10.0: (blank)

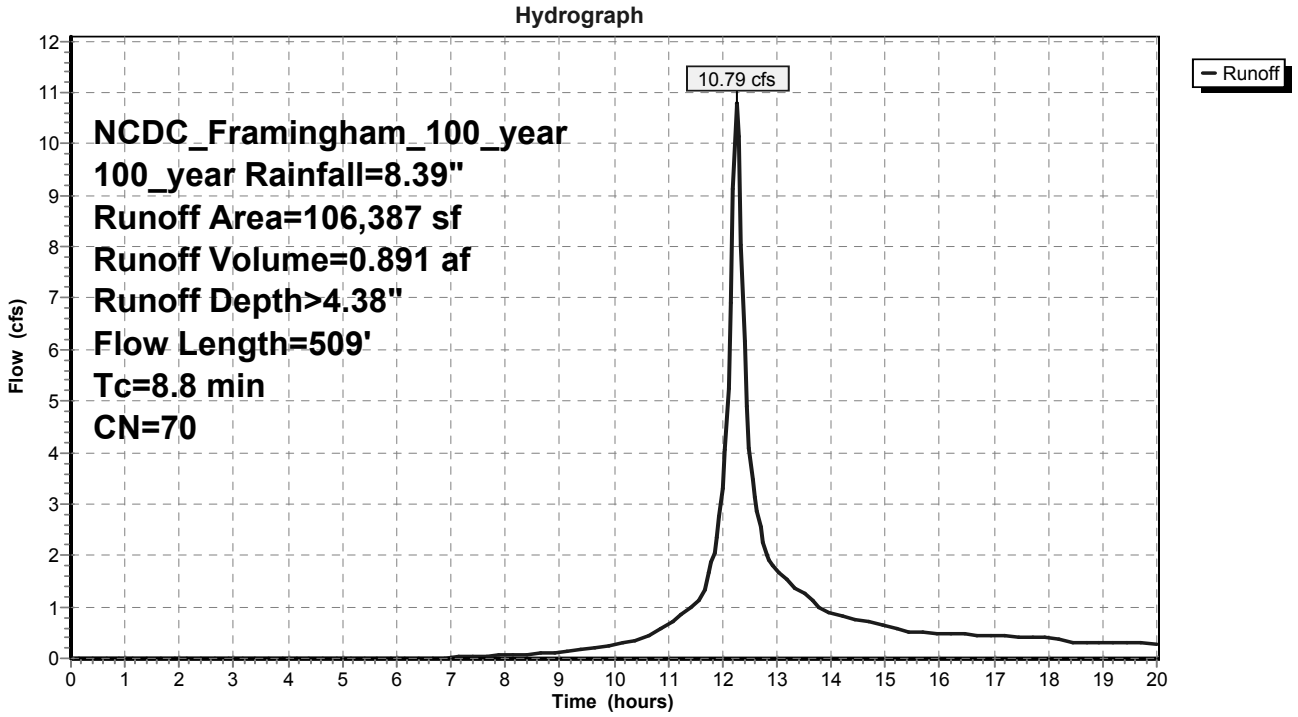
Runoff = 10.79 cfs @ 12.26 hrs, Volume= 0.891 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2 | 39 | GRASS, 0% imperv, HSG A |
| * | 331 | 61 | GRASS, 0% imperv, HSG B |
| * | 24,191 | 30 | Forest, 0% imperv, HSG A |
| * | 21,845 | 70 | Forest, 0% imperv, HSG C |
| * | 7,957 | 98 | Forest, 0% imperv, HSG W |
| * | 1,537 | 77 | Mining, 0% imperv, HSG A |
| * | 2 | 86 | Mining, 0% imperv, HSG B |
| * | 27,760 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 160 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 7,298 | 90 | GRAVEL, 65% imperv, HSG C |
| * | 8,762 | 98 | Water, 100% imperv, HSG C |
| * | 6,541 | 98 | Water, 100% imperv, HSG W |
| | 106,387 | 70 | Weighted Average |
| | 83,495 | | 78.48% Pervious Area |
| | 22,892 | | 21.52% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.6 | 21 | 0.0914 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.9 | 14 | 0.1437 | 0.28 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 14 | 0.1410 | 1.97 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.1 | 16 | 0.1641 | 4.05 | | **Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps |
| 0.2 | 58 | 0.1215 | 5.61 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 125 | 0.1137 | 5.43 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.4 | 100 | 0.0572 | 3.85 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.2 | 73 | 0.1431 | 6.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 1.8 | 41 | 0.0223 | 0.37 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 0.2 | 11 | 0.2240 | 1.18 | | **Shallow Concentrated Flow,** Forest w/Heavy Litter Kv= 2.5 fps |
| 2.9 | 35 | 0.0001 | 0.20 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 8.8 | 509 | Total | | | |

## Subcatchment W 10.0: (blank)



## Summary for Subcatchment W 2.0: (blank)

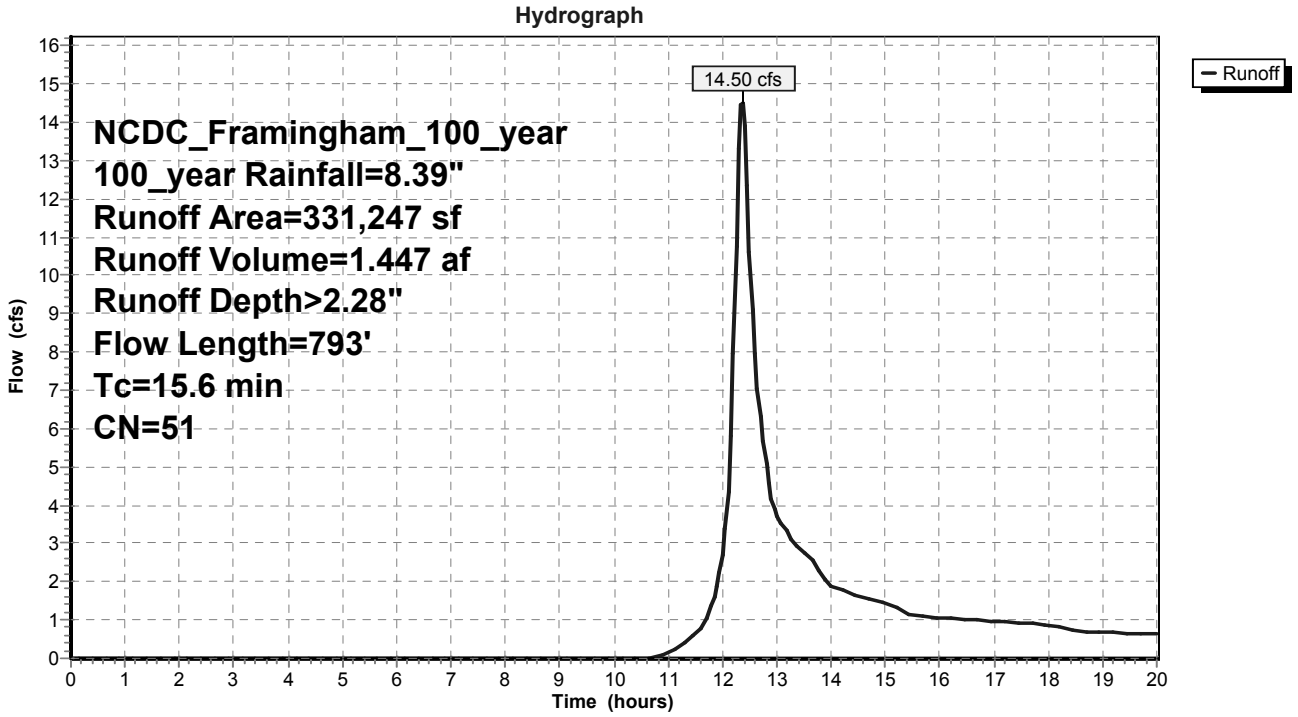
Runoff = 14.50 cfs @ 12.36 hrs, Volume= 1.447 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 40,834 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,020 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,781 | 30 | Forest, 0% imperv, HSG A |
| * | 40,735 | 77 | Forest, 0% imperv, HSG D |
| * | 158,571 | 30 | WOODS, 0% imperv, HSG A |
| * | 15 | 55 | WOODS, 0% imperv, HSG B |
| * | 28,711 | 77 | WOODS, 0% imperv, HSG D |
| * | 17,208 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 2,472 | 98 | DECK, 100% imperv, HSG A |
| * | 54 | 98 | DECK, 100% imperv, HSG B |
| * | 19,292 | 98 | Water, 100% imperv, HSG D |
| * | 1,268 | 98 | Water, 100% imperv, HSG W |
| * | 16,287 | 83 | Forested Wetland, 0% imperv, HSG D |
| | 331,247 | 51 | Weighted Average |
| | 320,062 | | 96.62% Pervious Area |
| | 11,185 | | 3.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 50 | 0.0542 | 0.10 | | **Sheet Flow,** Woods: Light Underbrush n= 0.400 P2= 3.00" |
| 0.6 | 61 | 0.1184 | 1.72 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 15 | 0.1140 | 5.44 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.1 | 8 | 0.0636 | 1.26 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.5 | 99 | 0.0442 | 3.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.3 | 533 | 0.1115 | 1.67 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.6 | 26 | 0.0203 | 0.71 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.0 | 1 | 0.0960 | 6.29 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 15.6 | 793 | Total | | | |

## Subcatchment W 2.0: (blank)



## Summary for Subcatchment W 3.1: (blank)

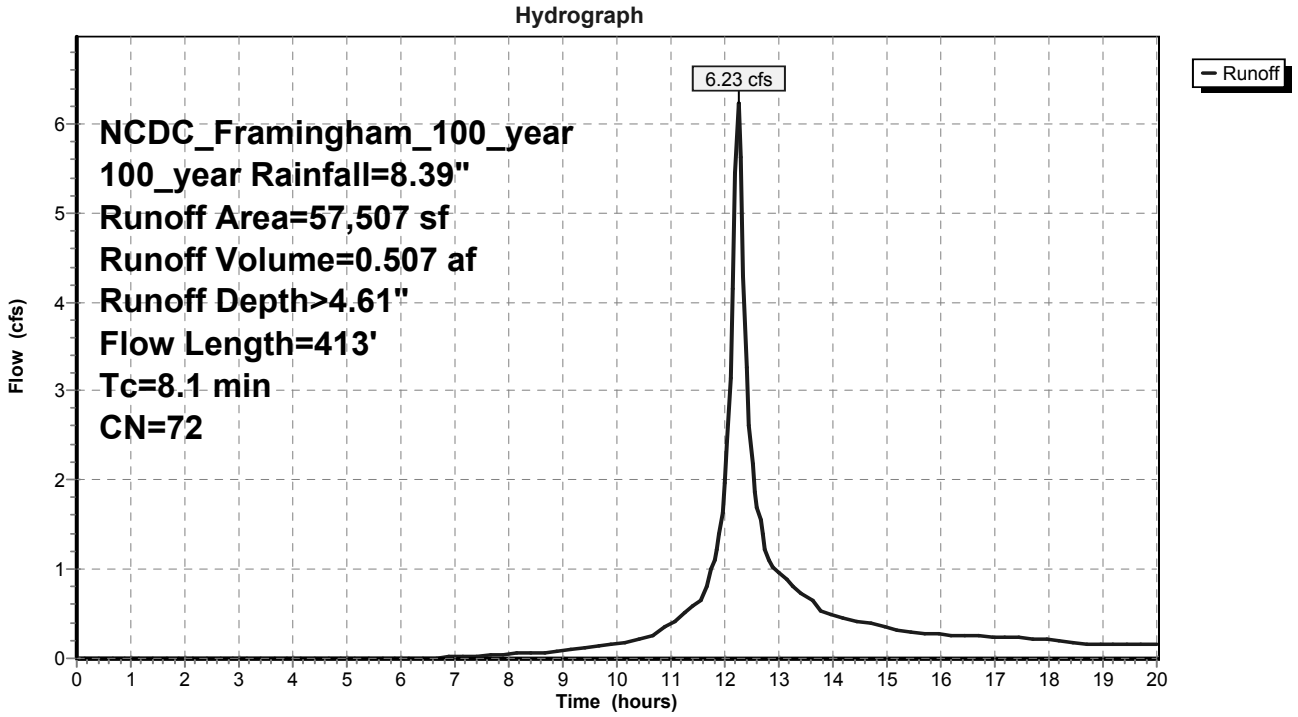
Runoff = 6.23 cfs @ 12.25 hrs, Volume= 0.507 af, Depth> 4.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 3,850 | 39 | GRASS, 0% imperv, HSG A |
| * | 26,567 | 61 | GRASS, 0% imperv, HSG B |
| * | 112 | 30 | WOODS, 0% imperv, HSG A |
| * | 408 | 55 | WOODS, 0% imperv, HSG B |
| * | 2,113 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 15,113 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 12 | 98 | DECK, 100% imperv, HSG A |
| * | 1,574 | 98 | DECK, 100% imperv, HSG B |
| * | 3,090 | 98 | IMP, 100% imperv, HSG A |
| * | 4,669 | 98 | IMP, 100% imperv, HSG B |
| | 57,507 | 72 | Weighted Average |
| | 46,310 | | 80.53% Pervious Area |
| | 11,197 | | 19.47% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2132 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 5.8 | 363 | 0.0223 | 1.05 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 8.1 | 413 | Total | | | |

## Subcatchment W 3.1: (blank)



## Summary for Subcatchment W 3.2: (blank)

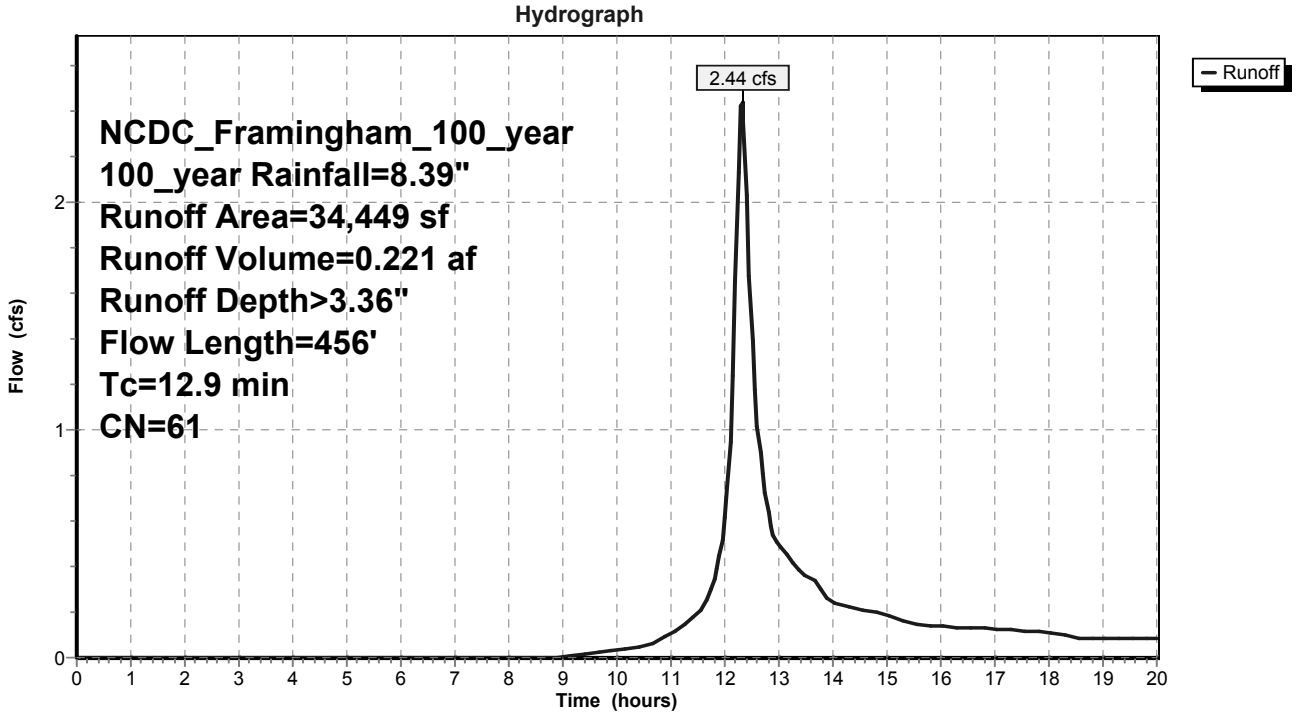
Runoff = 2.44 cfs @ 12.32 hrs, Volume= 0.221 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 2,379 | 39 | GRASS, 0% imperv, HSG A |
| * | 30,967 | 61 | GRASS, 0% imperv, HSG B |
| * | 8 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 459 | 98 | DECK, 100% imperv, HSG B |
| * | 15 | 98 | IMP, 100% imperv, HSG A |
| * | 621 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 34,449 | 61 | Weighted Average |
| | 34,444 | | 99.99% Pervious Area |
| | 5 | | 0.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 8.5 | 406 | 0.0128 | 0.79 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.4 | 50 | 0.0400 | 0.19 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 12.9 | 456 | Total | | | |

## Subcatchment W 3.2: (blank)



## Summary for Subcatchment W 3.3: (blank)

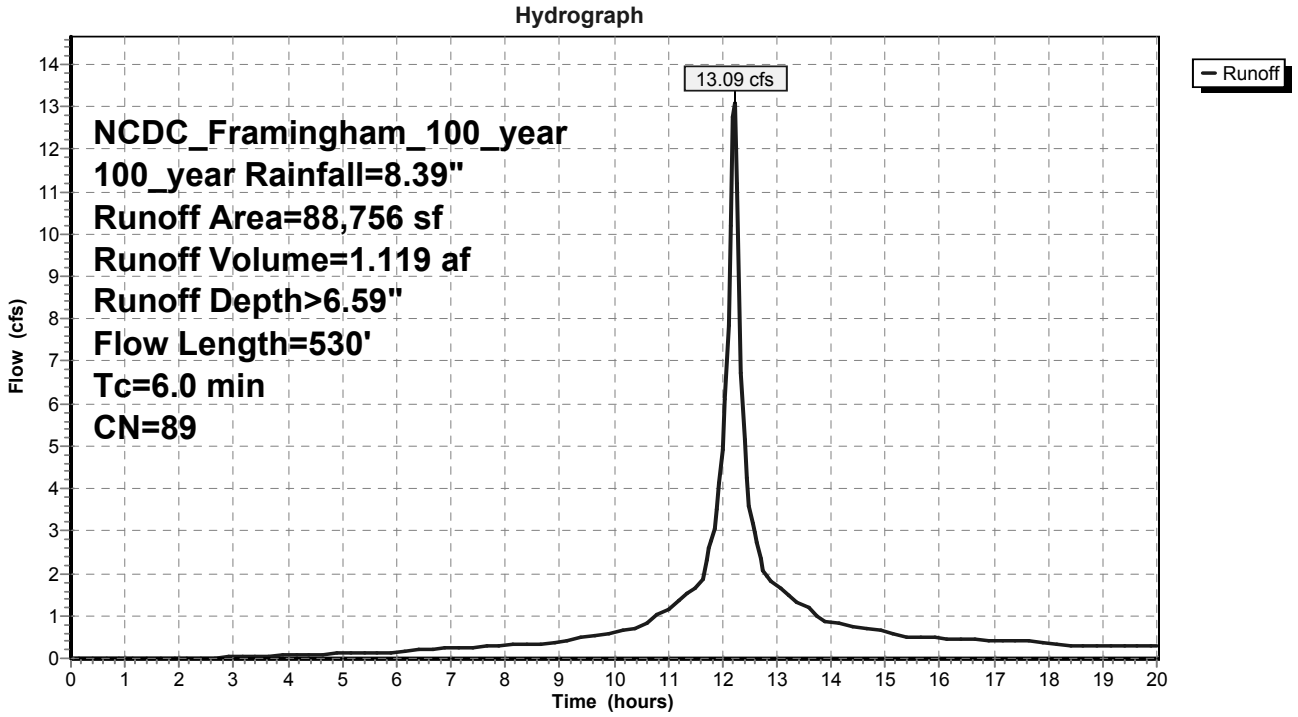
Runoff = 13.09 cfs @ 12.22 hrs, Volume= 1.119 af, Depth> 6.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 285 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,199 | 61 | GRASS, 0% imperv, HSG B |
| * | 4,658 | 30 | WOODS, 0% imperv, HSG A |
| * | 3,726 | 55 | WOODS, 0% imperv, HSG B |
| * | 4,454 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,698 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 18,852 | 98 | IMP, 100% imperv, HSG A |
| * | 45,884 | 98 | IMP, 100% imperv, HSG B |
| | 88,756 | 89 | Weighted Average |
| | 79,557 | | 89.64% Pervious Area |
| | 9,199 | | 10.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 3.6 | 474 | 0.0118 | 2.21 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.4 | 56 | 0.0168 | 2.09 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 4.0 | 530 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 3.3: (blank)



## Summary for Subcatchment W 3.4: (blank)

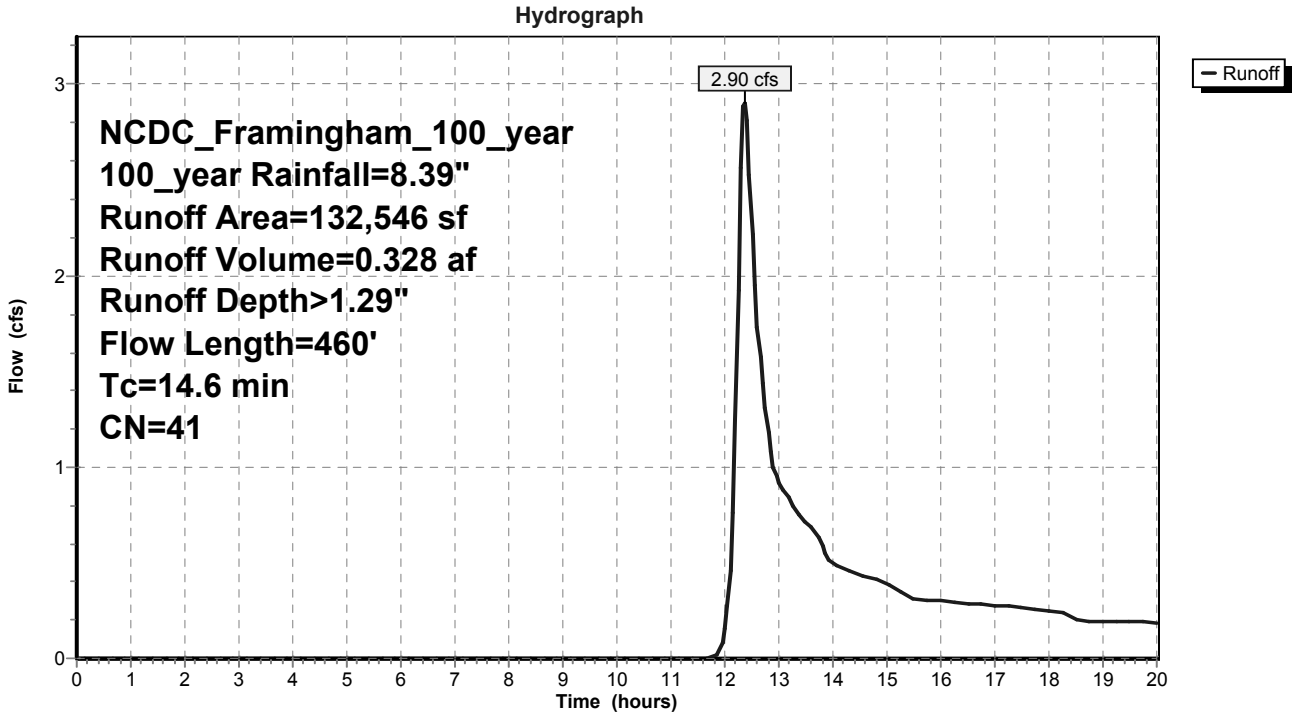
Runoff = 2.90 cfs @ 12.37 hrs, Volume= 0.328 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 34,402 | 39 | GRASS, 0% imperv, HSG A |
| * | 672 | 61 | GRASS, 0% imperv, HSG B |
| * | 77,152 | 30 | WOODS, 0% imperv, HSG A |
| * | 649 | 55 | WOODS, 0% imperv, HSG B |
| * | 10,242 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 9,429 | 98 | IMP, 100% imperv, HSG A |
| | 132,546 | 41 | Weighted Average |
| | 125,888 | | 94.98% Pervious Area |
| | 6,658 | | 5.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.2 | 36 | 0.0236 | 0.14 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 14 | 0.0374 | 1.15 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.0 | 5 | 0.0374 | 3.92 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.1 | 10 | 0.0374 | 1.35 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 21 | 0.0339 | 3.74 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 2.5 | 166 | 0.0258 | 1.12 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 5 | 0.0223 | 1.04 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.1 | 33 | 0.0328 | 3.67 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.2 | 19 | 0.0512 | 1.58 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 7.1 | 149 | 0.0048 | 0.35 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 14.6 | 460 | Total | | | |

## Subcatchment W 3.4: (blank)



## Summary for Subcatchment W 9.1A: (blank)

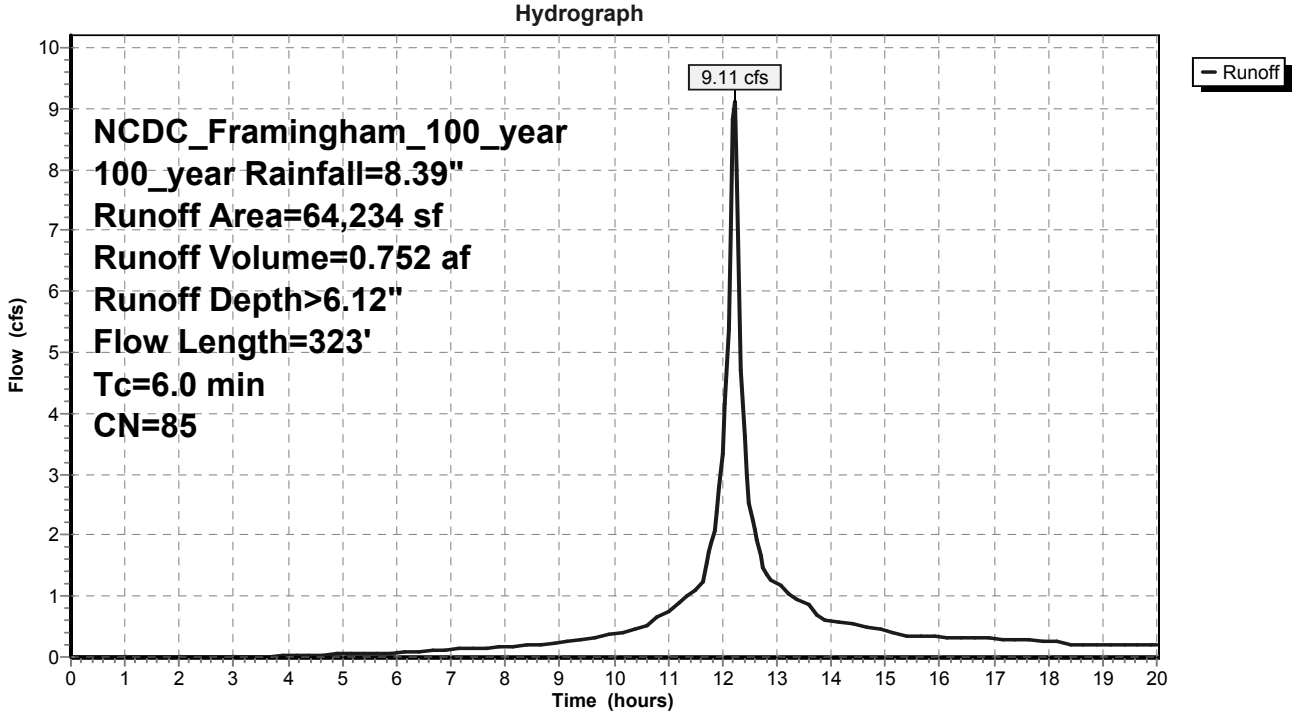
Runoff = 9.11 cfs @ 12.23 hrs, Volume= 0.752 af, Depth> 6.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 1,121 | 55 | WOODS, 0% imperv, HSG B |
| * | 60,291 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 2,821 | 98 | IMP, 100% imperv, HSG B |
| | 64,234 | 85 | Weighted Average |
| | 25,044 | | 38.99% Pervious Area |
| | 39,189 | | 61.01% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 1.5 | 44 | 0.3498 | 0.49 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.7 | 219 | 0.0972 | 5.02 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.0 | 4 | 0.0743 | 1.36 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.3 | 56 | 0.0467 | 3.48 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.5 | 323 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1A: (blank)



## Summary for Subcatchment W 9.1B: (blank)

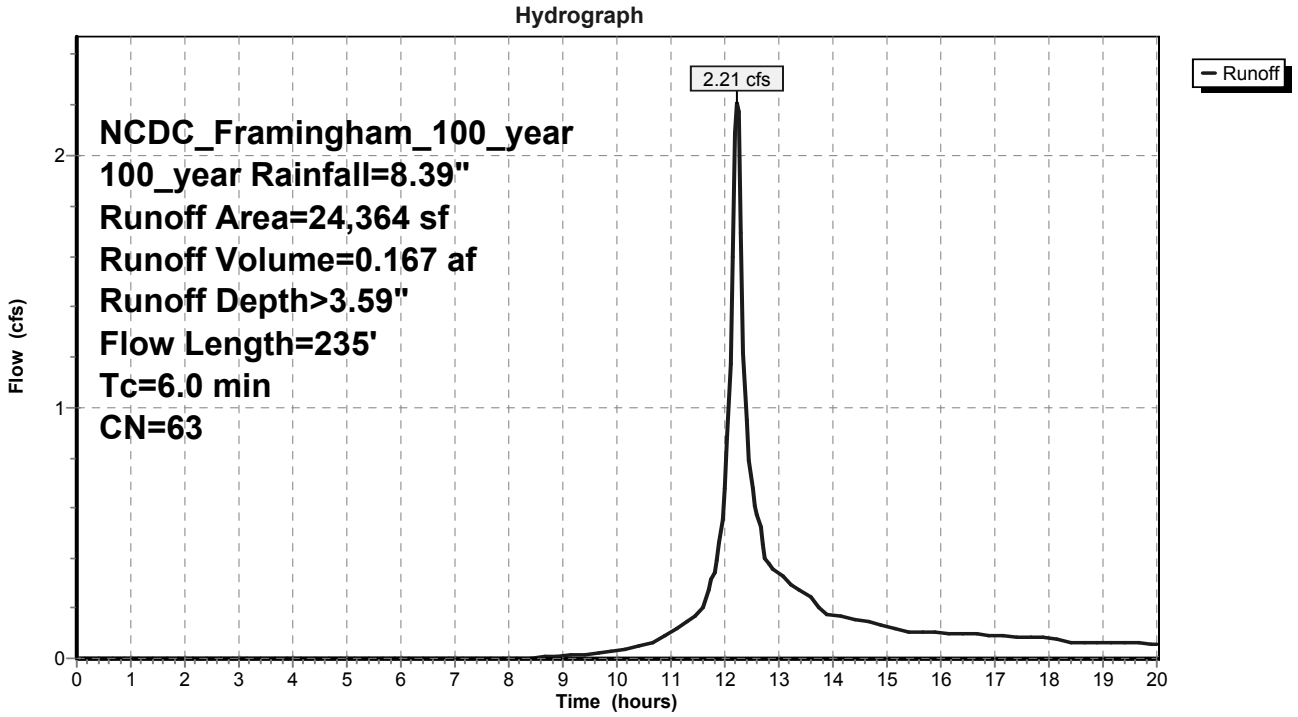
Runoff = 2.21 cfs @ 12.23 hrs, Volume= 0.167 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 12,160 | 39 | GRASS, 0% imperv, HSG A |
| * | 12 | 61 | GRASS, 0% imperv, HSG B |
| * | 116 | 55 | WOODS, 0% imperv, HSG B |
| * | 5,328 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 676 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 4,295 | 98 | IMP, 100% imperv, HSG A |
| * | 1,777 | 98 | IMP, 100% imperv, HSG B |
| | 24,364 | 63 | Weighted Average |
| | 20,461 | | 83.98% Pervious Area |
| | 3,902 | | 16.02% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.9 | 7 | 0.0283 | 0.12 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.5 | 40 | 0.0330 | 1.35 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.00" |
| 0.6 | 4 | 0.0284 | 0.11 | | **Sheet Flow,** Range n= 0.130 P2= 3.00" |
| 0.1 | 29 | 0.0549 | 3.77 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.0 | 156 | 0.0352 | 1.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 4.1 | 235 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W 9.1B: (blank)



## Summary for Subcatchment W-CULV-N: (blank)

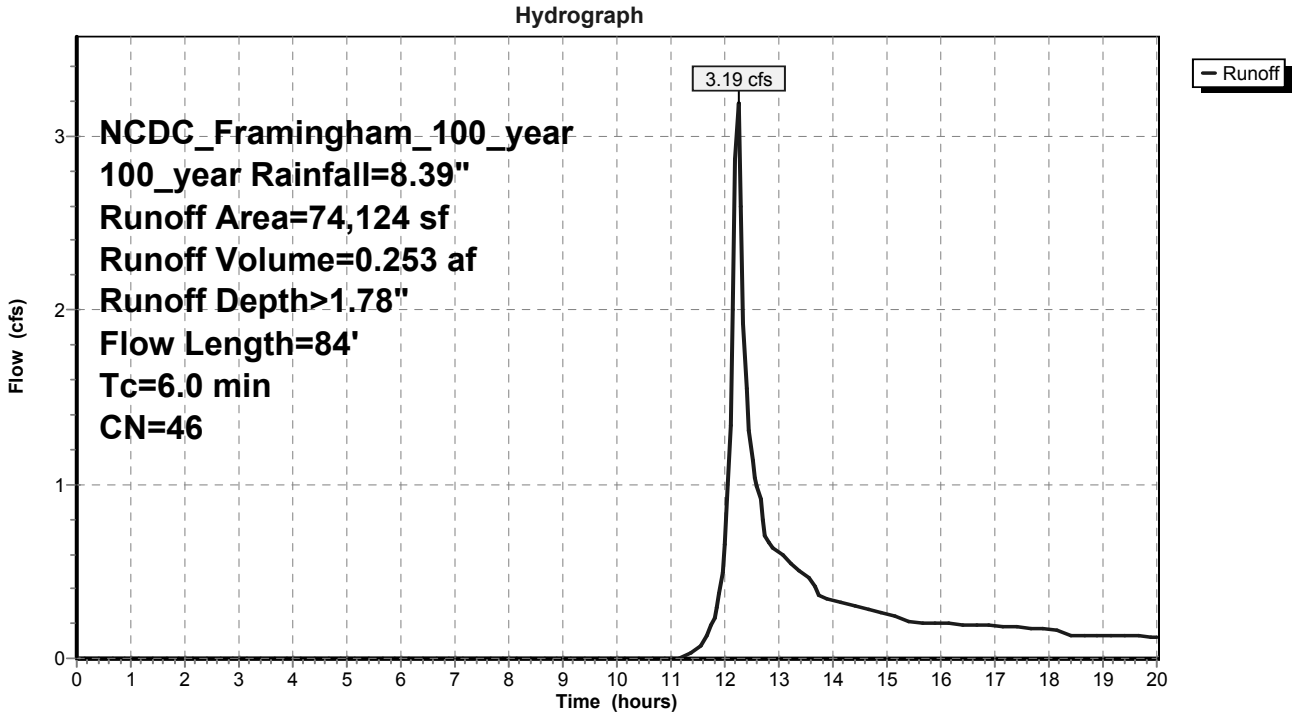
Runoff = 3.19 cfs @ 12.24 hrs, Volume= 0.253 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 49,219 | 39 | GRASS, 0% imperv, HSG A |
| * | 878 | 61 | GRASS, 0% imperv, HSG B |
| * | 11,450 | 30 | WOODS, 0% imperv, HSG A |
| * | 6,537 | 77 | GRAVEL, 65% imperv, HSG A |
| * | 3 | 85 | GRAVEL, 65% imperv, HSG B |
| * | 458 | 98 | DECK, 100% imperv, HSG A |
| * | 70 | 98 | DECK, 100% imperv, HSG B |
| * | 4,994 | 98 | IMP, 100% imperv, HSG A |
| * | 515 | 98 | IMP, 100% imperv, HSG B |
| | 74,124 | 46 | Weighted Average |
| | 69,873 | | 94.27% Pervious Area |
| | 4,251 | | 5.73% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 2.3 | 50 | 0.2138 | 0.37 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 0.2 | 34 | 0.2186 | 3.27 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 2.5 | 84 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-CULV-N: (blank)



## Summary for Subcatchment W-D-1: (blank)

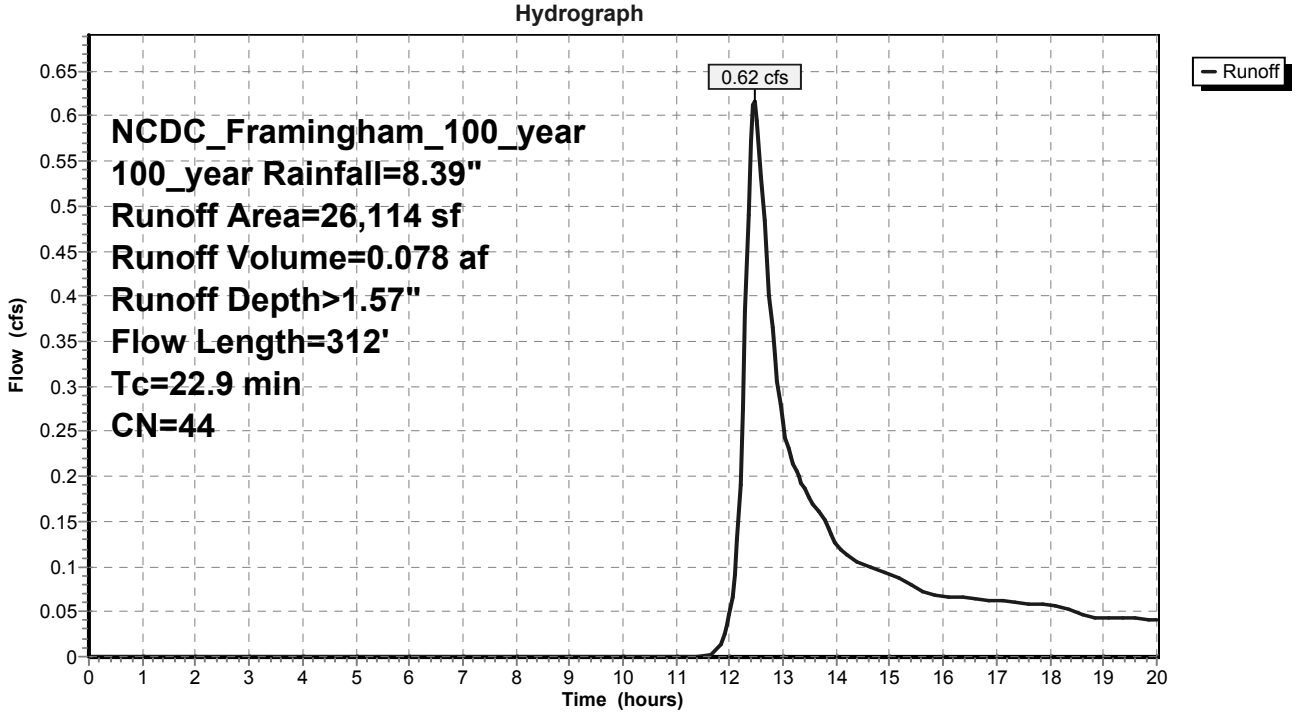
Runoff = 0.62 cfs @ 12.47 hrs, Volume= 0.078 af, Depth> 1.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 22,996 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,258 | 61 | GRASS, 0% imperv, HSG B |
| * | 535 | 98 | DECK, 100% imperv, HSG A |
| * | 1 | 98 | IMP, 100% imperv, HSG A |
| * | 47 | 98 | ROOF, 100% imperv, HSG B |
| * | 1,136 | 98 | SIDEWALK, 100% imperv, HSG A |
| * | 141 | 98 | SIDEWALK, 100% imperv, HSG B |
| | 26,114 | 44 | Weighted Average |
| | 26,114 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.3 | 50 | 0.0010 | 0.04 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 3.6 | 262 | 0.0300 | 1.21 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 22.9 | 312 | Total | | | |

## Subcatchment W-D-1: (blank)



## Summary for Subcatchment W-D-3: (blank)

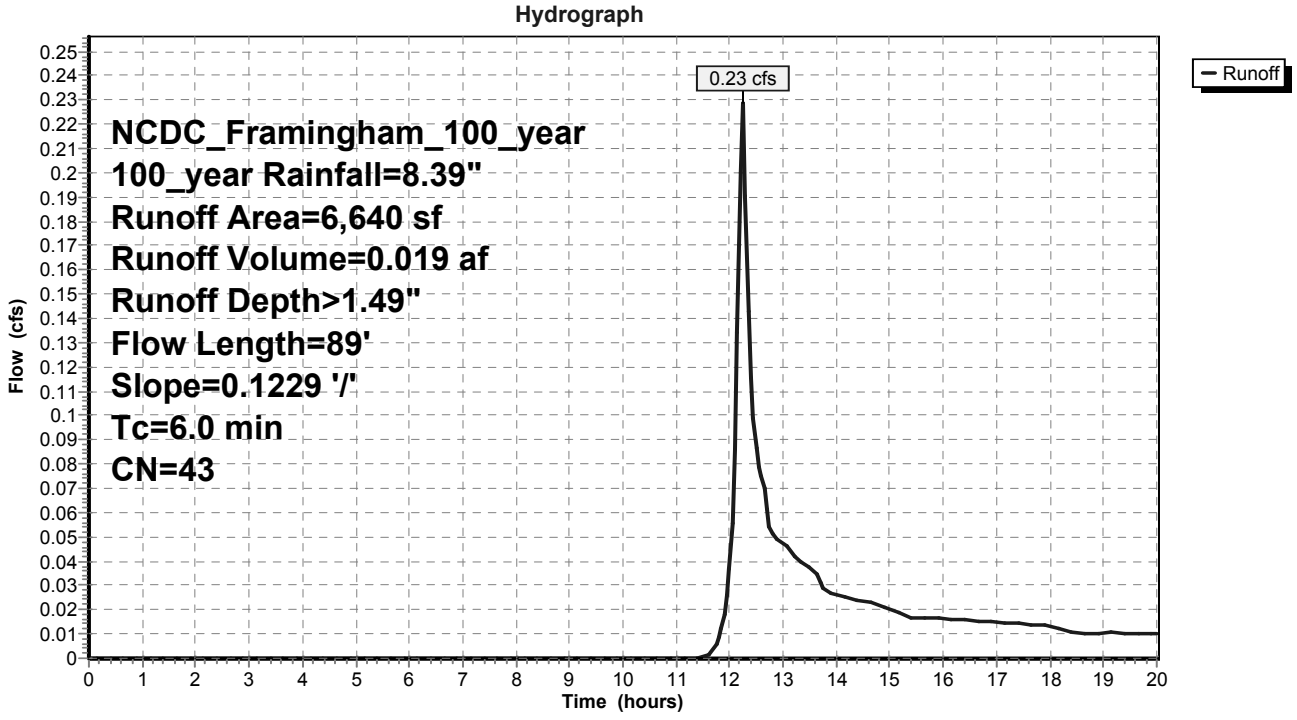
Runoff = 0.23 cfs @ 12.25 hrs, Volume= 0.019 af, Depth> 1.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
NCDC_Framingham_100_year 100_year Rainfall=8.39"

| | Area (sf) | CN | Description |
|---|---|---|---|
| * | 4,198 | 39 | GRASS, 0% imperv, HSG A |
| * | 1,421 | 30 | WOODS, 0% imperv, HSG A |
| * | 1,021 | 77 | GRAVEL, 65% imperv, HSG A |
| | 6,640 | 43 | Weighted Average |
| | 5,977 | | 90.01% Pervious Area |
| | 664 | | 9.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 4.5 | 89 | 0.1229 | 0.33 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.00" |
| 4.5 | 89 | Total, Increased to minimum Tc = 6.0 min | | | |

## Subcatchment W-D-3: (blank)



## Summary for Reach R-SWALE1: (new Reach)

Inflow Area = 0.663 ac, 2.32% Impervious, Inflow Depth > 3.48" for 100_year event
Inflow = 2.42 cfs @ 12.26 hrs, Volume= 0.192 af
Outflow = 2.12 cfs @ 12.31 hrs, Volume= 0.190 af, Atten= 12%, Lag= 3.4 min

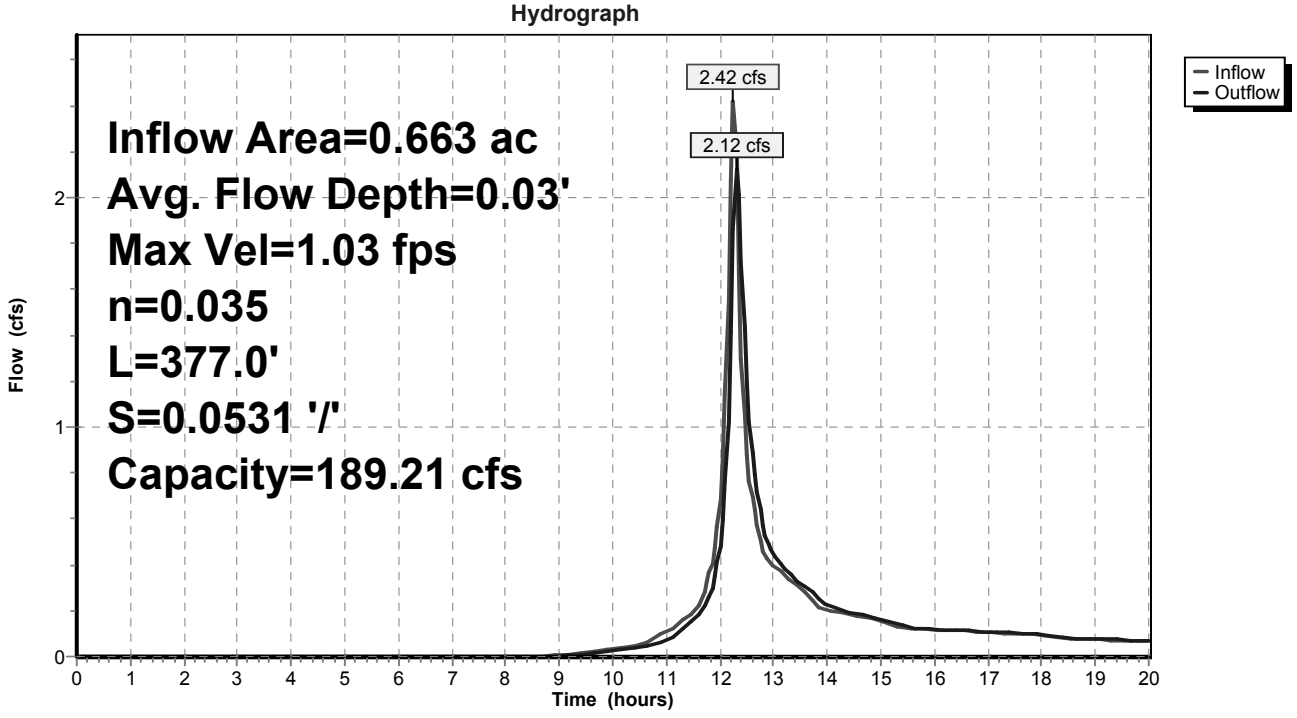
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 1.03 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 0.38 fps, Avg. Travel Time= 16.7 min

Peak Storage= 776 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 189.21 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 377.0' Slope= 0.0531 '/'
Inlet Invert= 165.00', Outlet Invert= 145.00'

‡

## Reach R-SWALE1: (new Reach)



## Summary for Reach R-SWALE2: (new Reach)

Inflow Area = 4.722 ac, 23.76% Impervious, Inflow Depth > 4.88" for 100_year event
Inflow = 23.21 cfs @ 12.23 hrs, Volume= 1.920 af
Outflow = 22.98 cfs @ 12.24 hrs, Volume= 1.914 af, Atten= 1%, Lag= 1.0 min

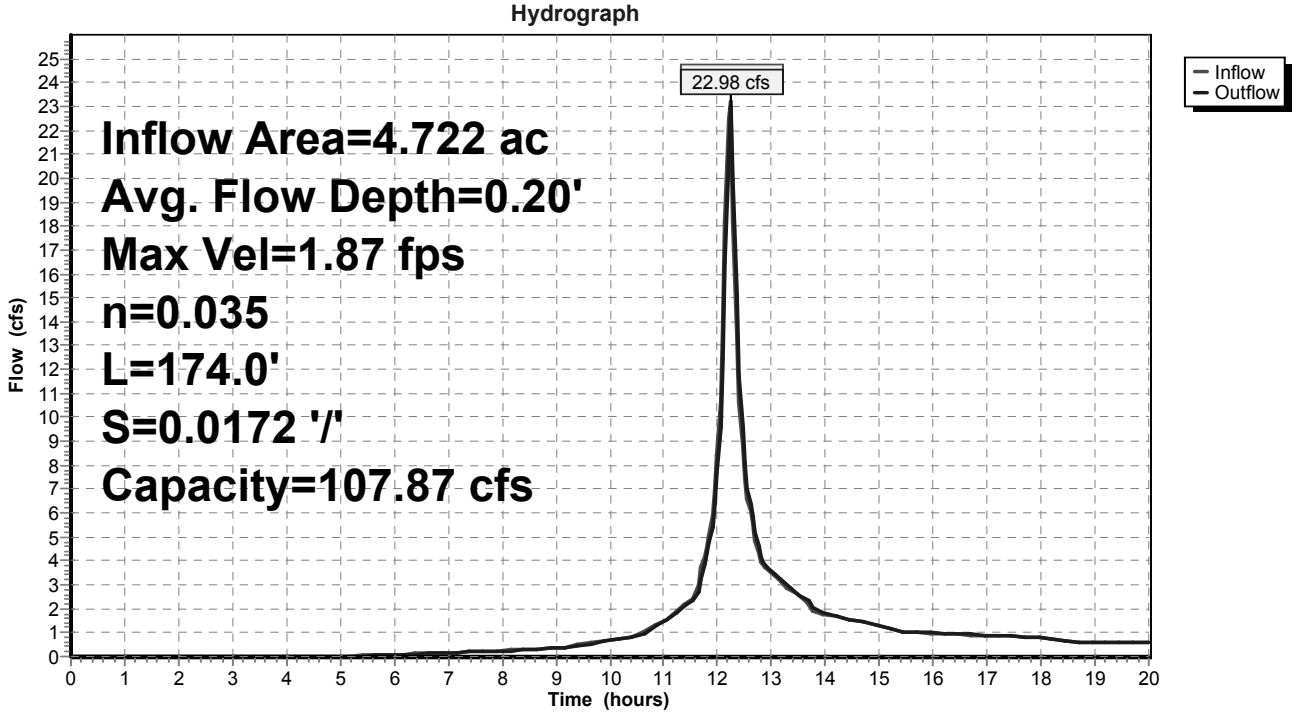
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 1.87 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 5.7 min

Peak Storage= 2,138 cf @ 12.24 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 32.0 sf, Capacity= 107.87 cfs

60.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 68.00'
Length= 174.0' Slope= 0.0172 '/'
Inlet Invert= 145.00', Outlet Invert= 142.00'

‡

## Reach R-SWALE2: (new Reach)



## Summary for Reach R-SWALE3: (new Reach)

Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 5.94" for 100_year event
Inflow = 102.71 cfs @ 12.25 hrs, Volume= 3.801 af
Outflow = 95.28 cfs @ 12.28 hrs, Volume= 3.782 af, Atten= 7%, Lag= 1.6 min

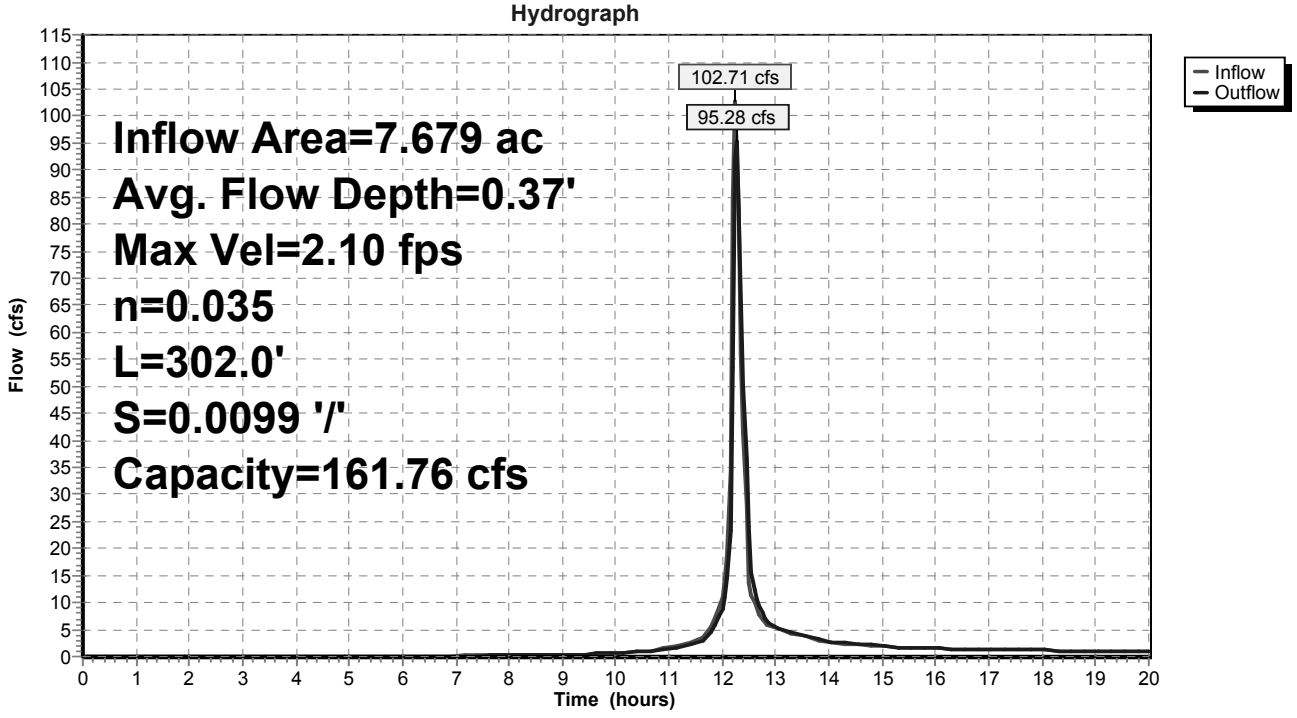
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 2.10 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.38 fps, Avg. Travel Time= 13.2 min

Peak Storage= 13,551 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.37'
Bank-Full Depth= 0.50' Flow Area= 62.0 sf, Capacity= 161.76 cfs

120.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 8.0 '/' Top Width= 128.00'
Length= 302.0' Slope= 0.0099 '/'
Inlet Invert= 142.00', Outlet Invert= 139.00'

‡

## Reach R-SWALE3: (new Reach)



## Summary for Pond DET-1: 387

Inflow Area = 0.908 ac, 0.08% Impervious, Inflow Depth > 5.84" for 100_year event
Inflow = 4.71 cfs @ 12.15 hrs, Volume= 0.442 af
Outflow = 3.85 cfs @ 12.21 hrs, Volume= 0.314 af, Atten= 18%, Lag= 3.7 min
Primary = 3.85 cfs @ 12.21 hrs, Volume= 0.314 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.63' @ 12.21 hrs Surf.Area= 5,014 sf Storage= 7,015 cf
Flood Elev= 170.00' Surf.Area= 5,344 sf Storage= 8,945 cf

Plug-Flow detention time= 167.9 min calculated for 0.313 af (71% of inflow)
Center-of-Mass det. time= 88.5 min ( 823.3 - 734.9 )

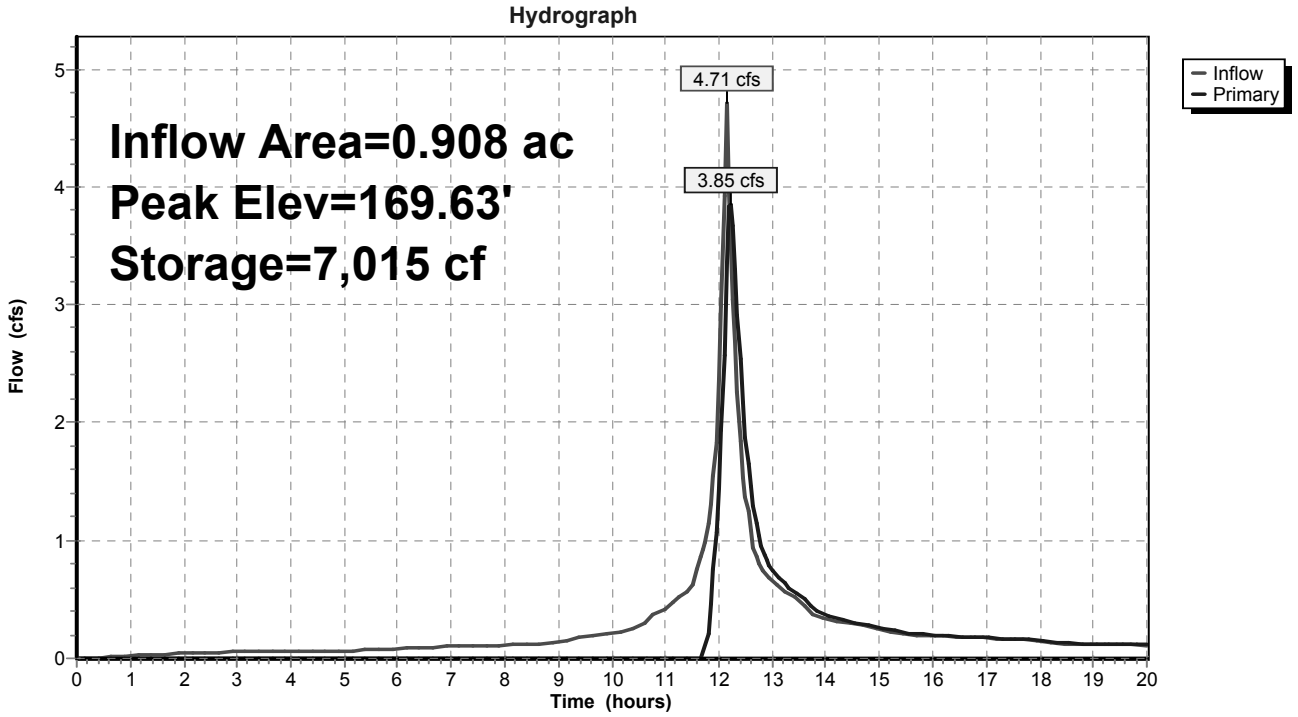
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 8,945 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 3,630 | 0 | 0 |
| 169.00 | 4,458 | 4,044 | 4,044 |
| 170.00 | 5,344 | 4,901 | 8,945 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 15.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.80' S= 0.0133 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.30' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=3.79 cfs @ 12.21 hrs HW=169.62' TW=158.72' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 3.79 cfs of 23.48 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 3.79 cfs @ 1.86 fps)

## Pond DET-1: 387



## Summary for Pond DET-2: 391

Inflow Area = 0.988 ac, 0.00% Impervious, Inflow Depth > 6.10" for 100_year event
Inflow = 6.45 cfs @ 12.14 hrs, Volume= 0.502 af
Outflow = 6.15 cfs @ 12.25 hrs, Volume= 0.462 af, Atten= 5%, Lag= 6.3 min
Primary = 6.16 cfs @ 12.25 hrs, Volume= 0.465 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 183.59' @ 12.25 hrs Surf.Area= 2,656 sf Storage= 5,490 cf
Flood Elev= 166.00' Surf.Area= 2,656 sf Storage= 5,490 cf

Plug-Flow detention time= 82.4 min calculated for 0.462 af (92% of inflow)
Center-of-Mass det. time= 51.2 min ( 782.0 - 730.8 )

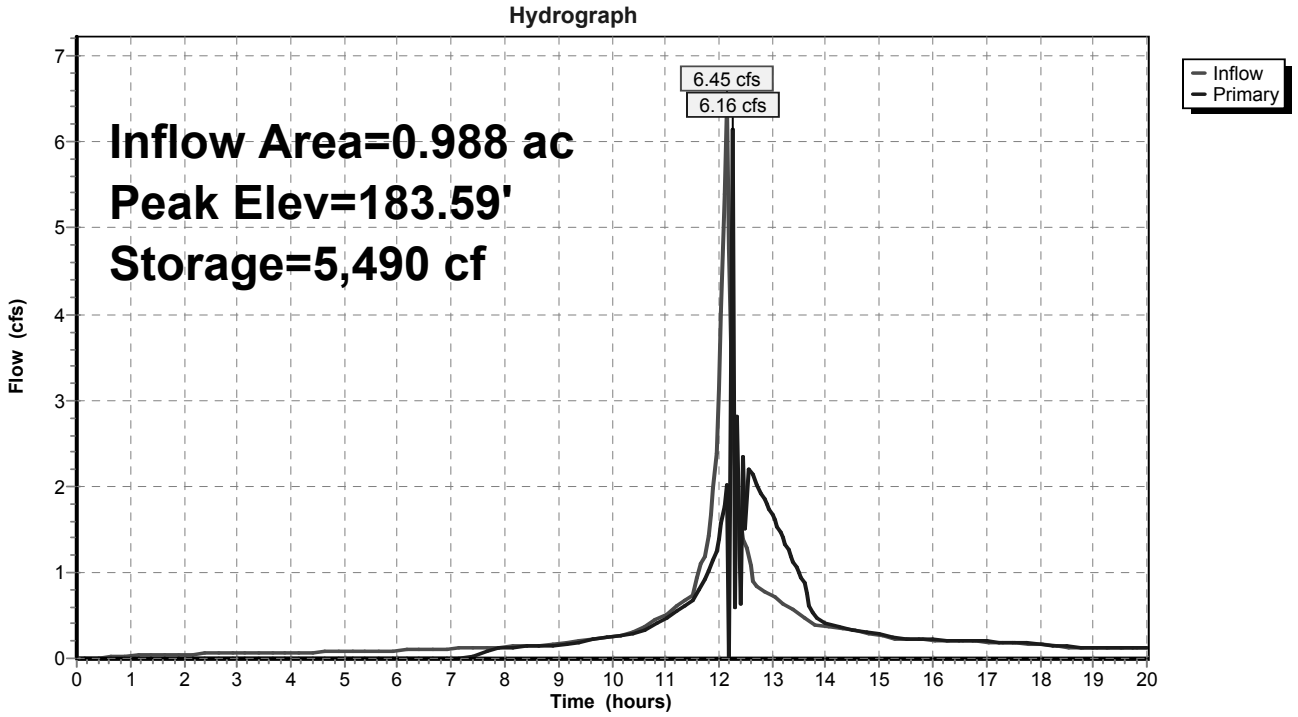
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 5,490 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 1,079 | 0 | 0 |
| 164.00 | 1,548 | 1,314 | 1,314 |
| 165.00 | 2,074 | 1,811 | 3,125 |
| 166.00 | 2,656 | 2,365 | 5,490 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 25.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.80' S= 0.0080 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 164.20' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=7.02 cfs @ 12.25 hrs HW=183.15' TW=165.72' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 7.02 cfs of 44.40 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 7.02 cfs @ 20.10 fps)

## Pond DET-2: 391



## Summary for Pond DET-3: 395

Inflow Area = 0.995 ac, 0.00% Impervious, Inflow Depth > 6.19" for 100_year event
Inflow = 5.61 cfs @ 12.15 hrs, Volume= 0.513 af
Outflow = 2.12 cfs @ 12.39 hrs, Volume= 0.457 af, Atten= 62%, Lag= 14.4 min
Primary = 2.12 cfs @ 12.39 hrs, Volume= 0.457 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 175.89' @ 12.39 hrs Surf.Area= 2,982 sf Storage= 6,319 cf
Flood Elev= 176.00' Surf.Area= 3,044 sf Storage= 6,640 cf

Plug-Flow detention time= 102.9 min calculated for 0.457 af (89% of inflow)
Center-of-Mass det. time= 62.5 min ( 793.1 - 730.5 )

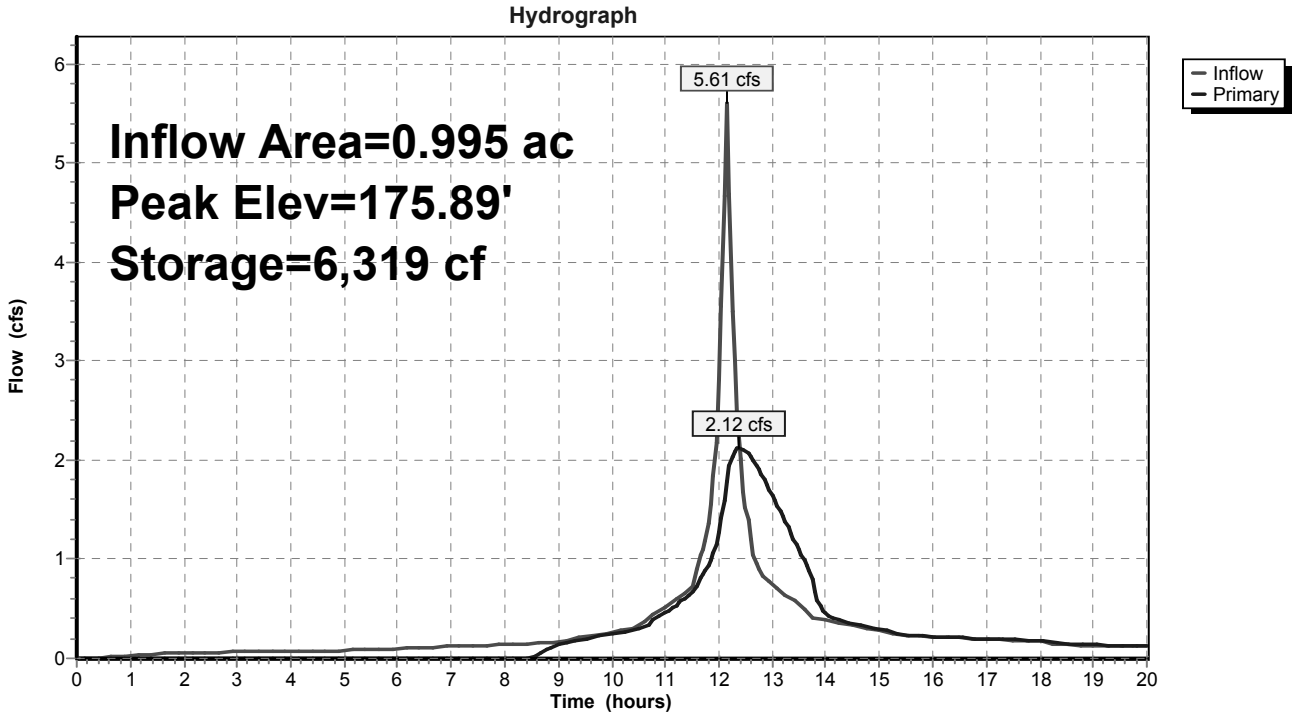
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 6,640 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 1,458 | 0 | 0 |
| 174.00 | 1,930 | 1,694 | 1,694 |
| 175.00 | 2,459 | 2,195 | 3,889 |
| 176.00 | 3,044 | 2,752 | 6,640 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 169.00' | **18.0" Round RCP_Round 18"**<br>L= 48.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.00' / 168.40' S= 0.0125 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 174.30' | **8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=2.12 cfs @ 12.39 hrs HW=175.89' TW=169.02' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 2.12 cfs of 24.08 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 2.12 cfs @ 6.07 fps)

## Pond DET-3: 395



## Summary for Pond INF-ROOF-100: 368

Inflow Area = 0.166 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.28 cfs @ 12.14 hrs, Volume= 0.106 af
Outflow = 0.56 cfs @ 12.41 hrs, Volume= 0.038 af, Atten= 56%, Lag= 16.0 min
Primary = 0.55 cfs @ 12.40 hrs, Volume= 0.039 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.70' @ 12.39 hrs Surf.Area= 471 sf Storage= 3,032 cf

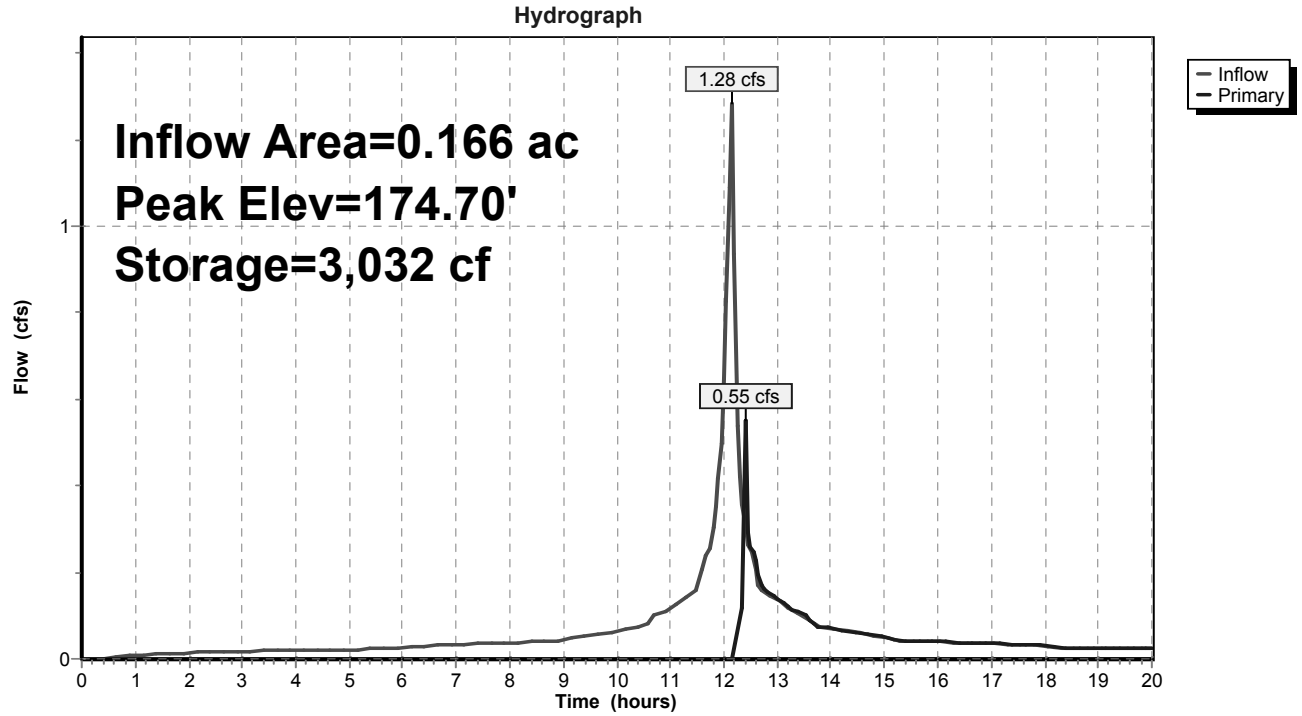
Plug-Flow detention time= 358.3 min calculated for 0.038 af (36% of inflow)
Center-of-Mass det. time= 173.2 min ( 878.5 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.54 cfs @ 12.40 hrs HW=174.69' TW=167.26' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.54 cfs @ 1.40 fps)

## Pond INF-ROOF-100: 368



## Summary for Pond INF-ROOF-110: 299

Inflow Area = 0.159 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.23 cfs @ 12.14 hrs, Volume= 0.102 af
Outflow = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af, Atten= 2%, Lag= 0.4 min
Primary = 1.20 cfs @ 12.15 hrs, Volume= 0.100 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.83' @ 12.15 hrs Surf.Area= 393 sf Storage= 130 cf
Flood Elev= 176.00' Surf.Area= 393 sf Storage= 2,620 cf

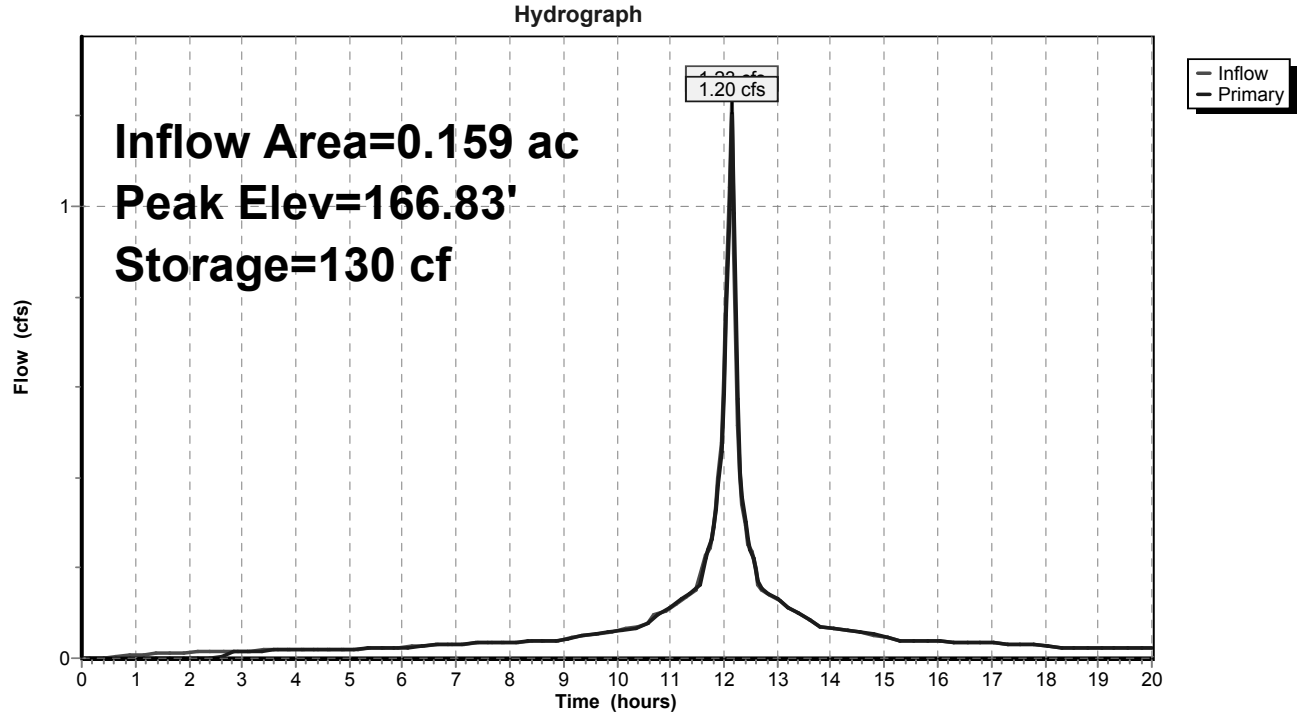
Plug-Flow detention time= 20.6 min calculated for 0.100 af (98% of inflow)
Center-of-Mass det. time= 12.0 min ( 717.3 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 166.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 167.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.20 cfs @ 12.15 hrs HW=166.83' TW=142.28' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 1.20 cfs @ 1.84 fps)

### Pond INF-ROOF-110: 299



## Summary for Pond INF-ROOF-114: 297

Inflow Area = 0.250 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.93 cfs @ 12.14 hrs, Volume= 0.160 af
Outflow = 1.85 cfs @ 12.15 hrs, Volume= 0.106 af, Atten= 4%, Lag= 0.7 min
Primary = 1.85 cfs @ 12.15 hrs, Volume= 0.106 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.44' @ 12.15 hrs Surf.Area= 393 sf Storage= 2,447 cf
Flood Elev= 164.00' Surf.Area= 393 sf Storage= 2,312 cf

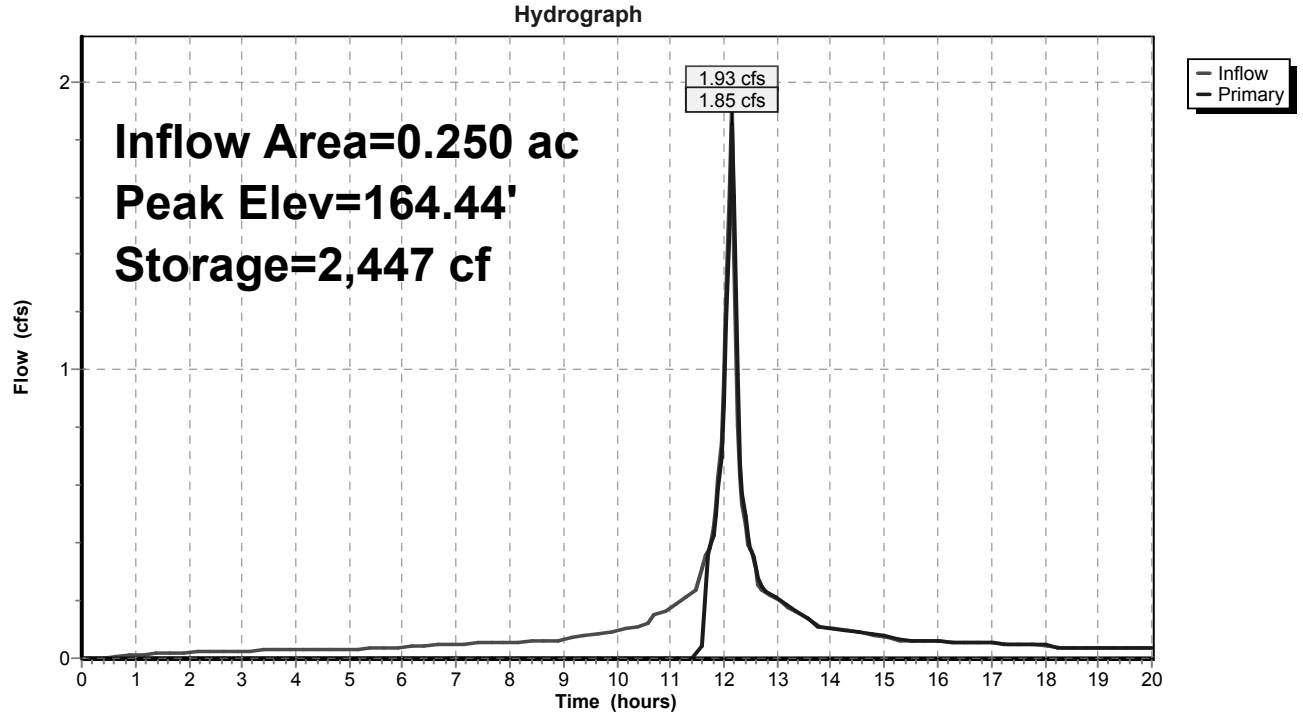
Plug-Flow detention time= 191.5 min calculated for 0.106 af (67% of inflow)
Center-of-Mass det. time= 101.5 min ( 806.9 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.83 cfs @ 12.15 hrs HW=164.43' TW=145.17' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 1.83 cfs @ 2.11 fps)

### Pond INF-ROOF-114: 297



## Summary for Pond INF-ROOF-117: 295

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 0.87 cfs @ 12.14 hrs, Volume= 0.072 af
Outflow = 0.84 cfs @ 12.15 hrs, Volume= 0.040 af, Atten= 4%, Lag= 0.4 min
Primary = 0.84 cfs @ 12.15 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 164.26' @ 12.15 hrs Surf.Area= 236 sf Storage= 1,435 cf
Flood Elev= 168.00' Surf.Area= 236 sf Storage= 1,572 cf

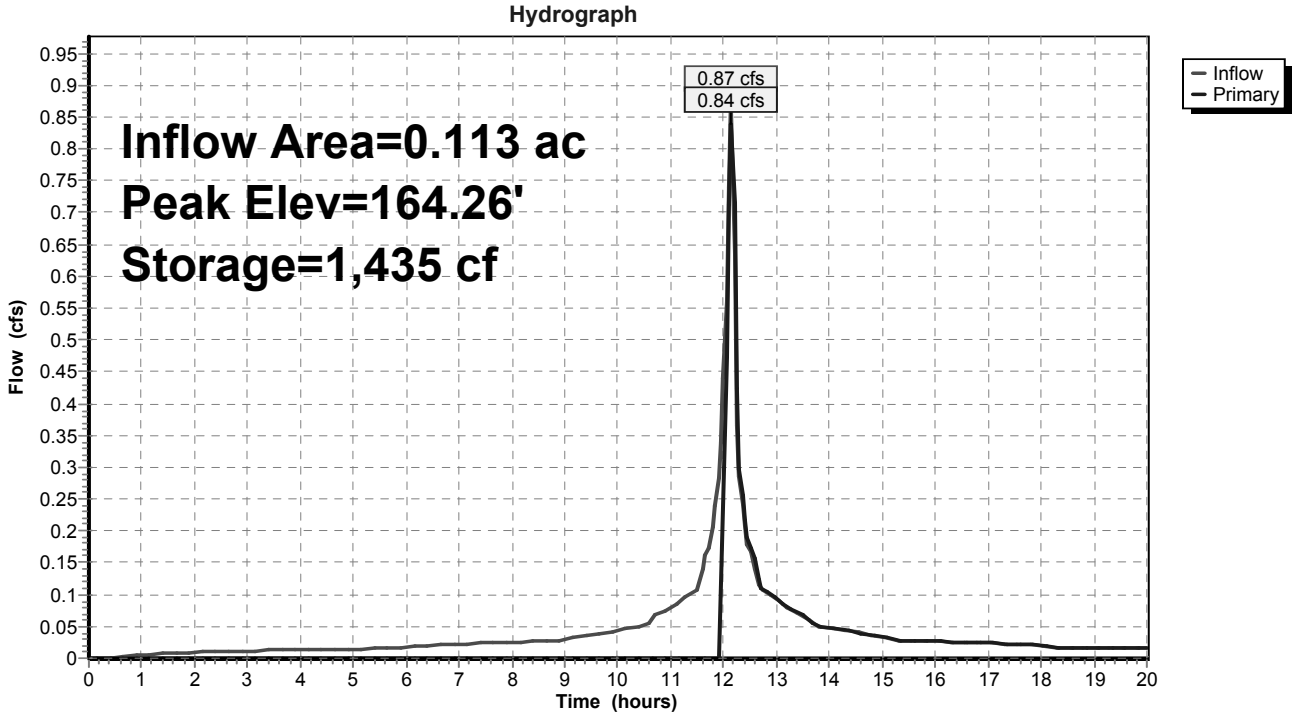
Plug-Flow detention time= 232.7 min calculated for 0.040 af (56% of inflow)
Center-of-Mass det. time= 119.4 min ( 824.8 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.84 cfs @ 12.15 hrs HW=164.26' TW=142.16' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.84 cfs @ 1.63 fps)

## Pond INF-ROOF-117: 295



## Summary for Pond INF-ROOF-123: 119

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 2.41 cfs @ 12.14 hrs, Volume= 0.200 af
Outflow = 2.31 cfs @ 12.16 hrs, Volume= 0.136 af, Atten= 4%, Lag= 0.8 min
Primary = 2.31 cfs @ 12.16 hrs, Volume= 0.136 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 149.01' @ 12.16 hrs Surf.Area= 471 sf Storage= 2,961 cf
Flood Elev= 150.00' Surf.Area= 471 sf Storage= 3,144 cf

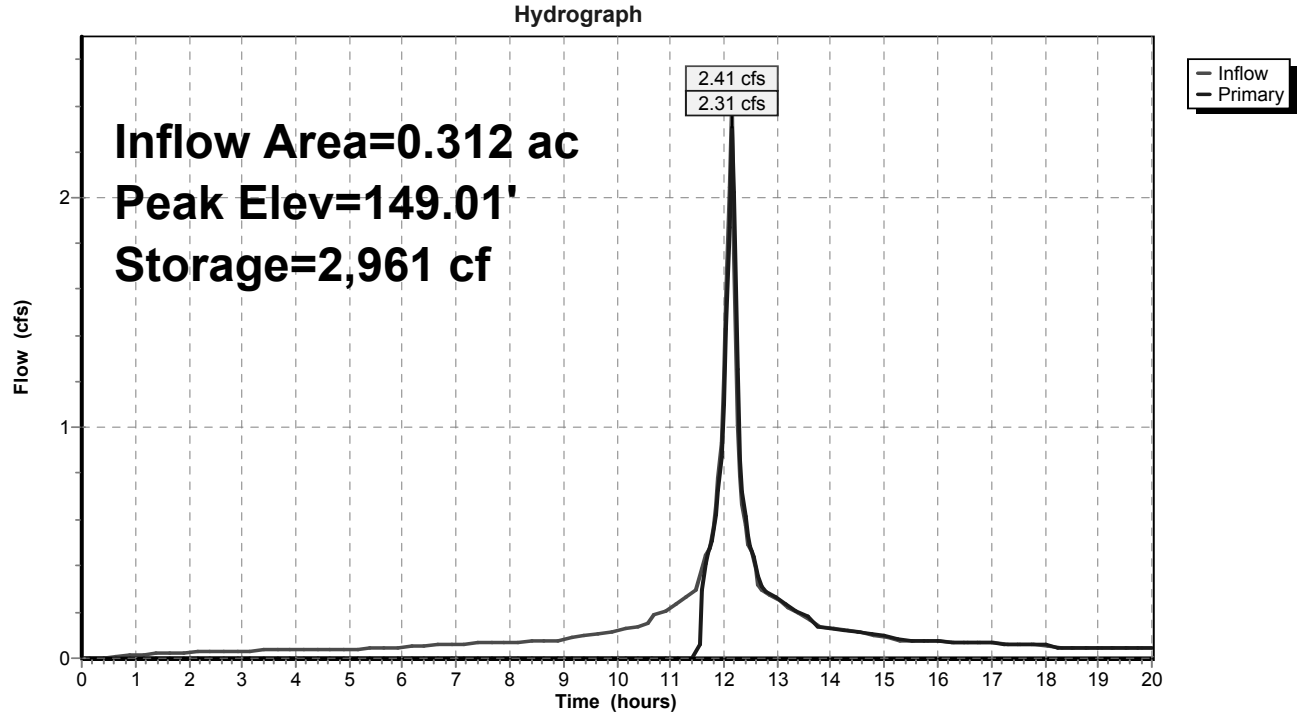
Plug-Flow detention time= 186.3 min calculated for 0.135 af (68% of inflow)
Center-of-Mass det. time= 99.5 min ( 804.9 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.50' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 141.50' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.27 cfs @ 12.16 hrs HW=149.00' TW=142.17' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 2.27 cfs @ 2.27 fps)

### Pond INF-ROOF-123: 119



## Summary for Pond INF-ROOF-13: 384

Inflow Area = 0.083 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 0.64 cfs @ 12.14 hrs, Volume= 0.053 af
Outflow = 0.04 cfs @ 13.66 hrs, Volume= 0.011 af, Atten= 94%, Lag= 91.1 min
Primary = 0.04 cfs @ 13.66 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 184.03' @ 13.66 hrs Surf.Area= 314 sf Storage= 1,858 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

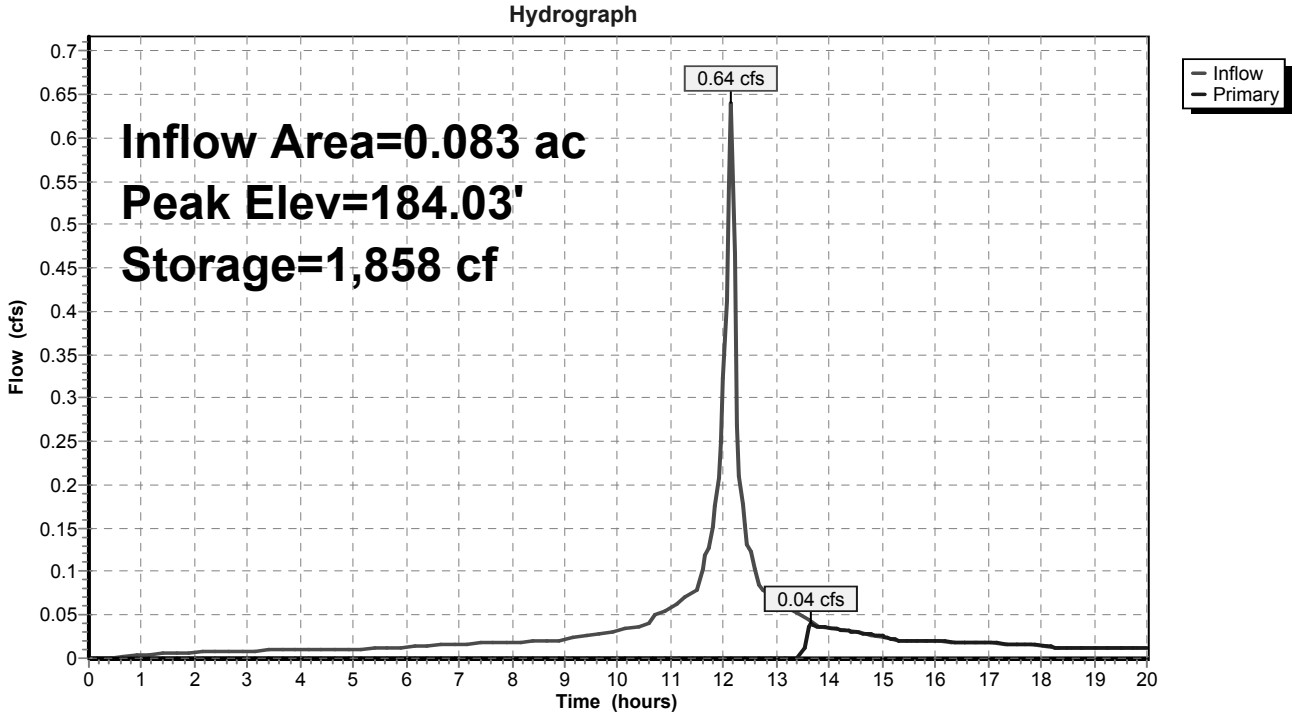
Plug-Flow detention time= 565.4 min calculated for 0.011 af (20% of inflow)
Center-of-Mass det. time= 260.9 min ( 966.2 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.04 cfs @ 13.66 hrs HW=184.03' TW=171.56' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 0.59 fps)

## Pond INF-ROOF-13: 384



## Summary for Pond INF-ROOF-16: 375

Inflow Area = 0.113 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 0.87 cfs @ 12.14 hrs, Volume= 0.072 af
Outflow = 0.27 cfs @ 12.36 hrs, Volume= 0.027 af, Atten= 69%, Lag= 13.1 min
Primary = 0.27 cfs @ 12.36 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 184.62' @ 12.36 hrs Surf.Area= 314 sf Storage= 2,003 cf
Flood Elev= 188.00' Surf.Area= 314 sf Storage= 2,096 cf

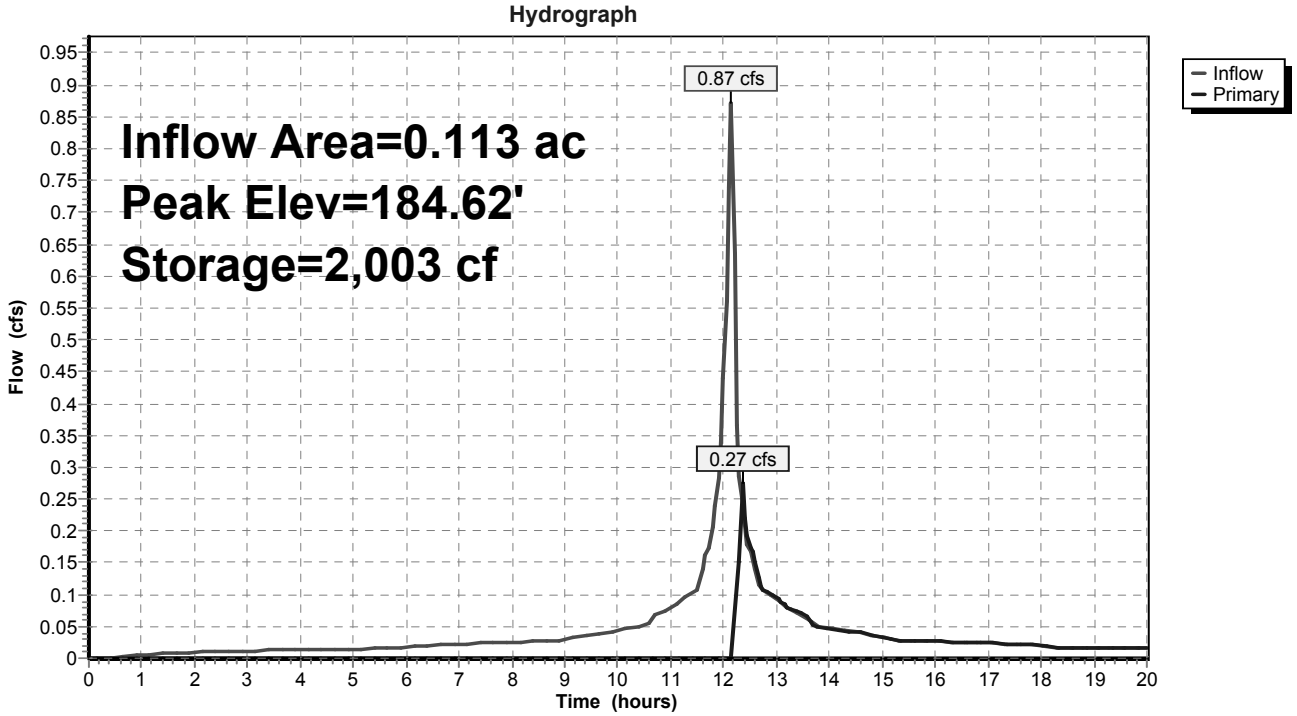
Plug-Flow detention time= 346.3 min calculated for 0.027 af (37% of inflow)
Center-of-Mass det. time= 167.8 min ( 873.1 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.26 cfs @ 12.36 hrs HW=184.62' TW=173.07' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.26 cfs @ 1.10 fps)

## Pond INF-ROOF-16: 375



## Summary for Pond INF-ROOF-19: 377

Inflow Area = 0.138 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.07 cfs @ 12.14 hrs, Volume= 0.088 af
Outflow = 1.05 cfs @ 12.15 hrs, Volume= 0.054 af, Atten= 2%, Lag= 0.4 min
Primary = 1.05 cfs @ 12.15 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 178.73' @ 12.15 hrs Surf.Area= 236 sf Storage= 1,522 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

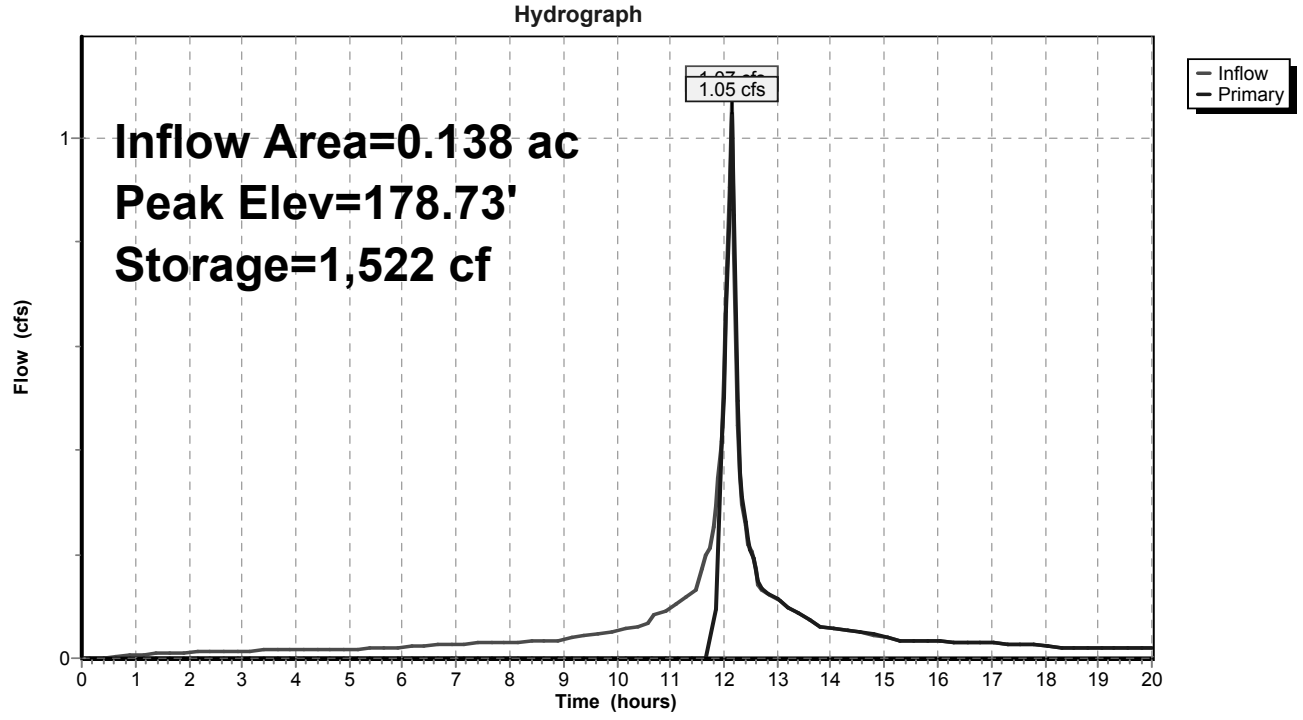
Plug-Flow detention time= 209.7 min calculated for 0.054 af (61% of inflow)
Center-of-Mass det. time= 109.3 min ( 814.6 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 171.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 178.50' | **36.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.04 cfs @ 12.15 hrs HW=178.73' TW=173.49' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 1.04 cfs @ 1.53 fps)

## Pond INF-ROOF-19: 377



## Summary for Pond INF-ROOF-23: 372

Inflow Area = 0.134 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.03 cfs @ 12.14 hrs, Volume= 0.085 af
Outflow = 1.02 cfs @ 12.20 hrs, Volume= 0.040 af, Atten= 1%, Lag= 3.6 min
Primary = 1.02 cfs @ 12.20 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 184.79' @ 12.20 hrs Surf.Area= 314 sf Storage= 2,045 cf
Flood Elev= 185.00' Surf.Area= 314 sf Storage= 2,096 cf

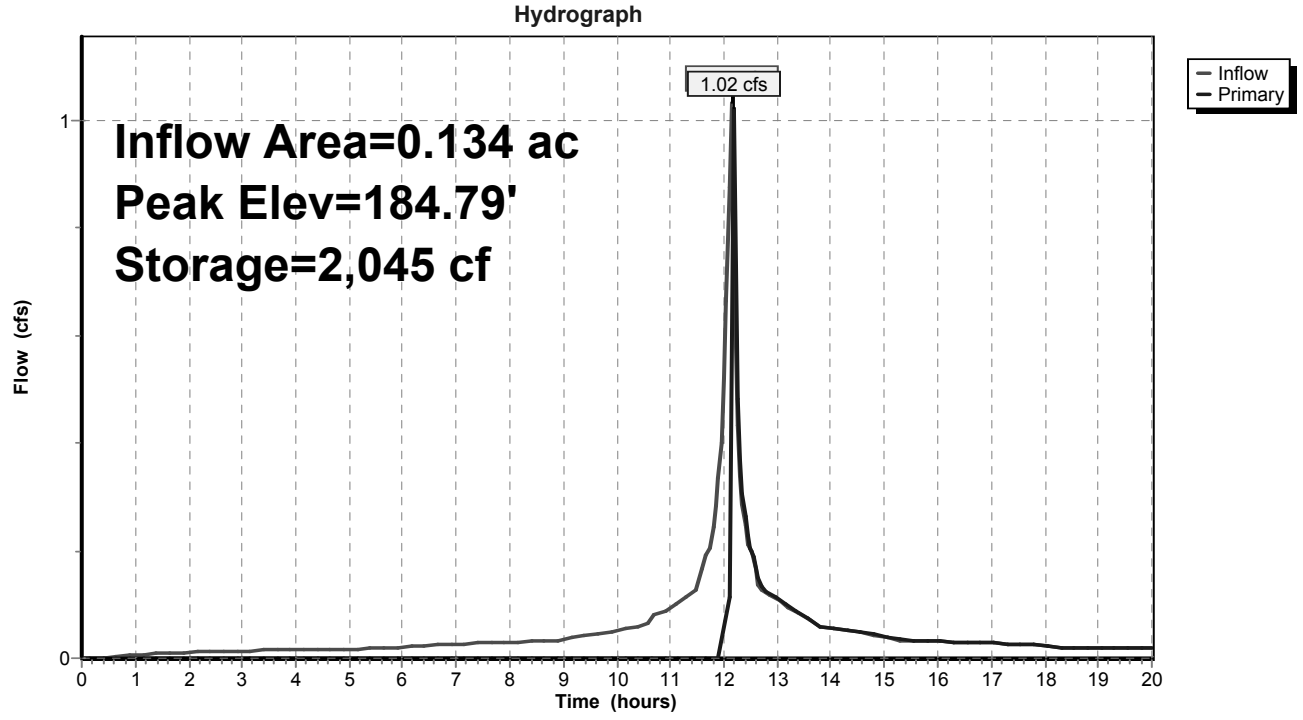
Plug-Flow detention time= 277.8 min calculated for 0.040 af (47% of inflow)
Center-of-Mass det. time= 138.7 min ( 844.0 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 176.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 177.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.99 cfs @ 12.20 hrs HW=184.79' TW=174.86' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 0.99 cfs @ 1.72 fps)

## Pond INF-ROOF-23: 372



## Summary for Pond INF-ROOF-25: 382

Inflow Area = 0.107 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 0.83 cfs @ 12.14 hrs, Volume= 0.068 af
Outflow = 0.78 cfs @ 12.14 hrs, Volume= 0.037 af, Atten= 6%, Lag= 0.0 min
Primary = 0.78 cfs @ 12.14 hrs, Volume= 0.037 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 176.24' @ 12.14 hrs Surf.Area= 236 sf Storage= 1,433 cf
Flood Elev= 185.00' Surf.Area= 236 sf Storage= 1,572 cf

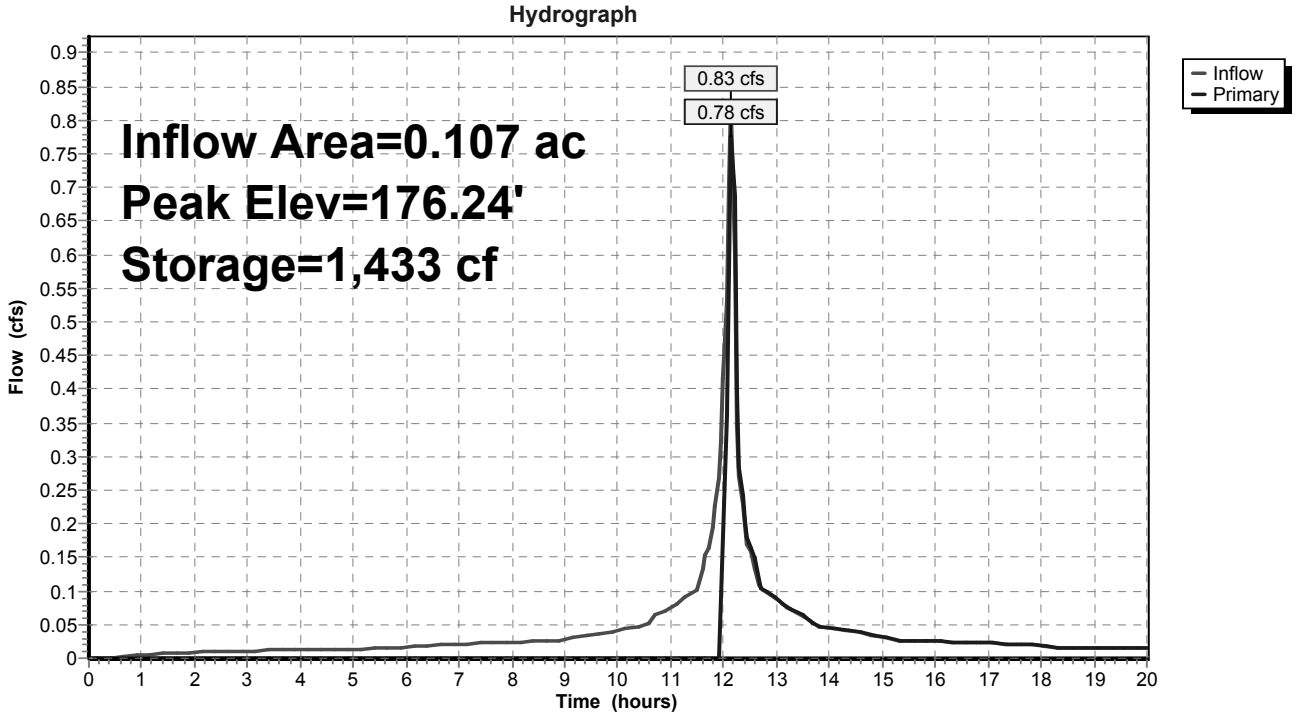
Plug-Flow detention time= 243.2 min calculated for 0.036 af (53% of inflow)
Center-of-Mass det. time= 124.2 min ( 829.5 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 176.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.77 cfs @ 12.14 hrs HW=176.24' TW=173.37' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.77 cfs @ 1.58 fps)

## Pond INF-ROOF-25: 382



## Summary for Pond INF-ROOF-28:

Inflow Area = 0.274 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 2.12 cfs @ 12.14 hrs, Volume= 0.175 af
Outflow = 2.08 cfs @ 12.15 hrs, Volume= 0.150 af, Atten= 2%, Lag= 0.4 min
Primary = 2.08 cfs @ 12.15 hrs, Volume= 0.150 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.97' @ 12.15 hrs Surf.Area= 236 sf Storage= 1,197 cf
Flood Elev= 177.00' Surf.Area= 236 sf Storage= 1,572 cf

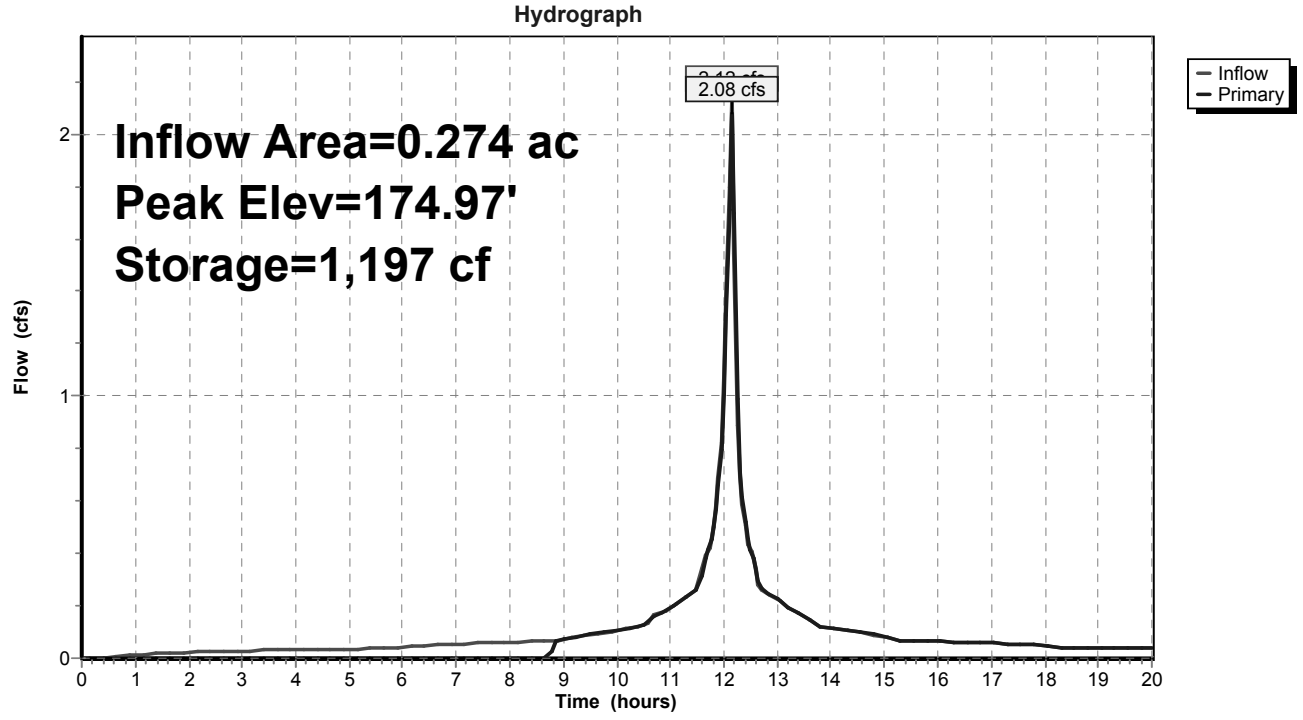
Plug-Flow detention time= 114.8 min calculated for 0.150 af (85% of inflow)
Center-of-Mass det. time= 63.3 min ( 768.7 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 169.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 174.50' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.07 cfs @ 12.15 hrs HW=174.97' TW=165.70' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 2.07 cfs @ 2.20 fps)

## Pond INF-ROOF-28:



## Summary for Pond INF-ROOF-3: 370

Inflow Area = 0.361 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 2.79 cfs @ 12.14 hrs, Volume= 0.231 af
Outflow = 3.75 cfs @ 12.11 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min
Primary = 3.75 cfs @ 12.11 hrs, Volume= 0.123 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 190.85' @ 12.10 hrs Surf.Area= 707 sf Storage= 4,716 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

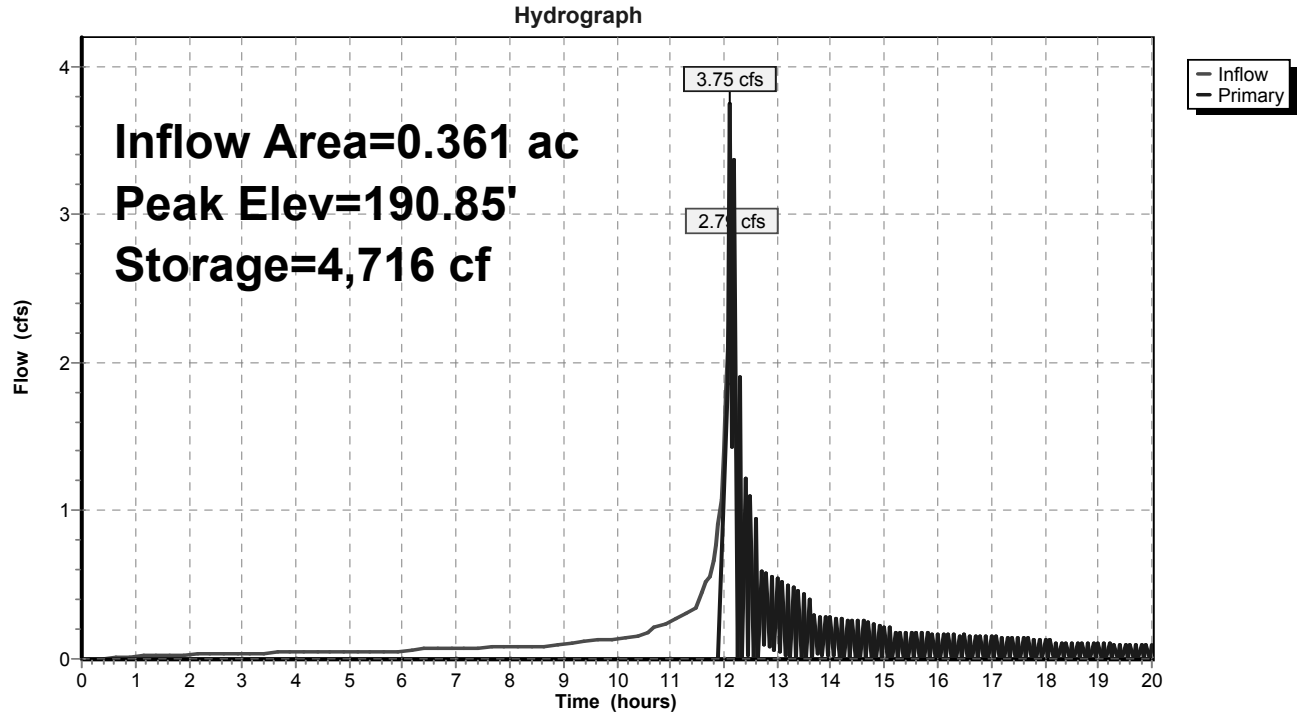
Plug-Flow detention time= 243.9 min calculated for 0.123 af (53% of inflow)
Center-of-Mass det. time= 123.8 min ( 829.1 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=3.52 cfs @ 12.11 hrs HW=190.79' TW=169.53' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 3.52 cfs @ 3.52 fps)

### Pond INF-ROOF-3: 370



## Summary for Pond INF-ROOF-36: 366

Inflow Area = 0.213 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.64 cfs @ 12.14 hrs, Volume= 0.136 af
Outflow = 1.59 cfs @ 12.12 hrs, Volume= 0.088 af, Atten= 3%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.12 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 314 sf Storage= 0 cf
Peak Elev= 190.40' @ 12.12 hrs Surf.Area= 314 sf Storage= 2,096 cf
Flood Elev= 157.00' Surf.Area= 314 sf Storage= 126 cf

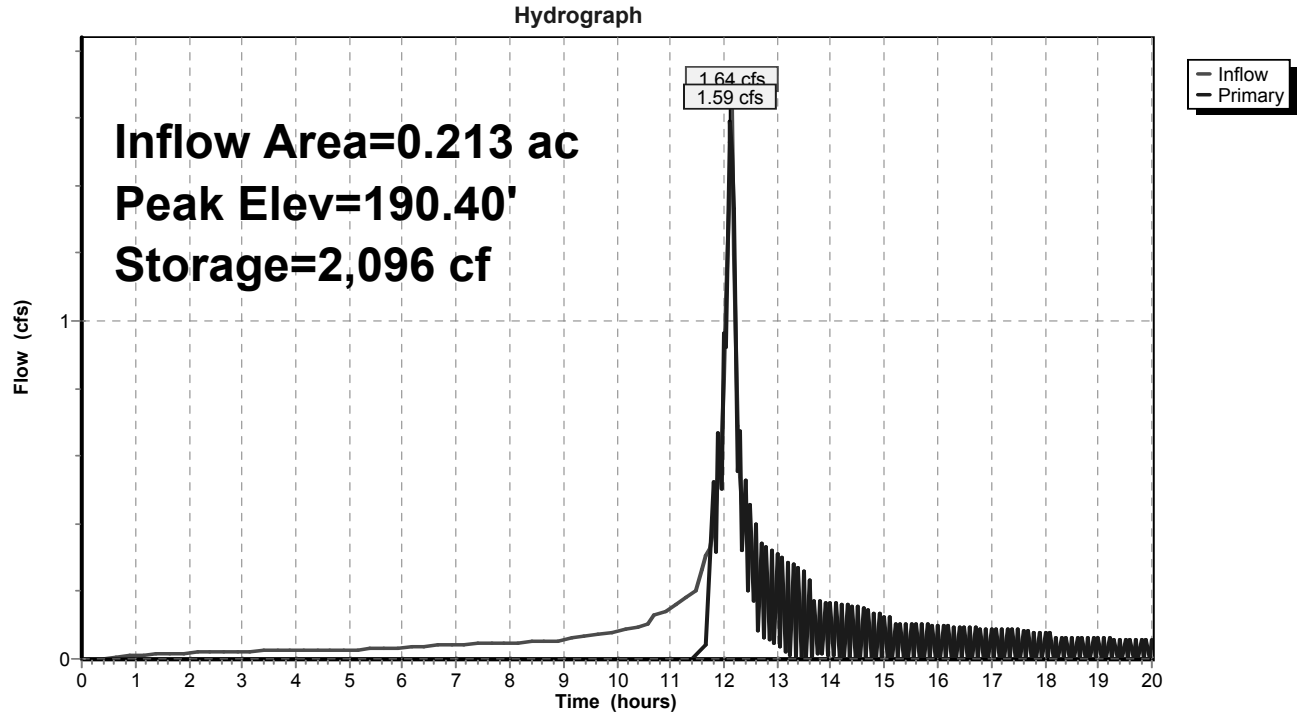
Plug-Flow detention time= 197.6 min calculated for 0.088 af (65% of inflow)
Center-of-Mass det. time= 103.7 min ( 809.0 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 4.00 = 2,096 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.51 cfs @ 12.12 hrs HW=190.38' TW=169.62' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.51 cfs @ 1.98 fps)

### Pond INF-ROOF-36: 366



## Summary for Pond INF-ROOF-43: 364

Inflow Area = 0.106 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 0.82 cfs @ 12.14 hrs, Volume= 0.068 af
Outflow = 0.95 cfs @ 12.19 hrs, Volume= 0.032 af, Atten= 0%, Lag= 2.9 min
Primary = 0.95 cfs @ 12.19 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.28' @ 12.20 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

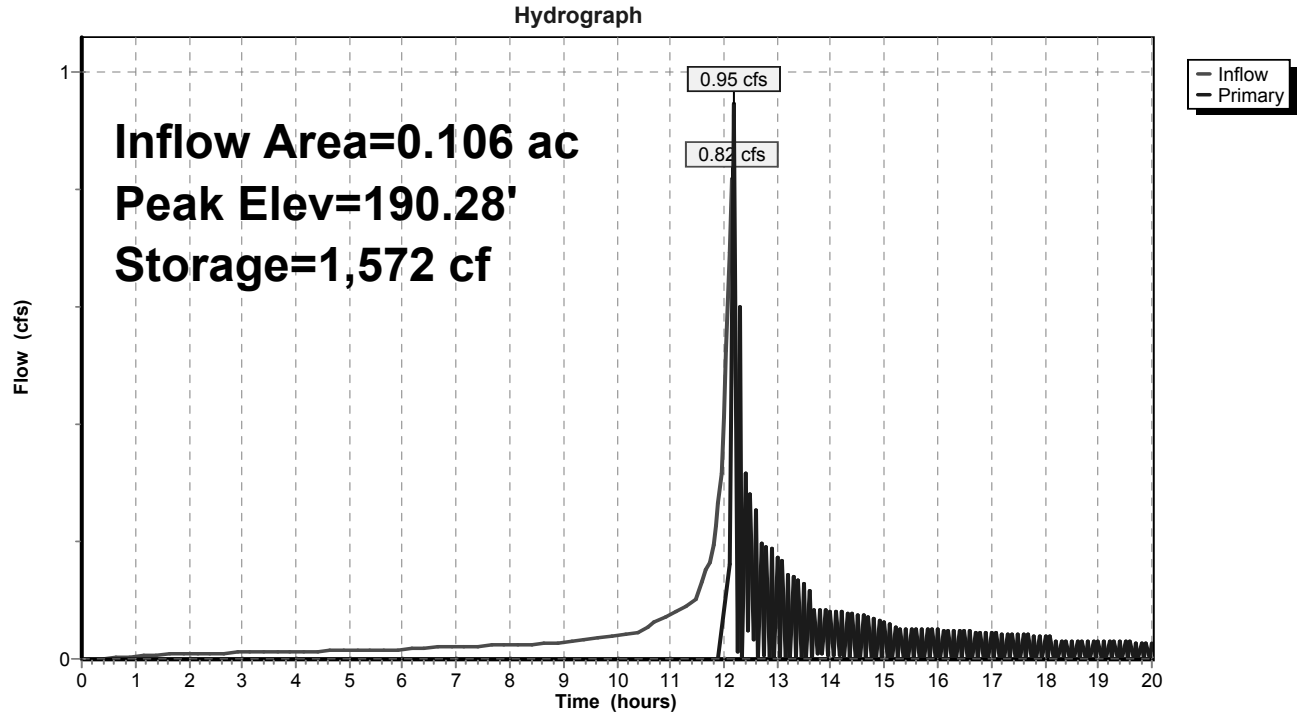
Plug-Flow detention time= 277.6 min calculated for 0.032 af (47% of inflow)
Center-of-Mass det. time= 138.0 min ( 843.3 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.84 cfs @ 12.19 hrs HW=190.26' TW=170.01' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 0.84 cfs @ 1.63 fps)

## Pond INF-ROOF-43: 364



## Summary for Pond INF-ROOF-53: 362

Inflow Area = 0.174 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.34 cfs @ 12.14 hrs, Volume= 0.111 af
Outflow = 1.96 cfs @ 12.20 hrs, Volume= 0.051 af, Atten= 0%, Lag= 3.3 min
Primary = 1.96 cfs @ 12.20 hrs, Volume= 0.051 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.45' @ 12.20 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

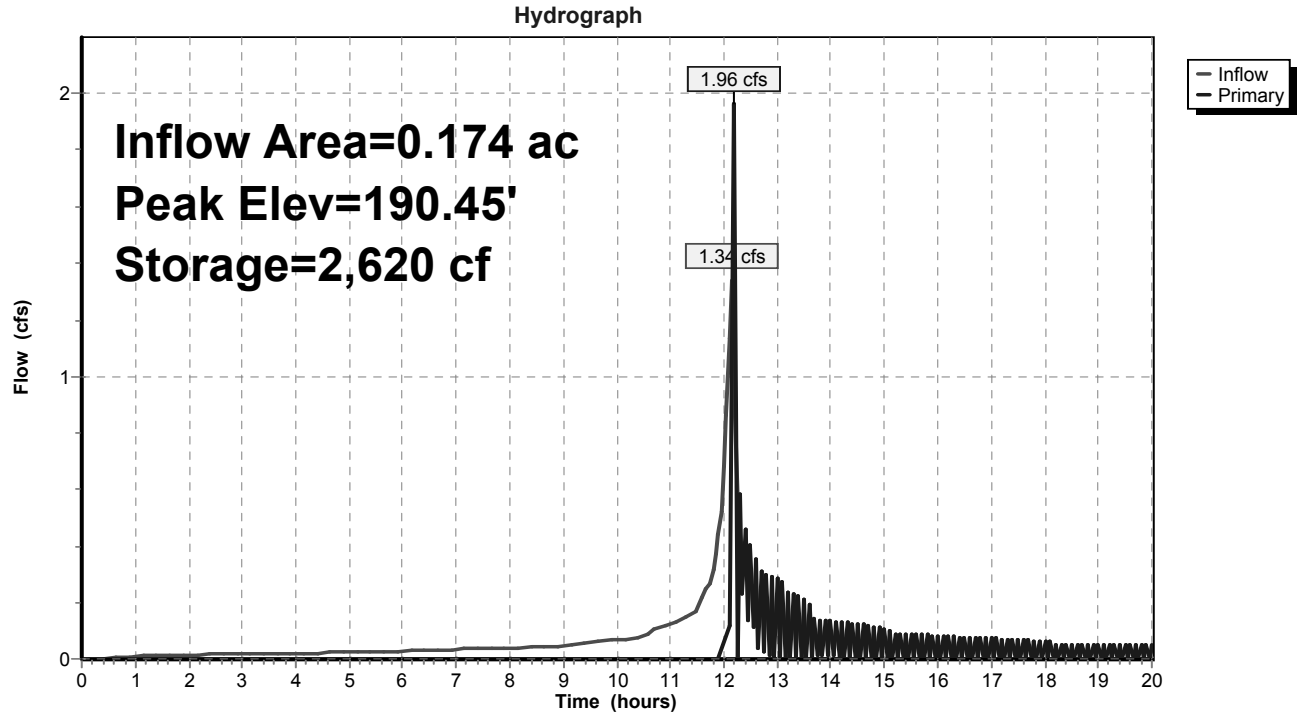
Plug-Flow detention time= 282.4 min calculated for 0.051 af (46% of inflow)
Center-of-Mass det. time= 140.0 min ( 845.4 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.86 cfs @ 12.20 hrs HW=190.44' TW=170.05' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.86 cfs @ 2.12 fps)

### Pond INF-ROOF-53: 362



## Summary for Pond INF-ROOF-55: 314

Inflow Area = 0.248 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.91 cfs @ 12.14 hrs, Volume= 0.159 af
Outflow = 2.17 cfs @ 12.11 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min
Primary = 2.17 cfs @ 12.11 hrs, Volume= 0.086 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.48' @ 12.10 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

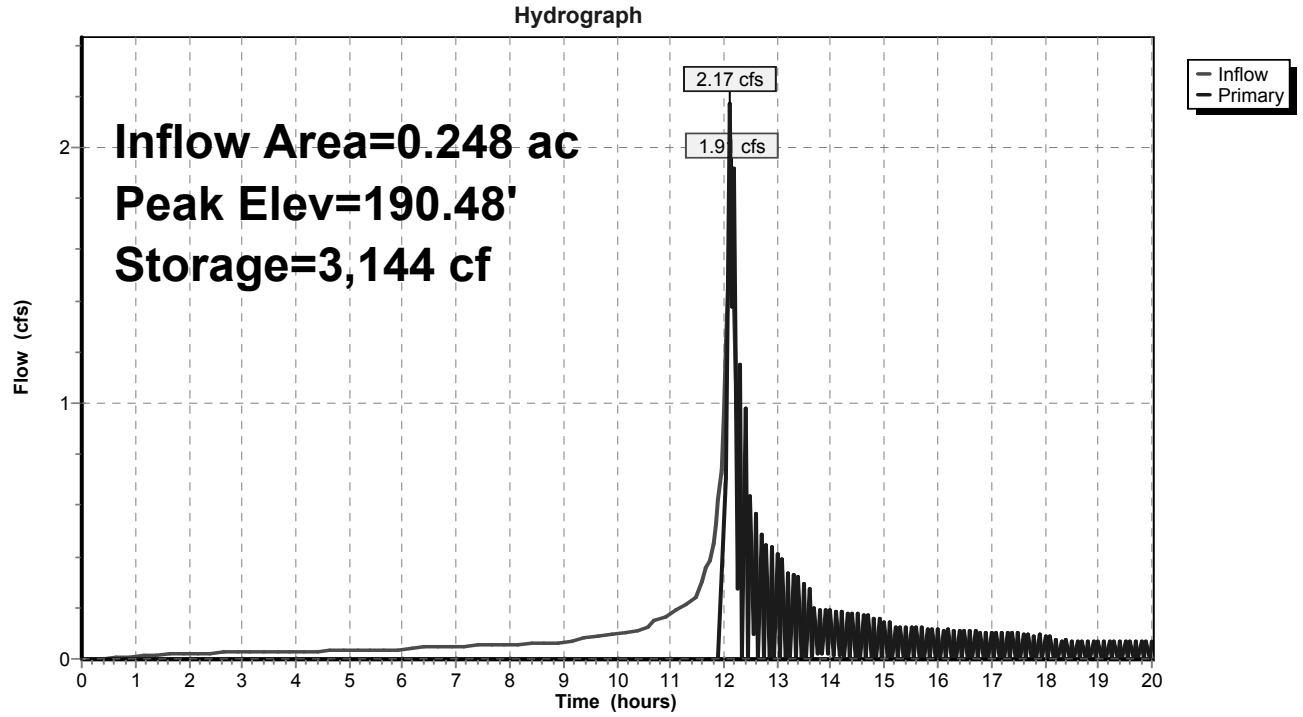
Plug-Flow detention time= 237.8 min calculated for 0.086 af (55% of inflow)
Center-of-Mass det. time= 121.2 min ( 826.5 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.02 cfs @ 12.11 hrs HW=190.46' TW=171.87' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 2.02 cfs @ 2.18 fps)

## Pond INF-ROOF-55: 314



## Summary for Pond INF-ROOF-62: 310

Inflow Area = 0.135 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.04 cfs @ 12.14 hrs, Volume= 0.086 af
Outflow = 1.07 cfs @ 12.14 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.1 min
Primary = 1.07 cfs @ 12.14 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.30' @ 12.14 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

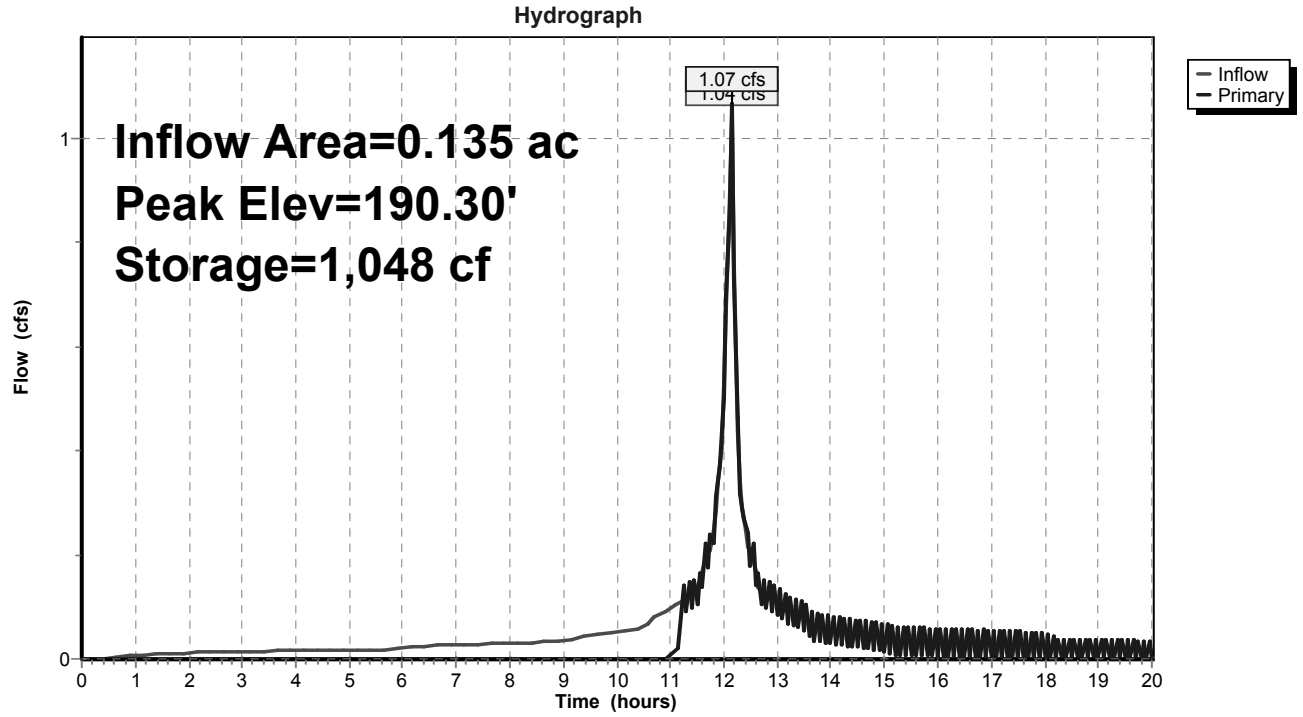
Plug-Flow detention time= 169.6 min calculated for 0.062 af (72% of inflow)
Center-of-Mass det. time= 90.8 min ( 796.1 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.04 cfs @ 12.14 hrs HW=190.30' TW=172.04' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.04 cfs @ 1.75 fps)

### Pond INF-ROOF-62: 310



## Summary for Pond INF-ROOF-63: 308

Inflow Area = 0.511 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 3.94 cfs @ 12.14 hrs, Volume= 0.327 af
Outflow = 3.96 cfs @ 12.14 hrs, Volume= 0.254 af, Atten= 0%, Lag= 0.0 min
Primary = 3.96 cfs @ 12.14 hrs, Volume= 0.254 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.93' @ 12.14 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

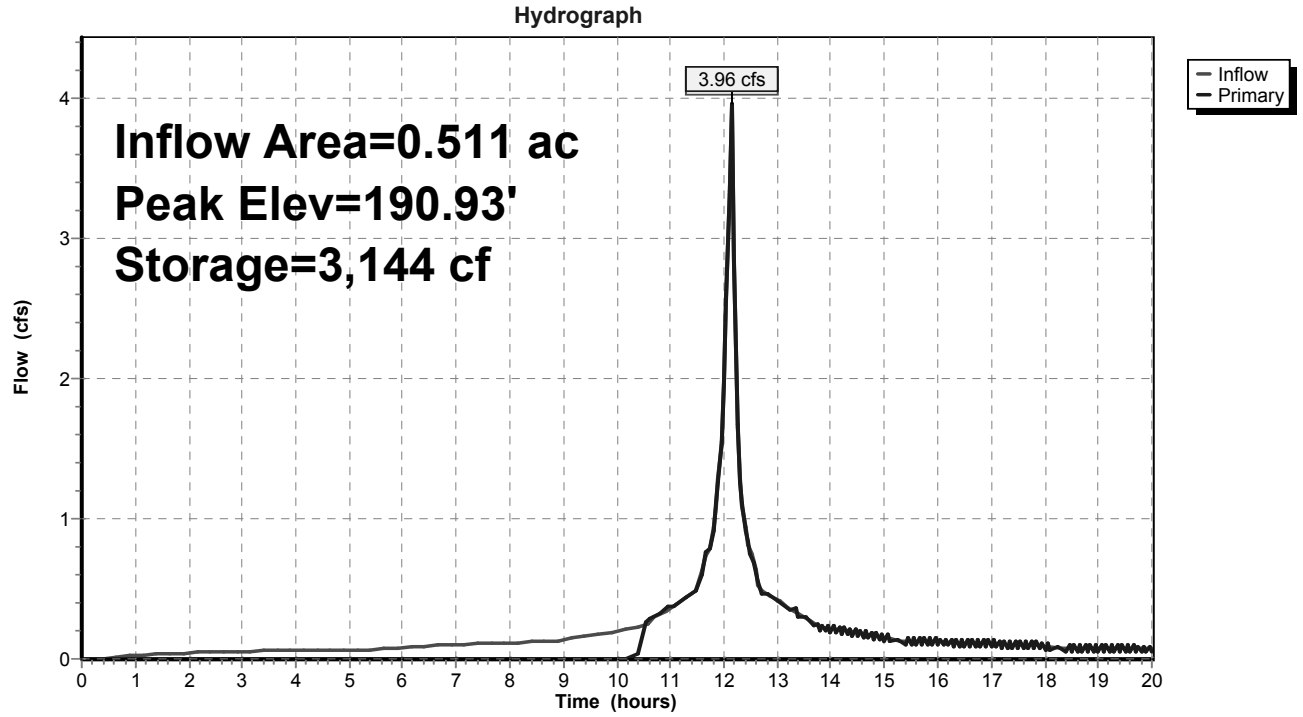
Plug-Flow detention time= 147.8 min calculated for 0.254 af (78% of inflow)
Center-of-Mass det. time= 80.2 min ( 785.5 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=3.87 cfs @ 12.14 hrs HW=190.90' TW=0.00' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 3.87 cfs @ 3.87 fps)

### Pond INF-ROOF-63: 308



## Summary for Pond INF-ROOF-67: 316

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.60 cfs @ 12.14 hrs, Volume= 0.132 af
Outflow = 1.61 cfs @ 12.14 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 12.14 hrs, Volume= 0.108 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.40' @ 12.14 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

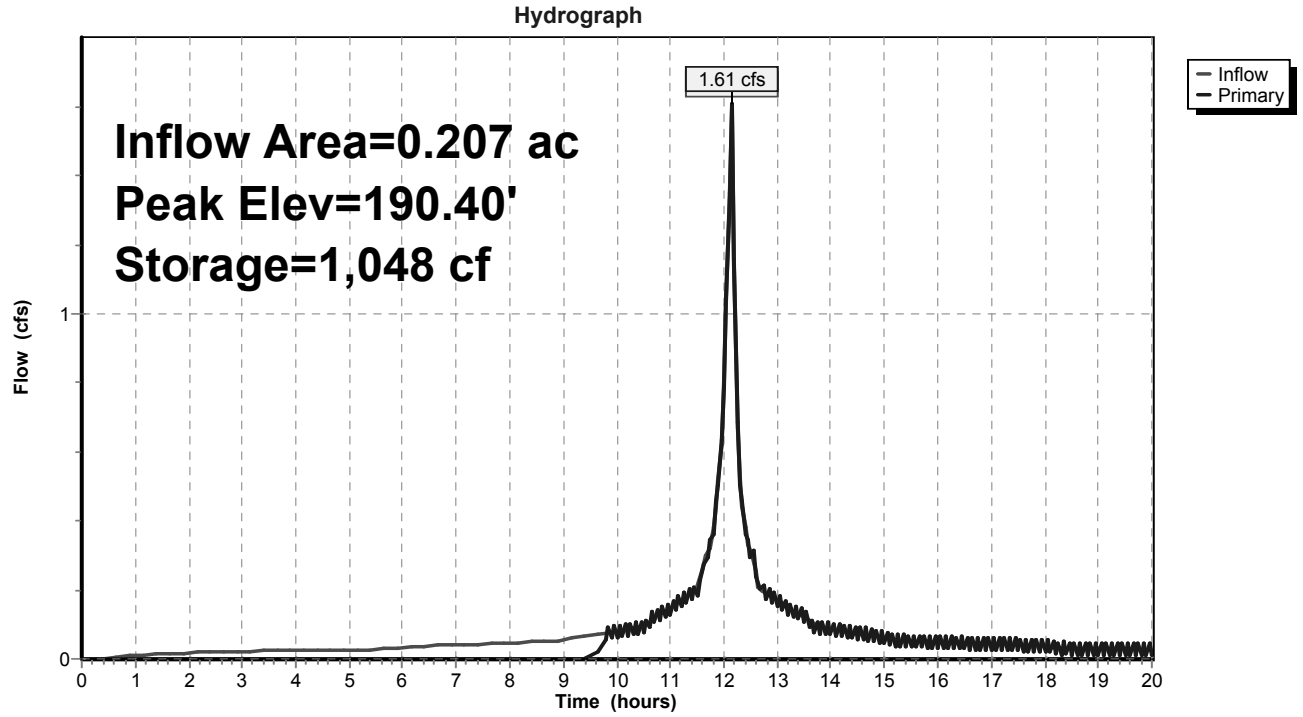
Plug-Flow detention time= 131.5 min calculated for 0.108 af (82% of inflow)
Center-of-Mass det. time= 71.6 min ( 776.9 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.57 cfs @ 12.14 hrs HW=190.39' TW=172.04' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 1.57 cfs @ 2.01 fps)

### Pond INF-ROOF-67: 316



## Summary for Pond INF-ROOF-71: 312

Inflow Area = 0.364 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 2.81 cfs @ 12.14 hrs, Volume= 0.233 af
Outflow = 2.76 cfs @ 12.14 hrs, Volume= 0.173 af, Atten= 2%, Lag= 0.0 min
Primary = 2.76 cfs @ 12.14 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.59' @ 12.14 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

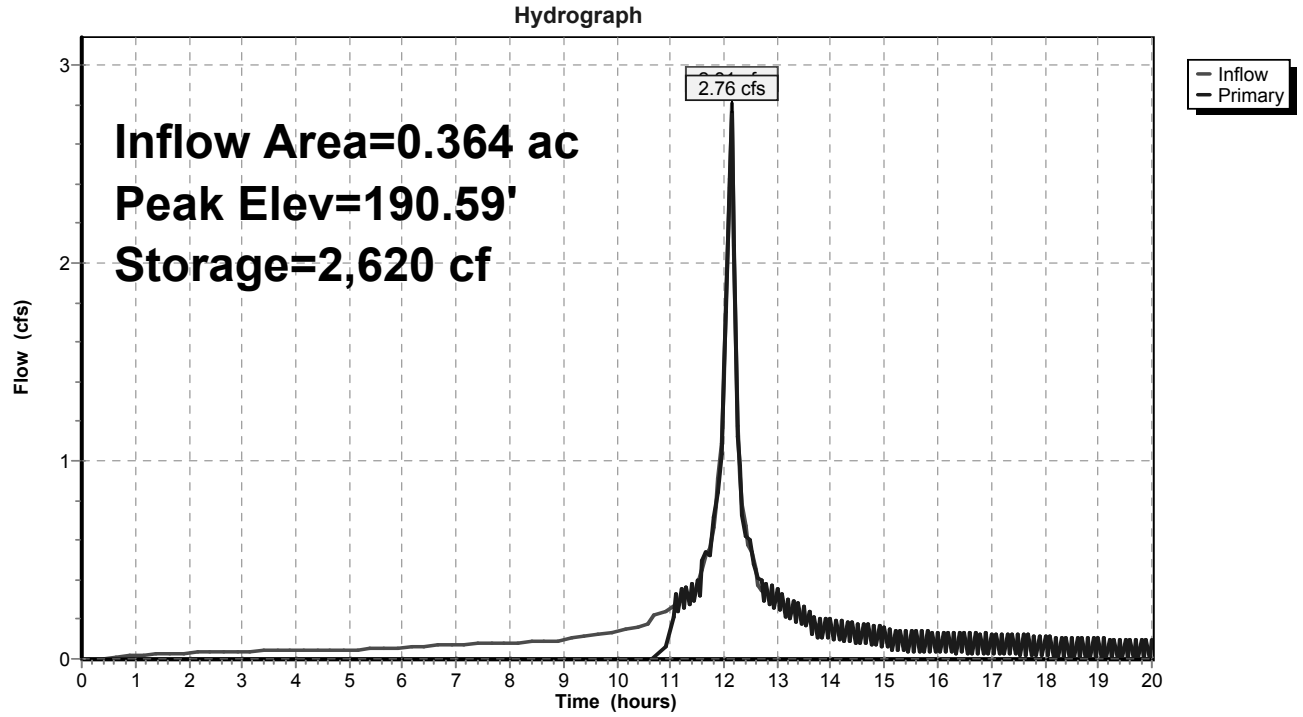
Plug-Flow detention time= 162.4 min calculated for 0.172 af (74% of inflow)
Center-of-Mass det. time= 87.6 min ( 792.9 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.70 cfs @ 12.14 hrs HW=190.58' TW=156.13' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 2.70 cfs @ 2.70 fps)

### Pond INF-ROOF-71: 312



## Summary for Pond INF-ROOF-76: 318

Inflow Area = 0.204 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.57 cfs @ 12.14 hrs, Volume= 0.130 af
Outflow = 2.18 cfs @ 12.10 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 2.18 cfs @ 12.10 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 393 sf Storage= 0 cf
Peak Elev= 190.49' @ 12.10 hrs Surf.Area= 393 sf Storage= 2,620 cf
Flood Elev= 157.00' Surf.Area= 393 sf Storage= 157 cf

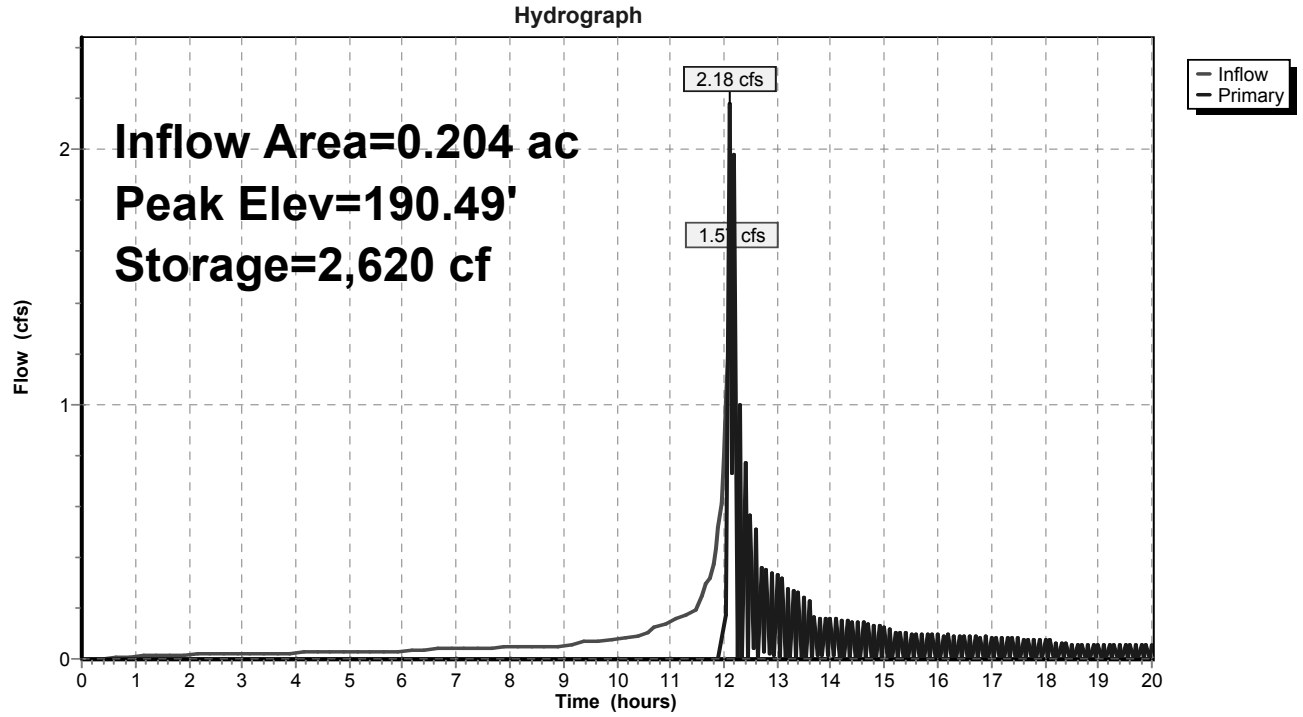
Plug-Flow detention time= 240.1 min calculated for 0.070 af (54% of inflow)
Center-of-Mass det. time= 122.4 min ( 827.8 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 5.00 = 2,620 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.03 cfs @ 12.10 hrs HW=190.46' TW=171.86' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 2.03 cfs @ 2.19 fps)

### Pond INF-ROOF-76: 318



## Summary for Pond INF-ROOF-89: 338

Inflow Area = 0.317 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 2.44 cfs @ 12.14 hrs, Volume= 0.203 af
Outflow = 2.98 cfs @ 12.19 hrs, Volume= 0.094 af, Atten= 0%, Lag= 3.0 min
Primary = 2.98 cfs @ 12.19 hrs, Volume= 0.094 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 707 sf Storage= 0 cf
Peak Elev= 190.64' @ 12.20 hrs Surf.Area= 707 sf Storage= 4,716 cf
Flood Elev= 157.00' Surf.Area= 707 sf Storage= 283 cf

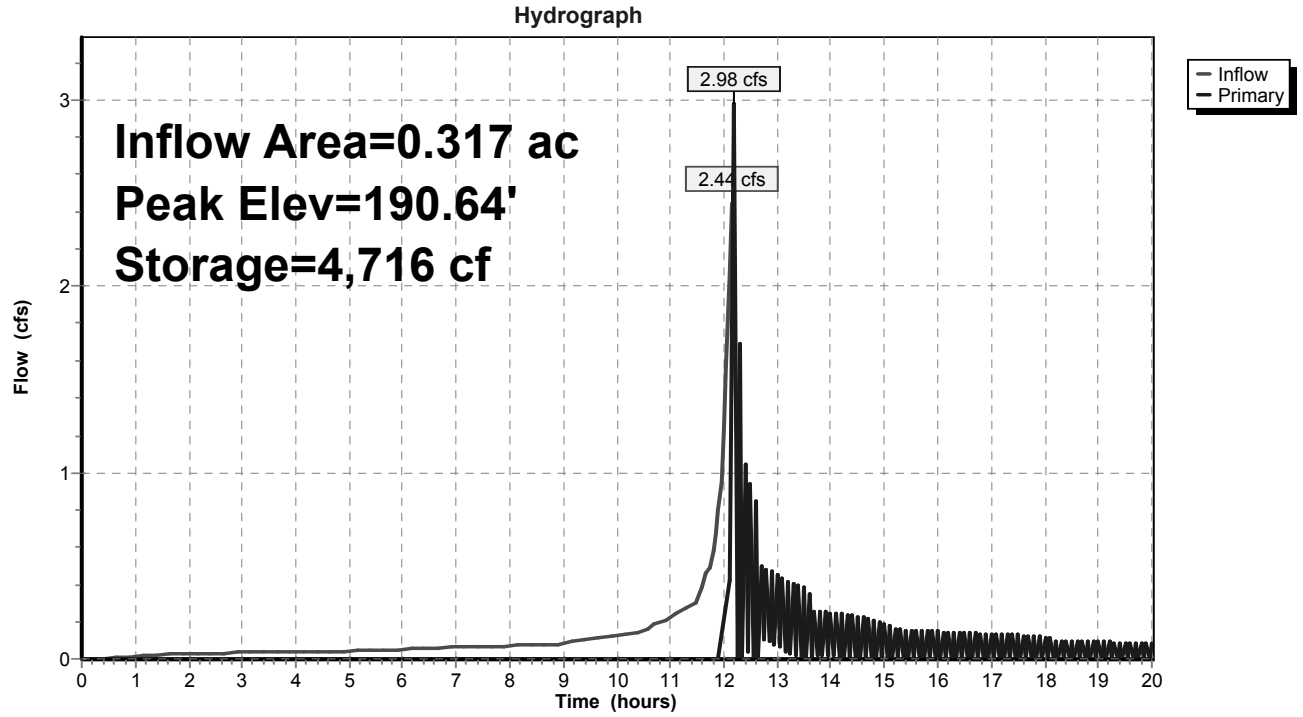
Plug-Flow detention time= 278.1 min calculated for 0.094 af (46% of inflow)
Center-of-Mass det. time= 138.4 min ( 843.7 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 9.00 = 4,716 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.76 cfs @ 12.19 hrs HW=190.59' TW=153.84' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 2.76 cfs @ 2.76 fps)

### Pond INF-ROOF-89: 338



## Summary for Pond INF-ROOF-90: 336

Inflow Area = 0.245 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.89 cfs @ 12.14 hrs, Volume= 0.157 af
Outflow = 2.55 cfs @ 12.10 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 2.55 cfs @ 12.10 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 471 sf Storage= 0 cf
Peak Elev= 190.55' @ 12.10 hrs Surf.Area= 471 sf Storage= 3,144 cf
Flood Elev= 157.00' Surf.Area= 471 sf Storage= 188 cf

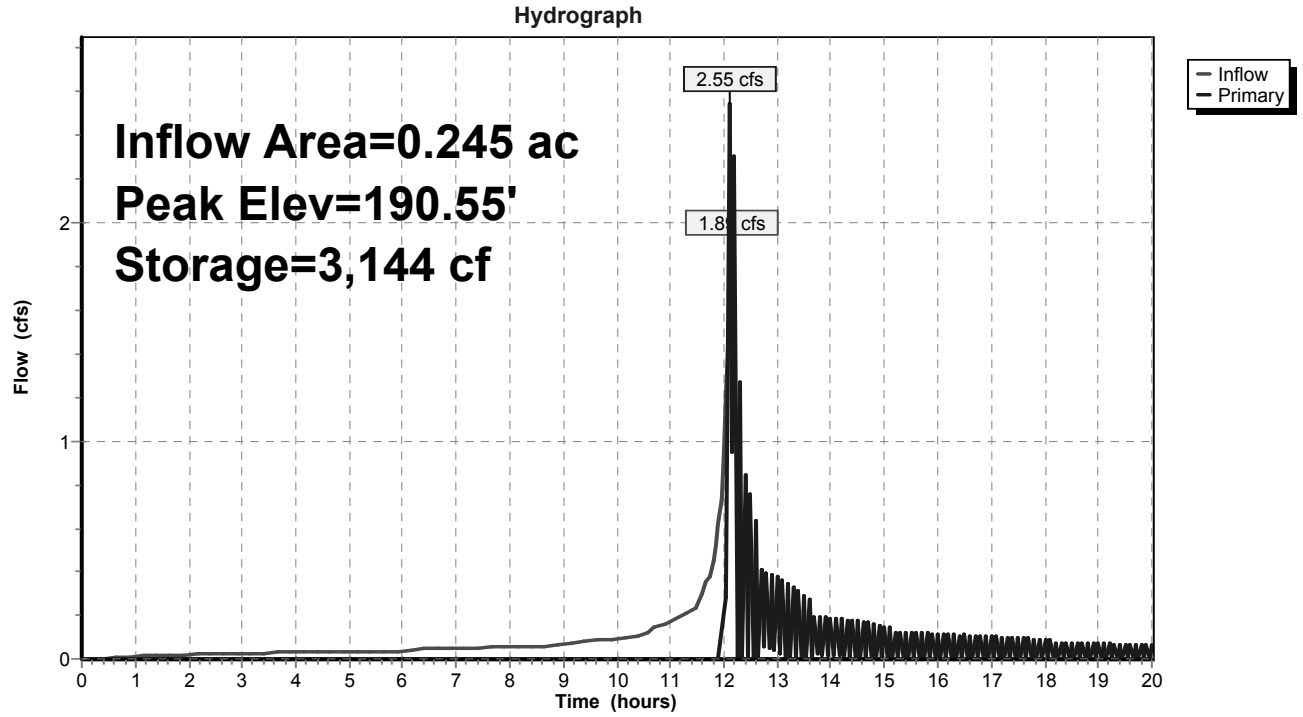
Plug-Flow detention time= 240.3 min calculated for 0.085 af (54% of inflow)
Center-of-Mass det. time= 122.3 min ( 827.6 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 6.00 = 3,144 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=2.41 cfs @ 12.10 hrs HW=190.52' TW=169.52' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 2.41 cfs @ 2.41 fps)

### Pond INF-ROOF-90: 336



## Summary for Pond INF-ROOF-94: 342

Inflow Area = 0.136 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.05 cfs @ 12.14 hrs, Volume= 0.087 af
Outflow = 1.28 cfs @ 12.11 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 1.28 cfs @ 12.11 hrs, Volume= 0.051 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.34' @ 12.11 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

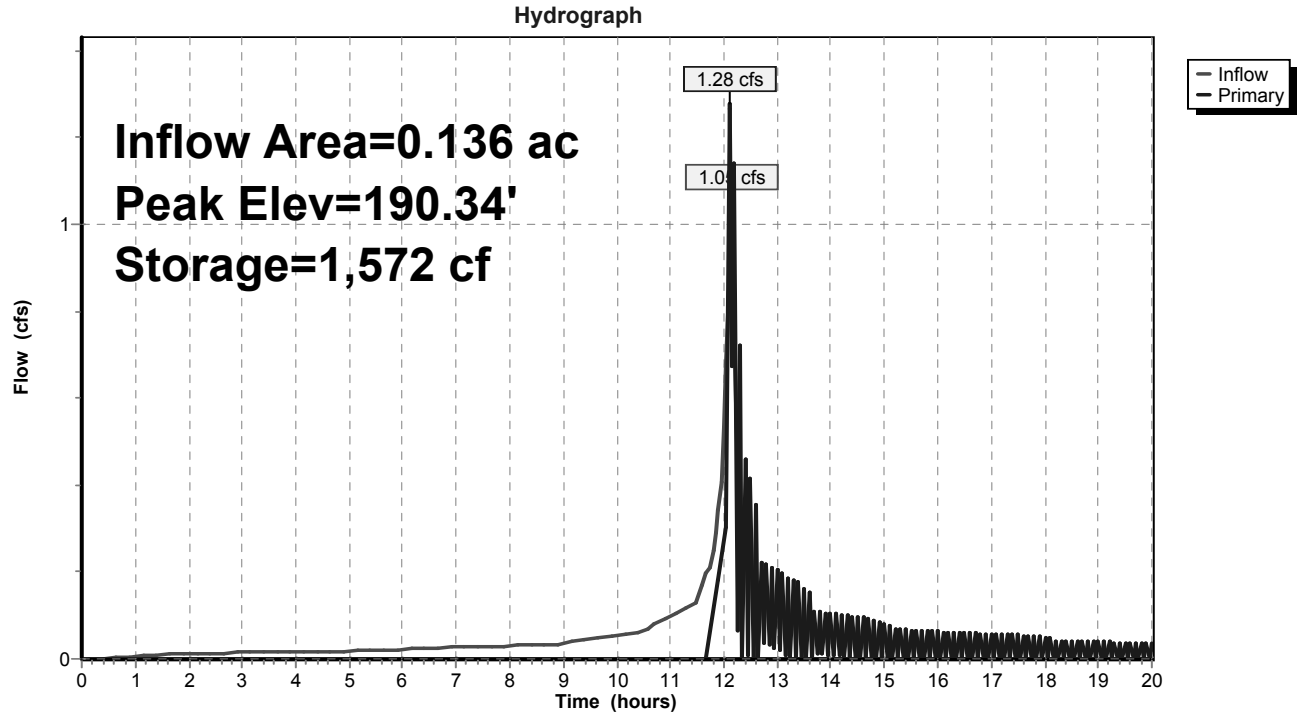
Plug-Flow detention time= 220.4 min calculated for 0.051 af (59% of inflow)
Center-of-Mass det. time= 113.8 min ( 819.1 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.19 cfs @ 12.11 hrs HW=190.32' TW=163.73' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.19 cfs @ 1.83 fps)

## Pond INF-ROOF-94: 342



## Summary for Pond INF-ROOF-95: 340

Inflow Area = 0.154 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.19 cfs @ 12.14 hrs, Volume= 0.098 af
Outflow = 1.41 cfs @ 12.15 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.3 min
Primary = 1.41 cfs @ 12.15 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 236 sf Storage= 0 cf
Peak Elev= 190.36' @ 12.15 hrs Surf.Area= 236 sf Storage= 1,572 cf
Flood Elev= 157.00' Surf.Area= 236 sf Storage= 94 cf

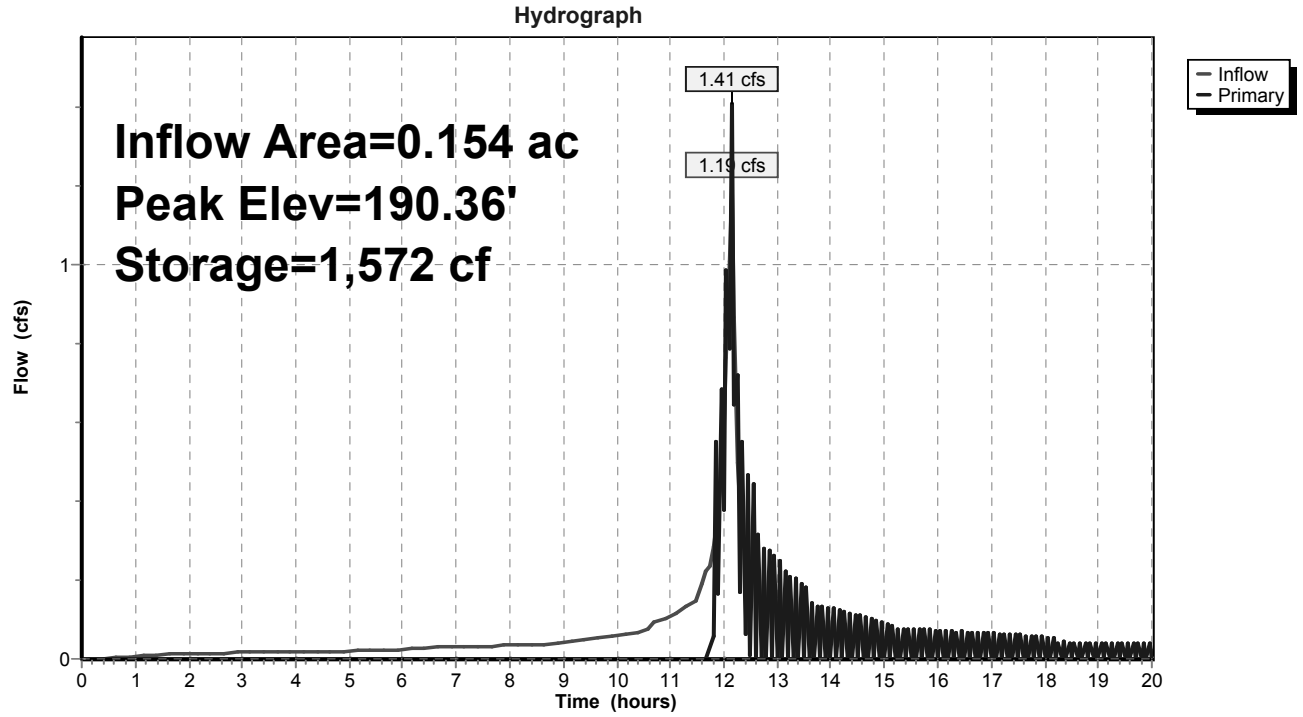
Plug-Flow detention time= 201.2 min calculated for 0.062 af (63% of inflow)
Center-of-Mass det. time= 105.3 min ( 810.6 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 3.00 = 1,572 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.37 cfs @ 12.15 hrs HW=190.36' TW=153.52' (Dynamic Tailwater)
└**1=Orifice/Grate** (Orifice Controls 1.37 cfs @ 1.92 fps)

### Pond INF-ROOF-95: 340



## Summary for Pond INF-ROOF-96: 344

Inflow Area = 0.207 ac, 0.00% Impervious, Inflow Depth > 7.68" for 100_year event
Inflow = 1.60 cfs @ 12.14 hrs, Volume= 0.132 af
Outflow = 1.61 cfs @ 12.14 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 12.14 hrs, Volume= 0.108 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 156.00' Surf.Area= 157 sf Storage= 0 cf
Peak Elev= 190.40' @ 12.14 hrs Surf.Area= 157 sf Storage= 1,048 cf
Flood Elev= 157.00' Surf.Area= 157 sf Storage= 63 cf

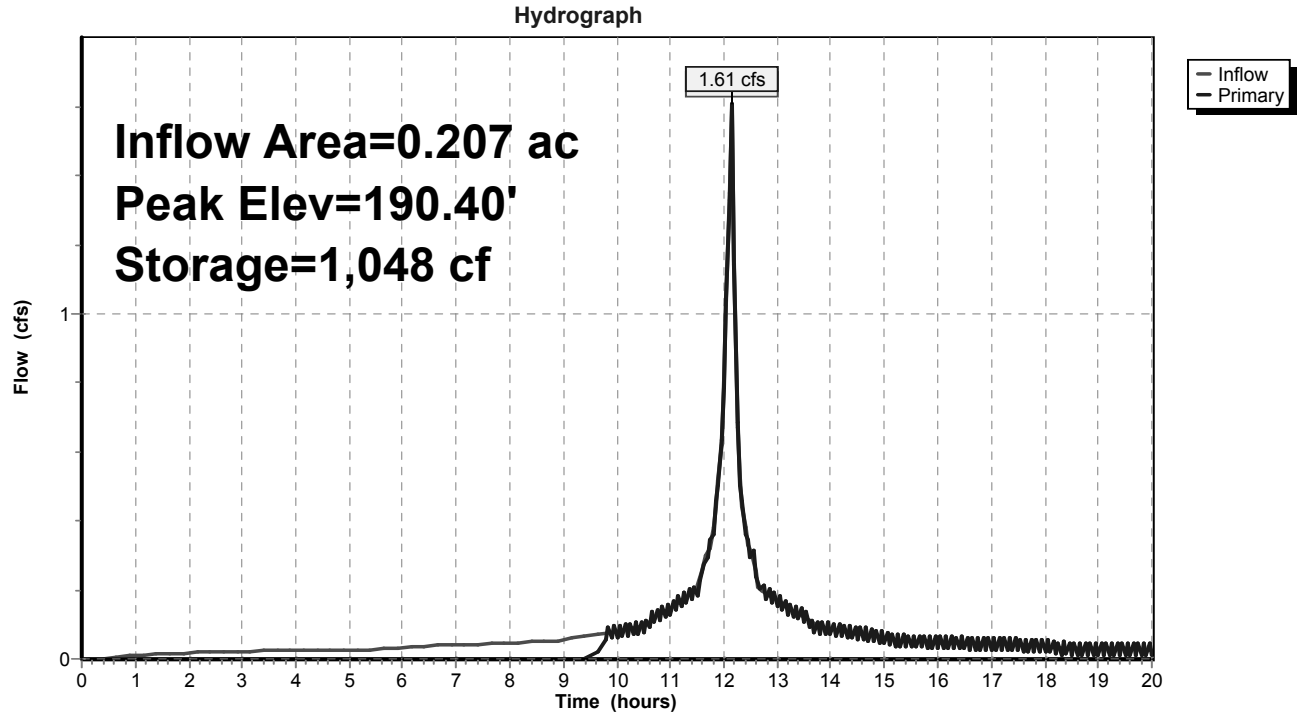
Plug-Flow detention time= 131.5 min calculated for 0.108 af (82% of inflow)
Center-of-Mass det. time= 71.6 min ( 776.9 - 705.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 156.00' | 122 cf | **10.00'D x 9.00'H Vertical Cone/Cylinder**<br>707 cf Overall - 402 cf Embedded = 305 cf x 40.0% Voids |
| #2 | 157.00' | 402 cf | **8.00'D x 8.00'H Vertical Cone/Cylinder**Inside #1 |
| | | 524 cf | x 2.00 = 1,048 cf Total Available Storage |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 190.00' | **24.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=1.57 cfs @ 12.14 hrs HW=190.39' TW=163.75' (Dynamic Tailwater)
↳**1=Orifice/Grate** (Orifice Controls 1.57 cfs @ 2.01 fps)

### Pond INF-ROOF-96: 344



## Summary for Pond P E 1.1A: 284

Inflow Area = 21.860 ac, 1.84% Impervious, Inflow Depth > 1.62" for 100_year event
Inflow = 16.05 cfs @ 12.23 hrs, Volume= 2.956 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 41,090 sf Storage= 0 cf
Peak Elev= 135.92' @ 20.00 hrs Surf.Area= 46,731 sf Storage= 128,579 cf
Flood Elev= 139.00' Surf.Area= 57,964 sf Storage= 284,195 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

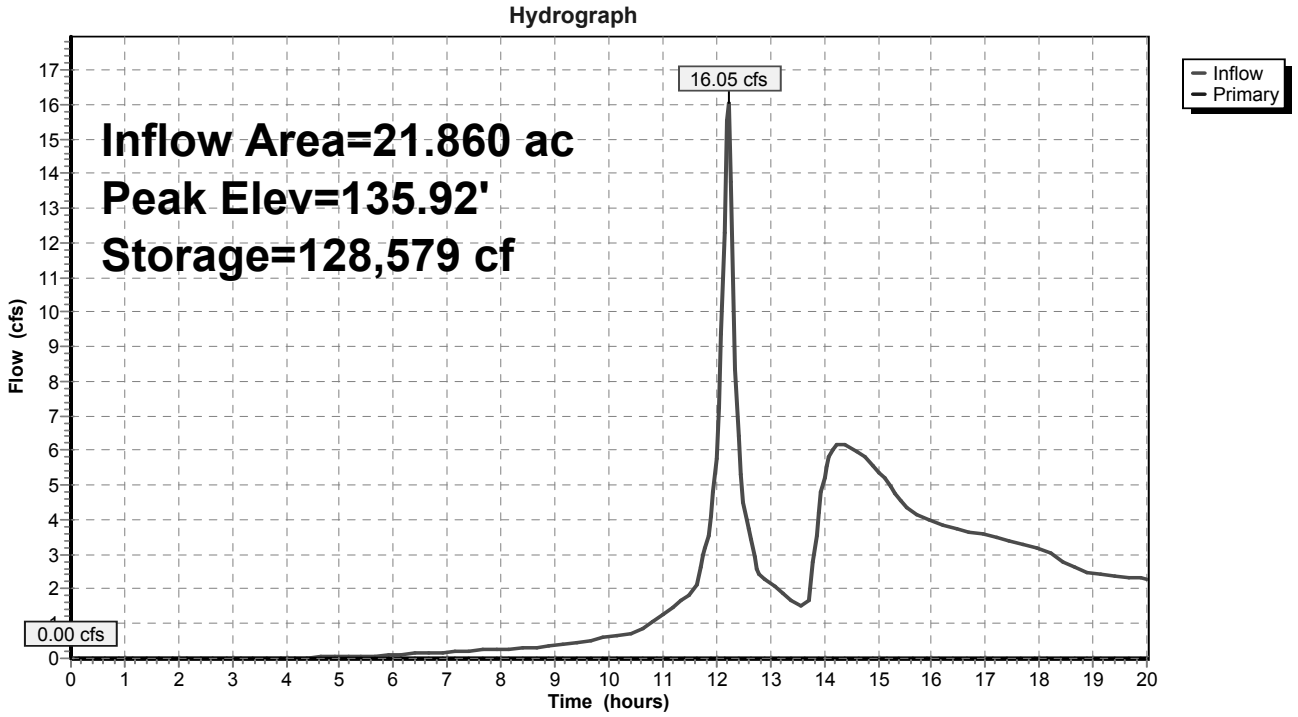
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 345,008 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 41,090 | 0 | 0 |
| 134.00 | 43,268 | 42,179 | 42,179 |
| 135.00 | 45,136 | 44,202 | 86,381 |
| 136.00 | 46,872 | 46,004 | 132,385 |
| 137.00 | 48,565 | 47,719 | 180,104 |
| 138.00 | 50,826 | 49,696 | 229,800 |
| 139.00 | 57,964 | 54,395 | 284,195 |
| 140.00 | 63,663 | 60,814 | 345,008 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 139.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 223.00 240.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=133.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P E 1.1A: 284



## Summary for Pond P E 1.1B: 283

Inflow Area = 19.156 ac, 1.06% Impervious, Inflow Depth > 3.16" for 100_year event
Inflow = 49.08 cfs @ 12.26 hrs, Volume= 5.040 af
Outflow = 5.25 cfs @ 14.36 hrs, Volume= 1.657 af, Atten= 89%, Lag= 126.2 min
Primary = 5.25 cfs @ 14.36 hrs, Volume= 1.657 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 142.00' Surf.Area= 2,966 sf Storage= 0 cf
Peak Elev= 147.06' @ 14.36 hrs Surf.Area= 104,548 sf Storage= 150,173 cf
Flood Elev= 149.00' Surf.Area= 178,469 sf Storage= 426,961 cf

Plug-Flow detention time= 265.0 min calculated for 1.657 af (33% of inflow)
Center-of-Mass det. time= 161.3 min ( 983.9 - 822.6 )

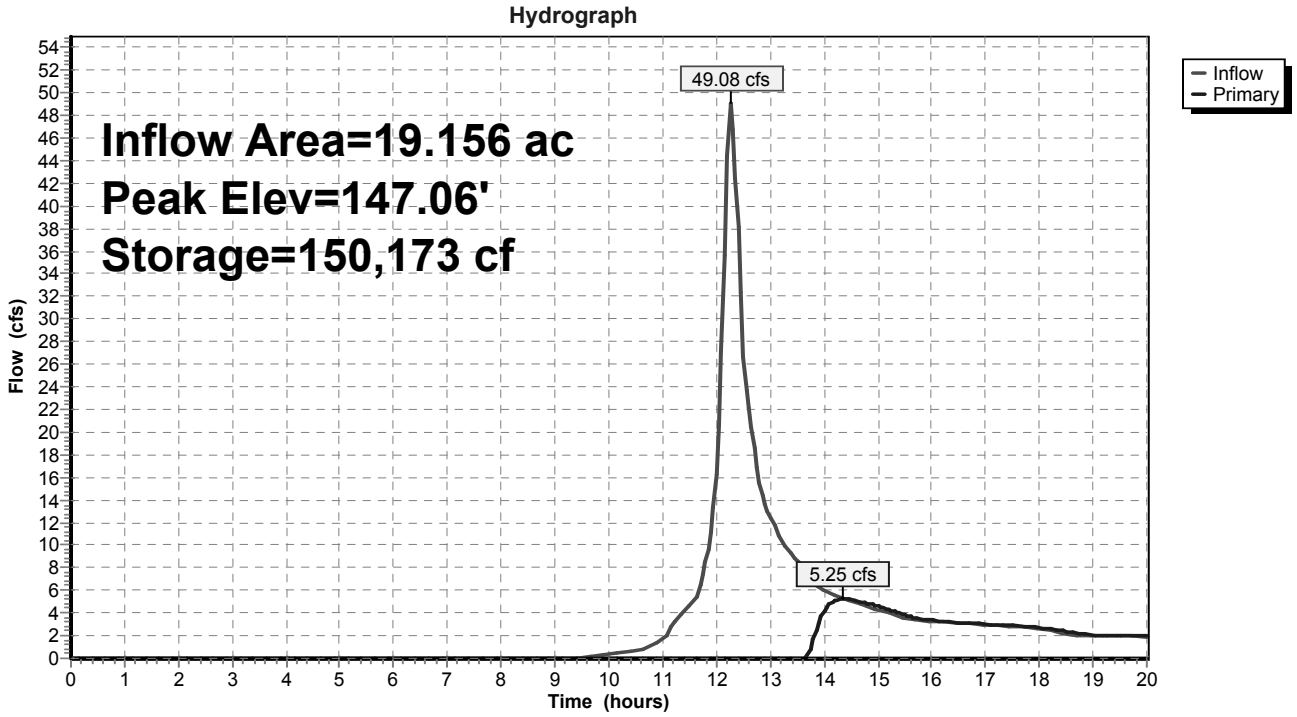
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 142.00' | 426,961 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 142.00 | 2,966 | 0 | 0 |
| 143.00 | 4,699 | 3,832 | 3,832 |
| 144.00 | 14,949 | 9,824 | 13,656 |
| 145.00 | 23,285 | 19,117 | 32,773 |
| 146.00 | 48,848 | 36,067 | 68,840 |
| 147.00 | 102,342 | 75,595 | 144,435 |
| 148.00 | 142,120 | 122,231 | 266,666 |
| 149.00 | 178,469 | 160,294 | 426,961 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 126.00 160.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=5.25 cfs @ 14.36 hrs HW=147.06' TW=134.28' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 5.25 cfs @ 0.76 fps)

## Pond P E 1.1B: 283



## Summary for Pond P E 1.2A: 282

Inflow Area = 7.679 ac, 17.79% Impervious, Inflow Depth > 5.91" for 100_year event
Inflow = 95.28 cfs @ 12.28 hrs, Volume= 3.782 af
Outflow = 43.44 cfs @ 12.43 hrs, Volume= 2.585 af, Atten= 54%, Lag= 9.1 min
Primary = 43.44 cfs @ 12.43 hrs, Volume= 2.585 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 133.00' Surf.Area= 6,429 sf Storage= 0 cf
Peak Elev= 135.40' @ 12.43 hrs Surf.Area= 72,709 sf Storage= 76,389 cf
Flood Elev= 135.00' Surf.Area= 57,759 sf Storage= 50,257 cf

Plug-Flow detention time= 105.2 min calculated for 2.579 af (68% of inflow)
Center-of-Mass det. time= 47.8 min ( 831.8 - 784.0 )

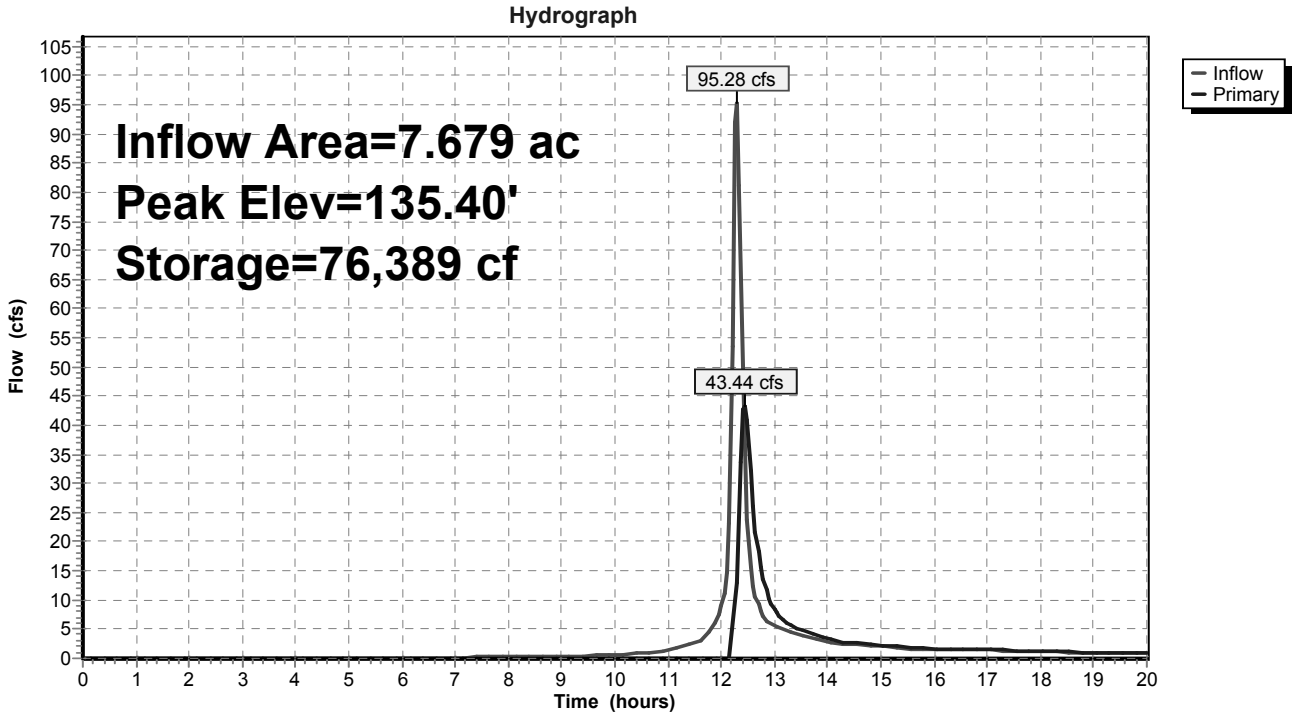
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 133.00' | 126,676 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 133.00 | 6,429 | 0 | 0 |
| 134.00 | 18,162 | 12,296 | 12,296 |
| 135.00 | 57,759 | 37,961 | 50,257 |
| 136.00 | 95,079 | 76,419 | 126,676 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 135.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 4.00 50.00 86.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=42.85 cfs @ 12.43 hrs HW=135.40' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 42.85 cfs @ 1.74 fps)

## Pond P E 1.2A: 282



## Summary for Pond P E-CULV-S: 231

Inflow Area = 4.510 ac, 0.93% Impervious, Inflow Depth > 3.70" for 100_year event
Inflow = 16.67 cfs @ 12.27 hrs, Volume= 1.390 af
Outflow = 14.76 cfs @ 12.33 hrs, Volume= 1.378 af, Atten= 11%, Lag= 3.3 min
Primary = 14.76 cfs @ 12.33 hrs, Volume= 1.378 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.20' @ 12.33 hrs Surf.Area= 3,628 sf Storage= 2,794 cf
Flood Elev= 171.00' Surf.Area= 9,105 sf Storage= 14,267 cf

Plug-Flow detention time= 7.1 min calculated for 1.378 af (99% of inflow)
Center-of-Mass det. time= 4.0 min ( 814.0 - 810.0 )

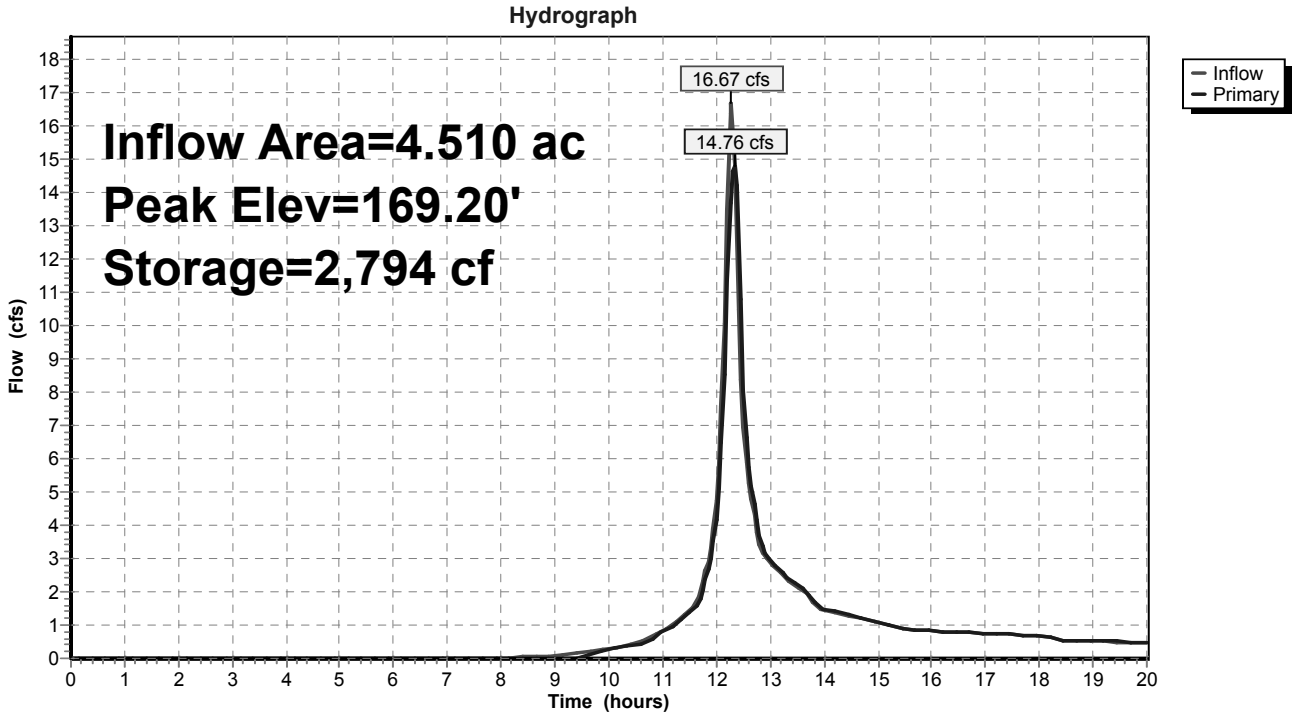
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 168.00' | 14,267 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 168.00 | 1,243 | 0 | 0 |
| 169.00 | 3,008 | 2,125 | 2,125 |
| 170.00 | 6,086 | 4,547 | 6,672 |
| 171.00 | 9,105 | 7,595 | 14,267 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 236.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 158.00' S= 0.0254 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 168.25' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=14.63 cfs @ 12.33 hrs HW=169.19' TW=145.94' (Dynamic Tailwater)
↑**1=RCP_Round 18"** (Passes 14.63 cfs of 18.79 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 14.63 cfs @ 4.66 fps)

## Pond P E-CULV-S: 231



## Summary for Pond P INF-E-1:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.385 ac, 0.00% Impervious, Inflow Depth > 5.06" for 100_year event
Inflow = 6.36 cfs @ 12.25 hrs, Volume= 0.584 af
Outflow = 7.82 cfs @ 12.25 hrs, Volume= 0.444 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 9.35 hrs, Volume= 0.027 af
Primary = 7.80 cfs @ 12.25 hrs, Volume= 0.416 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 183.90' @ 12.25 hrs Surf.Area= 3,441 sf Storage= 7,308 cf
Flood Elev= 168.50' Surf.Area= 3,441 sf Storage= 7,308 cf

Plug-Flow detention time= 111.7 min calculated for 0.443 af (76% of inflow)
Center-of-Mass det. time= 47.3 min ( 831.8 - 784.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 162.50' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 163.00' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | x 2.00 = 7,308 cf Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 364.90' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #2 | Device 3 | 165.00' | **9.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Primary | 160.50' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 160.50' / 159.50' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #4 | Discarded | 162.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 9.35 hrs HW=163.01' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=7.78 cfs @ 12.25 hrs HW=183.82' TW=159.74' (Dynamic Tailwater)
└**3=RCP_Round 18"** (Passes 7.78 cfs of 30.74 cfs potential flow)
  ├**1=Bleeder at WQT Vol** ( Controls 0.00 cfs)
  └**2=Orifice/Grate Overflow** (Orifice Controls 7.78 cfs @ 20.75 fps)

## Pond P INF-E-1: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

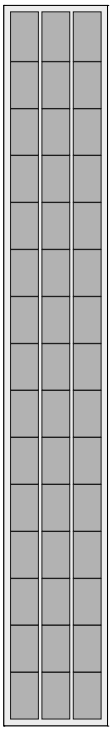
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

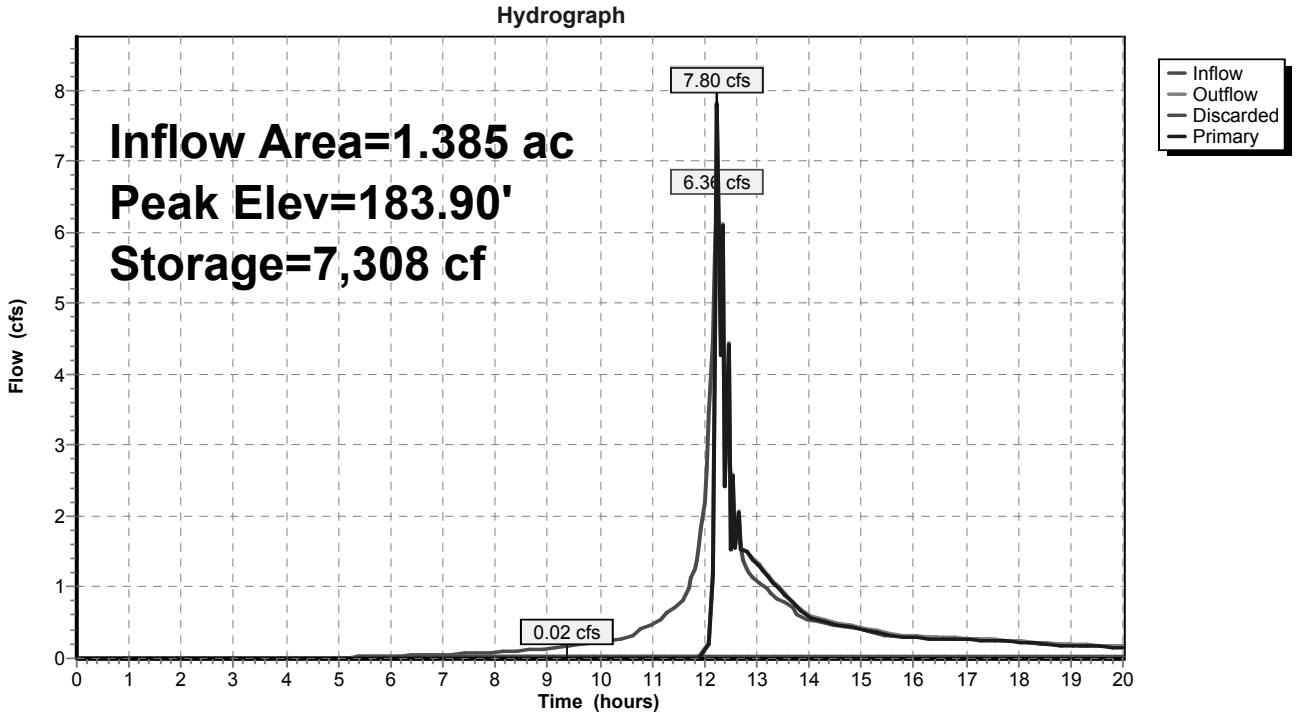
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-1:


Hydrograph
Inflow Area=1.385 ac
Peak Elev=183.90'
Storage=7,308 cf
7.80 cfs
6.36 cfs
0.02 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
3
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## Summary for Pond P INF-E-2: 142

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 5.89" for 100_year event
Inflow = 6.95 cfs @ 12.23 hrs, Volume= 0.573 af
Outflow = 8.28 cfs @ 12.21 hrs, Volume= 0.505 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 7.15 hrs, Volume= 0.014 af
Primary = 8.27 cfs @ 12.21 hrs, Volume= 0.490 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.87' @ 12.20 hrs Surf.Area= 1,721 sf Storage= 3,654 cf
Flood Elev= 169.60' Surf.Area= 1,721 sf Storage= 3,654 cf

Plug-Flow detention time= 72.3 min calculated for 0.505 af (88% of inflow)
Center-of-Mass det. time= 32.1 min ( 799.6 - 767.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 164.00' | 1,578 cf | **15.75'W x 109.24'L x 3.50'H Field A**<br>6,022 cf Overall - 2,076 cf Embedded = 3,946 cf x 40.0% Voids |
| #2A | 164.50' | 2,076 cf | **ADS_StormTech SC-740** x 45 Inside #1<br>Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf<br>Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap<br>Row Length Adjustment= +0.44' x 6.45 sf x 3 rows |
| | | 3,654 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 166.50' | **18.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 4 | 167.00' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary overflow** C= 0.600 |
| #3 | Device 4 | 366.40' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #4 | Primary | 162.00' | **18.0" Round RCP_Round 18"**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 161.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #5 | Discarded | 164.00' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 7.15 hrs HW=164.50' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=6.73 cfs @ 12.21 hrs HW=171.37' TW=170.27' (Dynamic Tailwater)
└**4=RCP_Round 18"** (Outlet Controls 6.73 cfs @ 3.81 fps)
  ├**1=Orifice/Grate Overflow** (Passes < 3.78 cfs potential flow)
  ├**2=Orifice/Grate Overflow - auxiliary overflow**(Passes < 3.78 cfs potential flow)
  └**3=Bleeder at WQT Vol** ( Controls 0.00 cfs)

## Pond P INF-E-2: 142 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechSC-740**
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

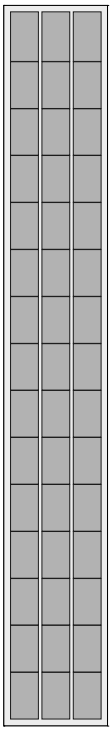
15 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 107.24' Row Length +12.0" End Stone x 2 = 109.24' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 2,075.8 cf Chamber Storage

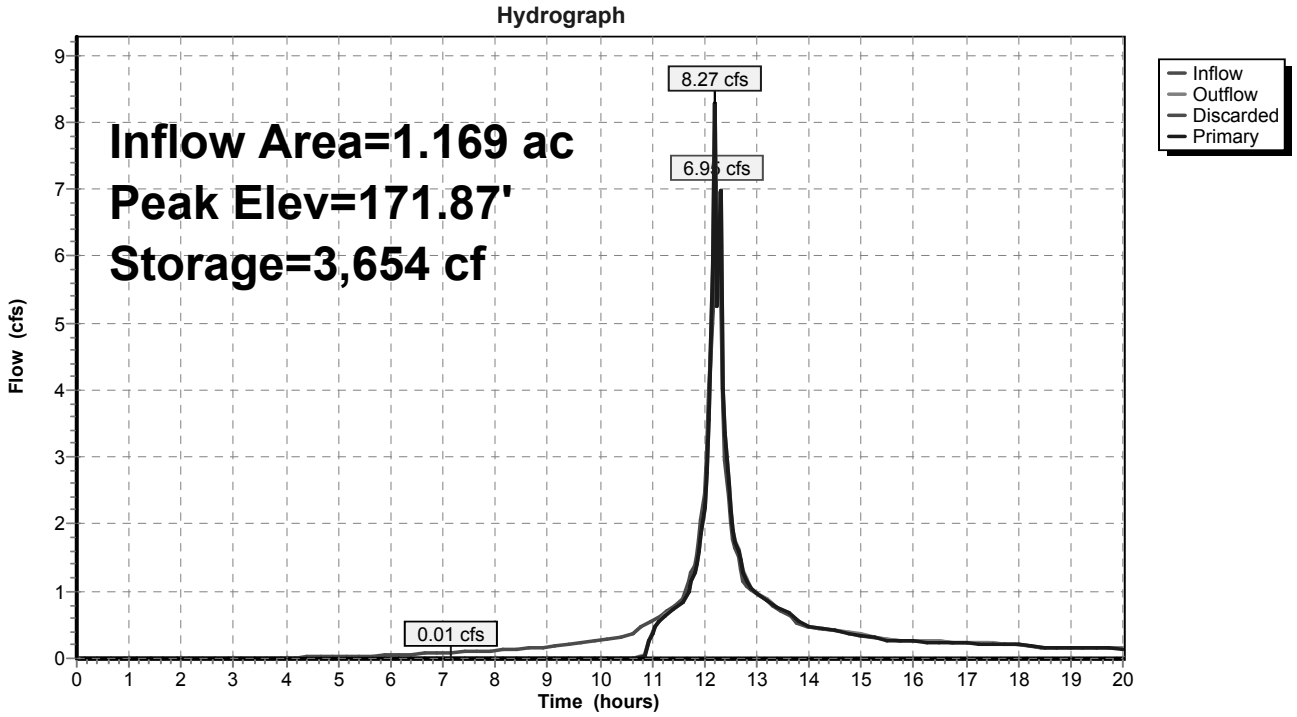
6,021.9 cf Field - 2,075.8 cf Chambers = 3,946.0 cf Stone x 40.0% Voids = 1,578.4 cf Stone Storage

Chamber Storage + Stone Storage = 3,654.2 cf = 0.084 af
Overall Storage Efficiency = 60.7%

45 Chambers
223.0 cy Field
146.1 cy Stone



## Pond P INF-E-2: 142



## Summary for Pond P INF-E-3:

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 6.824 ac, 5.44% Impervious, Inflow Depth > 4.92" for 100_year event
Inflow = 29.26 cfs @ 12.23 hrs, Volume= 2.798 af
Outflow = 30.98 cfs @ 12.21 hrs, Volume= 2.378 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 5.15 hrs, Volume= 0.038 af
Primary = 30.95 cfs @ 12.21 hrs, Volume= 2.340 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.94' @ 12.21 hrs Surf.Area= 6,283 sf Storage= 21,456 cf
Flood Elev= 174.75' Surf.Area= 6,283 sf Storage= 21,456 cf

Plug-Flow detention time= 81.1 min calculated for 2.378 af (85% of inflow)
Center-of-Mass det. time= 33.9 min ( 818.4 - 784.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.25' | 8,735 cf | **44.25'W x 142.00'L x 5.50'H Field A**<br>34,558 cf Overall - 12,722 cf Embedded = 21,837 cf x 40.0% Voids |
| #2A | 168.00' | 12,722 cf | **ADS_StormTech MC-3500 c +Cap**x 114 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf |
| | | 21,456 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.75' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.75' / 161.75' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Device 1 | 171.25' | **14.0" W x 6.0" H Vert. Orifice/Grate Overflow** C= 0.600 |
| #3 | Device 1 | 171.75' | **36.0" W x 3.0" H Vert. Orifice/Grate Overflow - auxiliary X 4.00**<br>C= 0.600 |
| #4 | Device 1 | 169.35' | **3.0" Vert. Bleeder at WQT Vol** C= 0.600 |
| #5 | Discarded | 167.25' | **0.170 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.02 cfs @ 5.15 hrs HW=167.33' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=30.38 cfs @ 12.21 hrs HW=174.81' TW=168.83' (Dynamic Tailwater)
└**1=Culvert** (Passes 30.38 cfs of 32.08 cfs potential flow)
  ├**2=Orifice/Grate Overflow** (Orifice Controls 5.11 cfs @ 8.75 fps)
  ├**3=Orifice/Grate Overflow - auxiliary** (Orifice Controls 24.72 cfs @ 8.24 fps)
  └**4=Bleeder at WQT Vol** (Orifice Controls 0.55 cfs @ 11.12 fps)

## Pond P INF-E-3: - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 6 rows = 187.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

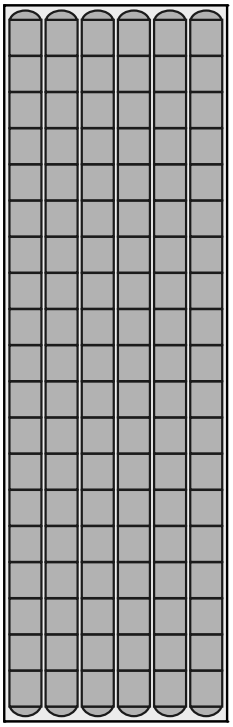
19 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 140.00' Row Length +12.0" End Stone x 2 = 142.00' Base Length
6 Rows x 77.0" Wide + 9.0" Spacing x 5 + 12.0" Side Stone x 2 = 44.25' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

114 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 6 Rows = 12,721.7 cf Chamber Storage

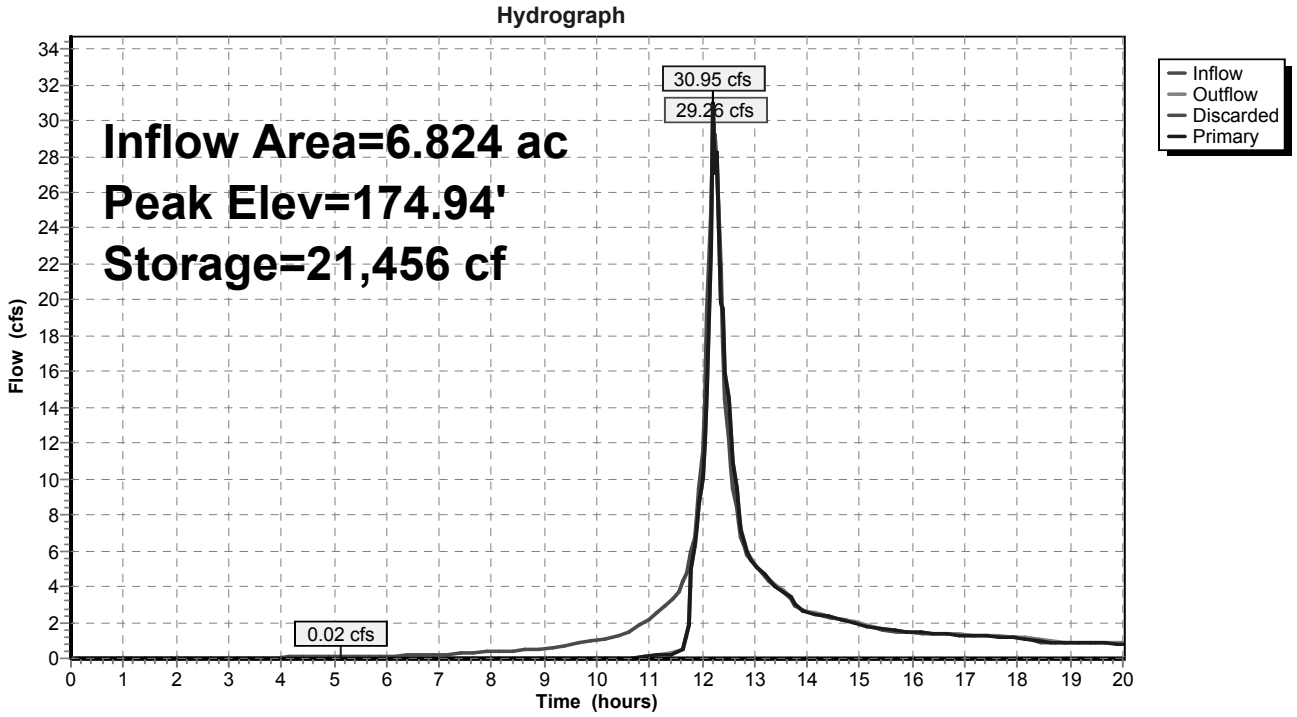
34,558.4 cf Field - 12,721.7 cf Chambers = 21,836.7 cf Stone x 40.0% Voids = 8,734.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,456.4 cf = 0.493 af
Overall Storage Efficiency = 62.1%

114 Chambers
1,279.9 cy Field
808.8 cy Stone



## Pond P INF-E-3:


Hydrograph
Inflow Area=6.824 ac
Peak Elev=174.94'
Storage=21,456 cf
30.95 cfs
29.26 cfs
0.02 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34

## Summary for Pond P INF-E-4A: 145

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 1.603 ac, 0.00% Impervious, Inflow Depth > 6.12" for 100_year event
Inflow = 11.01 cfs @ 12.29 hrs, Volume= 0.817 af
Outflow = 10.07 cfs @ 12.26 hrs, Volume= 0.682 af, Atten= 9%, Lag= 0.0 min
Discarded = 0.01 cfs @ 9.65 hrs, Volume= 0.011 af
Primary = 10.06 cfs @ 12.26 hrs, Volume= 0.671 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 593.15' @ 12.26 hrs Surf.Area= 2,089 sf Storage= 7,026 cf
Flood Elev= 175.00' Surf.Area= 2,089 sf Storage= 7,026 cf

Plug-Flow detention time= 92.4 min calculated for 0.680 af (83% of inflow)
Center-of-Mass det. time= 43.8 min ( 878.1 - 834.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 2,974 cf | **22.75'W x 91.81'L x 5.50'H Field A**<br>11,487 cf Overall - 4,052 cf Embedded = 7,435 cf x 40.0% Voids |
| #2A | 168.25' | 4,052 cf | **ADS_StormTech MC-3500 c +Cap**x 36 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 7,026 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 171.50' | **3.0" Vert. Orifice/Grate Overflow** C= 0.600 |
| #2 | Device 3 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #3 | Primary | 168.00' | **24.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #4 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 9.65 hrs HW=167.59' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=8.95 cfs @ 12.26 hrs HW=530.09' TW=171.01' (Dynamic Tailwater)
└**3=Culvert** (Passes 8.95 cfs of 248.61 cfs potential flow)
  ├**1=Orifice/Grate Overflow** (Orifice Controls 4.47 cfs @ 91.16 fps)
  └**2=Bleeder** (Orifice Controls 4.48 cfs @ 91.24 fps)

## Pond P INF-E-4A: 145 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

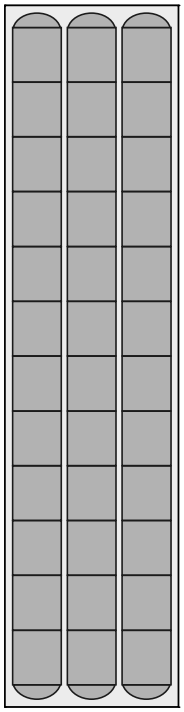
12 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 89.81' Row Length +12.0" End Stone x 2 = 91.81' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

36 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 4,051.9 cf Chamber Storage

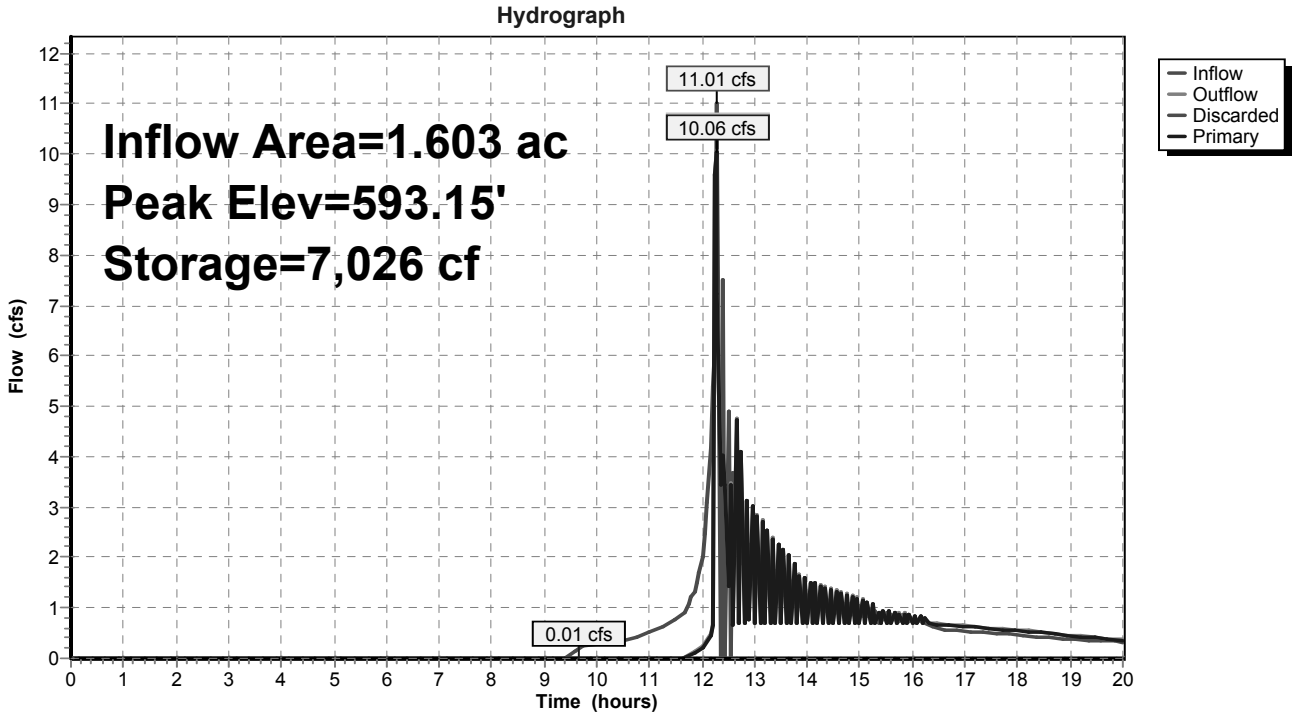
11,487.3 cf Field - 4,051.9 cf Chambers = 7,435.4 cf Stone x 40.0% Voids = 2,974.2 cf Stone Storage

Chamber Storage + Stone Storage = 7,026.0 cf = 0.161 af
Overall Storage Efficiency = 61.2%

36 Chambers
425.5 cy Field
275.4 cy Stone



## Pond P INF-E-4A: 145



## Summary for Pond P INF-E-4B: 140

Pipe out is not designed. It is modeled herein to be free flowing at a slope of 0.5%

Orifice outlet is designed at the elevation to allow for 72 hour drawdown at the conservative rate of 0.27 in/hr.

---

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth > 7.20" for 100_year event
Inflow = 4.49 cfs @ 12.14 hrs, Volume= 0.354 af
Outflow = 3.89 cfs @ 12.18 hrs, Volume= 0.301 af, Atten= 13%, Lag= 2.2 min
Discarded = 0.01 cfs @ 2.70 hrs, Volume= 0.012 af
Primary = 3.88 cfs @ 12.18 hrs, Volume= 0.289 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.91' @ 12.18 hrs Surf.Area= 1,273 sf Storage= 4,196 cf
Flood Elev= 175.00' Surf.Area= 1,273 sf Storage= 4,242 cf

Plug-Flow detention time= 128.8 min calculated for 0.300 af (85% of inflow)
Center-of-Mass det. time= 78.8 min ( 805.3 - 726.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 167.50' | 1,840 cf | **22.75'W x 55.96'L x 5.50'H Field A**<br>7,002 cf Overall - 2,403 cf Embedded = 4,599 cf x 40.0% Voids |
| #2A | 168.25' | 2,403 cf | **ADS_StormTech MC-3500 c +Cap**x 21 Inside #1<br>Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf<br>Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap<br>Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf |
| | | 4,242 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 166.90' | **18.0" Round Culvert**<br>L= 200.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.90' / 166.80' S= 0.0005 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.50' | **3.0" Vert. Orifice/Grate** C= 0.600 |
| #3 | Device 1 | 172.00' | **36.0" W x 3.0" H Vert. Orifice/Grate-auxiliary** C= 0.600 |
| #4 | Device 1 | 169.90' | **3.0" Vert. Bleeder** C= 0.600 |
| #5 | Discarded | 167.50' | **0.270 in/hr Exfiltration over Surface area** |

**Discarded OutFlow** Max=0.01 cfs @ 2.70 hrs HW=167.58' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=3.77 cfs @ 12.18 hrs HW=172.87' TW=165.44' (Dynamic Tailwater)
└**1=Culvert** (Passes 3.77 cfs of 13.75 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.37 fps)
  ├**3=Orifice/Grate-auxiliary** (Orifice Controls 3.11 cfs @ 4.15 fps)
  └**4=Bleeder** (Orifice Controls 0.40 cfs @ 8.12 fps)

## Pond P INF-E-4B: 140 - Chamber Wizard Field A

**Chamber Model = ADS_StormTechMC-3500 c +Cap**
Effective Size= 70.4"W x 45.0"H => 15.34 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +15.6 cf x 2 x 3 rows = 93.6 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

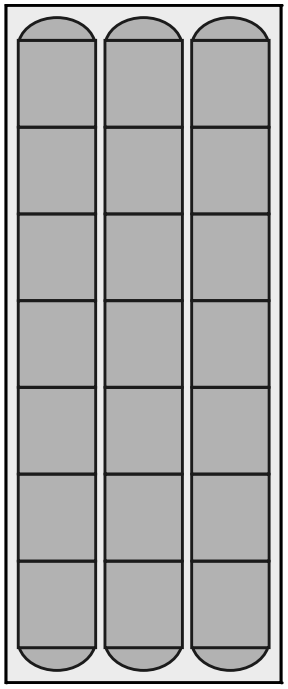
7 Chambers/Row x 7.17' Long +1.88' Cap Length x 2 = 53.96' Row Length +12.0" End Stone x 2 = 55.96' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Base + 45.0" Chamber Height + 12.0" Cover = 5.50' Field Height

21 Chambers x 110.0 cf + 15.6 cf Cap Volume x 2 x 3 Rows = 2,402.6 cf Chamber Storage

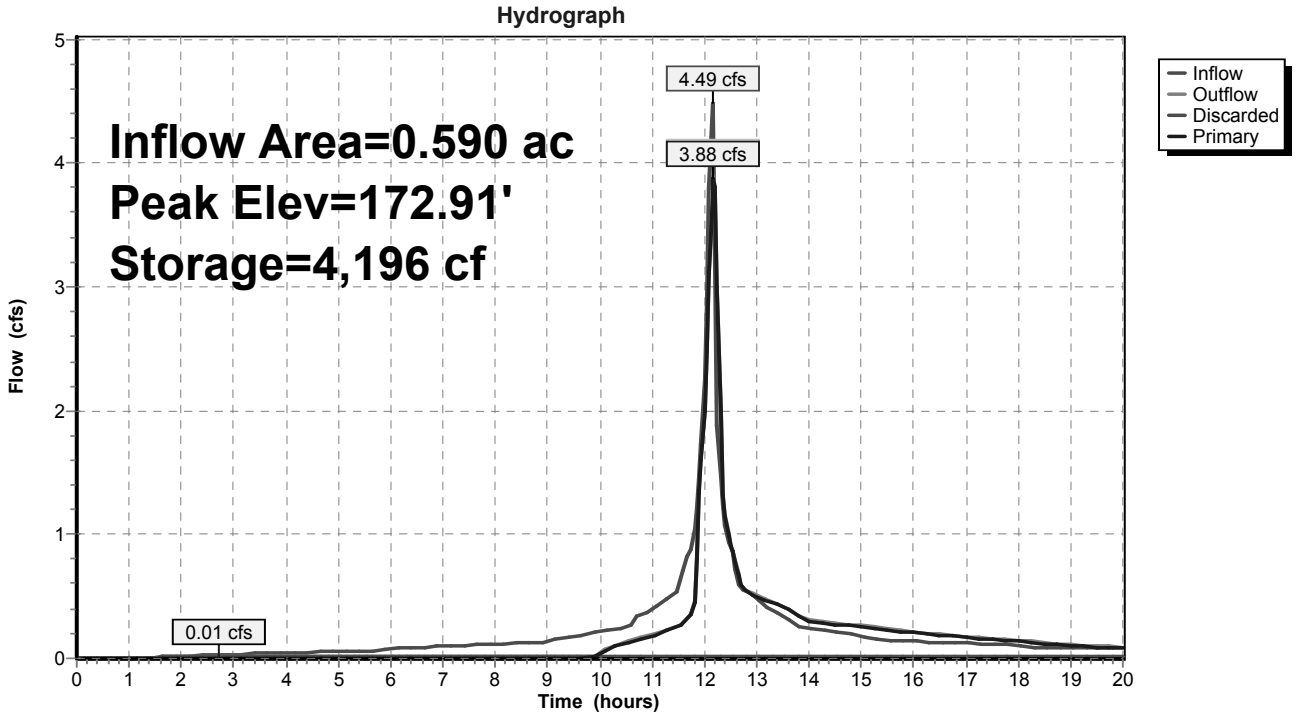
7,001.6 cf Field - 2,402.6 cf Chambers = 4,599.0 cf Stone x 40.0% Voids = 1,839.6 cf Stone Storage

Chamber Storage + Stone Storage = 4,242.2 cf = 0.097 af
Overall Storage Efficiency = 60.6%

21 Chambers
259.3 cy Field
170.3 cy Stone



## Pond P INF-E-4B: 140



## Summary for Pond P MH-CULV-NA: 114

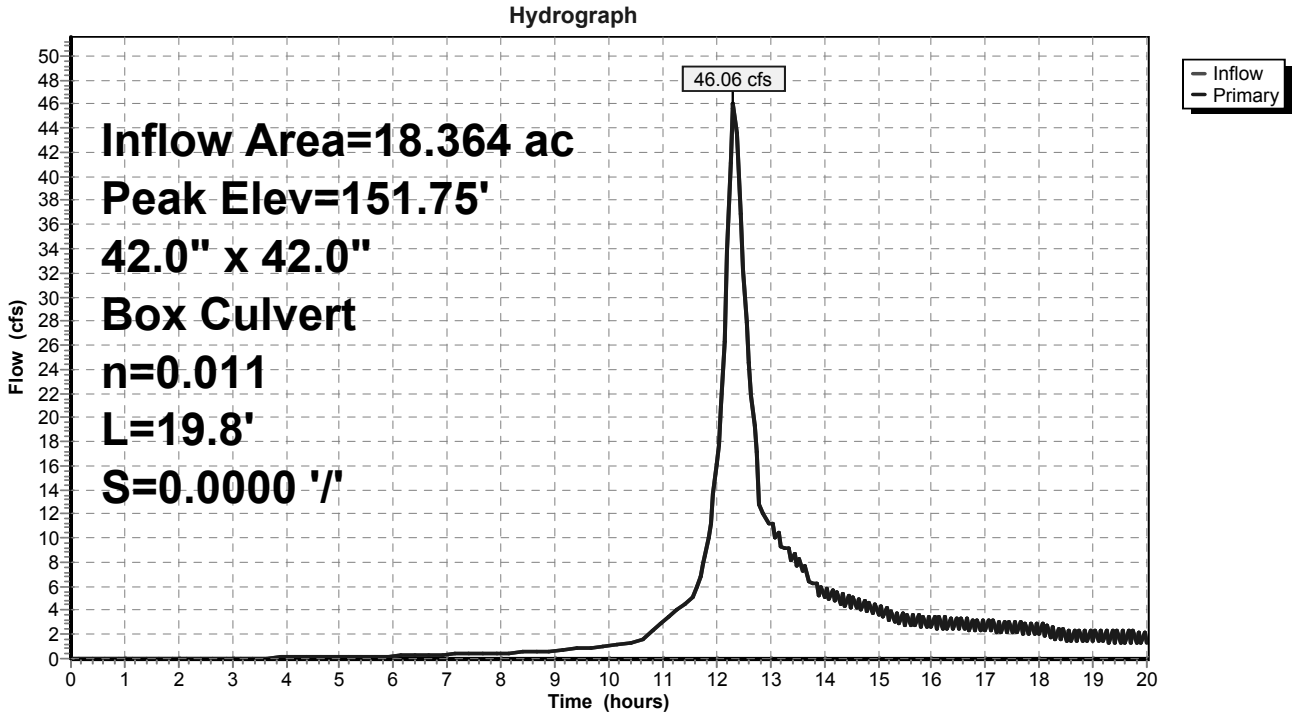
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 3.32" for 100_year event
Inflow = 46.06 cfs @ 12.32 hrs, Volume= 5.087 af
Outflow = 46.06 cfs @ 12.32 hrs, Volume= 5.086 af, Atten= 0%, Lag= 0.0 min
Primary = 46.06 cfs @ 12.32 hrs, Volume= 5.086 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 151.75' @ 12.32 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 147.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 19.8' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 147.58' S= 0.0000 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=45.48 cfs @ 12.32 hrs HW=151.71' TW=151.12' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 45.48 cfs @ 3.71 fps)

## Pond P MH-CULV-NA: 114



## Summary for Pond P MH-CULV-NB: 115

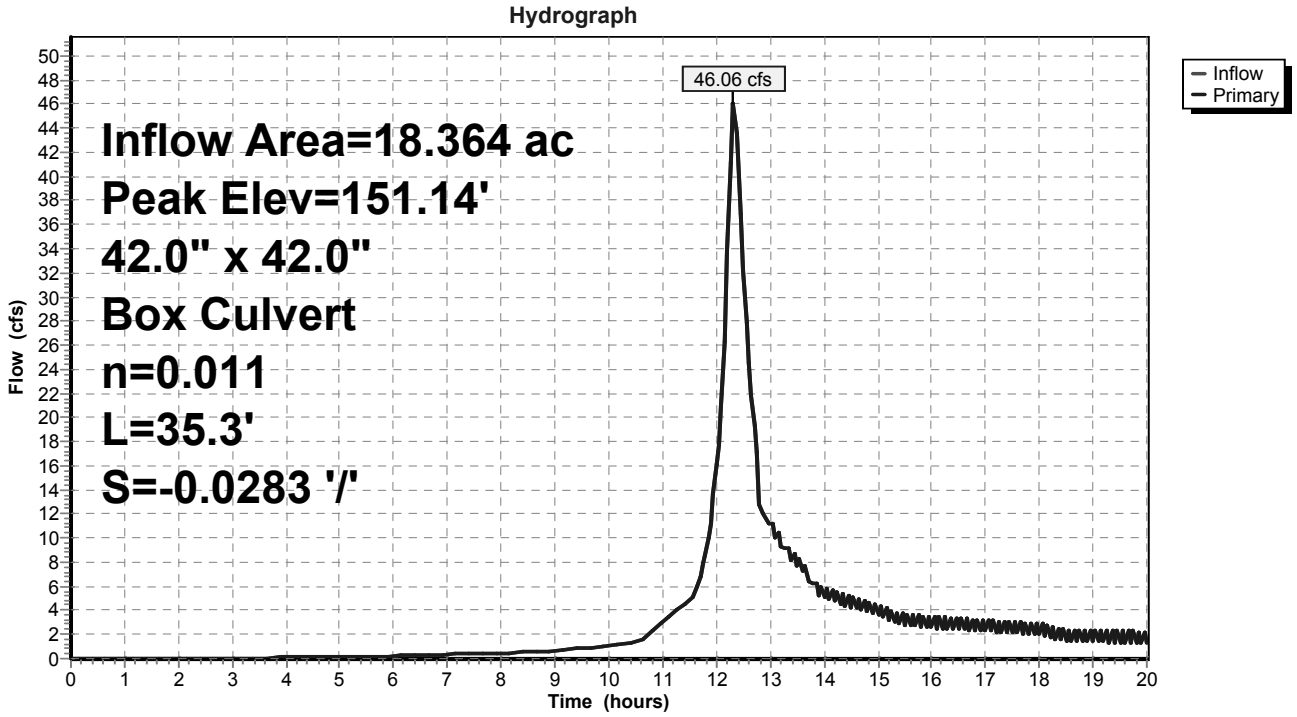
Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 3.32" for 100_year event
Inflow = 46.06 cfs @ 12.32 hrs, Volume= 5.086 af
Outflow = 46.06 cfs @ 12.32 hrs, Volume= 5.086 af, Atten= 0%, Lag= 0.0 min
Primary = 46.06 cfs @ 12.32 hrs, Volume= 5.086 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 151.14' @ 12.32 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.58' | **42.0" W x 42.0" H Box 3.5' x 3.5' Box**<br>L= 35.3' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 147.58' / 148.58' S= -0.0283 '/' Cc= 0.900<br>n= 0.011, Flow Area= 12.25 sf |

**Primary OutFlow** Max=45.48 cfs @ 12.32 hrs HW=151.12' TW=0.00' (Dynamic Tailwater)
↑**1=3.5' x 3.5' Box** (Inlet Controls 45.48 cfs @ 5.12 fps)

## Pond P MH-CULV-NB: 115



## Summary for Pond P RG-E-7:

Inflow Area = 0.951 ac, 0.00% Impervious, Inflow Depth > 6.71" for 100_year event
Inflow = 6.17 cfs @ 12.22 hrs, Volume= 0.532 af
Outflow = 10.41 cfs @ 12.30 hrs, Volume= 0.477 af, Atten= 0%, Lag= 4.5 min
Primary = 10.70 cfs @ 12.29 hrs, Volume= 0.599 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 174.21' @ 12.28 hrs Surf.Area= 4,555 sf Storage= 3,893 cf
Flood Elev= 175.00' Surf.Area= 7,929 sf Storage= 8,847 cf

Plug-Flow detention time= 77.5 min calculated for 0.477 af (90% of inflow)
Center-of-Mass det. time= 40.7 min ( 787.4 - 746.7 )

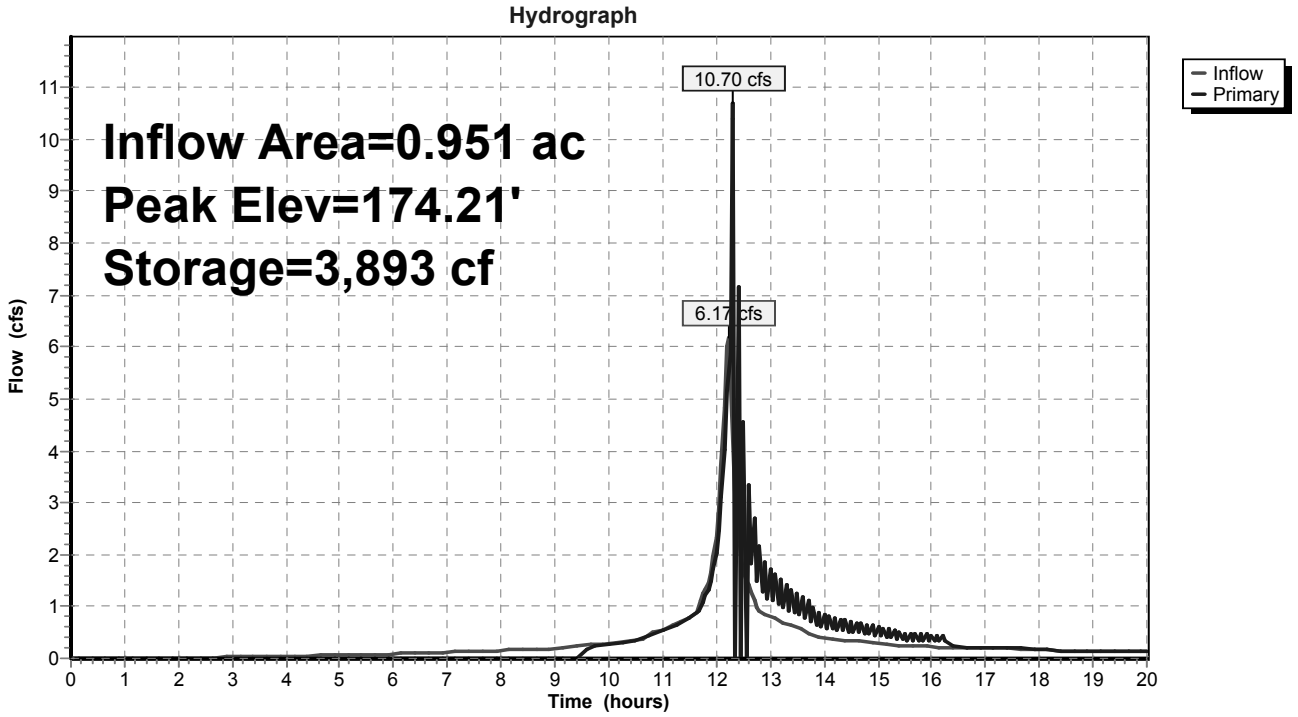
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 173.00' | 8,847 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 173.00 | 2,408 | 0 | 0 |
| 174.00 | 3,678 | 3,043 | 3,043 |
| 175.00 | 7,929 | 5,804 | 8,847 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 173.80' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.40' | **18.0" Round Culvert**<br>L= 35.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 169.40' / 169.20' S= 0.0057 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.00 cfs @ 12.29 hrs HW=174.20' TW=439.70' (Dynamic Tailwater)
↑**2=Culvert** ( Controls 0.00 cfs)
↑**1=Orifice/Grate** ( Controls 0.00 cfs)

## Pond P RG-E-7:


Hydrograph
Inflow Area=0.951 ac
Peak Elev=174.21'
Storage=3,893 cf
10.70 cfs
6.17 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
0 1 2 3 4 5 6 7 8 9 10 11

## Summary for Pond P RG-E-9A:

Inflow Area = 2.302 ac, 0.00% Impervious, Inflow Depth > 5.12" for 100_year event
Inflow = 11.51 cfs @ 12.24 hrs, Volume= 0.983 af
Outflow = 9.96 cfs @ 12.29 hrs, Volume= 0.977 af, Atten= 14%, Lag= 3.3 min
Primary = 9.96 cfs @ 12.29 hrs, Volume= 0.977 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 166.87' @ 12.29 hrs Surf.Area= 1,558 sf Storage= 1,649 cf
Flood Elev= 167.00' Surf.Area= 1,657 sf Storage= 1,860 cf

Plug-Flow detention time= 6.3 min calculated for 0.977 af (99% of inflow)
Center-of-Mass det. time= 4.2 min ( 784.8 - 780.6 )

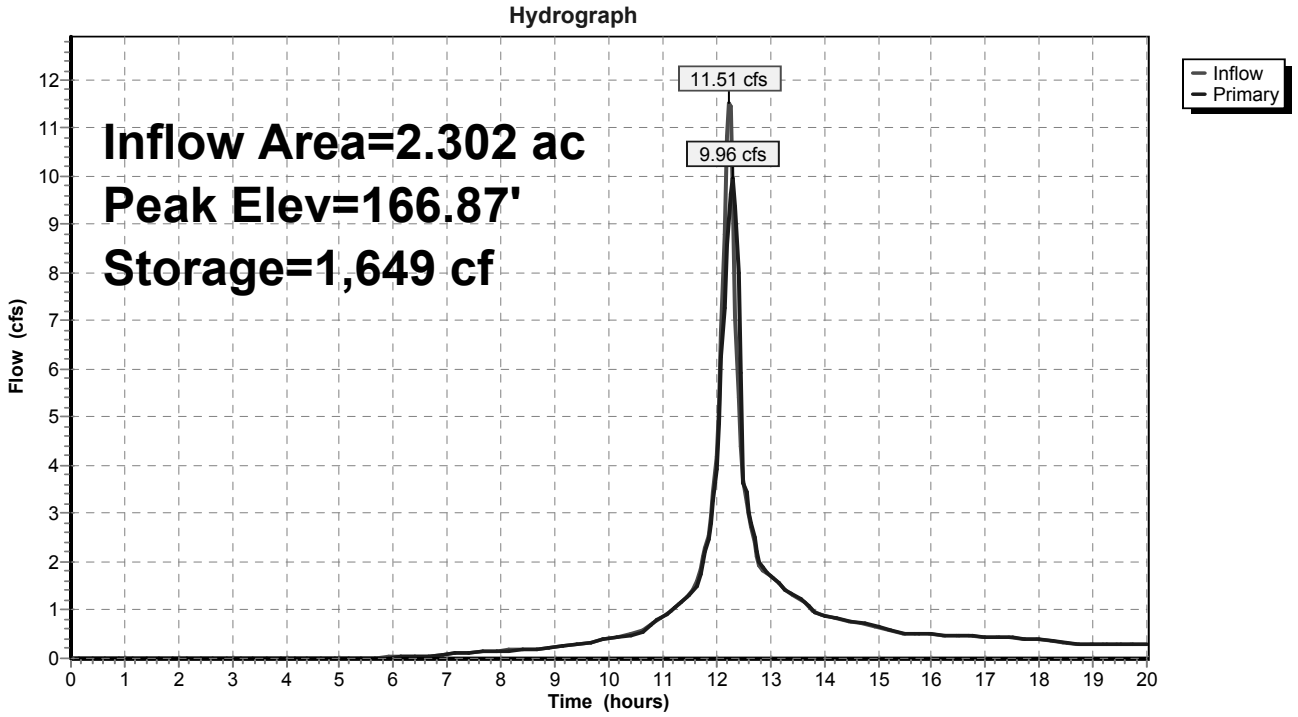
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 165.00' | 1,860 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 165.00 | 266 | 0 | 0 |
| 166.00 | 898 | 582 | 582 |
| 167.00 | 1,657 | 1,278 | 1,860 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 165.50' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 151.00' | **18.0" Round Culvert**<br>L= 46.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 151.00' / 150.20' S= 0.0174 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=9.90 cfs @ 12.29 hrs HW=166.85' TW=150.77' (Dynamic Tailwater)
↑**2=Culvert** (Passes 9.90 cfs of 38.64 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 9.90 cfs @ 5.60 fps)

## Pond P RG-E-9A:


Hydrograph
Inflow Area=2.302 ac
Peak Elev=166.87'
Storage=1,649 cf
11.51 cfs
9.96 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P RG-E-9B: 244

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

---

Inflow Area = 2.836 ac, 0.00% Impervious, Inflow Depth > 4.76" for 100_year event
Inflow = 11.62 cfs @ 12.27 hrs, Volume= 1.125 af
Outflow = 11.54 cfs @ 12.29 hrs, Volume= 1.013 af, Atten= 1%, Lag= 1.2 min
Primary = 11.54 cfs @ 12.29 hrs, Volume= 1.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 150.77' @ 12.29 hrs Surf.Area= 3,988 sf Storage= 5,831 cf
Flood Elev= 151.00' Surf.Area= 4,178 sf Storage= 6,784 cf

Plug-Flow detention time= 58.0 min calculated for 1.011 af (90% of inflow)
Center-of-Mass det. time= 24.7 min ( 812.8 - 788.1 )

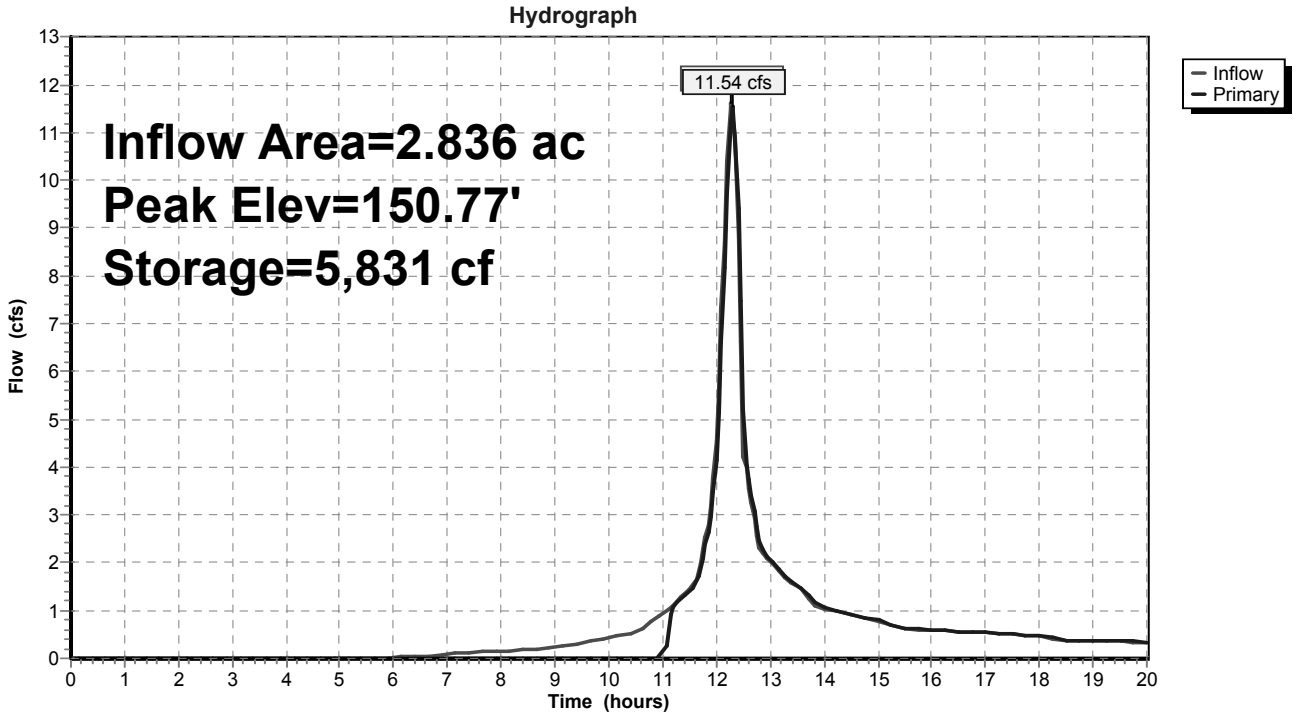
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 149.00' | 6,784 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 149.00 | 2,666 | 0 | 0 |
| 150.00 | 3,362 | 3,014 | 3,014 |
| 151.00 | 4,178 | 3,770 | 6,784 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 28.00 31.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=11.47 cfs @ 12.29 hrs HW=150.77' TW=145.81' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 11.47 cfs @ 1.62 fps)

## Pond P RG-E-9B: 244



## Summary for Pond P RG-W-5A: 250

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 4.52" for 100_year event
Inflow = 6.52 cfs @ 12.20 hrs, Volume= 0.498 af
Outflow = 6.34 cfs @ 12.20 hrs, Volume= 0.496 af, Atten= 3%, Lag= 0.0 min
Primary = 6.34 cfs @ 12.20 hrs, Volume= 0.496 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 163.77' @ 12.20 hrs Surf.Area= 216 sf Storage= 120 cf
Flood Elev= 164.00' Surf.Area= 252 sf Storage= 173 cf

Plug-Flow detention time= 2.4 min calculated for 0.495 af (99% of inflow)
Center-of-Mass det. time= 1.2 min ( 797.9 - 796.8 )

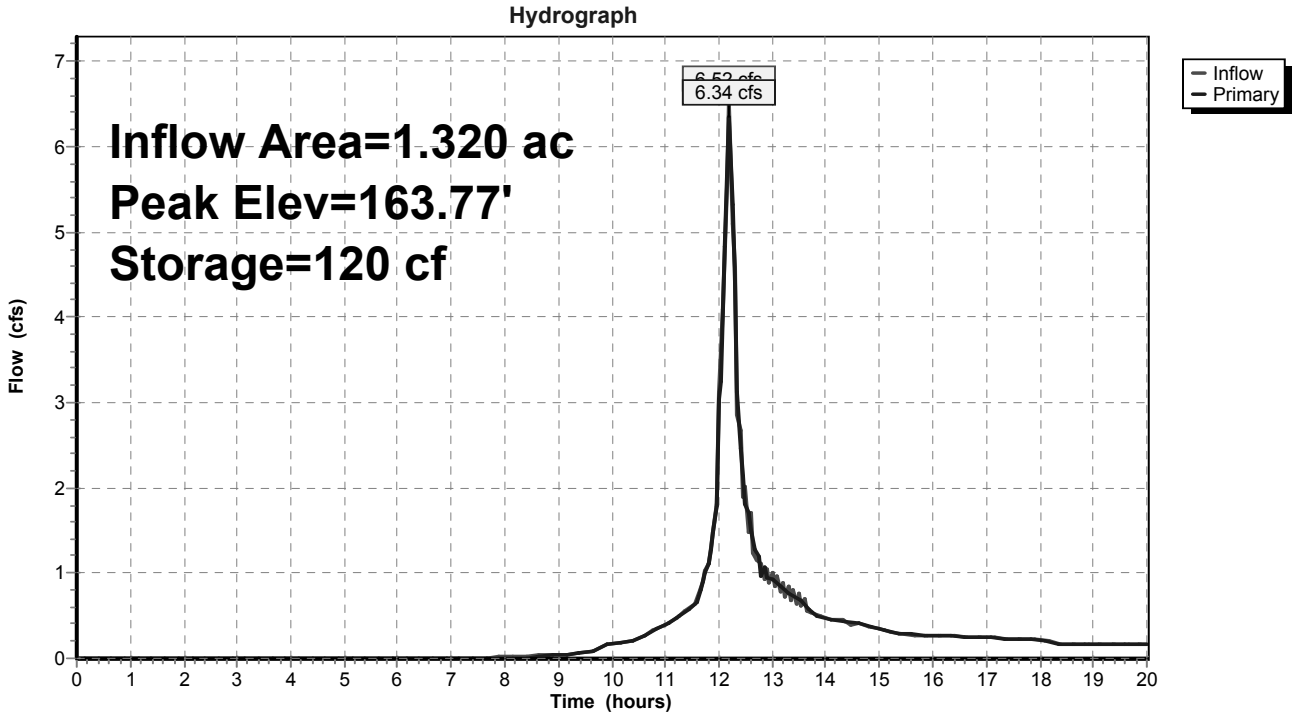
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 163.00' | 173 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 163.00 | 95 | 0 | 0 |
| 164.00 | 252 | 173 | 173 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 163.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=6.27 cfs @ 12.20 hrs HW=163.77' TW=162.77' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 6.27 cfs @ 1.59 fps)

## Pond P RG-W-5A: 250



## Summary for Pond P RG-W-5B: 252

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 4.51" for 100_year event
Inflow = 6.34 cfs @ 12.20 hrs, Volume= 0.496 af
Outflow = 6.24 cfs @ 12.19 hrs, Volume= 0.495 af, Atten= 2%, Lag= 0.0 min
Primary = 6.24 cfs @ 12.19 hrs, Volume= 0.495 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.77' @ 12.19 hrs Surf.Area= 178 sf Storage= 94 cf
Flood Elev= 163.00' Surf.Area= 212 sf Storage= 138 cf

Plug-Flow detention time= 1.8 min calculated for 0.495 af (100% of inflow)
Center-of-Mass det. time= 0.8 min ( 798.7 - 797.9 )

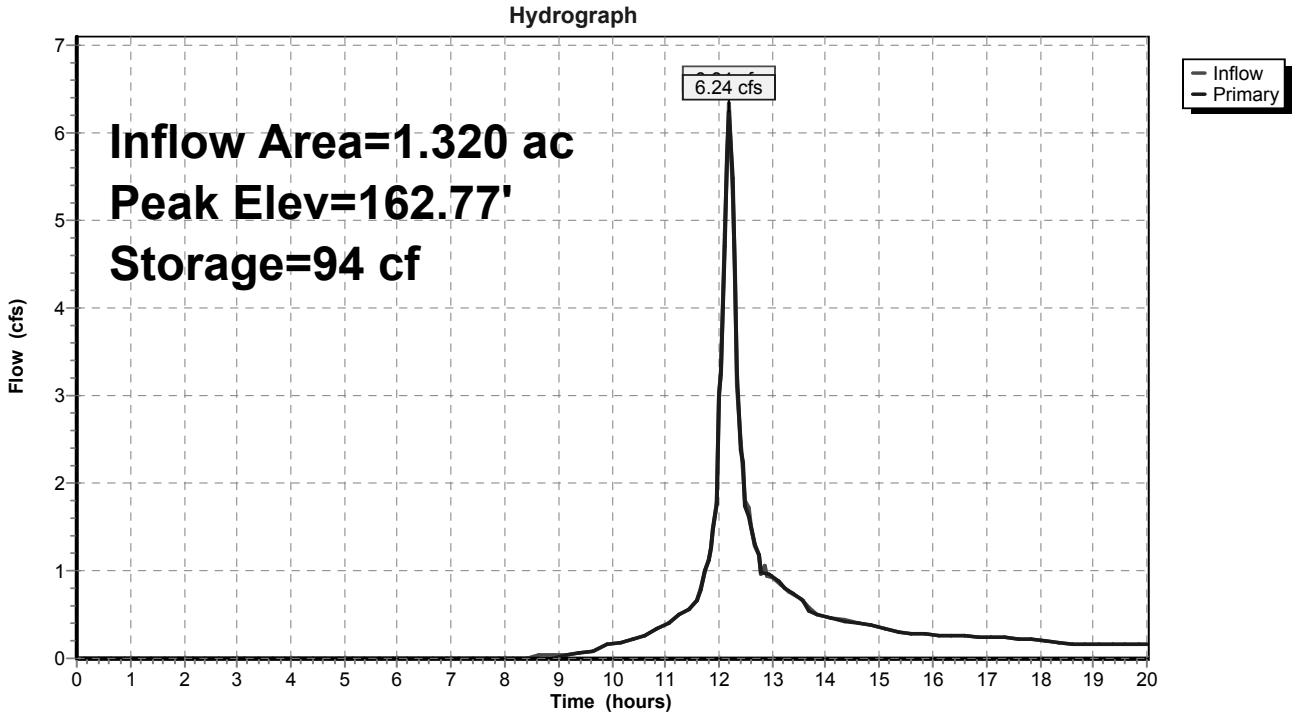
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 138 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 65 | 0 | 0 |
| 163.00 | 212 | 138 | 138 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=6.18 cfs @ 12.19 hrs HW=162.77' TW=161.77' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 6.18 cfs @ 1.58 fps)

## Pond P RG-W-5B: 252



## Summary for Pond P RG-W-5C: 254

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.1 in/hr to drawdown in 72 hours.

---

Inflow Area = 1.320 ac, 0.58% Impervious, Inflow Depth > 4.50" for 100_year event
Inflow = 6.24 cfs @ 12.19 hrs, Volume= 0.495 af
Outflow = 6.14 cfs @ 12.20 hrs, Volume= 0.476 af, Atten= 2%, Lag= 0.4 min
Primary = 6.14 cfs @ 12.20 hrs, Volume= 0.476 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 161.77' @ 12.20 hrs Surf.Area= 999 sf Storage= 1,041 cf
Flood Elev= 162.00' Surf.Area= 1,046 sf Storage= 1,280 cf

Plug-Flow detention time= 22.1 min calculated for 0.476 af (96% of inflow)
Center-of-Mass det. time= 8.3 min ( 807.0 - 798.7 )

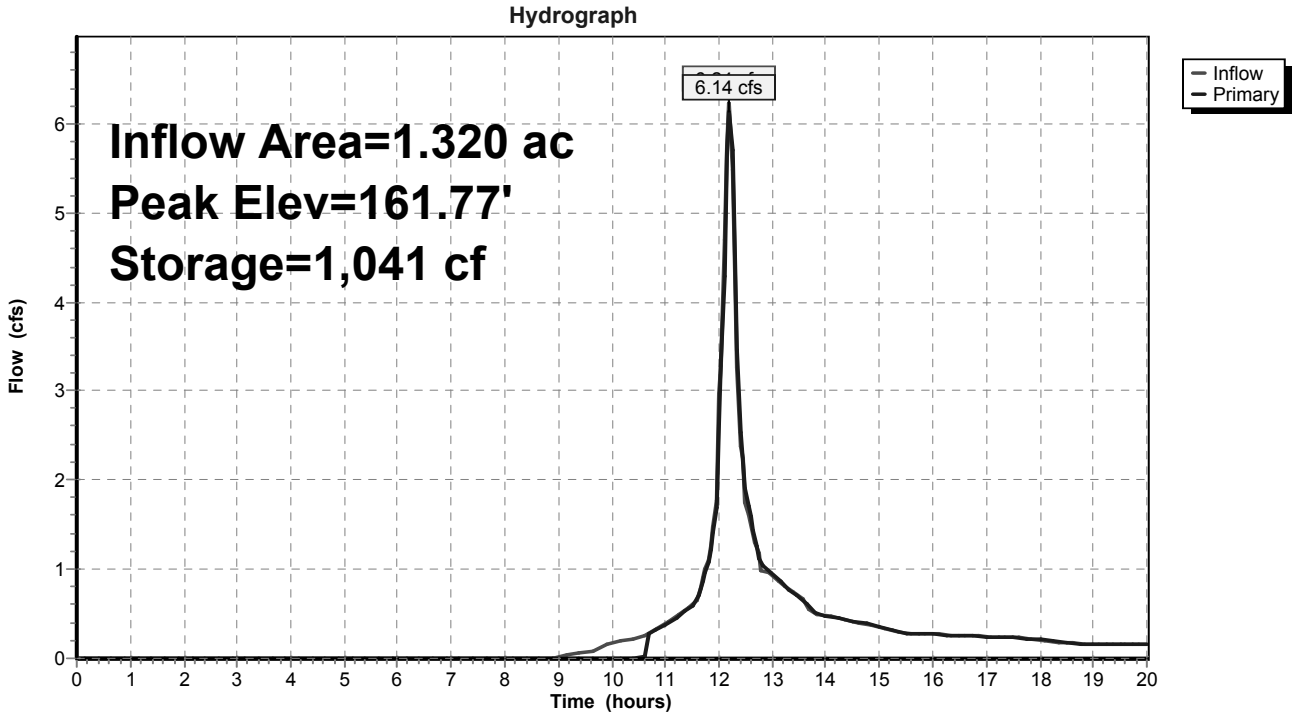
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 160.50' | 1,280 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 160.50 | 624 | 0 | 0 |
| 161.00 | 778 | 351 | 351 |
| 161.50 | 946 | 431 | 782 |
| 162.00 | 1,046 | 498 | 1,280 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 161.50' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 16.00 19.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=6.13 cfs @ 12.20 hrs HW=161.77' TW=153.90' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 6.13 cfs @ 1.58 fps)

## Pond P RG-W-5C: 254



## Summary for Pond P S-CB-E-1: 263

Inflow Area = 1.190 ac, 0.00% Impervious, Inflow Depth > 5.08" for 100_year event
Inflow = 6.14 cfs @ 12.23 hrs, Volume= 0.504 af
Outflow = 6.14 cfs @ 12.23 hrs, Volume= 0.499 af, Atten= 0%, Lag= 0.5 min
Primary = 6.14 cfs @ 12.23 hrs, Volume= 0.499 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 171.00' Surf.Area= 155 sf Storage= 0 cf
Peak Elev= 171.78' @ 12.23 hrs Surf.Area= 748 sf Storage= 353 cf
Flood Elev= 172.00' Surf.Area= 913 sf Storage= 534 cf

Plug-Flow detention time= 7.3 min calculated for 0.498 af (99% of inflow)
Center-of-Mass det. time= 4.1 min ( 785.3 - 781.2 )

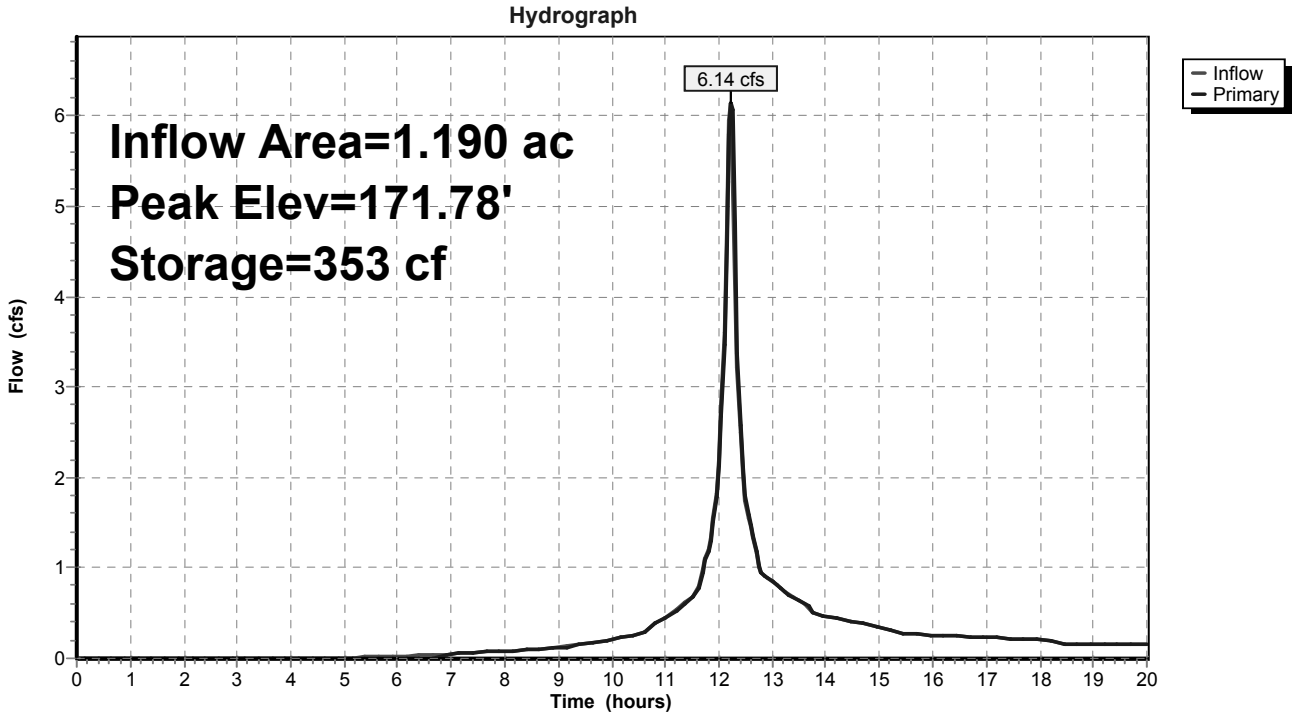
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 534 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 155 | 0 | 0 |
| 172.00 | 913 | 534 | 534 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.50' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 169.20' | **18.0" Round Culvert**<br>L= 16.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 167.80' / 169.20' S= -0.0875 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=5.98 cfs @ 12.23 hrs HW=171.78' TW=166.69' (Dynamic Tailwater)
↑**2=Culvert** (Passes 5.98 cfs of 14.37 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 5.98 cfs @ 1.72 fps)

## Pond P S-CB-E-1: 263



## Summary for Pond P W 3.1: 5

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 4.31" for 100_year event
Inflow = 17.69 cfs @ 12.26 hrs, Volume= 2.349 af
Outflow = 17.69 cfs @ 12.27 hrs, Volume= 2.179 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.01 cfs @ 7.15 hrs, Volume= 0.011 af
Primary = 17.68 cfs @ 12.27 hrs, Volume= 2.168 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 234 sf Storage= 0 cf
Peak Elev= 156.15' @ 12.27 hrs Surf.Area= 4,863 sf Storage= 8,034 cf
Flood Elev= 157.00' Surf.Area= 6,397 sf Storage= 12,836 cf

Plug-Flow detention time= 36.5 min calculated for 2.179 af (93% of inflow)
Center-of-Mass det. time= 11.9 min ( 826.4 - 814.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 12,836 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

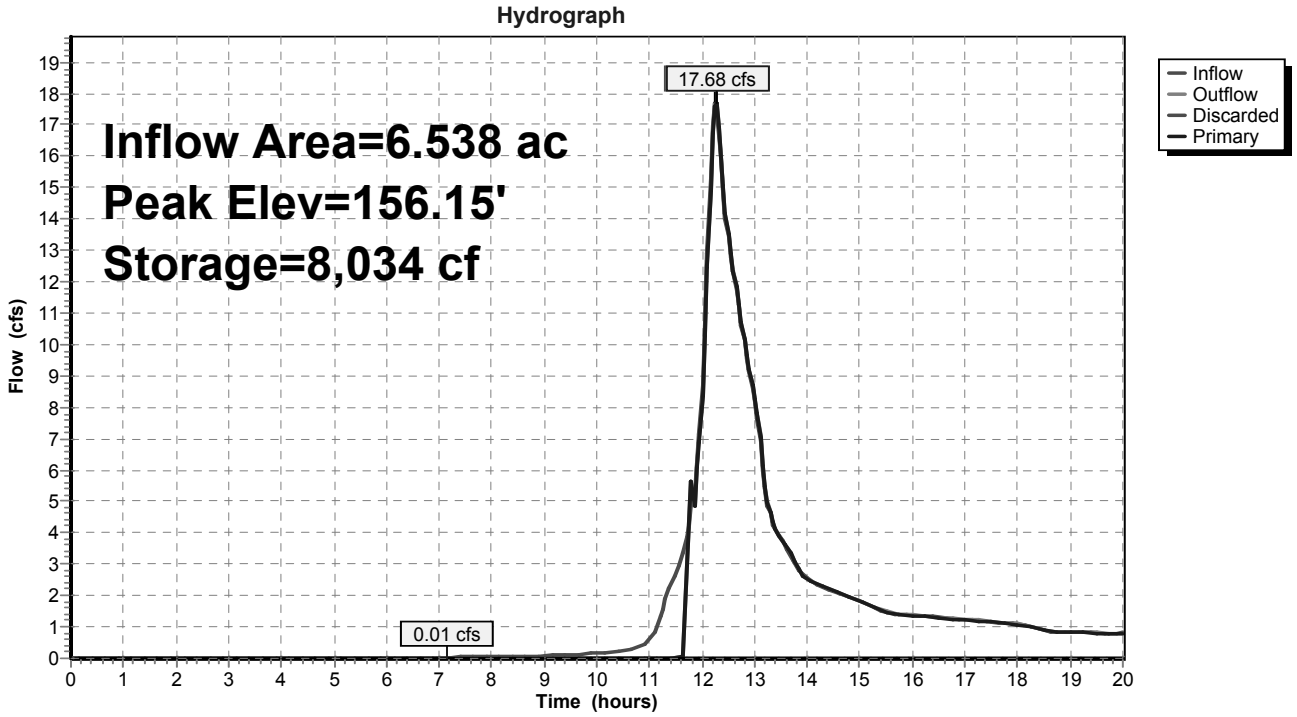
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 234 | 0 | 0 |
| 154.00 | 1,659 | 947 | 947 |
| 155.00 | 3,263 | 2,461 | 3,407 |
| 156.00 | 4,598 | 3,930 | 7,338 |
| 157.00 | 6,397 | 5,498 | 12,836 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 42.00 135.00 140.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Discarded | 153.00' | **0.01 cfs Exfiltration at all elevations** |

**Discarded OutFlow** Max=0.01 cfs @ 7.15 hrs HW=153.03' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

**Primary OutFlow** Max=17.57 cfs @ 12.27 hrs HW=156.15' TW=0.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 17.57 cfs @ 1.20 fps)

## Pond P W 3.1: 5


Hydrograph
Inflow Area=6.538 ac
Peak Elev=156.15'
Storage=8,034 cf
17.68 cfs
0.01 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

## Summary for Pond P W 3.4: 13

Inflow Area = 3.043 ac, 5.02% Impervious, Inflow Depth > 1.29" for 100_year event
Inflow = 2.90 cfs @ 12.37 hrs, Volume= 0.328 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 180.00' Surf.Area= 569 sf Storage= 0 cf
Peak Elev= 183.66' @ 20.00 hrs Surf.Area= 8,938 sf Storage= 14,263 cf
Flood Elev= 185.00' Surf.Area= 14,093 sf Storage= 29,756 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

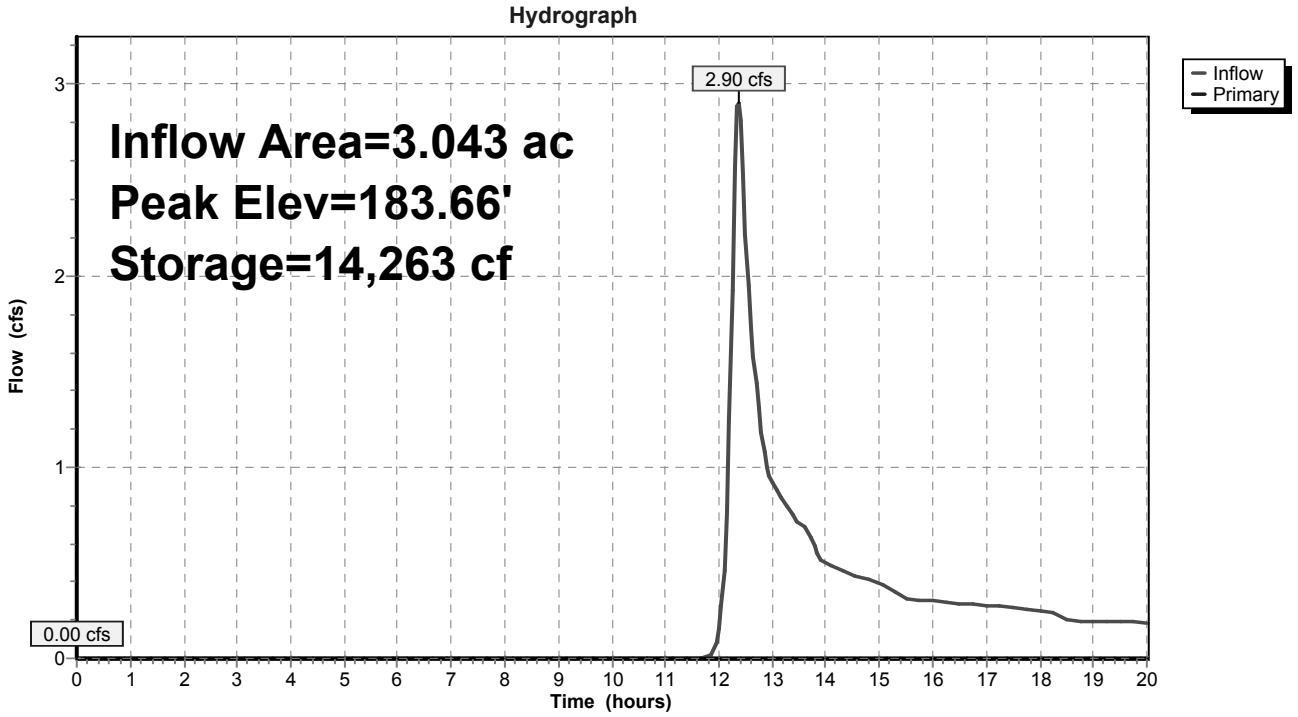
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 180.00' | 29,756 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 180.00 | 569 | 0 | 0 |
| 181.00 | 2,065 | 1,317 | 1,317 |
| 182.00 | 3,883 | 2,974 | 4,292 |
| 183.00 | 6,092 | 4,988 | 9,279 |
| 184.00 | 10,384 | 8,238 | 17,517 |
| 185.00 | 14,093 | 12,239 | 29,756 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 184.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 7.00 45.00 51.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=180.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 3.4: 13


Hydrograph
Inflow Area=3.043 ac
Peak Elev=183.66'
Storage=14,263 cf
2.90 cfs
0.00 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P W 9.1B: 14

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 157.00' Surf.Area= 732 sf Storage= 0 cf
Peak Elev= 157.00' @ 0.00 hrs Surf.Area= 732 sf Storage= 0 cf
Flood Elev= 159.00' Surf.Area= 4,550 sf Storage= 5,474 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

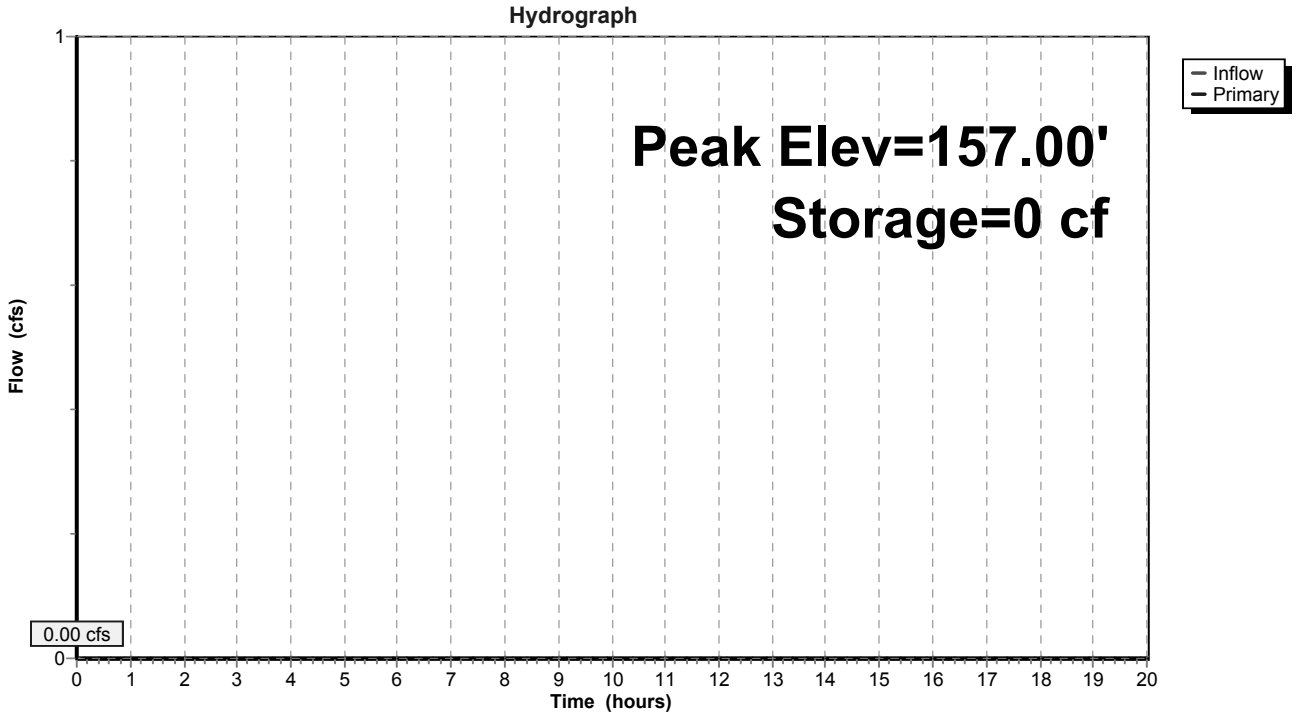
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 157.00' | 5,474 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 157.00 | 732 | 0 | 0 |
| 158.00 | 2,833 | 1,783 | 1,783 |
| 159.00 | 4,550 | 3,691 | 5,474 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 35.00 125.00 164.00<br>Height (feet) 1.00 0.00 0.00 1.00 |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=157.00' TW=153.00' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P W 9.1B: 14



## Summary for Pond P W-CULV-N: 227

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 3.32" for 100_year event
Inflow = 52.50 cfs @ 12.26 hrs, Volume= 5.088 af
Outflow = 46.06 cfs @ 12.32 hrs, Volume= 5.087 af, Atten= 12%, Lag= 3.9 min
Primary = 46.06 cfs @ 12.32 hrs, Volume= 5.087 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 153.00' Surf.Area= 4,411 sf Storage= 0 cf
Peak Elev= 154.42' @ 12.32 hrs Surf.Area= 7,720 sf Storage= 8,696 cf
Flood Elev= 159.00' Surf.Area= 21,416 sf Storage= 72,181 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min ( 803.3 - 802.5 )

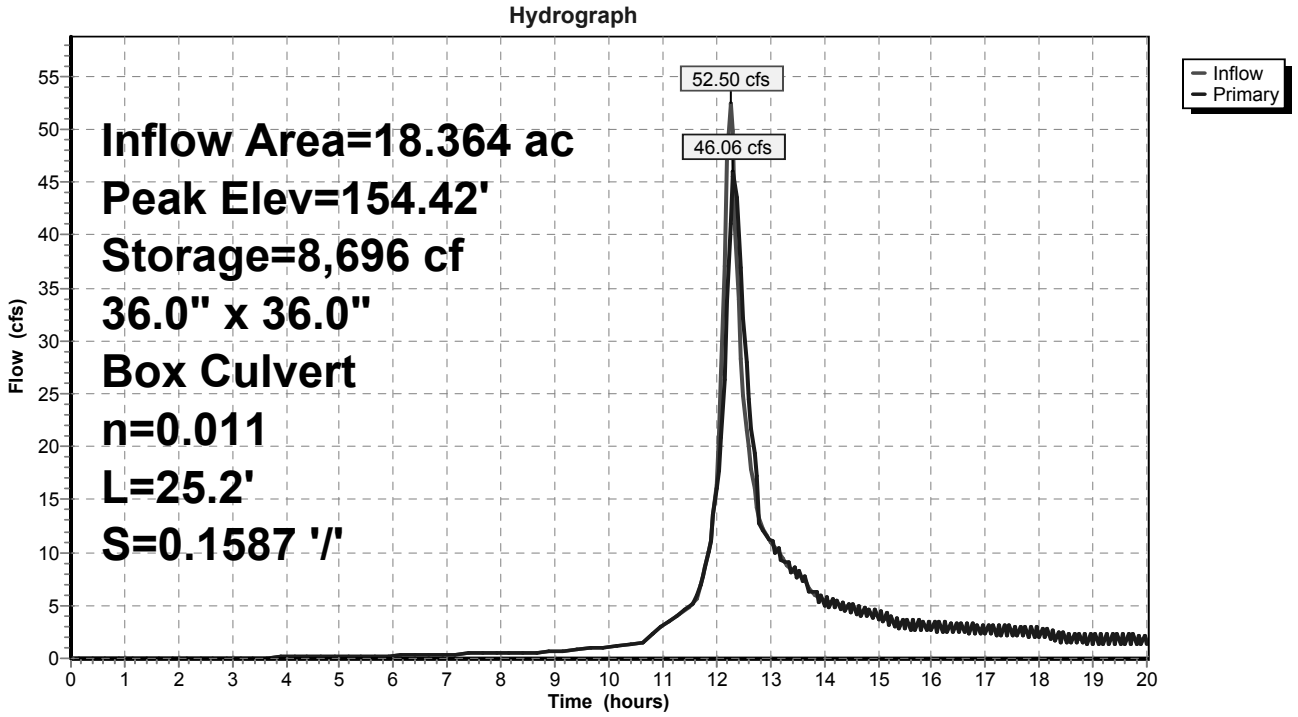
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 153.00' | 72,181 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 153.00 | 4,411 | 0 | 0 |
| 154.00 | 6,861 | 5,636 | 5,636 |
| 155.00 | 8,907 | 7,884 | 13,520 |
| 156.00 | 11,660 | 10,284 | 23,804 |
| 157.00 | 14,425 | 13,042 | 36,846 |
| 158.00 | 17,414 | 15,919 | 52,765 |
| 159.00 | 21,416 | 19,415 | 72,181 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 151.58' | **36.0" W x 36.0" H Box 3.5' x 3.5' Box**<br>L= 25.2' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 151.58' / 147.58' S= 0.1587 '/' Cc= 0.900<br>n= 0.011, Flow Area= 9.00 sf |

**Primary OutFlow** Max=45.46 cfs @ 12.32 hrs HW=154.40' TW=151.71' (Dynamic Tailwater)
↑—**1=3.5' x 3.5' Box** (Inlet Controls 45.46 cfs @ 5.38 fps)

## Pond P W-CULV-N: 227



## Summary for Pond P W-D-3: 111

| | | | | | |
|---|---|---|---|---|---|
| Inflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |
| Outflow | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af, Atten= 0%, Lag= 0.0 min |
| Primary | = | 0.00 cfs @ | 0.00 hrs, | Volume= | 0.000 af |

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Starting Elev= 158.00' Surf.Area= 435 sf Storage= 0 cf
Peak Elev= 158.00' @ 0.00 hrs Surf.Area= 435 sf Storage= 0 cf
Flood Elev= 161.00' Surf.Area= 1,217 sf Storage= 2,517 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no inflow)

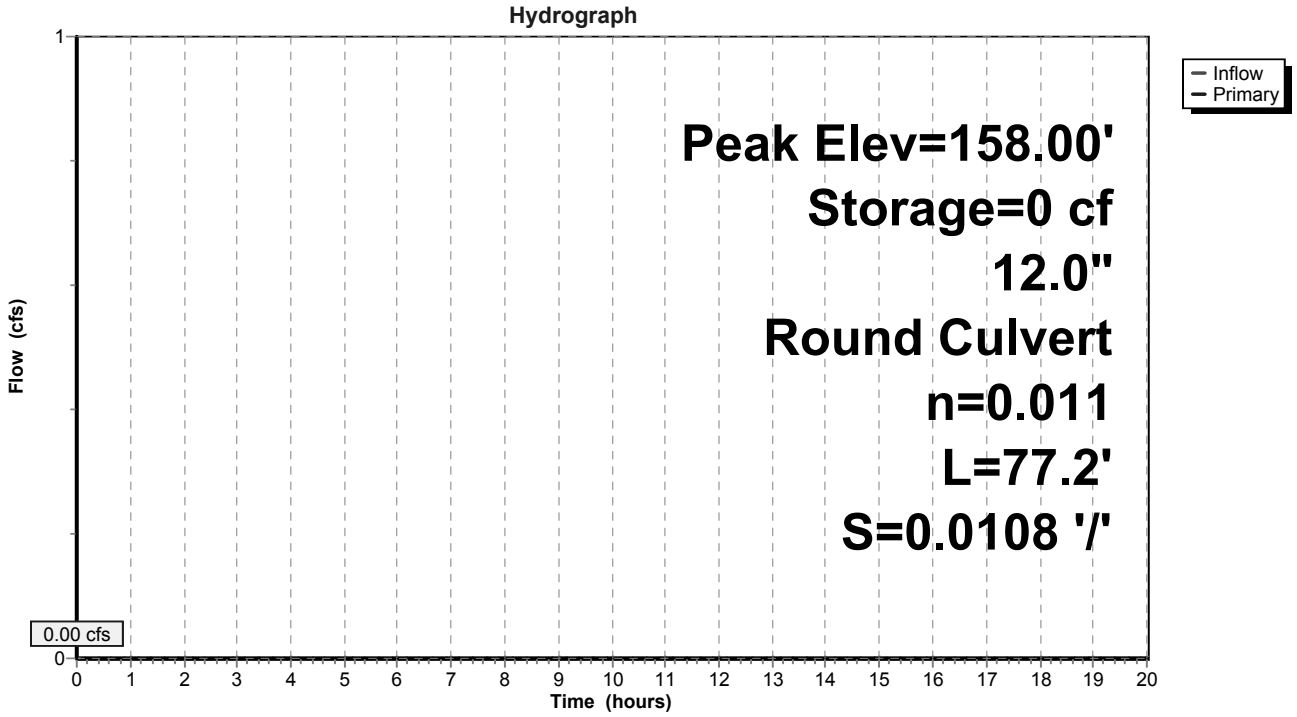
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 158.00' | 2,517 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 158.00 | 435 | 0 | 0 |
| 159.00 | 722 | 578 | 578 |
| 161.00 | 1,217 | 1,939 | 2,517 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 156.12' | **12.0" Round Existing Culvert to Remain in Place**<br>L= 77.2' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 156.12' / 155.29' S= 0.0108 '/' Cc= 0.900<br>n= 0.011, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=158.00' TW=153.00' (Dynamic Tailwater)
**1=Existing Culvert to Remain in Place** (Passes 0.00 cfs of 3.51 cfs potential flow)

## Pond P W-D-3: 111



## Summary for Pond P-RG-E-1:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.3 in/hr to drawdown in 72 hours.

---

Inflow Area = 2.568 ac, 0.00% Impervious, Inflow Depth > 4.68" for 100_year event
Inflow = 11.89 cfs @ 12.24 hrs, Volume= 1.002 af
Outflow = 10.54 cfs @ 12.30 hrs, Volume= 0.931 af, Atten= 11%, Lag= 3.6 min
Primary = 3.75 cfs @ 12.30 hrs, Volume= 0.776 af
Secondary = 6.79 cfs @ 12.30 hrs, Volume= 0.155 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 142.64' @ 12.30 hrs Surf.Area= 4,132 sf Storage= 7,585 cf
Flood Elev= 143.00' Surf.Area= 4,489 sf Storage= 9,132 cf

Plug-Flow detention time= 50.9 min calculated for 0.929 af (93% of inflow)
Center-of-Mass det. time= 26.3 min ( 813.7 - 787.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 140.00' | 9,132 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

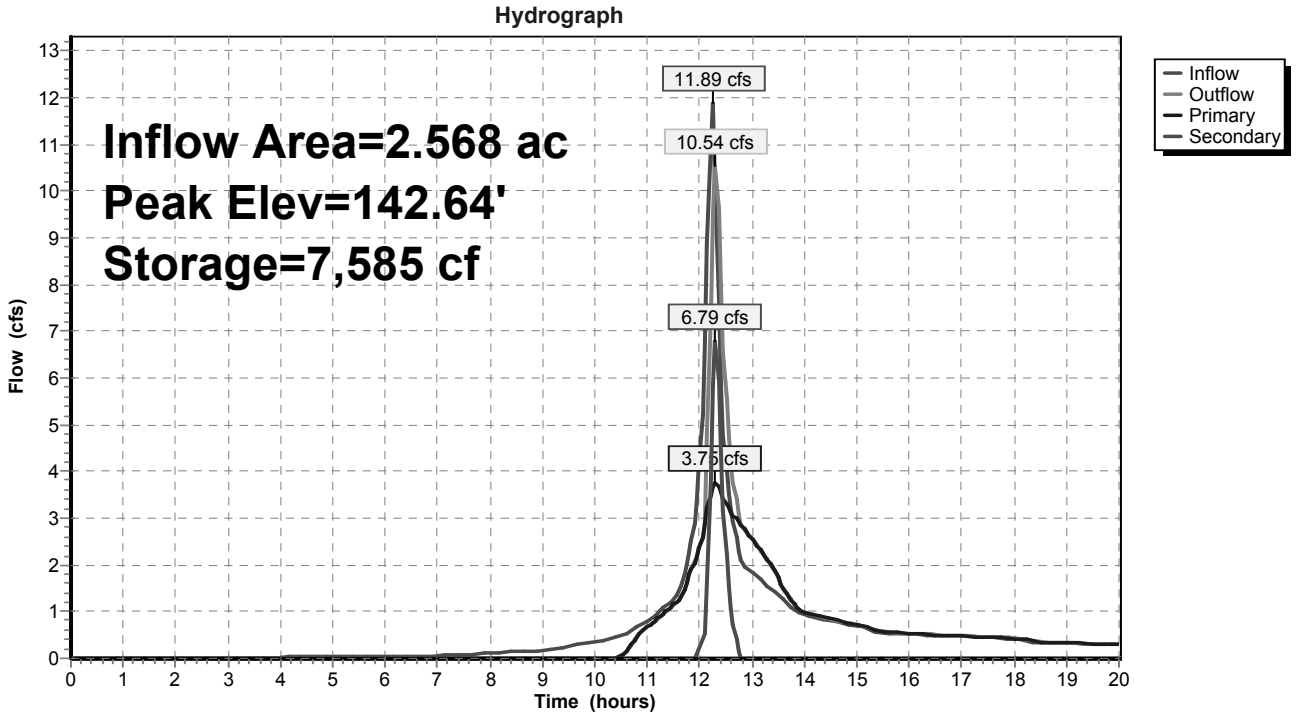
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 140.00 | 1,669 | 0 | 0 |
| 141.00 | 2,558 | 2,114 | 2,114 |
| 142.00 | 3,495 | 3,027 | 5,140 |
| 143.00 | 4,489 | 3,992 | 9,132 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Secondary | 142.00' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 3.00 6.00 9.00<br>Height (feet) 1.00 0.00 0.00 1.00 |
| #2 | Device 3 | 141.25' | **11.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 140.00' | **18.0" Round Culvert**<br>L= 50.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 140.00' / 139.50' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.75 cfs @ 12.30 hrs HW=142.64' TW=141.17' (Dynamic Tailwater)
↑—**3=Culvert** (Passes 3.75 cfs of 11.83 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 3.75 cfs @ 5.68 fps)

**Secondary OutFlow** Max=6.64 cfs @ 12.30 hrs HW=142.64' TW=142.36' (Dynamic Tailwater)
↑—**1=Asymmetrical Weir** (Weir Controls 6.64 cfs @ 1.52 fps)

## Pond P-RG-E-1:


Hydrograph
Inflow Area=2.568 ac
Peak Elev=142.64'
Storage=7,585 cf
11.89 cfs
10.54 cfs
6.79 cfs
3.75 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-2:

No Infiltration rate assumed in the model. However, an infiltration rate of 0.17 in/hr will be required to meet the 72 hour drawdown requirement.

---

Inflow Area = 0.477 ac, 0.08% Impervious, Inflow Depth > 5.30" for 100_year event
Inflow = 2.66 cfs @ 12.23 hrs, Volume= 0.211 af
Outflow = 2.54 cfs @ 12.25 hrs, Volume= 0.196 af, Atten= 4%, Lag= 1.6 min
Primary = 2.54 cfs @ 12.25 hrs, Volume= 0.196 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 162.75' @ 12.25 hrs Surf.Area= 1,685 sf Storage= 989 cf
Flood Elev= 163.00' Surf.Area= 1,929 sf Storage= 1,444 cf

Plug-Flow detention time= 45.9 min calculated for 0.196 af (93% of inflow)
Center-of-Mass det. time= 21.4 min ( 800.6 - 779.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 162.00' | 1,444 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

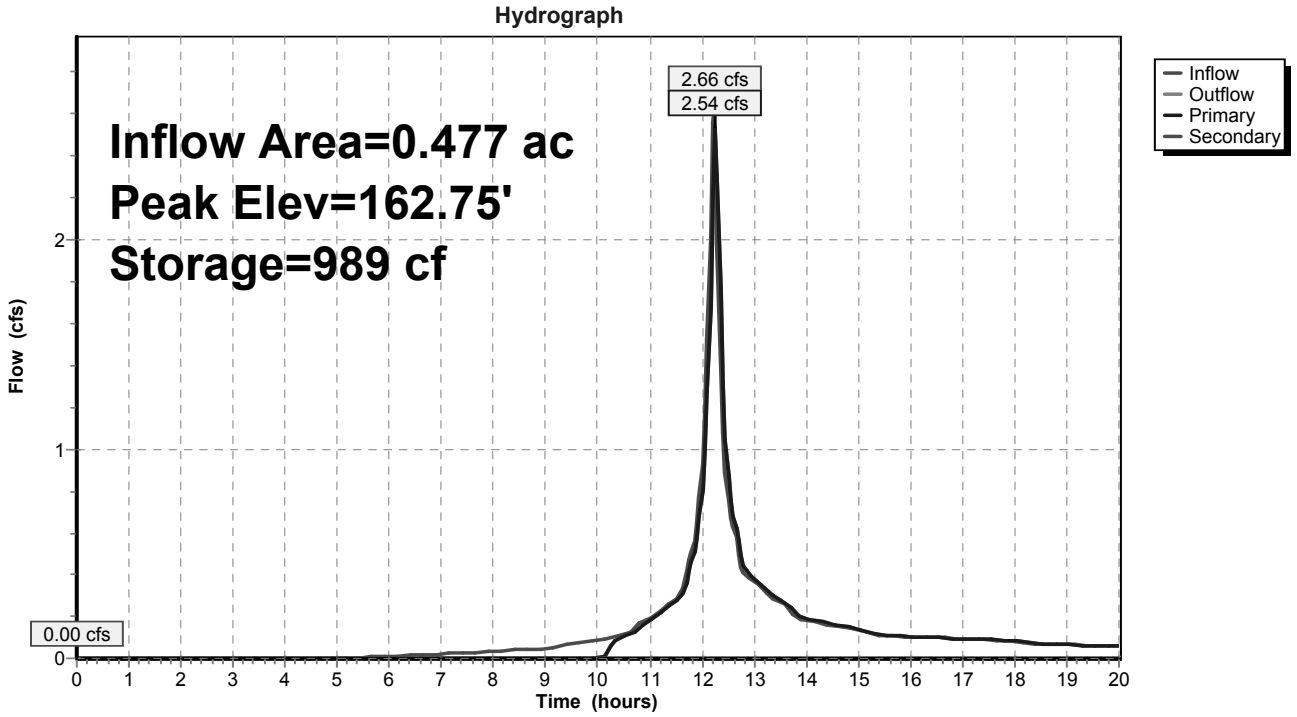
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 162.00 | 959 | 0 | 0 |
| 163.00 | 1,929 | 1,444 | 1,444 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.90' | **18.0" Round RCP_Round 18"**<br>L= 18.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.90' / 155.70' S= 0.0111 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 162.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Secondary | 162.80' | **Asymmetrical Weir, C= 3.27**<br>Offset (feet) 0.00 1.00 5.00 6.00<br>Height (feet) 0.33 0.00 0.00 0.33 |

**Primary OutFlow** Max=2.52 cfs @ 12.25 hrs HW=162.75' TW=151.21' (Dynamic Tailwater)
↑—**1=RCP_Round 18"** (Passes 2.52 cfs of 26.26 cfs potential flow)
↑—**2=Orifice/Grate** (Weir Controls 2.52 cfs @ 1.62 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
↑—**3=Asymmetrical Weir** ( Controls 0.00 cfs)

## Pond P-RG-E-2:


Hydrograph
Inflow Area=0.477 ac
Peak Elev=162.75'
Storage=989 cf
2.66 cfs
2.54 cfs
0.00 cfs
Inflow
Outflow
Primary
Secondary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4A:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth > 4.72" for 100_year event
Inflow = 2.45 cfs @ 12.23 hrs, Volume= 0.190 af
Outflow = 0.99 cfs @ 12.41 hrs, Volume= 0.182 af, Atten= 59%, Lag= 10.9 min
Primary = 0.99 cfs @ 12.41 hrs, Volume= 0.182 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.71' @ 12.41 hrs Surf.Area= 2,075 sf Storage= 1,806 cf
Flood Elev= 173.00' Surf.Area= 2,506 sf Storage= 2,480 cf

Plug-Flow detention time= 39.5 min calculated for 0.182 af (95% of inflow)
Center-of-Mass det. time= 22.4 min ( 812.2 - 789.8 )

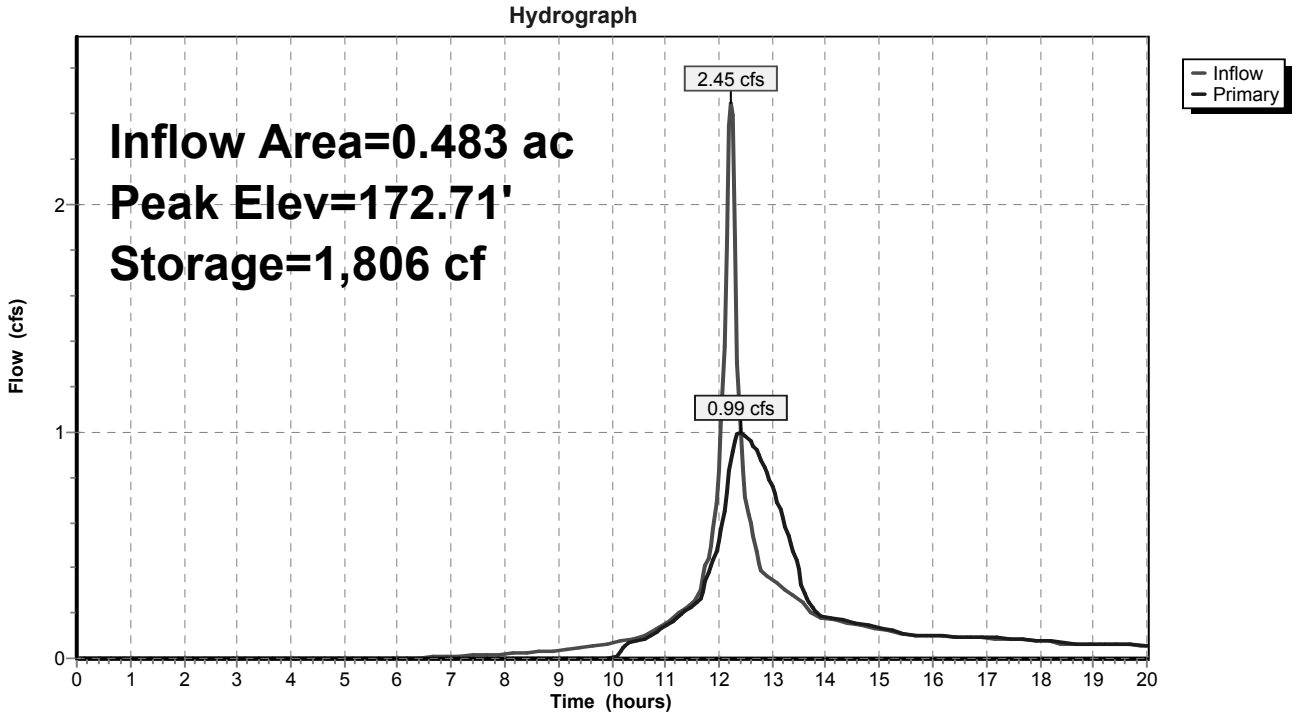
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 171.00' | 2,480 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 171.00 | 371 | 0 | 0 |
| 172.00 | 1,041 | 706 | 706 |
| 173.00 | 2,506 | 1,774 | 2,480 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 168.00' | **18.0" Round Culvert**<br>L= 65.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 168.00' / 167.30' S= 0.0108 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 171.60' | **6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=0.99 cfs @ 12.41 hrs HW=172.70' TW=167.31' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.99 cfs of 18.13 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.99 cfs @ 5.06 fps)

## Pond P-RG-E-4A:


Hydrograph
Inflow Area=0.483 ac
Peak Elev=172.71'
Storage=1,806 cf
2.45 cfs
0.99 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-4B:

Inflow Area = 0.527 ac, 0.00% Impervious, Inflow Depth > 5.89" for 100_year event
Inflow = 3.17 cfs @ 12.23 hrs, Volume= 0.259 af
Outflow = 1.90 cfs @ 12.33 hrs, Volume= 0.235 af, Atten= 40%, Lag= 6.6 min
Primary = 1.90 cfs @ 12.33 hrs, Volume= 0.235 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.50' @ 12.33 hrs Surf.Area= 2,423 sf Storage= 2,596 cf
Flood Elev= 171.00' Surf.Area= 2,920 sf Storage= 3,942 cf

Plug-Flow detention time= 67.4 min calculated for 0.235 af (91% of inflow)
Center-of-Mass det. time= 34.9 min ( 801.8 - 766.8 )

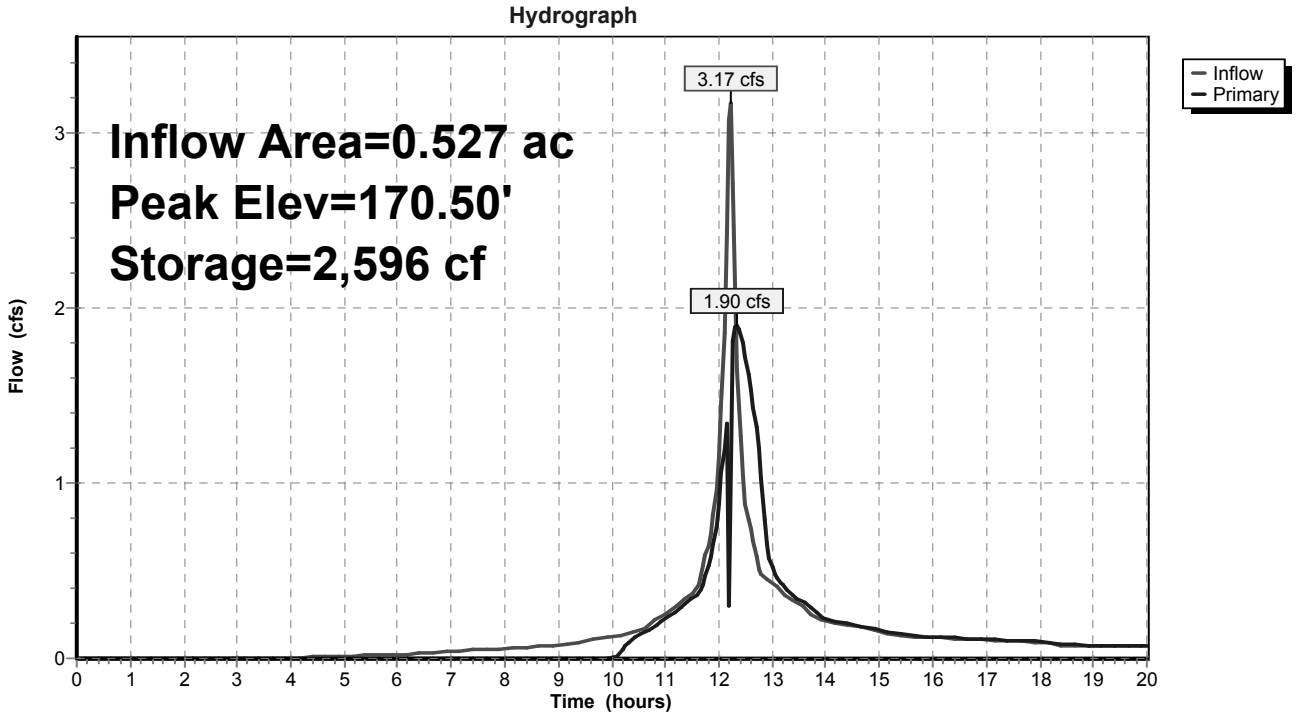
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 169.00' | 3,942 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 169.00 | 1,097 | 0 | 0 |
| 170.00 | 1,933 | 1,515 | 1,515 |
| 171.00 | 2,920 | 2,427 | 3,942 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.90' | **18.0" Round Culvert**<br>L= 72.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.90' / 161.90' S= 0.0139 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2 | Device 1 | 169.70' | **9.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |

**Primary OutFlow** Max=1.89 cfs @ 12.33 hrs HW=170.49' TW=169.20' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.89 cfs of 10.14 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.89 cfs @ 4.29 fps)

## Pond P-RG-E-4B:


Hydrograph
Inflow Area=0.527 ac
Peak Elev=170.50'
Storage=2,596 cf
3.17 cfs
1.90 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-E-8:

Inflow Area = 0.652 ac, 0.01% Impervious, Inflow Depth > 4.84" for 100_year event
Inflow = 3.37 cfs @ 12.23 hrs, Volume= 0.263 af
Outflow = 0.42 cfs @ 14.50 hrs, Volume= 0.172 af, Atten= 88%, Lag= 136.3 min
Primary = 0.42 cfs @ 14.50 hrs, Volume= 0.218 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 175.88' @ 14.48 hrs Surf.Area= 4,949 sf Storage= 7,419 cf
Flood Elev= 176.00' Surf.Area= 5,077 sf Storage= 8,003 cf

Plug-Flow detention time= 267.1 min calculated for 0.171 af (65% of inflow)
Center-of-Mass det. time= 190.6 min ( 978.4 - 787.8 )

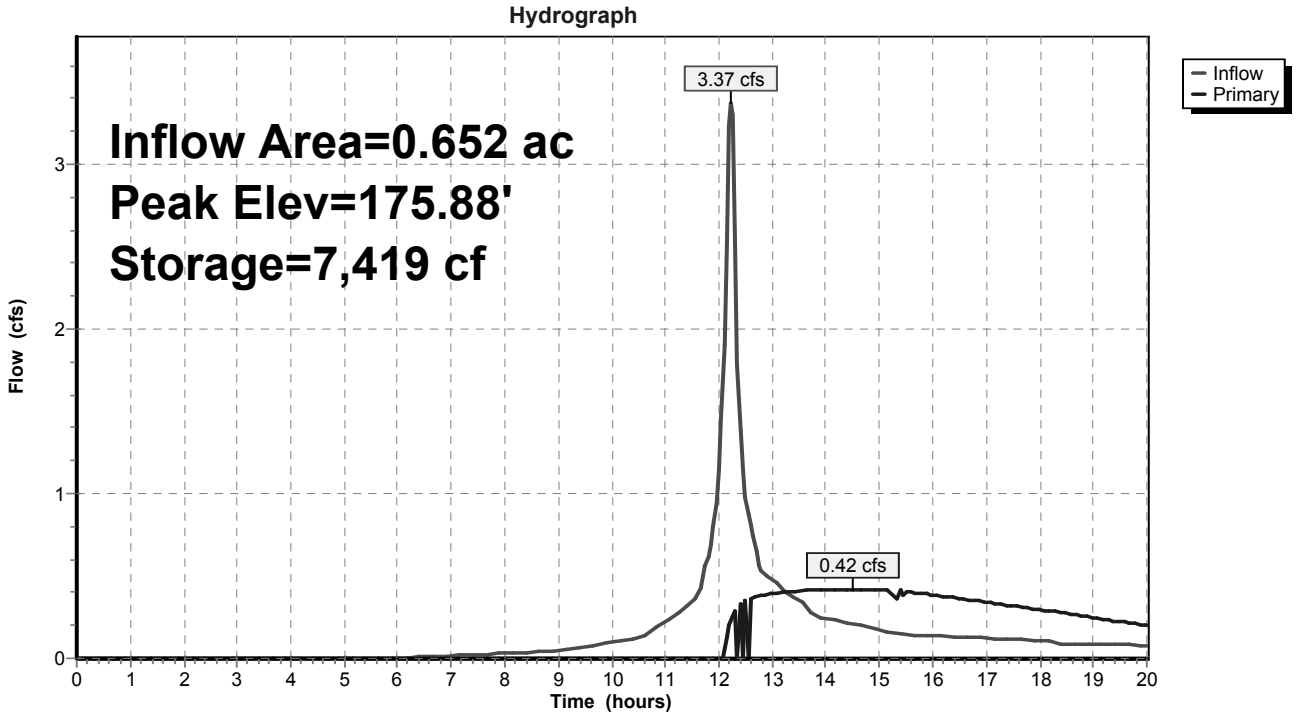
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 174.00' | 8,003 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 174.00 | 2,972 | 0 | 0 |
| 175.00 | 3,978 | 3,475 | 3,475 |
| 176.00 | 5,077 | 4,528 | 8,003 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 174.90' | **4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #2 | Primary | 170.40' | **18.0" Round RCP_Round 18"**<br>L= 91.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 170.40' / 169.20' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.42 cfs @ 14.50 hrs HW=175.88' TW=173.01' (Dynamic Tailwater)
↑—**2=RCP_Round 18"** (Passes 0.42 cfs of 14.20 cfs potential flow)
↑—**1=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.78 fps)

## Pond P-RG-E-8:


Hydrograph
Inflow Area=0.652 ac
Peak Elev=175.88'
Storage=7,419 cf
3.37 cfs
0.42 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond P-RG-W-2: 306

Inflow Area = 4.854 ac, 0.00% Impervious, Inflow Depth > 4.47" for 100_year event
Inflow = 24.18 cfs @ 12.20 hrs, Volume= 1.809 af
Outflow = 11.04 cfs @ 12.37 hrs, Volume= 1.670 af, Atten= 54%, Lag= 10.1 min
Primary = 11.04 cfs @ 12.37 hrs, Volume= 1.670 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 172.78' @ 12.37 hrs Surf.Area= 10,297 sf Storage= 18,970 cf
Flood Elev= 174.00' Surf.Area= 14,642 sf Storage= 34,022 cf

Plug-Flow detention time= 52.7 min calculated for 1.665 af (92% of inflow)
Center-of-Mass det. time= 26.4 min ( 823.1 - 796.7 )

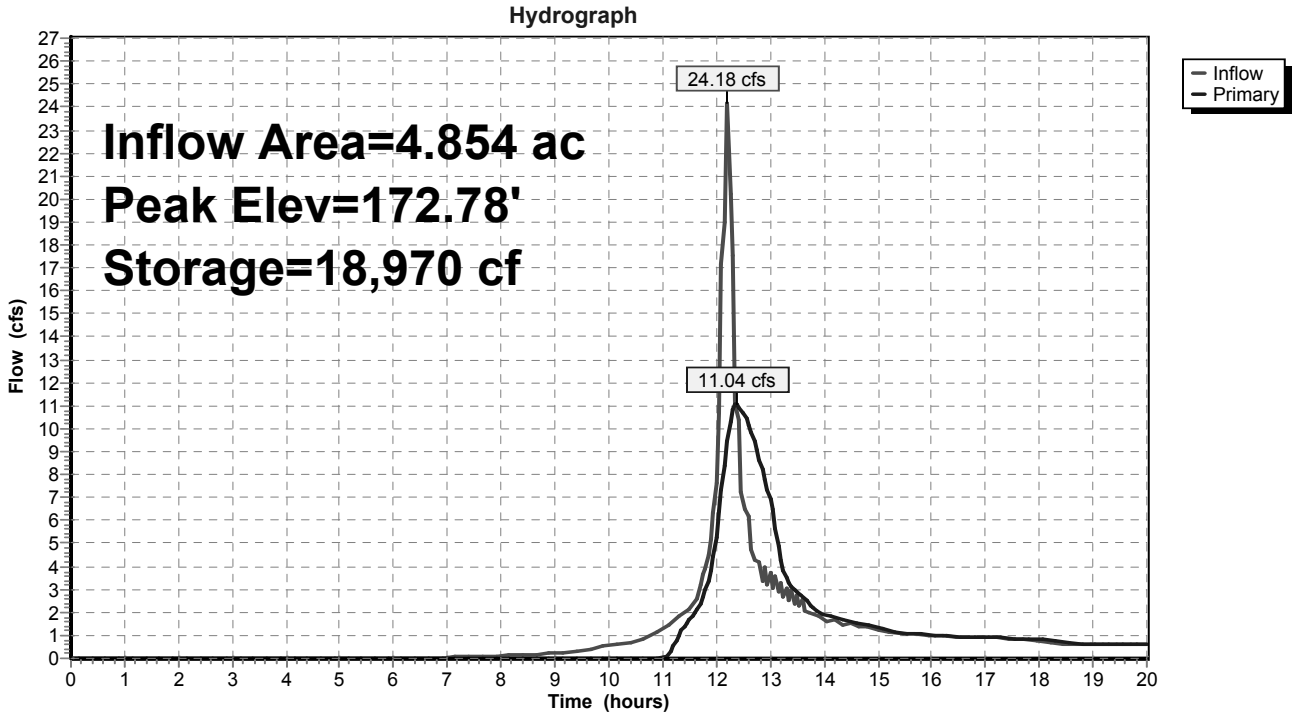
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 34,022 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 3,744 | 0 | 0 |
| 171.00 | 5,804 | 4,774 | 4,774 |
| 172.00 | 8,133 | 6,969 | 11,743 |
| 173.00 | 10,892 | 9,513 | 21,255 |
| 174.00 | 14,642 | 12,767 | 34,022 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.10' | **18.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 162.10' | **18.0" Round RCP_Round 18"**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.10' / 160.80' S= 0.0096 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=11.02 cfs @ 12.37 hrs HW=172.78' TW=156.14' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 11.02 cfs of 23.96 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 11.02 cfs @ 6.23 fps)

## Pond P-RG-W-2: 306



## Summary for Pond P-RG-W-3:

No infiltration assumed in this model. However, the basin will require an infiltration rate of approximately 0.85 in/hr to drawdown in 72 hours.

---

Inflow Area = 4.660 ac, 0.00% Impervious, Inflow Depth > 4.00" for 100_year event
Inflow = 23.44 cfs @ 12.20 hrs, Volume= 1.554 af
Outflow = 10.89 cfs @ 12.35 hrs, Volume= 1.083 af, Atten= 54%, Lag= 9.3 min
Primary = 10.89 cfs @ 12.35 hrs, Volume= 1.083 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.41' @ 12.35 hrs Surf.Area= 13,067 sf Storage= 24,962 cf
Flood Elev= 173.00' Surf.Area= 24,206 sf Storage= 71,944 cf

Plug-Flow detention time= 132.0 min calculated for 1.083 af (70% of inflow)
Center-of-Mass det. time= 57.9 min ( 859.0 - 801.0 )

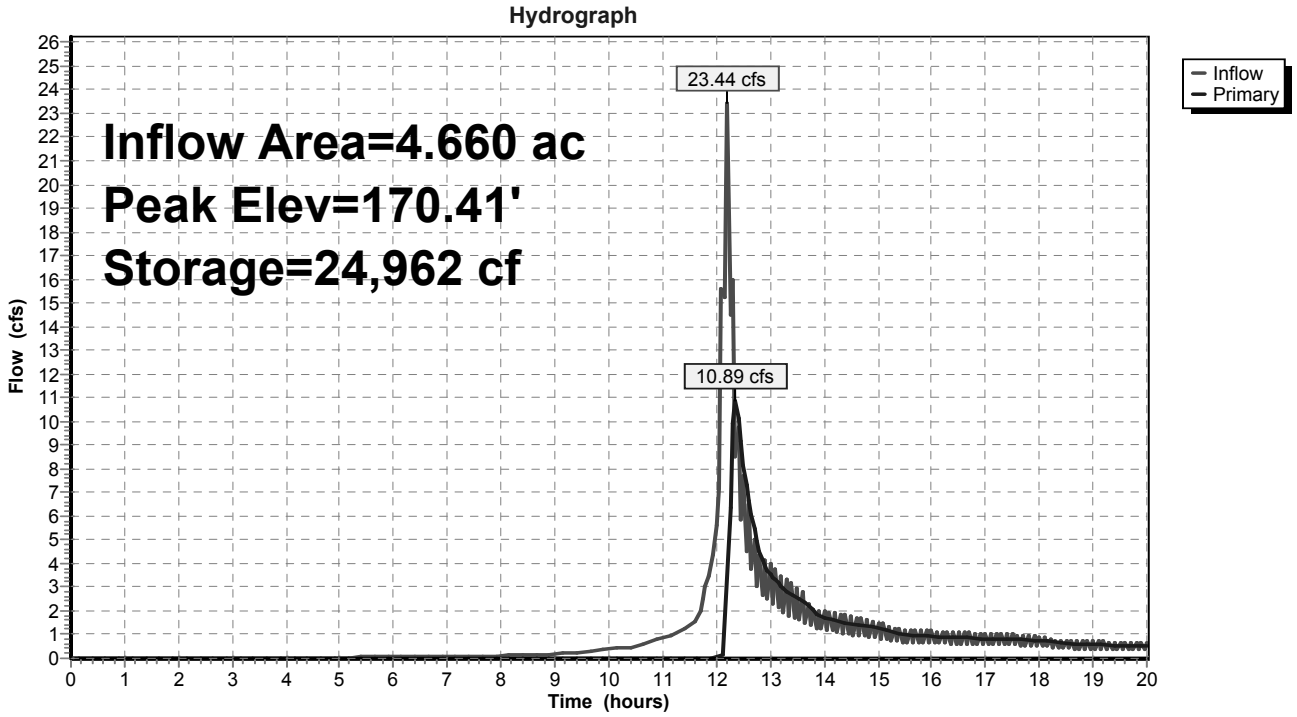
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 167.00' | 71,944 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 167.00 | 1,954 | 0 | 0 |
| 168.00 | 4,656 | 3,305 | 3,305 |
| 169.00 | 8,325 | 6,491 | 9,796 |
| 170.00 | 11,764 | 10,045 | 19,840 |
| 171.00 | 14,923 | 13,344 | 33,184 |
| 172.00 | 19,196 | 17,060 | 50,243 |
| 173.00 | 24,206 | 21,701 | 71,944 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 170.00' | **24.0" Horiz. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 164.00' | **18.0" Round RCP_Round 18"**<br>L= 133.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 164.00' / 163.00' S= 0.0075 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=10.83 cfs @ 12.35 hrs HW=170.41' TW=154.38' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 10.83 cfs of 18.09 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 10.83 cfs @ 2.10 fps)

## Pond P-RG-W-3:


Hydrograph
Inflow Area=4.660 ac
Peak Elev=170.41'
Storage=24,962 cf
23.44 cfs
10.89 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

## Summary for Pond P-RG-W-4:

Inflow Area = 2.305 ac, 0.00% Impervious, Inflow Depth > 4.84" for 100_year event
Inflow = 11.91 cfs @ 12.23 hrs, Volume= 0.930 af
Outflow = 10.72 cfs @ 12.27 hrs, Volume= 0.857 af, Atten= 10%, Lag= 2.5 min
Primary = 10.72 cfs @ 12.27 hrs, Volume= 0.857 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.85' @ 12.27 hrs Surf.Area= 4,717 sf Storage= 5,628 cf
Flood Elev= 172.00' Surf.Area= 5,024 sf Storage= 6,366 cf

Plug-Flow detention time= 49.7 min calculated for 0.855 af (92% of inflow)
Center-of-Mass det. time= 22.5 min ( 810.2 - 787.7 )

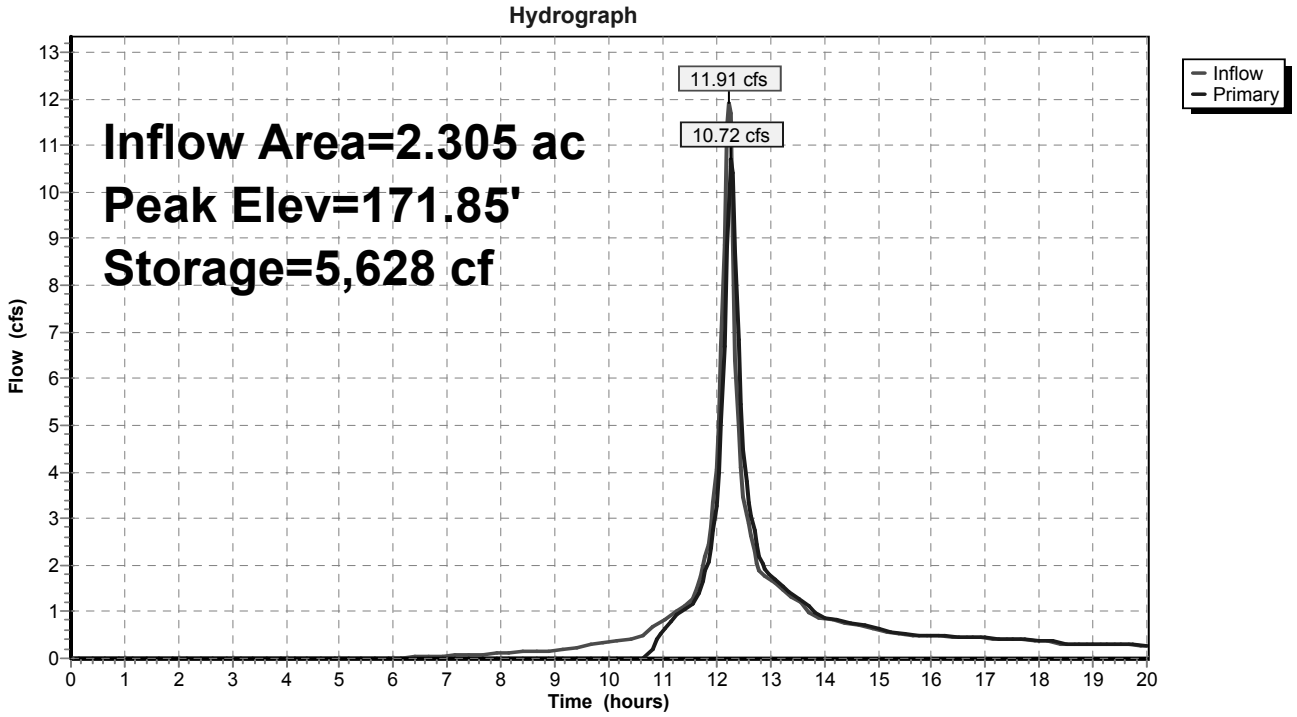
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 170.00' | 15,687 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 170.00 | 1,710 | 0 | 0 |
| 171.00 | 2,999 | 2,355 | 2,355 |
| 172.00 | 5,024 | 4,012 | 6,366 |
| 173.00 | 13,618 | 9,321 | 15,687 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 171.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |
| #2 | Primary | 166.40' | **18.0" Round RCP_Round 18"**<br>L= 42.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 166.40' / 166.00' S= 0.0095 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=10.50 cfs @ 12.27 hrs HW=171.84' TW=154.29' (Dynamic Tailwater)
↑**2=RCP_Round 18"** (Passes 10.50 cfs of 21.06 cfs potential flow)
↑**1=Orifice/Grate** (Weir Controls 10.50 cfs @ 2.61 fps)

## Pond P-RG-W-4:


Hydrograph
Inflow Area=2.305 ac
Peak Elev=171.85'
Storage=5,628 cf
11.91 cfs
10.72 cfs
Inflow
Primary
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

## Summary for Pond R-CULV-1: PIPE 1

Inflow Area = 3.188 ac, 0.00% Impervious, Inflow Depth > 5.33" for 100_year event
Inflow = 14.88 cfs @ 12.26 hrs, Volume= 1.417 af
Outflow = 14.88 cfs @ 12.26 hrs, Volume= 1.417 af, Atten= 0%, Lag= 0.0 min
Primary = 14.88 cfs @ 12.26 hrs, Volume= 1.417 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

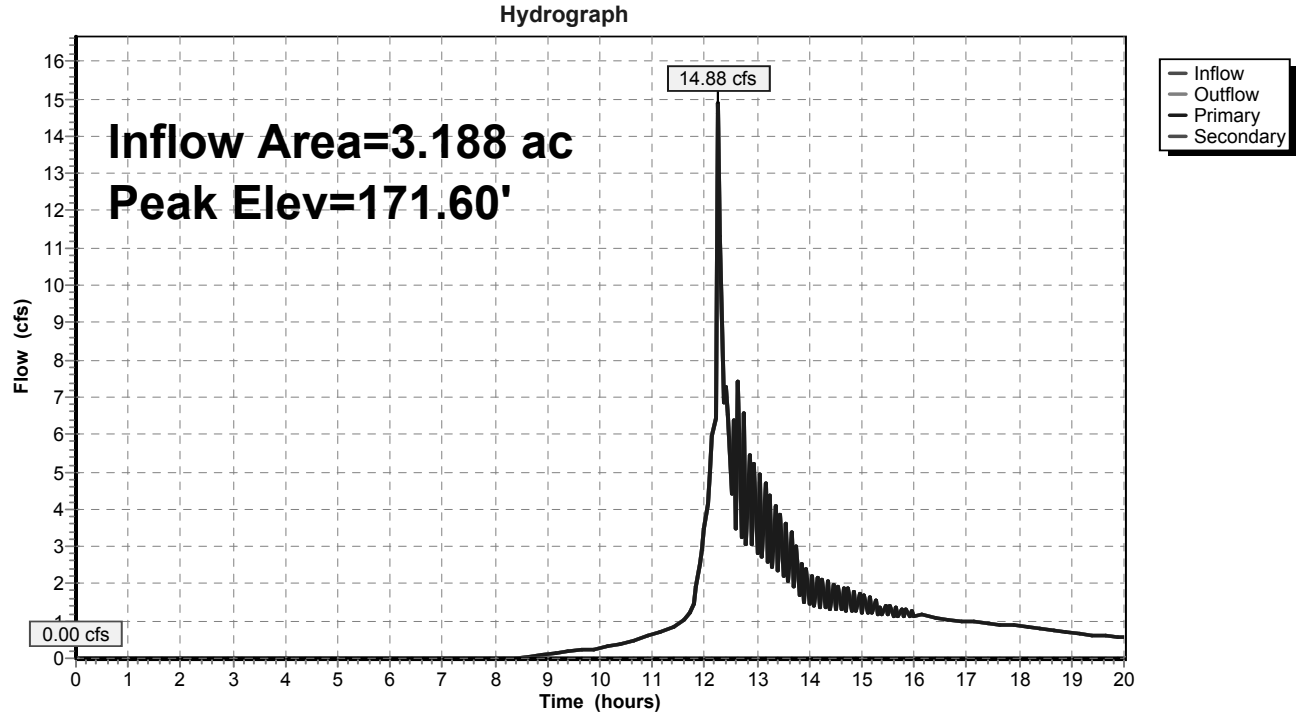
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 171.60' @ 12.26 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 162.00' | **24.0" Round RCP_Round 24"**<br>L= 195.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 162.00' / 158.10' S= 0.0200 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 173.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=32.72 cfs @ 12.26 hrs HW=171.12' TW=165.00' (Dynamic Tailwater)
└**1=RCP_Round 24"** (Outlet Controls 32.72 cfs @ 10.42 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=162.00' TW=142.00' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-1: PIPE 1



## Summary for Pond R-CULV-10: PIPE 10

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 4.29" for 100_year event
Inflow = 60.00 cfs @ 12.25 hrs, Volume= 7.099 af
Outflow = 60.00 cfs @ 12.25 hrs, Volume= 7.099 af, Atten= 0%, Lag= 0.0 min
Primary = 60.00 cfs @ 12.25 hrs, Volume= 7.099 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

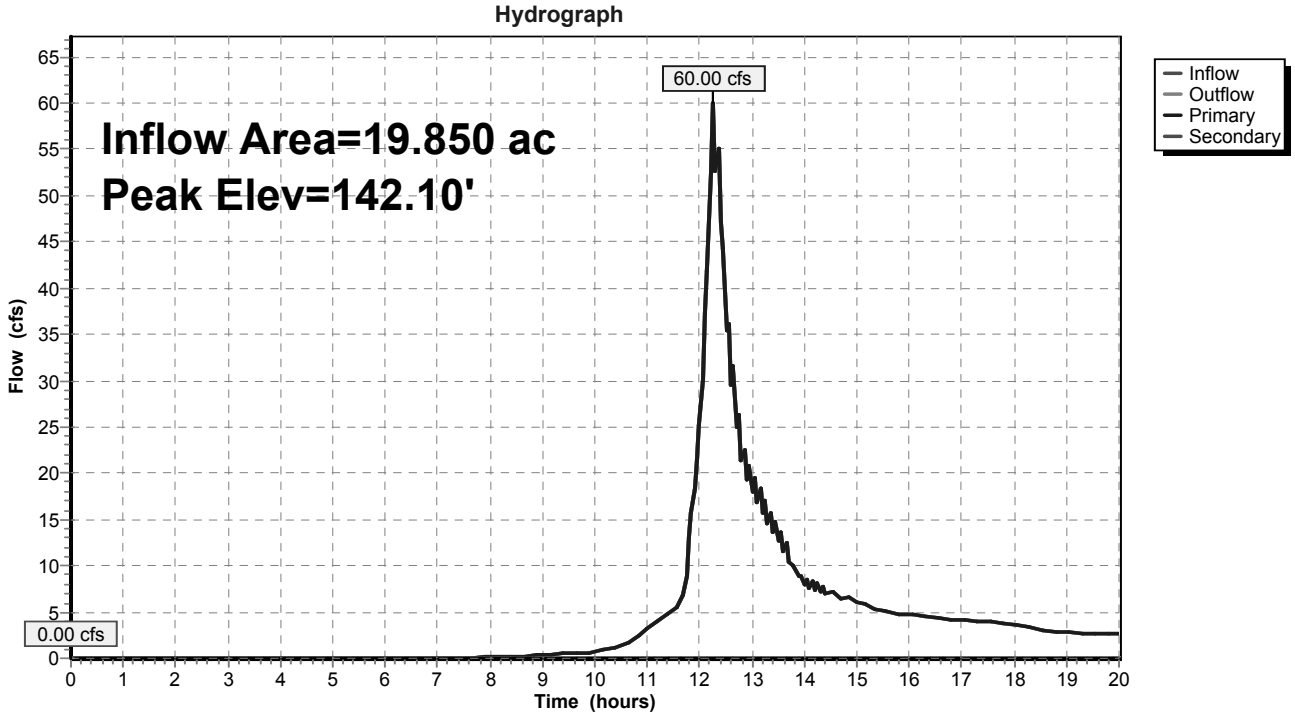
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 142.10' @ 12.25 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 136.50' | **36.0" Round Culvert**<br>L= 339.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 136.50' / 135.00' S= 0.0044 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 144.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=59.95 cfs @ 12.25 hrs HW=142.09' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 59.95 cfs @ 8.48 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=136.50' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-10: PIPE 10



## Summary for Pond R-CULV-2: PIPE 2

Inflow Area = 10.999 ac, 3.37% Impervious, Inflow Depth > 4.61" for 100_year event
Inflow = 47.87 cfs @ 12.25 hrs, Volume= 4.222 af
Outflow = 47.87 cfs @ 12.25 hrs, Volume= 4.222 af, Atten= 0%, Lag= 0.0 min
Primary = 47.87 cfs @ 12.25 hrs, Volume= 4.189 af
Secondary = 46.97 cfs @ 12.25 hrs, Volume= 0.774 af

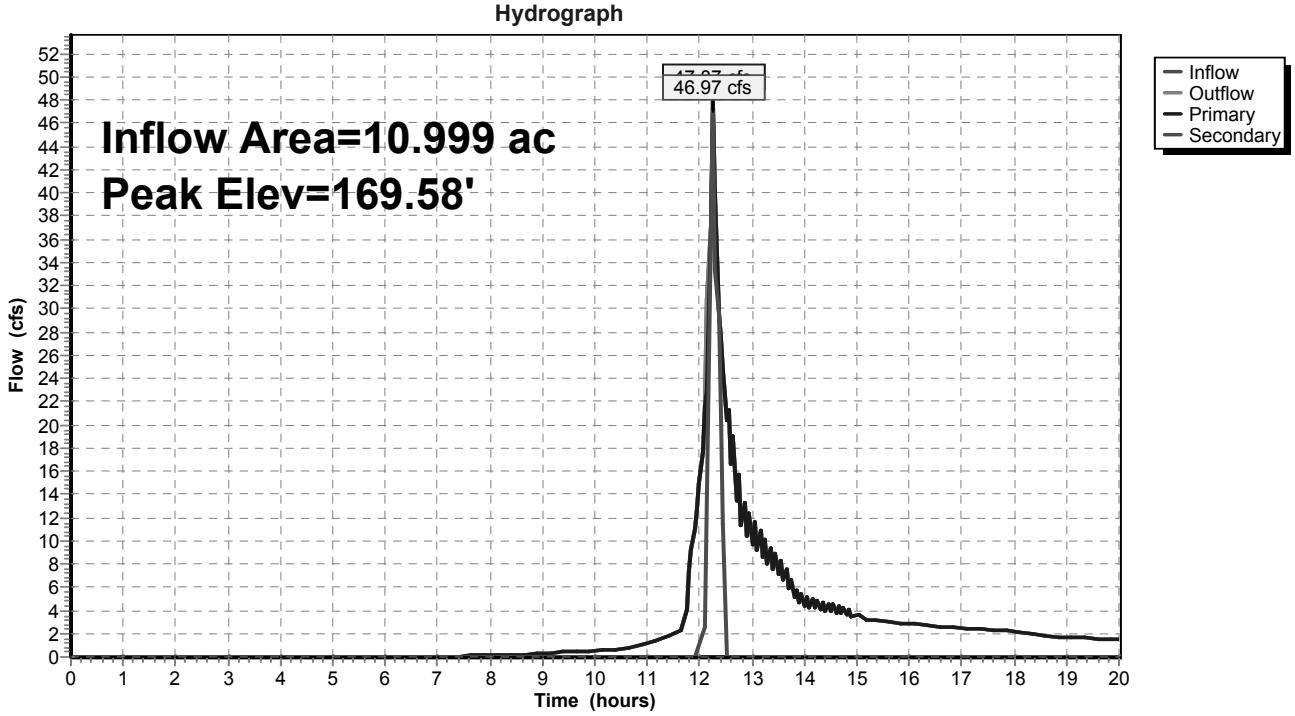
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 169.58' @ 12.19 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 158.00' | **36.0" Round Culvert**<br>L= 191.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 158.00' / 155.10' S= 0.0152 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 166.80' | **36.0" Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=0.00 cfs @ 12.25 hrs HW=165.50' TW=170.83' (Dynamic Tailwater)
└**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 12.25 hrs HW=166.12' TW=142.35' (Dynamic Tailwater)
└**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-2: PIPE 2



## Summary for Pond R-CULV-3: PIPE 3

Inflow Area = 14.512 ac, 2.87% Impervious, Inflow Depth > 4.62" for 100_year event
Inflow = 60.04 cfs @ 12.26 hrs, Volume= 5.582 af
Outflow = 60.04 cfs @ 12.26 hrs, Volume= 5.582 af, Atten= 0%, Lag= 0.0 min
Primary = 42.31 cfs @ 12.25 hrs, Volume= 5.396 af
Secondary = 17.79 cfs @ 12.26 hrs, Volume= 0.185 af

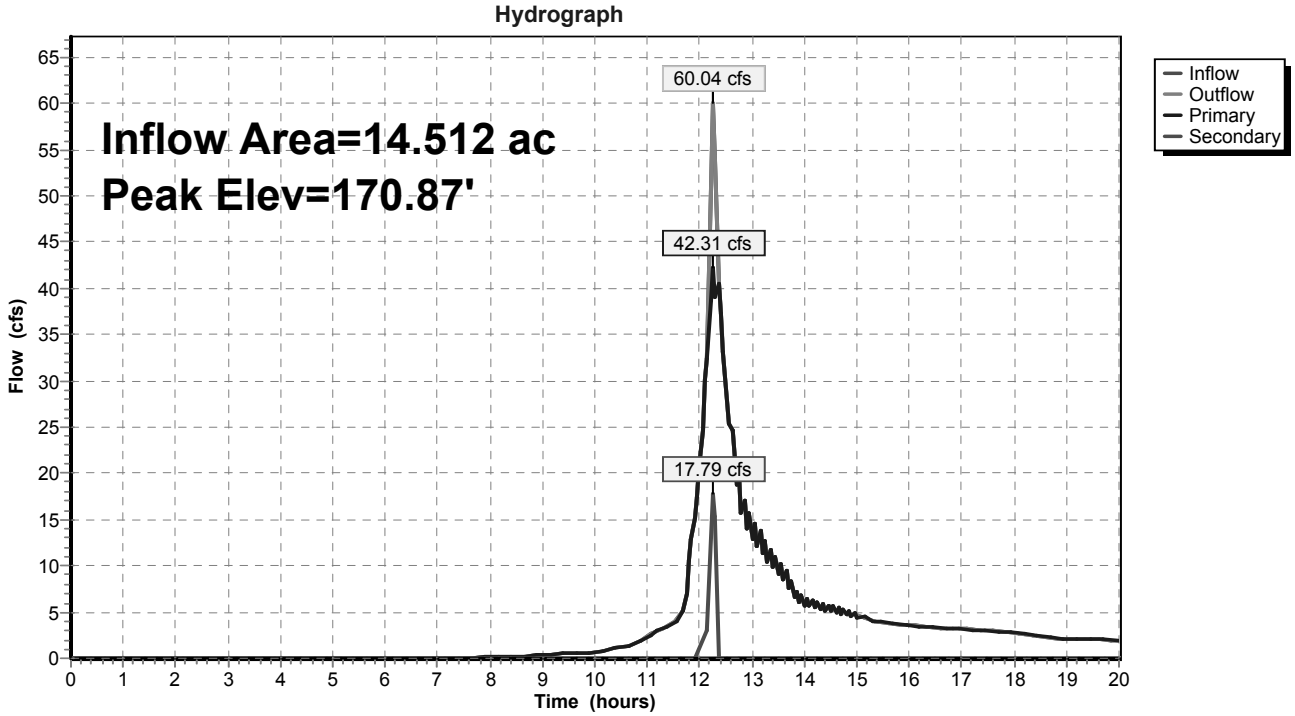
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 170.87' @ 12.26 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 155.00' | **24.0" Round Culvert**<br>L= 230.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 155.00' / 150.10' S= 0.0213 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=41.74 cfs @ 12.25 hrs HW=170.85' TW=159.70' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 41.74 cfs @ 13.28 fps)

**Secondary OutFlow** Max=17.16 cfs @ 12.26 hrs HW=170.79' TW=142.36' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 17.16 cfs @ 5.46 fps)

## Pond R-CULV-3: PIPE 3



## Summary for Pond R-CULV-4: PIPE 4

Inflow Area = 15.897 ac, 2.62% Impervious, Inflow Depth > 4.39" for 100_year event
Inflow = 50.11 cfs @ 12.25 hrs, Volume= 5.813 af
Outflow = 50.11 cfs @ 12.25 hrs, Volume= 5.813 af, Atten= 0%, Lag= 0.0 min
Primary = 50.11 cfs @ 12.25 hrs, Volume= 5.813 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

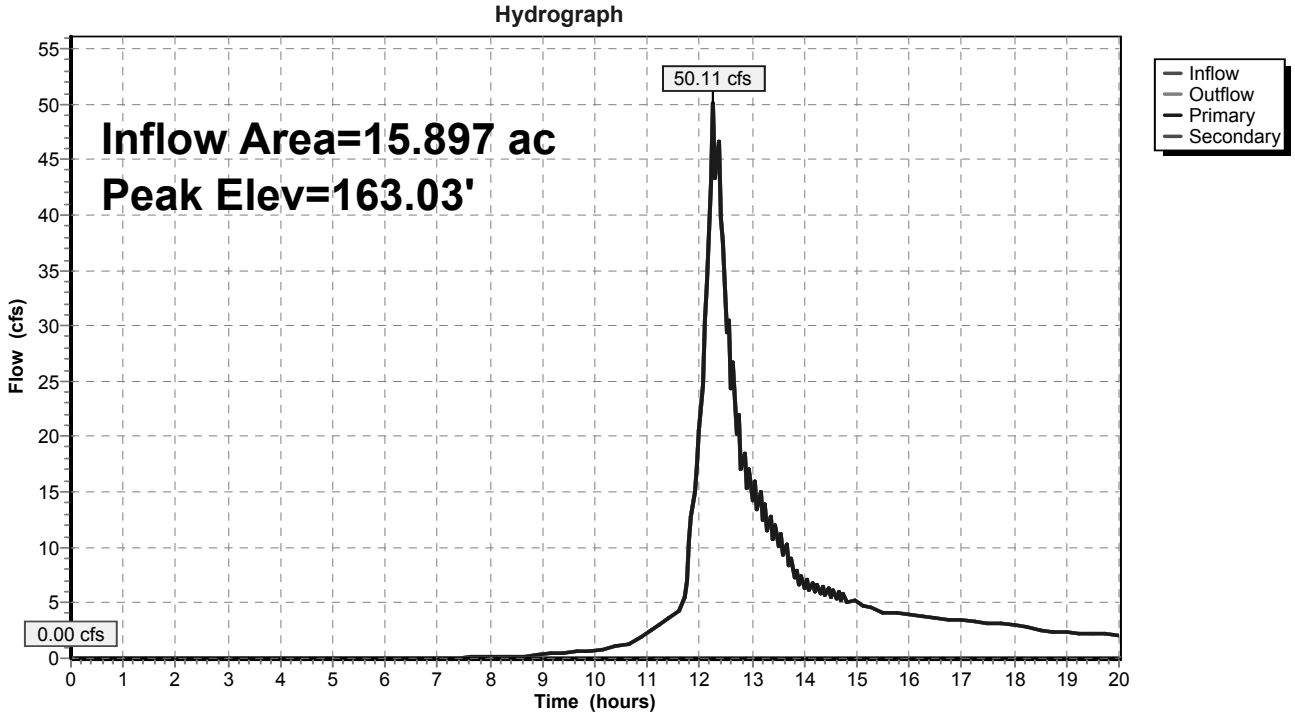
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 163.03' @ 12.20 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 150.00' | **24.0" Round Culvert**<br>L= 38.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 150.00' / 149.50' S= 0.0132 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 169.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.00 cfs @ 12.25 hrs HW=159.72' TW=159.96' (Dynamic Tailwater)
↑—**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=150.00' TW=142.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-4: PIPE 4



## Summary for Pond R-CULV-5: PIPE 5

Inflow Area = 16.805 ac, 2.48% Impervious, Inflow Depth > 4.37" for 100_year event
Inflow = 53.78 cfs @ 12.25 hrs, Volume= 6.127 af
Outflow = 53.78 cfs @ 12.25 hrs, Volume= 6.127 af, Atten= 0%, Lag= 0.0 min
Primary = 53.78 cfs @ 12.25 hrs, Volume= 6.127 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

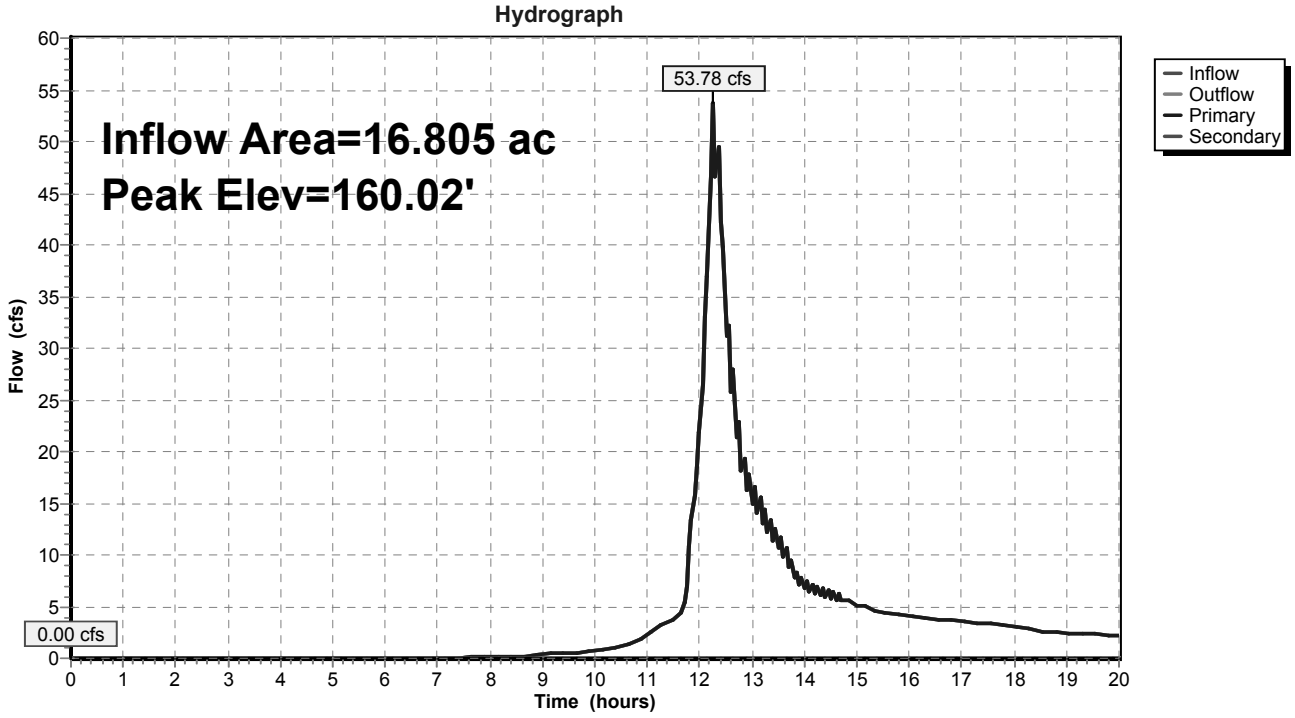
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 160.02' @ 12.25 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 149.40' | **24.0" Round Culvert**<br>L= 78.3' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 149.40' / 148.10' S= 0.0166 '/' Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2 | Secondary | 170.00' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=50.54 cfs @ 12.25 hrs HW=159.99' TW=151.25' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 50.54 cfs @ 16.09 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=149.40' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-5: PIPE 5



## Summary for Pond R-CULV-6: PIPE 6

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 4.39" for 100_year event
Inflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Outflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af, Atten= 0%, Lag= 0.0 min
Primary = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

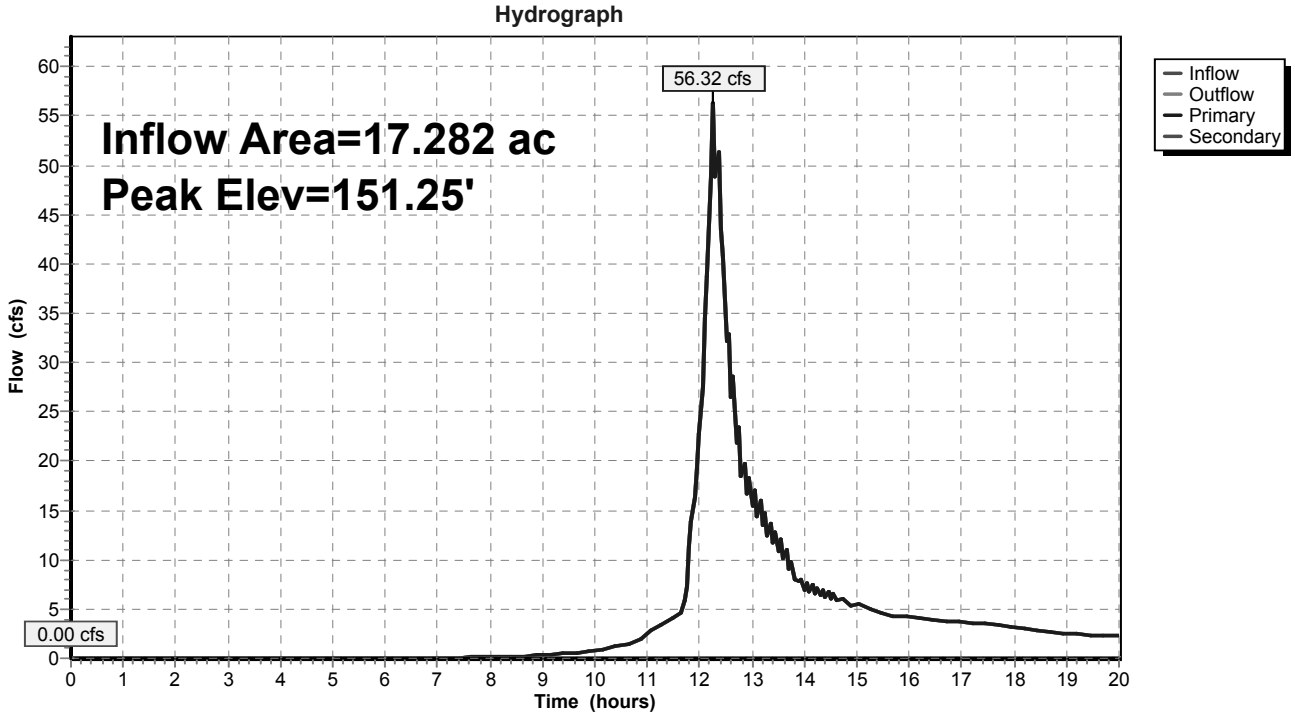
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 151.25' @ 12.25 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 148.00' | **36.0" Round Culvert**<br>L= 135.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 148.00' / 145.10' S= 0.0215 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 161.10' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=56.32 cfs @ 12.25 hrs HW=151.25' TW=148.25' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 56.32 cfs @ 7.97 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=148.00' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-6: PIPE 6



## Summary for Pond R-CULV-7: PIPE 7

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 4.39" for 100_year event
Inflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Outflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af, Atten= 0%, Lag= 0.0 min
Primary = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

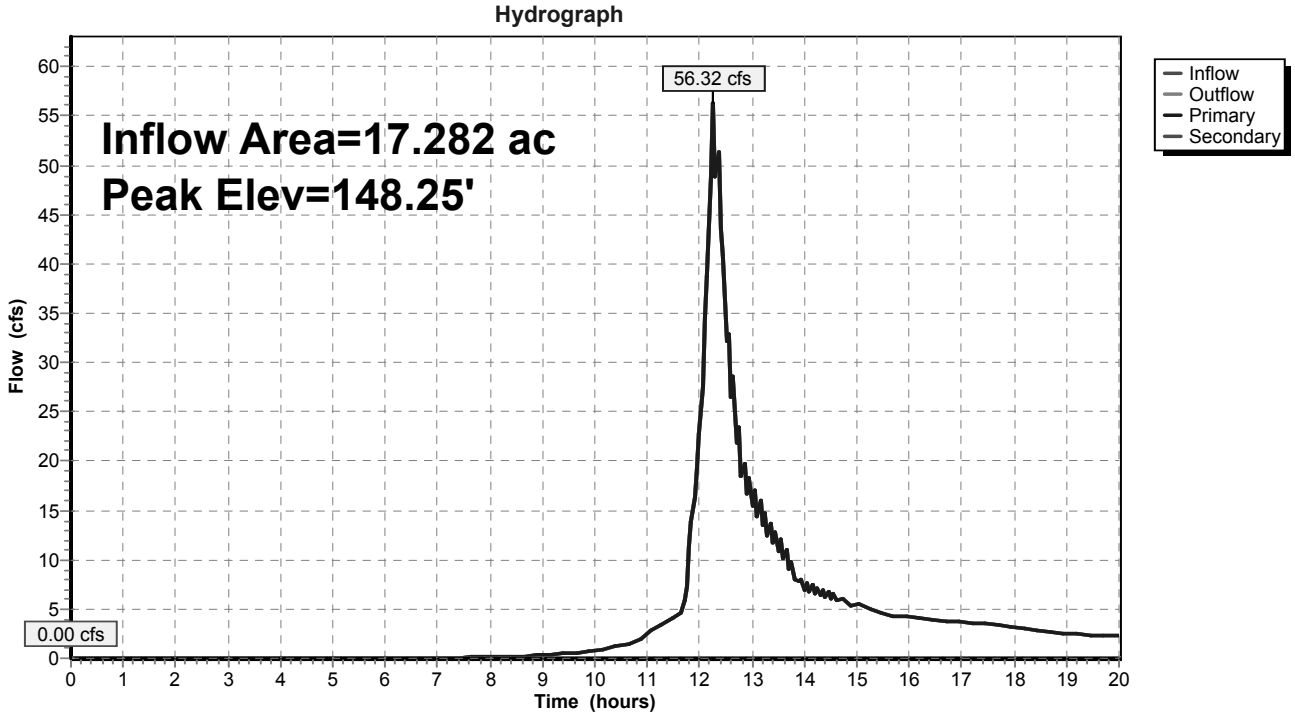
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 148.25' @ 12.25 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 145.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 145.00' / 141.10' S= 0.0198 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=56.32 cfs @ 12.25 hrs HW=148.25' TW=144.49' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 56.32 cfs @ 7.97 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=145.00' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-7: PIPE 7



## Summary for Pond R-CULV-8: PIPE 8

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 4.39" for 100_year event
Inflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Outflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af, Atten= 0%, Lag= 0.0 min
Primary = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

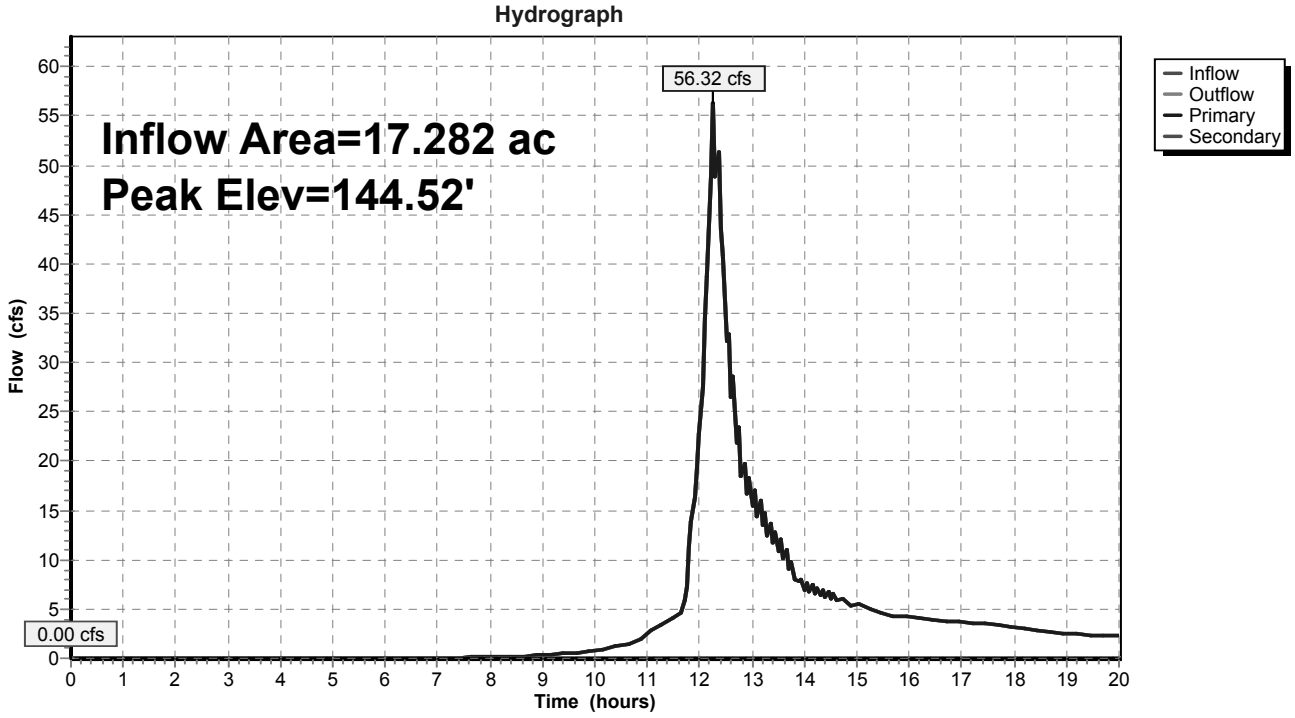
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 144.52' @ 12.27 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 141.00' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 141.00' / 138.70' S= 0.0117 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 150.20' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=54.53 cfs @ 12.25 hrs HW=144.49' TW=142.00' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 54.53 cfs @ 8.33 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=141.00' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-8: PIPE 8



## Summary for Pond R-CULV-9: PIPE 9

Inflow Area = 17.282 ac, 2.41% Impervious, Inflow Depth > 4.39" for 100_year event
Inflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Outflow = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af, Atten= 0%, Lag= 0.0 min
Primary = 56.32 cfs @ 12.25 hrs, Volume= 6.323 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

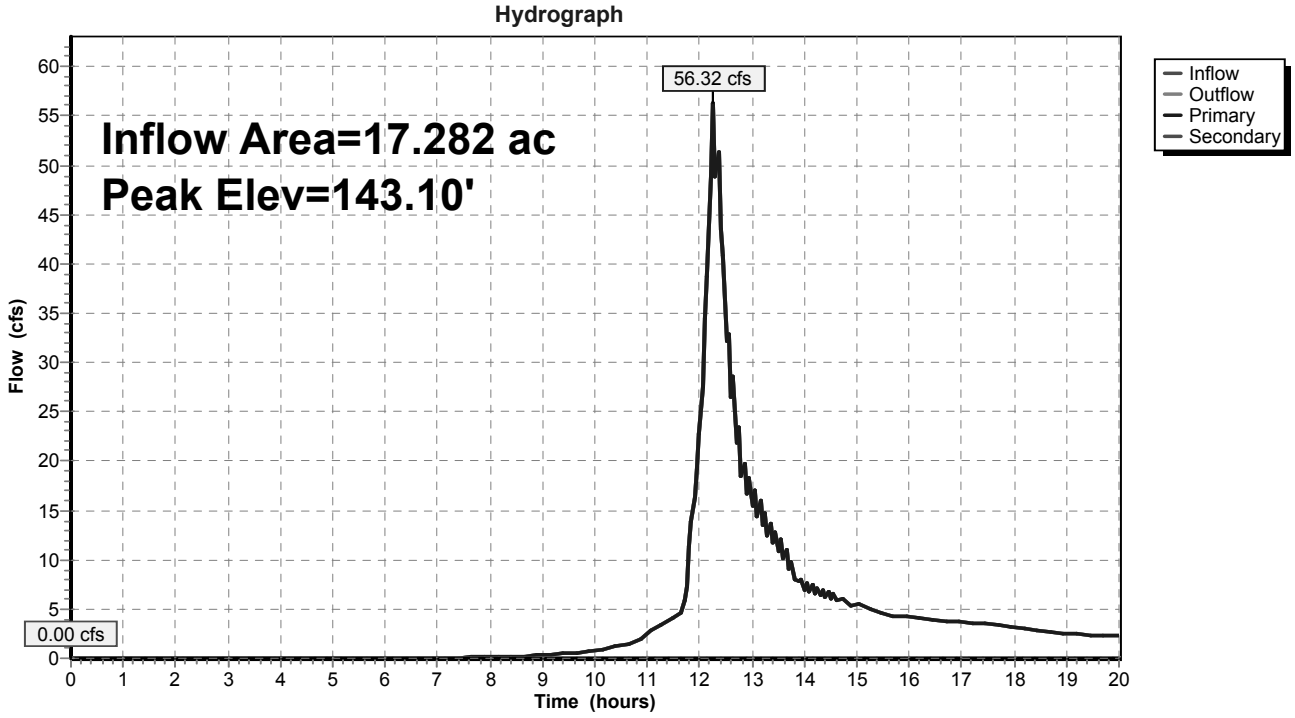
Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 143.10' @ 12.20 hrs

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 138.71' | **36.0" Round Culvert**<br>L= 197.0' RCP, groove end projecting, Ke= 0.200<br>Inlet / Outlet Invert= 138.71' / 136.60' S= 0.0107 '/' Cc= 0.900<br>n= 0.013, Flow Area= 7.07 sf |
| #2 | Secondary | 143.50' | **24.0" Horiz. Orifice/Grate** C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.00 cfs @ 12.25 hrs HW=142.00' TW=142.10' (Dynamic Tailwater)
↑—**1=Culvert** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=138.71' TW=133.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** ( Controls 0.00 cfs)

## Pond R-CULV-9: PIPE 9

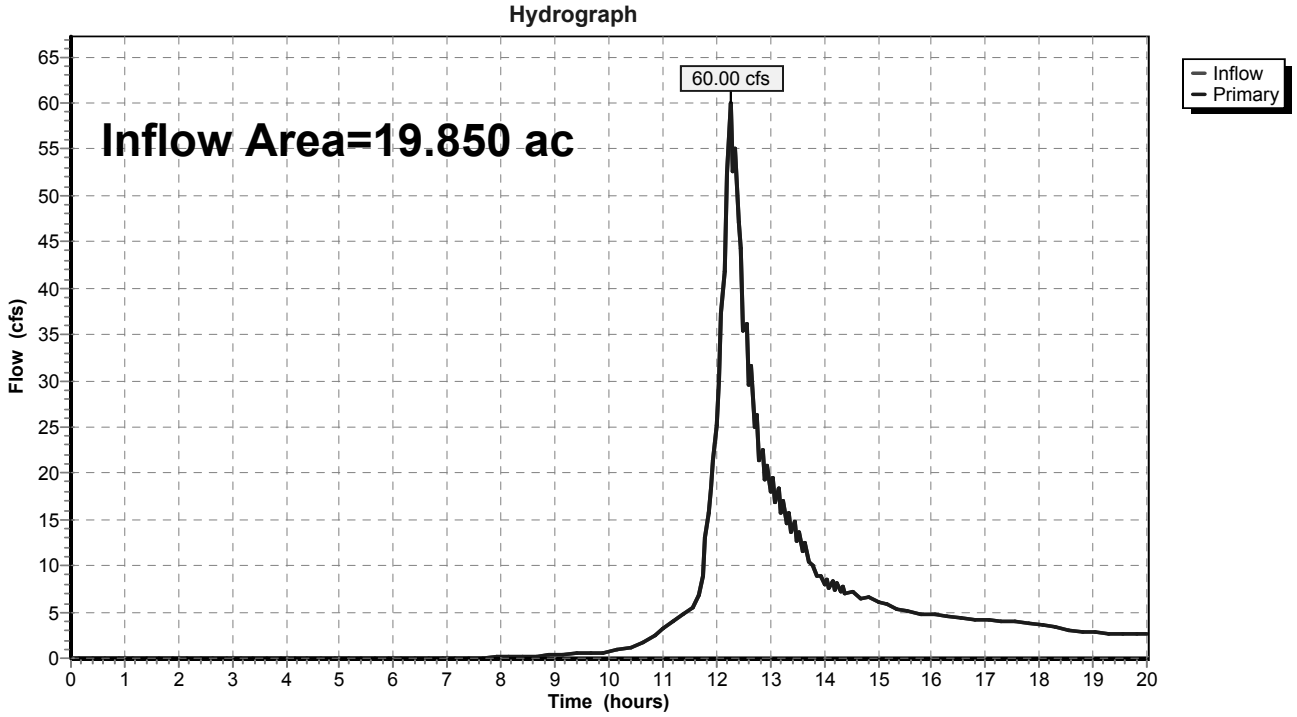


## Summary for Link DP CULV: outflow from culvert

Inflow Area = 19.850 ac, 2.10% Impervious, Inflow Depth > 4.29" for 100_year event
Inflow = 60.00 cfs @ 12.25 hrs, Volume= 7.099 af
Primary = 60.00 cfs @ 12.25 hrs, Volume= 7.099 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP CULV: outflow from culvert

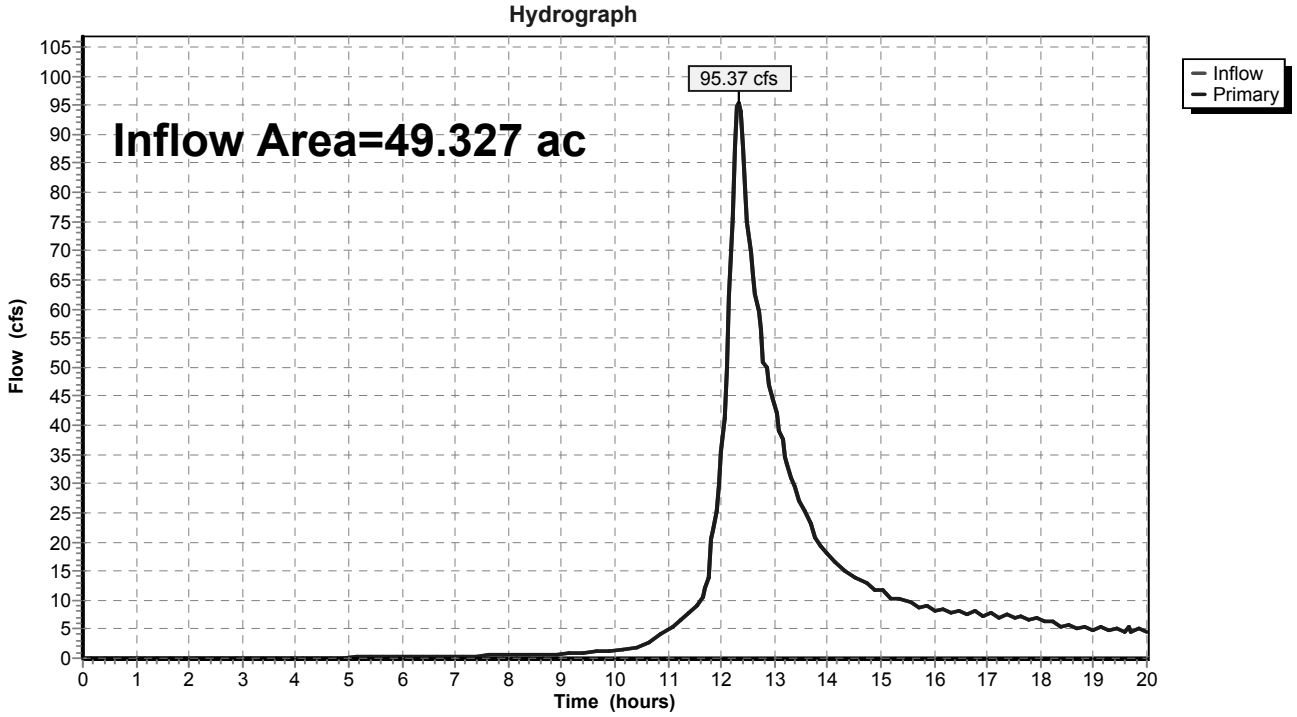


## Summary for Link DP North: DP North

Inflow Area = 49.327 ac, 7.79% Impervious, Inflow Depth > 3.23" for 100_year event
Inflow = 95.37 cfs @ 12.32 hrs, Volume= 13.284 af
Primary = 95.37 cfs @ 12.32 hrs, Volume= 13.284 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP North: DP North

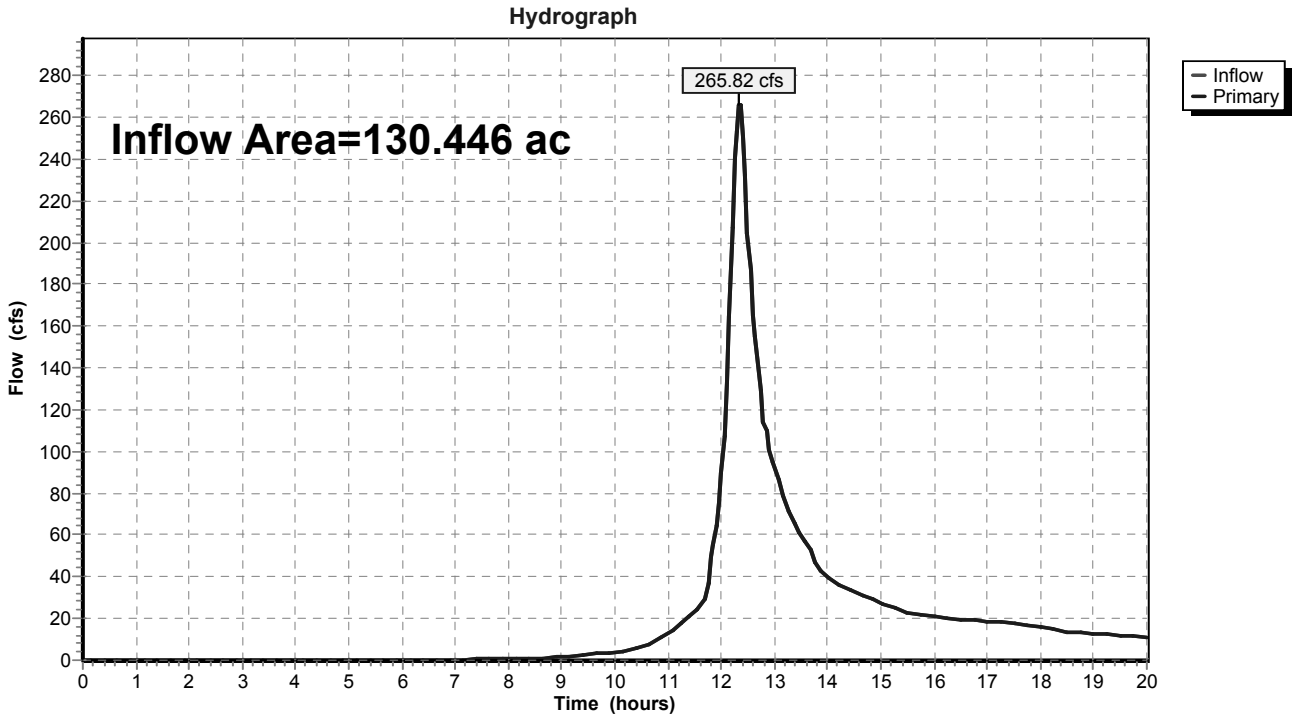


## Summary for Link DP Sudbury: DP Sudbury

Inflow Area = 130.446 ac, 6.65% Impervious, Inflow Depth > 2.98" for 100_year event
Inflow = 265.82 cfs @ 12.35 hrs, Volume= 32.420 af
Primary = 265.82 cfs @ 12.35 hrs, Volume= 32.420 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Sudbury: DP Sudbury

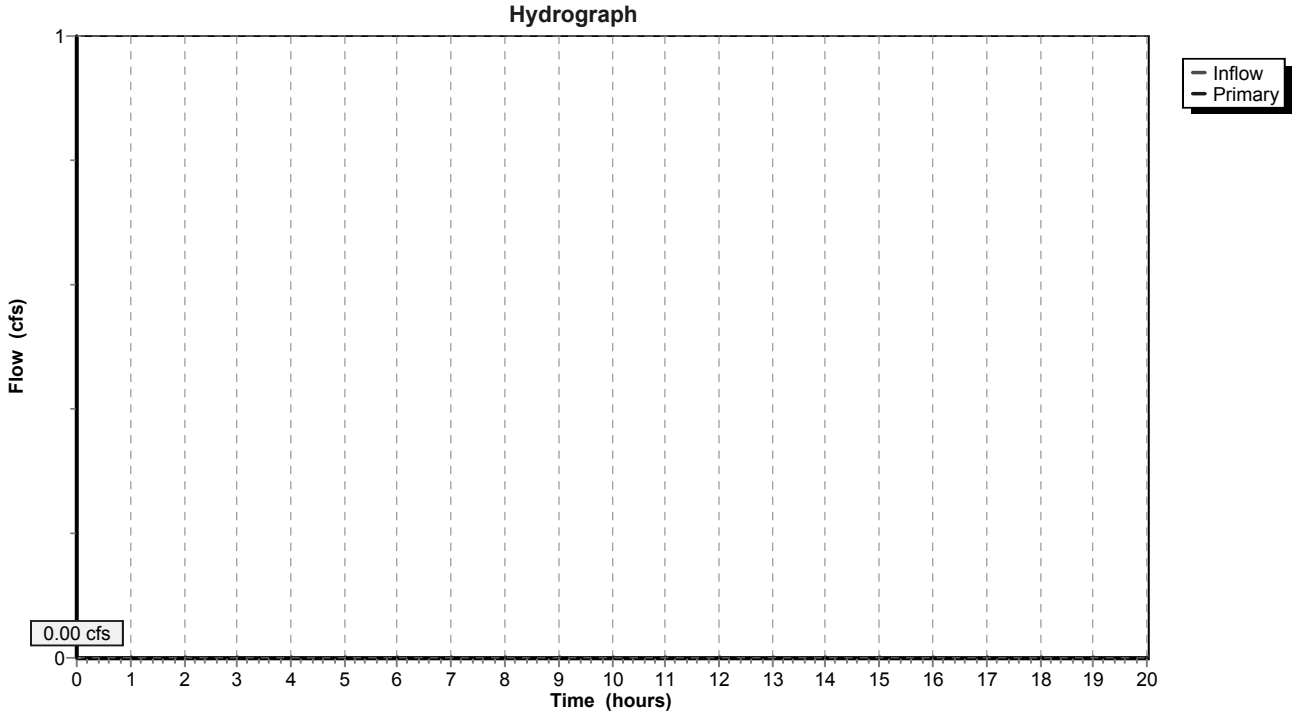


## Summary for Link DP Wellhead: DP Wellhead

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP Wellhead: DP Wellhead

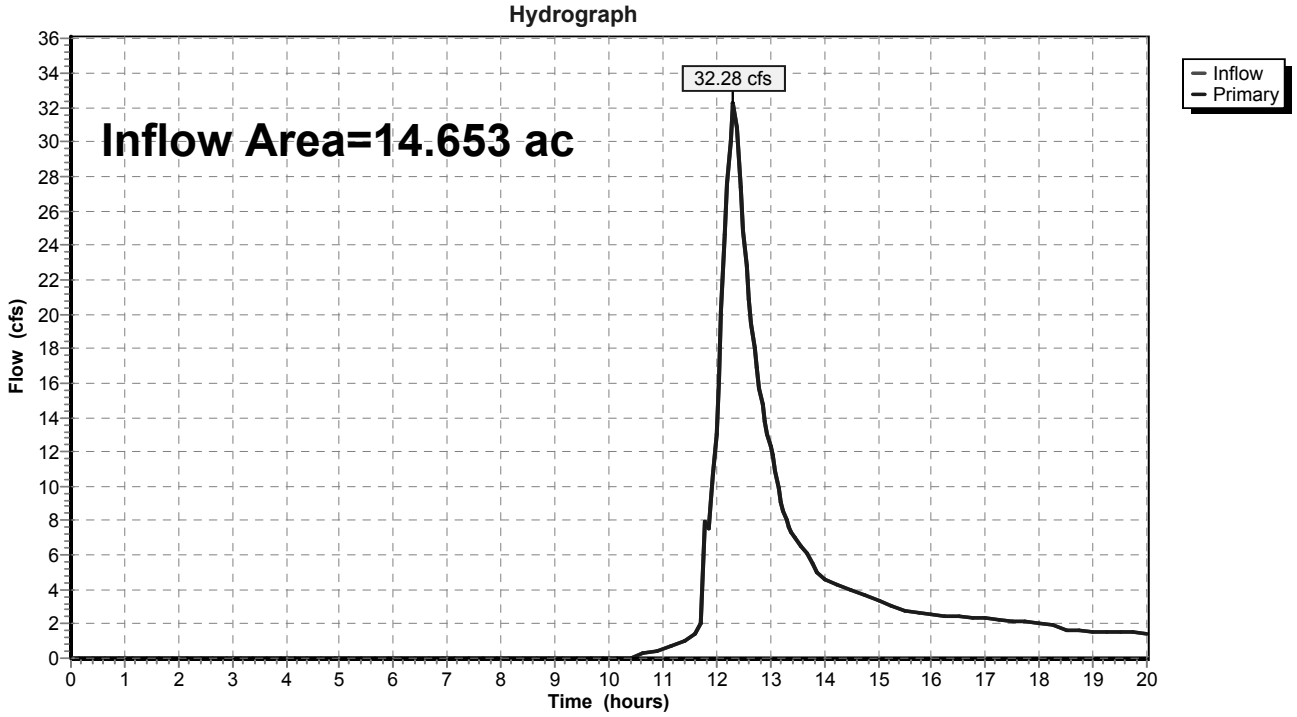


## Summary for Link DP West: DP West

Inflow Area = 14.653 ac, 3.51% Impervious, Inflow Depth > 3.17" for 100_year event
Inflow = 32.28 cfs @ 12.32 hrs, Volume= 3.869 af
Primary = 32.28 cfs @ 12.32 hrs, Volume= 3.869 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link DP West: DP West

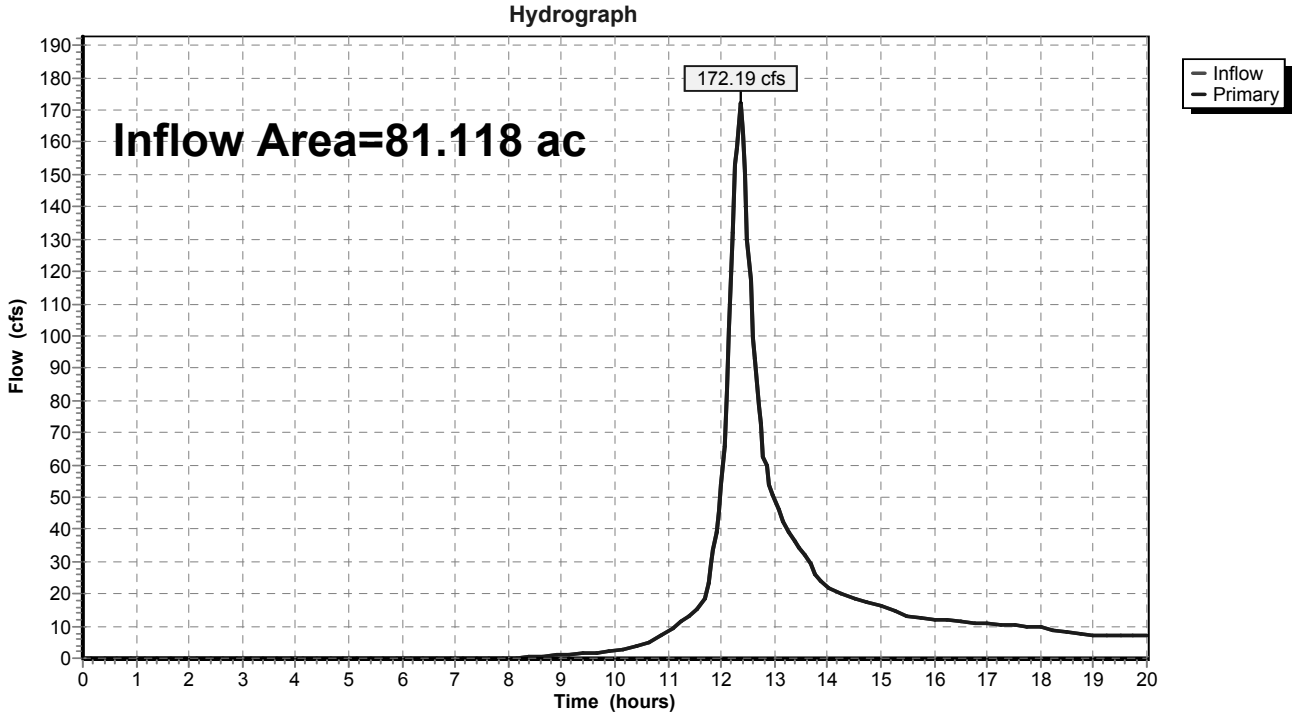


## Summary for Link L E 1.0: L E 1.0

Inflow Area = 81.118 ac, 5.95% Impervious, Inflow Depth > 2.83" for 100_year event
Inflow = 172.19 cfs @ 12.36 hrs, Volume= 19.136 af
Primary = 172.19 cfs @ 12.36 hrs, Volume= 19.136 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 1.0: L E 1.0

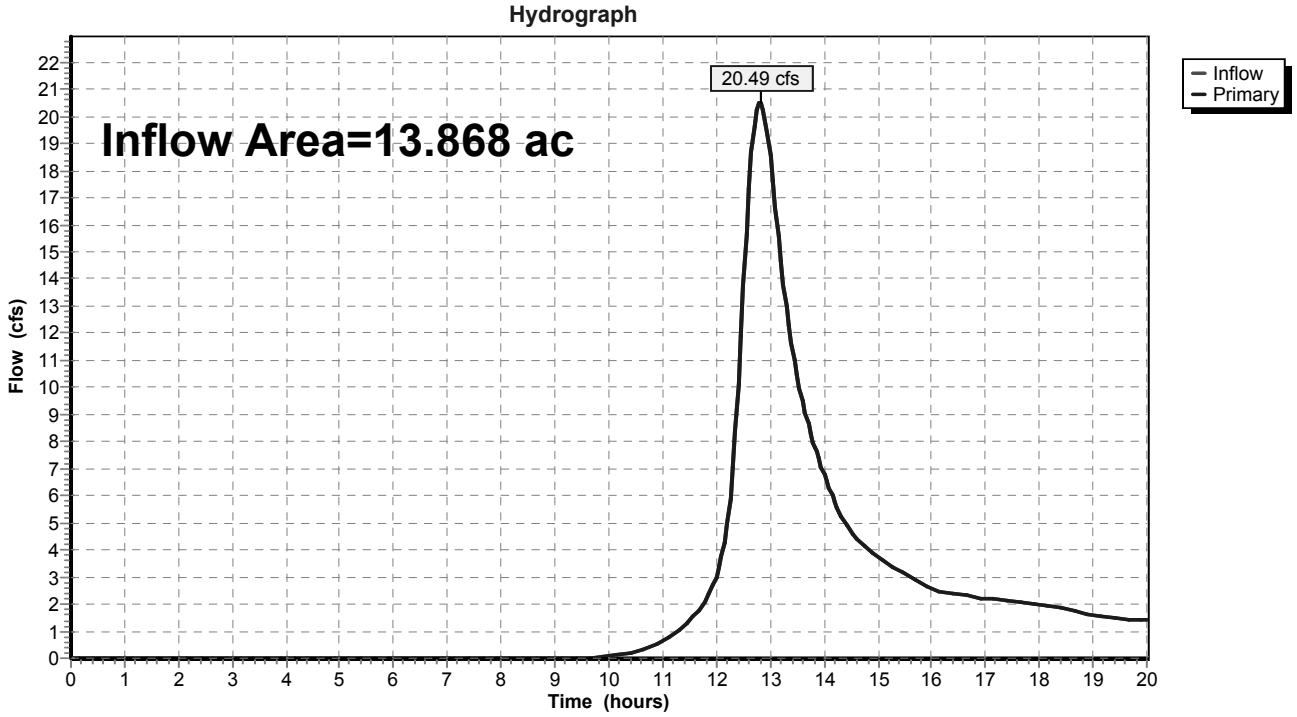


## Summary for Link L E 4.0: L E 4.0

Inflow Area = 13.868 ac, 9.70% Impervious, Inflow Depth > 2.98" for 100_year event
Inflow = 20.49 cfs @ 12.81 hrs, Volume= 3.438 af
Primary = 20.49 cfs @ 12.81 hrs, Volume= 3.438 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L E 4.0: L E 4.0

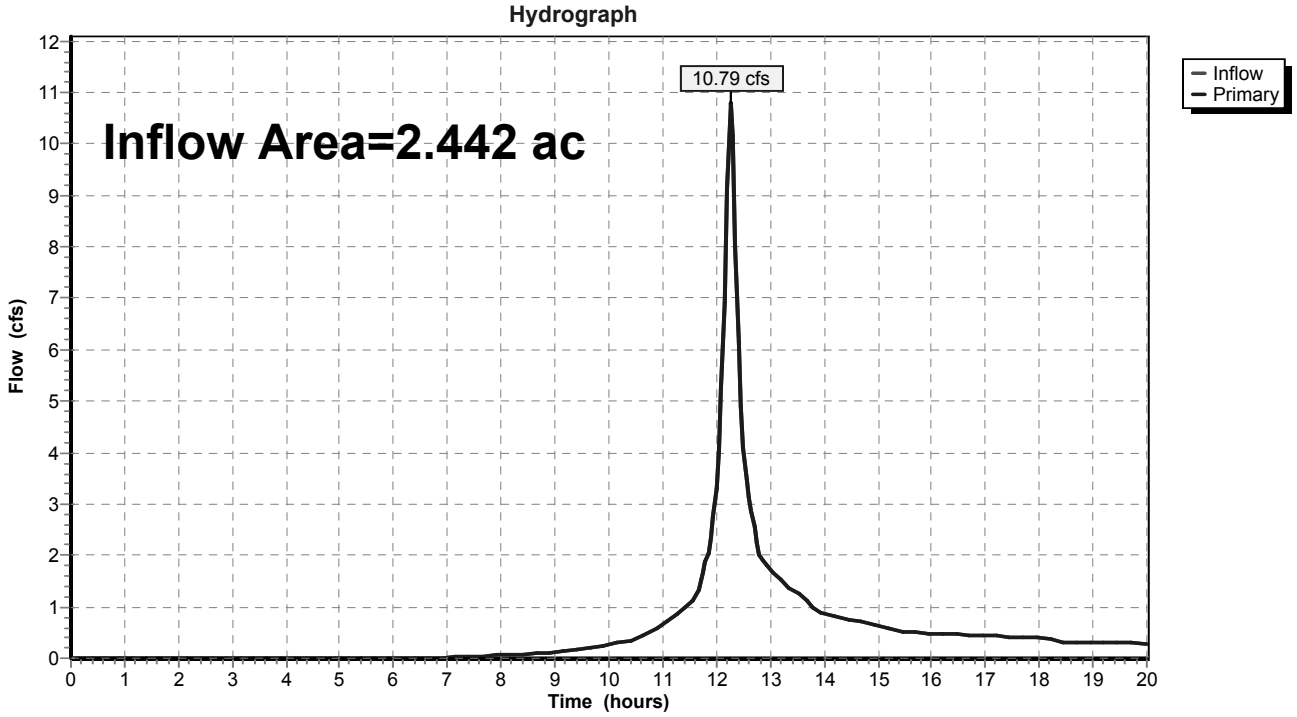


## Summary for Link L W 10.0: L W 10.0

Inflow Area = 2.442 ac, 21.52% Impervious, Inflow Depth > 4.38" for 100_year event
Inflow = 10.79 cfs @ 12.26 hrs, Volume= 0.891 af
Primary = 10.79 cfs @ 12.26 hrs, Volume= 0.891 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 10.0: L W 10.0

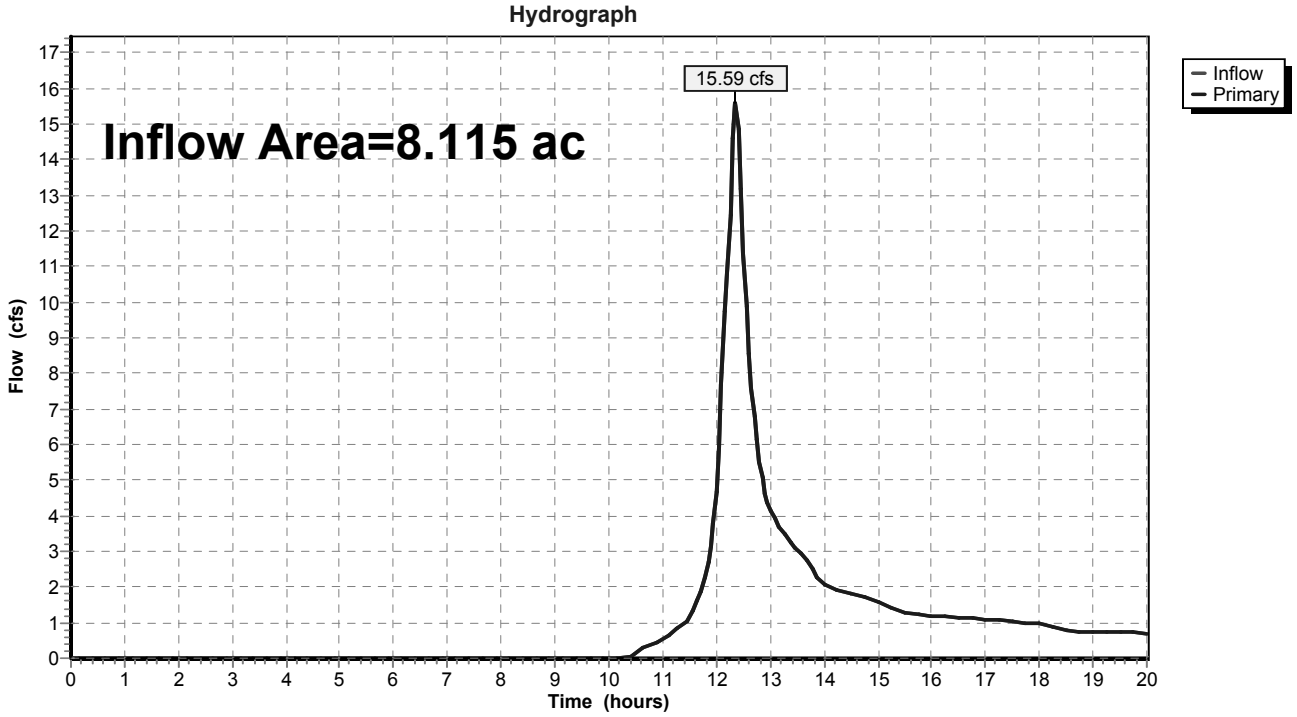


## Summary for Link L W 2.0: L W 2.0

Inflow Area = 8.115 ac, 3.16% Impervious, Inflow Depth > 2.52" for 100_year event
Inflow = 15.59 cfs @ 12.35 hrs, Volume= 1.701 af
Primary = 15.59 cfs @ 12.35 hrs, Volume= 1.701 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 2.0: L W 2.0

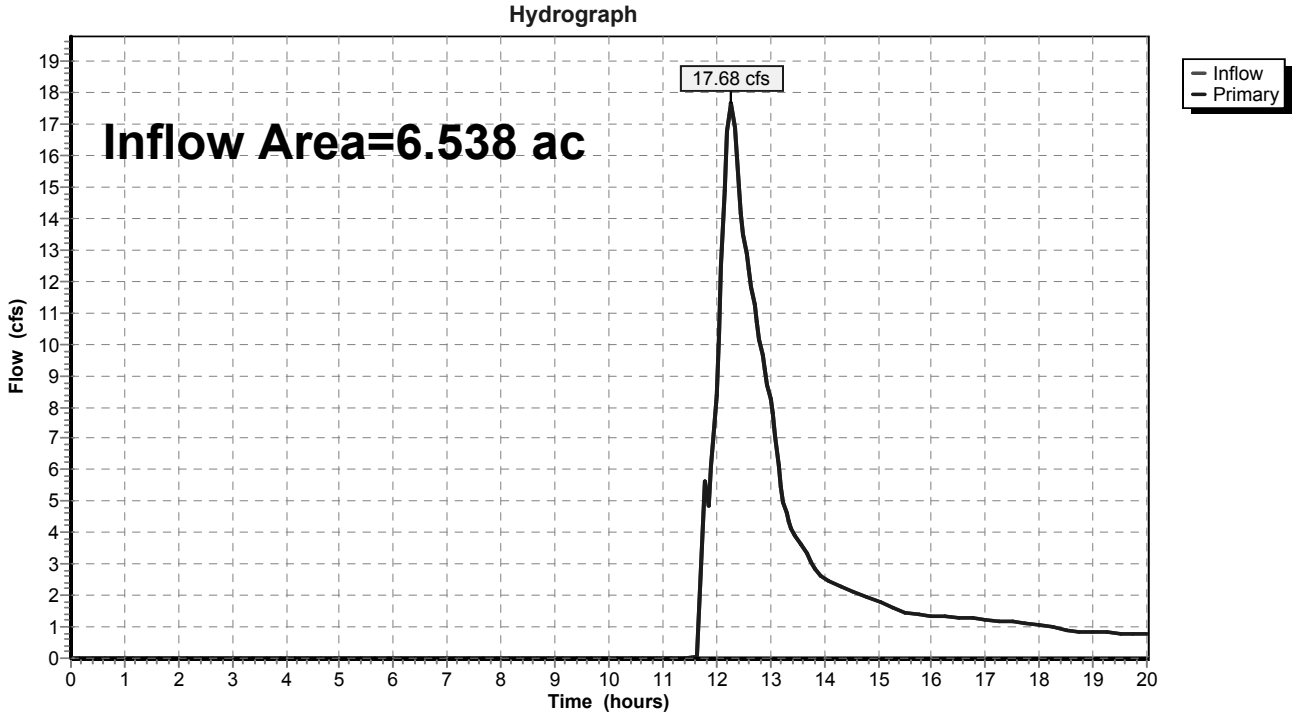


## Summary for Link L W 3.0: L W 3.0

Inflow Area = 6.538 ac, 3.93% Impervious, Inflow Depth > 3.98" for 100_year event
Inflow = 17.68 cfs @ 12.27 hrs, Volume= 2.168 af
Primary = 17.68 cfs @ 12.27 hrs, Volume= 2.168 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 3.0: L W 3.0

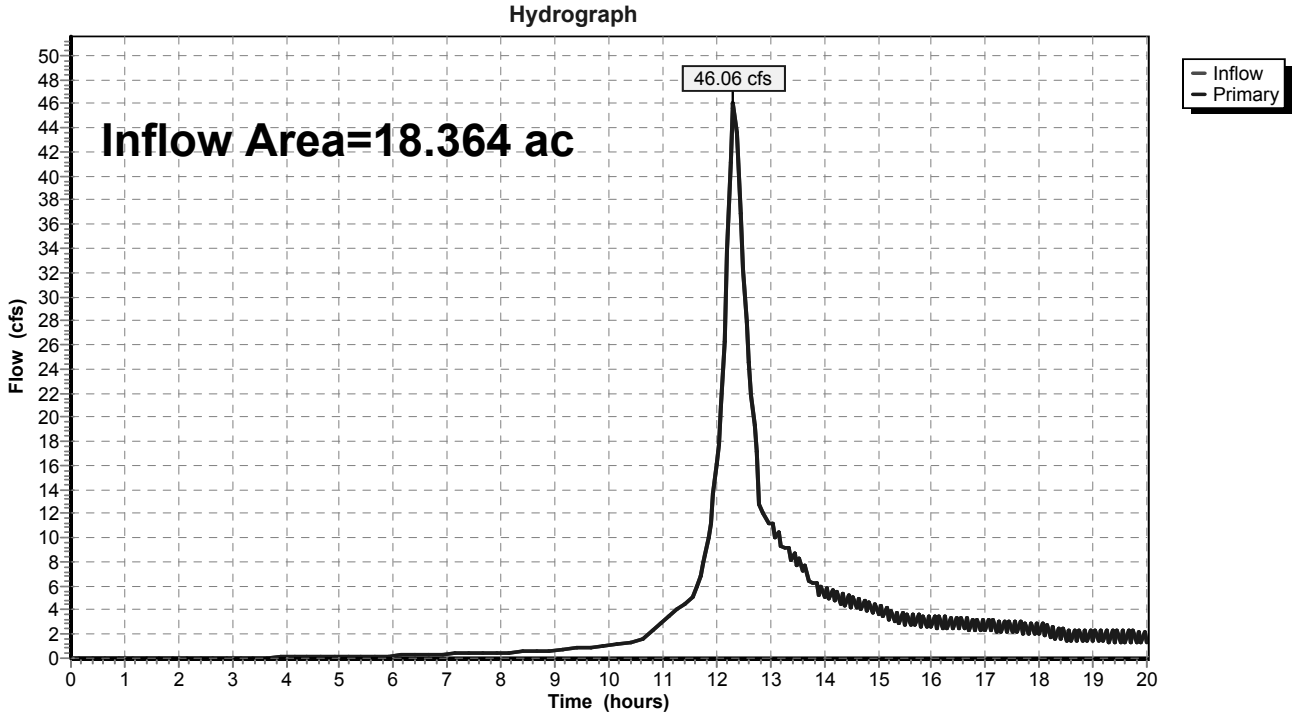


## Summary for Link L W 9.0: L W 9.0

Inflow Area = 18.364 ac, 7.94% Impervious, Inflow Depth > 3.32" for 100_year event
Inflow = 46.06 cfs @ 12.32 hrs, Volume= 5.086 af
Primary = 46.06 cfs @ 12.32 hrs, Volume= 5.086 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L W 9.0: L W 9.0

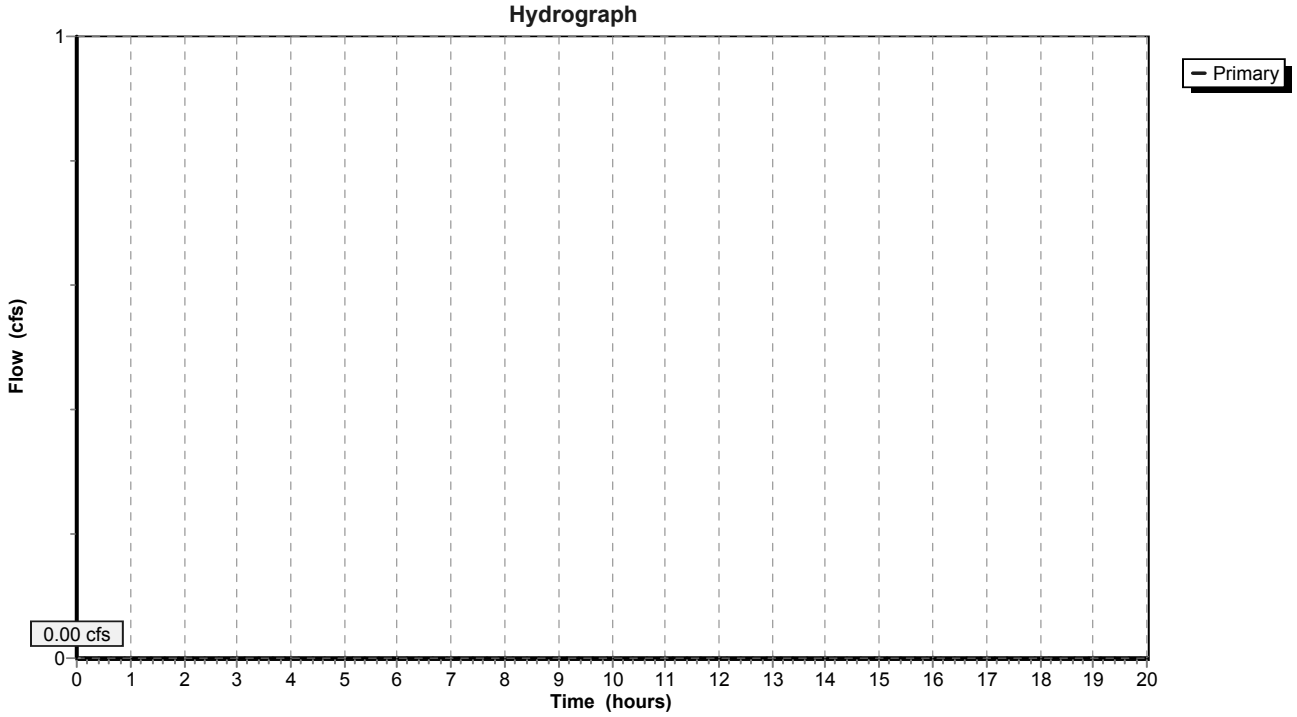


## Summary for Link L Well 1.1B: L Well 1.1B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.1B: L Well 1.1B

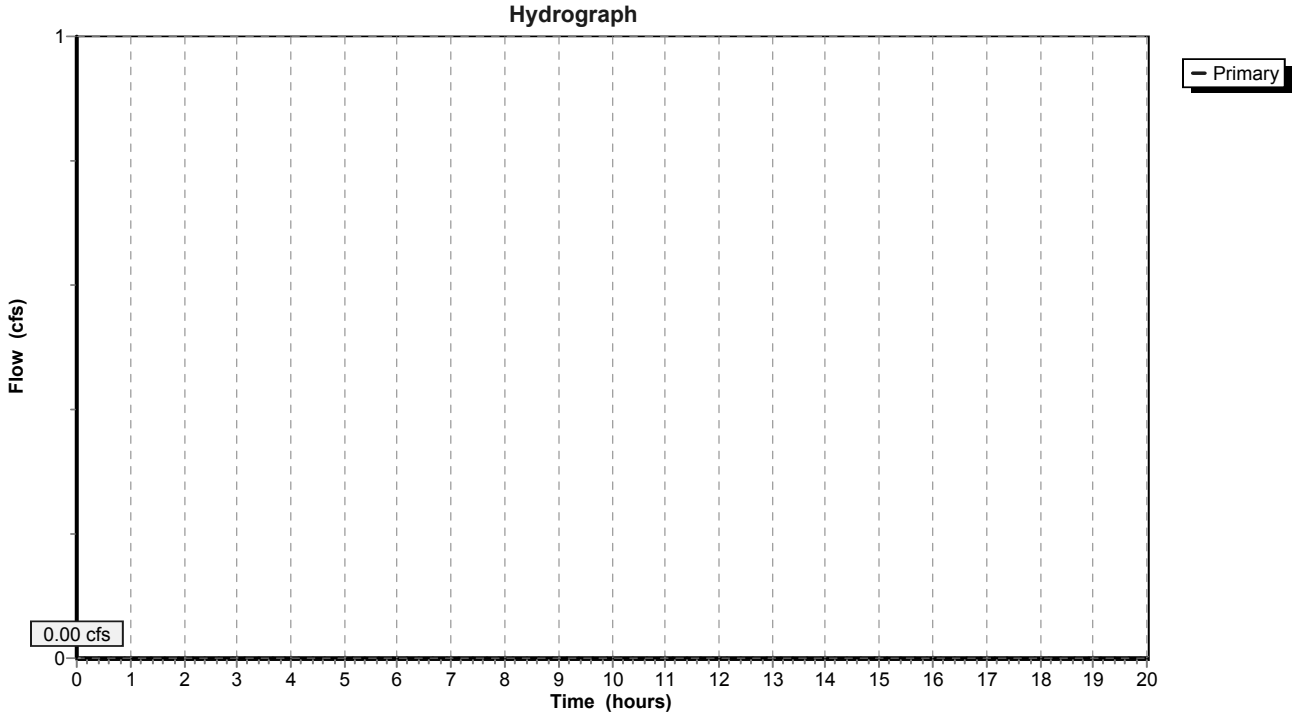


## Summary for Link L Well 1.2A: L Well 1.2A

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2A: L Well 1.2A

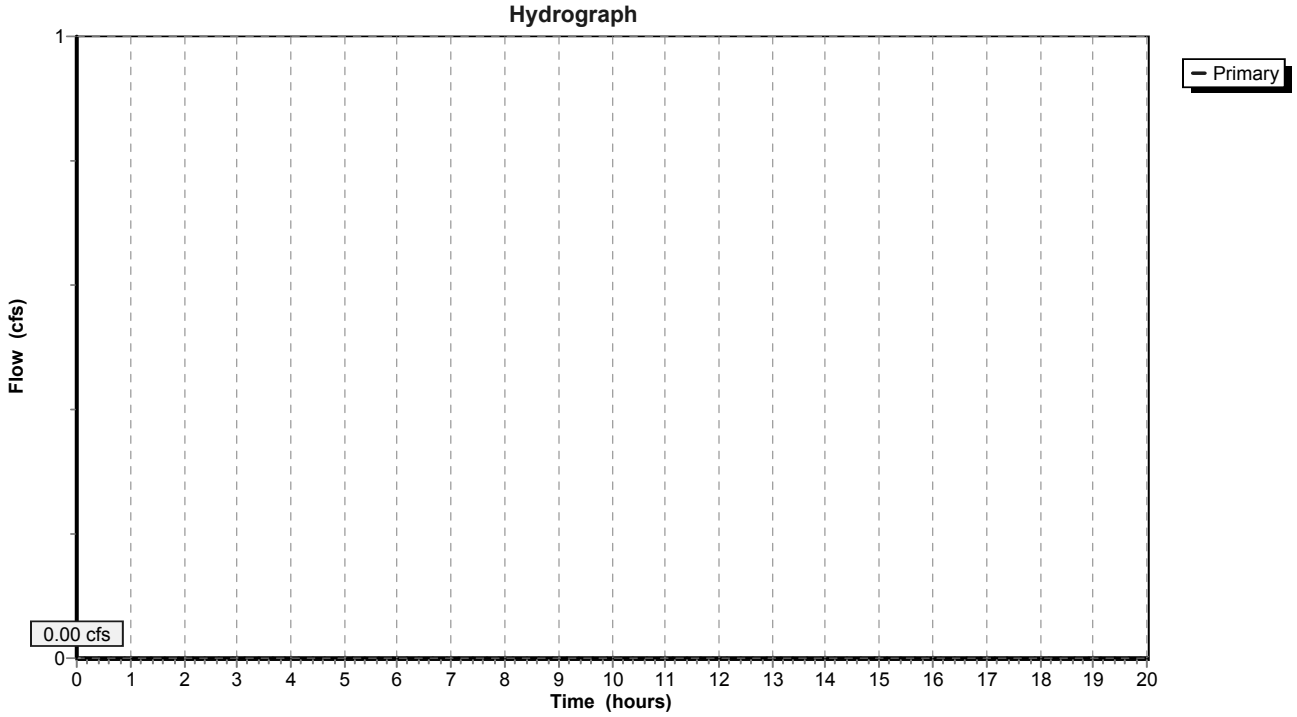


## Summary for Link L Well 1.2B: L Well 1.2B

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2B: L Well 1.2B

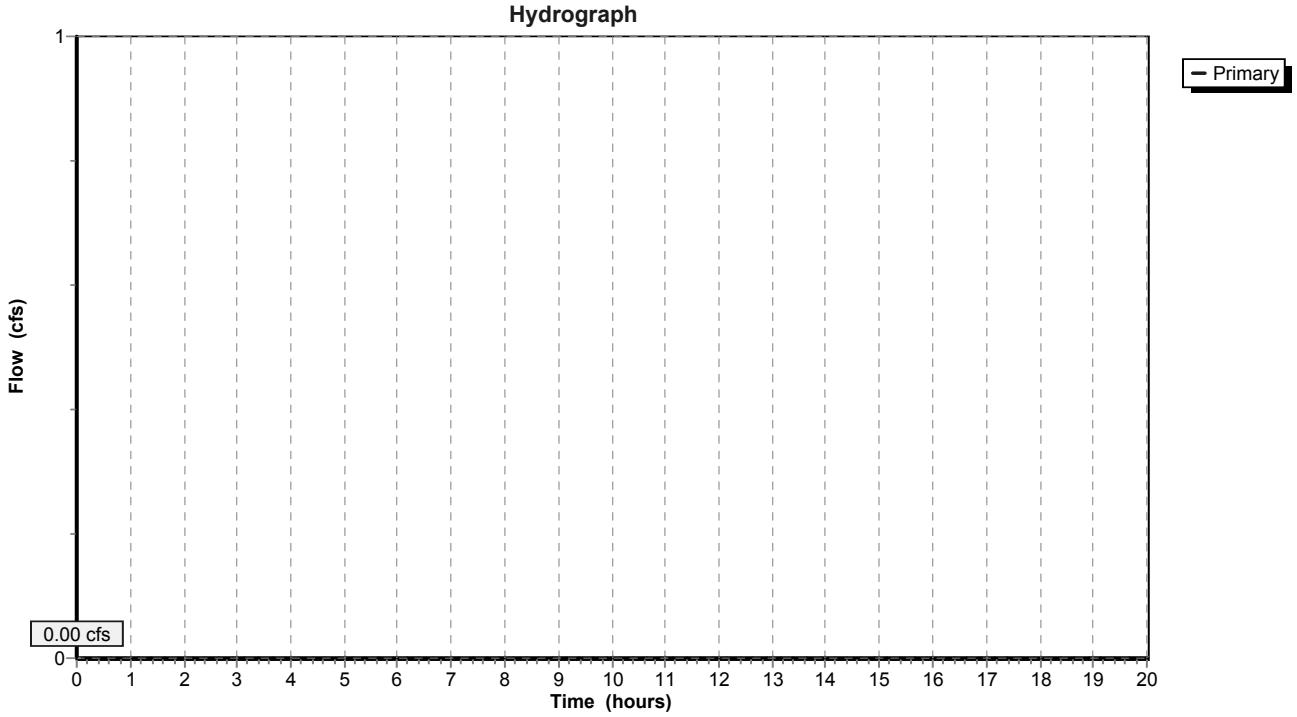


## Summary for Link L Well 1.2C: L Well 1.2C

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

## Link L Well 1.2C: L Well 1.2C



**VANASSE HANGEN BRUSTLIN, INC.**

| | | | |
|---|---|---|---|
| Project: | Danforth Green | Project #: | 12004.00 |
| Location: | Framingham, MA | Sheet: | 1 of 4 |
| Calculated By: | JWD | Date: | 4/24/2013 |
| Title: | Storm Drain Calculations per Stormcad Model | | |

| Description | Start Node | Stop Node | Upstream Invert (ft) | Downstream Invert (ft) | Slope (ft/ft) | Manning's n | Diameter (in) | Length (ft) | System Intensity (in/hr) | Upstream CA (acres) | System CA (acres) | Flow (cfs) | Capacity (cfs) | Average Velocity (ft/s) | Elevation Ground Start (ft) | Cover Start (ft) | Elevation Ground Stop (ft) | Cover Stop (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PIPE-BLDG1 | BLDG 1 | DMH 11 | 164 | 162 | 0.025 | 0.01 | 12 | 79.4 | 6 | 0.094 | 0.094 | 0.57 | 7.35 | 5.56 | 174 | 9 | 167.2 | 4.2 | 164.31 | 162.19 |
| PIPE-BLDG2 | BLDG 2 | FES 12 | 173.5 | 173 | 0.016 | 0.01 | 12 | 32 | 6 | 0.111 | 0.111 | 0.67 | 5.79 | 4.91 | 176 | 1.5 | 175 | 1 | 173.84 | 173.23 |
| PIPE-BLDG3 | BLDG 3 | FES 13 | 173.5 | 173 | 0.013 | 0.01 | 12 | 37.3 | 6 | 0.228 | 0.228 | 1.38 | 5.36 | 5.72 | 176.5 | 2 | 175 | 1 | 174 | 173.35 |
| PIPE-BLDG4 | BLDG4 | FES 18 | 165 | 164 | 0.037 | 0.01 | 12 | 26.9 | 6 | 0.2 | 0.2 | 1.21 | 8.92 | 7.93 | 178 | 12 | 166 | 1 | 165.46 | 164.26 |
| PIPE-BLDG5 | BLDG 5 | FES 19 | 165 | 164 | 0.013 | 0.01 | 12 | 75.8 | 6 | 0.203 | 0.203 | 1.23 | 5.32 | 5.51 | 179 | 13 | 166 | 1 | 165.47 | 164.33 |
| PIPE-BLDG6 | BLDG6 | FES 20 | 164.5 | 164 | 0.017 | 0.01 | 12 | 28.6 | 6 | 0.205 | 0.205 | 1.24 | 6.12 | 6.11 | 167 | 1.5 | 166 | 1 | 164.97 | 164.32 |
| PIPE-BLDG7 | BLDG 7 | DMH 27 | 174 | 172.9 | 0.017 | 0.01 | 12 | 64.7 | 6 | 0.104 | 0.104 | 0.63 | 6.04 | 4.97 | 178 | 3 | 176.6 | 2.7 | 174.33 | 173.12 |
| PIPE-BLDG8 | BLDG 8 | FES 21 | 168.5 | 168 | 0.024 | 0.01 | 12 | 20.8 | 6 | 0.235 | 0.235 | 1.42 | 7.18 | 7.12 | 173 | 3.5 | 170 | 1 | 169 | 168.33 |
| PIPE-BLDG9 | BLDG 9 | DMH 36 | 171.5 | 170.8 | 0.006 | 0.01 | 12 | 117.4 | 6 | 0.104 | 0.104 | 0.63 | 3.58 | 3.42 | 174 | 1.5 | 172.8 | 1 | 171.83 | 171.15 |
| PIPE-BLDG10 | BLDG 10 | DMH 36 | 172 | 170.8 | 0.037 | 0.01 | 12 | 32.6 | 6 | 0.088 | 0.088 | 0.53 | 8.88 | 6.23 | 176 | 3 | 172.8 | 1 | 172.3 | 171.15 |
| PIPE-BLDG11 | BLDG 11 | FES 23 | 169 | 168 | 0.015 | 0.01 | 12 | 68.3 | 6 | 0.104 | 0.104 | 0.63 | 5.6 | 4.71 | 174 | 4 | 170 | 1 | 169.33 | 168.23 |
| PIPE-CB1 | CB-1 | FES 3 | 173 | 172.5 | 0.006 | 0.01 | 12 | 87.5 | 6 | 0.198 | 0.198 | 1.2 | 3.5 | 4.04 | 176.5 | 2.5 | 174 | 0.5 | 173.46 | 172.9 |
| PIPE-CB2 | CB-2 | DMH 3 | 182.9 | 181.9 | 0.013 | 0.01 | 12 | 76.4 | 6 | 0.234 | 0.234 | 1.41 | 5.3 | 5.71 | 186.9 | 3 | 185.5 | 2.6 | 183.4 | 182.25 |
| PIPE-CB3 | CB-3 | DMH 3 | 181 | 180.8 | 0.011 | 0.01 | 12 | 18.6 | 6 | 0.158 | 0.158 | 0.96 | 4.8 | 4.77 | 185.02 | 3.02 | 185.5 | 3.7 | 181.41 | 181.12 |
| PIPE-CB4 | CB-4 | FES 6 | 177.3 | 173 | 0.063 | 0.01 | 12 | 68.4 | 6 | 0.479 | 0.479 | 2.9 | 11.61 | 12.28 | 181.91 | 3.61 | 174.25 | 0.25 | 178.03 | 173.34 |
| PIPE-CB5 | CB-5 | DMH 6 | 177.6 | 175.8 | 0.01 | 0.01 | 24 | 180.5 | 6 | 4.261 | 4.261 | 25.77 | 29.36 | 10.54 | 181.6 | 2 | 182.58 | 4.78 | 179.38 | 177.27 |
| PIPE-CB6 | CB-6 | DMH 10 | 164 | 158 | 0.018 | 0.01 | 18 | 326.7 | 6 | 1.784 | 1.784 | 10.79 | 18.5 | 10.87 | 168 | 2.5 | 172 | 12.5 | 165.26 | 158.82 |
| PIPE-CB7 | CB-7 | DMH 11 | 160.5 | 160 | 0.034 | 0.01 | 12 | 14.9 | 6 | 0 | 0 | 7.52 | 8.49 | 12.21 | 164.5 | 3 | 167.2 | 6.2 | 161.48 | 160.86 |
| PIPE-CB8 | CB-8 | DMH 12 | 180.5 | 180.3 | 0.015 | 0.01 | 12 | 13.2 | 6 | 0.261 | 0.261 | 1.58 | 5.71 | 6.21 | 184.5 | 3 | 184.3 | 3 | 181.03 | 180.7 |
| PIPE-CB9 | CB-9 | DMH 13 | 170.6 | 170.4 | 0.009 | 0.01 | 12 | 22.5 | 6 | 0.088 | 0.088 | 0.53 | 4.36 | 3.77 | 174.6 | 3 | 174.5 | 3.1 | 170.9 | 170.92 |
| PIPE-CB10 | CB-10 | DMH 14 | 169.2 | 169 | 0.019 | 0.01 | 12 | 10.4 | 6 | 0.079 | 0.079 | 0.48 | 6.43 | 4.79 | 173.2 | 3 | 173 | 3 | 169.49 | 169.2 |
| PIPE-CB11 | CB-11 | DMH 15 | 168.2 | 167.8 | 0.009 | 0.01 | 12 | 45.9 | 6 | 0.487 | 0.487 | 2.95 | 4.32 | 5.92 | 171.5 | 2.3 | 172.19 | 3.39 | 168.94 | 168.6 |
| PIPE-CB12 | CB-12 | DMH 16 | 167.8 | 167.7 | 0.012 | 0.01 | 12 | 8.2 | 6 | 0.189 | 0.189 | 1.15 | 5.11 | 5.24 | 171.8 | 3 | 172 | 3.3 | 168.25 | 168.06 |
| PIPE-CB13 | CB-13 | DMH 17 | 169.1 | 168.8 | 0.011 | 0.01 | 12 | 27.5 | 6 | 0.115 | 0.115 | 0.69 | 4.84 | 4.37 | 173.1 | 3 | 174 | 4.2 | 169.45 | 169.06 |
| PIPE-CB14 | CB-14 | DMH 17 | 171.4 | 168.8 | 0.05 | 0.01 | 12 | 52.3 | 6 | 0.03 | 0.03 | 0.18 | 10.33 | 4.99 | 175.4 | 3 | 174 | 4.2 | 171.57 | 169.09 |
| PIPE-CB15 | CB-15 | DMH 18 | 169.8 | 169 | 0.019 | 0.01 | 12 | 41.2 | 6 | 0.22 | 0.22 | 1.33 | 6.46 | 6.47 | 173.8 | 3 | 174.2 | 4.2 | 170.29 | 169.31 |
| PIPE-CB16 | CB-16 | DMH 18 | 170.7 | 169 | 0.032 | 0.01 | 12 | 53.3 | 6 | 0.135 | 0.135 | 0.82 | 8.27 | 6.71 | 174.7 | 3 | 174.2 | 4.2 | 171.08 | 169.21 |
| PIPE-CB17 | CB-17 | DMH 24 | 170.8 | 169.6 | 0.02 | 0.01 | 12 | 59.5 | 6 | 0.052 | 0.052 | 0.31 | 6.58 | 4.3 | 174.8 | 3 | 175 | 4.4 | 171.03 | 170.64 |
| PIPE-CB18 | CB-18 | DMH 24 | 169.8 | 169.6 | 0.013 | 0.01 | 18 | 15.8 | 6 | 1.398 | 1.398 | 8.45 | 15.38 | 8.91 | 173.8 | 2.5 | 175 | 3.9 | 170.93 | 170.53 |
| PIPE-CB19 | CB-19 | DMH 25 | 170.3 | 168.7 | 0.028 | 0.01 | 12 | 57.8 | 6 | 0.068 | 0.068 | 0.41 | 7.7 | 5.2 | 174.3 | 3 | 171.34 | 1.64 | 170.56 | 168.86 |

| Description | Start Node | Stop Node | Upstream Invert (ft) | Downstream Invert (ft) | Slope (ft/ft) | Manning's n | Diameter (in) | Length (ft) | System Intensity (in/hr) | Upstream CA (acres) | System CA (acres) | Flow (cfs) | Capacity (cfs) | Average Velocity (ft/s) | Elevation Ground Start (ft) | Cover Start (ft) | Elevation Ground Stop (ft) | Cover Stop (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PIPE-CB20 | CB-20 | DMH 25 | 168.5 | 167.9 | 0.028 | 0.01 | 12 | 21.1 | 6 | 1.153 | 1.153 | 6.97 | 7.81 | 11.24 | 172.5 | 3 | 171.34 | 2.44 | 169.47 | 168.73 |
| PIPE-CB23 | CB-23 | DMH 30 | 167 | 164.7 | 0.017 | 0.01 | 12 | 133.4 | 6 | 0.445 | 0.445 | 2.69 | 6.08 | 7.51 | 171.6 | 3.6 | 172.1 | 6.4 | 167.7 | 165.46 |
| PIPE-CB24 | CB-24 | DMH 32 | 169.5 | 168.5 | 0.01 | 0.01 | 12 | 104.4 | 6 | 0.168 | 0.168 | 1.01 | 4.53 | 4.65 | 173.5 | 3 | 173 | 3.5 | 169.92 | 169.08 |
| PIPE-CB25 | CB-25 | DMH 32 | 169 | 168.5 | 0.043 | 0.01 | 12 | 11.5 | 6 | 0.255 | 0.255 | 1.54 | 9.66 | 9.01 | 173 | 3 | 173 | 3.5 | 169.53 | 169.08 |
| PIPE-CB26 | CB-26 | DMH 33 | 167.6 | 167.5 | 0.011 | 0.01 | 12 | 9.4 | 6 | 0.176 | 0.176 | 1.06 | 4.78 | 4.89 | 171.6 | 3 | 171.7 | 3.2 | 168.19 | 168.2 |
| PIPE-CB27 | CB-27 | WQU 3 | 167 | 166.3 | 0.029 | 0.01 | 12 | 24 | 6 | 0.187 | 0.187 | 1.13 | 7.91 | 7.15 | 171 | 3 | 171.6 | 4.3 | 167.45 | 167.09 |
| PIPE-CB28 | CB-28 | DMH 37 | 169.7 | 169.2 | 0.008 | 0.01 | 12 | 58.9 | 6 | 0.339 | 0.339 | 2.05 | 4.27 | 5.38 | 173.7 | 3 | 173.2 | 3 | 170.31 | 169.69 |
| PIPE-CB29 | CB-29 | DMH 38 | 166.5 | 166.4 | 0.009 | 0.01 | 12 | 11.4 | 6 | 0.198 | 0.198 | 1.2 | 4.34 | 4.72 | 170.5 | 3 | 172 | 4.6 | 167.04 | 167.07 |
| PIPE-CB30 | CB-30 | DMH 39 | 167.9 | 167.8 | 0.008 | 0.01 | 12 | 12 | 6 | 0.101 | 0.101 | 0.61 | 4.23 | 3.84 | 171.9 | 3 | 172.1 | 3.3 | 168.23 | 168.07 |
| PIPE-CB31 | CB-31 | WQU 4 | 167.8 | 167.7 | 0.01 | 0.01 | 12 | 9.8 | 6 | 0.088 | 0.088 | 0.53 | 4.68 | 3.96 | 171.9 | 3.1 | 172.1 | 3.4 | 168.1 | 167.94 |
| PIPE-CB32 | CB-32 | DMH 47 | 148 | 146.1 | 0.011 | 0.01 | 12 | 170.1 | 6 | 0.069 | 0.069 | 0.42 | 4.9 | 3.81 | 160 | 11 | 150.3 | 3.2 | 148.27 | 146.3 |
| PIPE-CB33 | CB-33 | DMH 48 | 152.5 | 147 | 0.036 | 0.01 | 12 | 154.7 | 6 | 0.818 | 0.818 | 4.95 | 8.73 | 11.47 | 156.5 | 3 | 153 | 5 | 153.41 | 147.54 |
| PIPE-CB34 | CB-34 | DMH 48 | 146.5 | 145.8 | 0.008 | 0.01 | 12 | 88.6 | 6 | 0.593 | 0.593 | 3.58 | 4.12 | 5.9 | 150.5 | 3 | 153 | 6.2 | 147.31 | 146.83 |
| PIPE-DCB21 | DCB-21 | WQU 2 | 172.4 | 172 | 0.027 | 0.01 | 12 | 15 | 6 | 0.212 | 0.212 | 1.28 | 7.57 | 7.18 | 176.4 | 3 | 176.5 | 3.5 | 172.88 | 172.31 |
| PIPE-DCB22 | DCB-22 | WQU 2 | 172.4 | 172 | 0.007 | 0.01 | 12 | 55 | 6 | 0.258 | 0.258 | 1.56 | 3.95 | 4.73 | 176.4 | 3 | 176.5 | 3.5 | 172.93 | 172.44 |
| PIPE-DMH1 | DMH 1 | DMH 2 | 163.5 | 162.1 | 0.017 | 0.01 | 18 | 82.3 | 5.918 | 0 | 0 | 3.9 | 17.81 | 8.07 | 174.5 | 9.5 | 175 | 11.4 | 164.26 | 162.58 |
| PIPE-DMH2 | DMH 2 | FES 4 | 162 | 158 | 0.025 | 0.01 | 18 | 163.1 | 5.884 | 0 | 0 | 3.9 | 21.38 | 9.2 | 175 | 11.5 | 160 | 0.5 | 162.76 | 158.43 |
| PIPE-DMH3 | DMH 3 | FES 5 | 173 | 170 | 0.035 | 0.01 | 12 | 85.9 | 5.955 | 0.392 | 0.392 | 2.35 | 8.66 | 9.38 | 185.5 | 11.5 | 174.25 | 3.25 | 173.66 | 170.36 |
| PIPE-DMH4 | DMH 4 | DMH 5 | 160.3 | 158.6 | 0.015 | 0.01 | 12 | 112.5 | 5.866 | 0 | 0 | 2.1 | 5.69 | 6.7 | 173.9 | 12.6 | 175.7 | 16.1 | 160.92 | 159.02 |
| PIPE-DMH5 | DMH 5 | FES 7 | 157.6 | 156 | 0.01 | 0.01 | 12 | 158.2 | 5.81 | 0 | 0 | 2.1 | 4.66 | 5.78 | 175.7 | 17.1 | 157.25 | 0.25 | 158.22 | 156.47 |
| PIPE-DMH6 | DMH 6 | DMH 7 | 175.7 | 173.8 | 0.01 | 0.01 | 24 | 189 | 5.943 | 4.261 | 4.261 | 25.52 | 29.49 | 10.57 | 182.58 | 4.88 | 174.1 | -1.7 | 177.47 | 175.25 |
| PIPE-DMH7 | DMH 7 | DMH 8 | 165.4 | 162 | 0.022 | 0.01 | 24 | 155.1 | 5.883 | 4.261 | 4.261 | 32.47 | 43.54 | 15.19 | 174.1 | 6.7 | 171.1 | 7.1 | 167.3 | 163.35 |
| PIPE-DMH8 | DMH 8 | DMH 9 | 161.9 | 159 | 0.043 | 0.01 | 24 | 67.7 | 5.849 | 4.261 | 4.261 | 32.32 | 60.88 | 19.67 | 171.1 | 7.2 | 171 | 10 | 163.79 | 160.22 |
| PIPE-DMH9 | DMH 9 | FES 8 | 158.9 | 156 | 0.029 | 0.01 | 24 | 99.3 | 5.838 | 4.261 | 4.261 | 32.27 | 50.24 | 16.98 | 171 | 10.1 | 158.33 | 0.33 | 160.79 | 157.29 |
| PIPE-DMH10 | DMH 10 | FES 9 | 153 | 150 | 0.028 | 0.01 | 18 | 105.7 | 5.9 | 1.784 | 1.784 | 10.61 | 23 | 12.76 | 172 | 17.5 | 151.79 | 0.29 | 154.25 | 150.74 |
| PIPE-DMH11 | DMH 11 | FES 10 | 150 | 149 | 0.035 | 0.01 | 12 | 28.3 | 5.952 | 0.094 | 0.094 | 8.09 | 8.71 | 12.59 | 167.2 | 16.2 | 150.25 | 0.25 | 150.99 | 149.85 |
| PIPE-DMH12 | DMH 12 | DMH 13 | 173.3 | 170.4 | 0.033 | 0.01 | 12 | 89.1 | 5.993 | 0.261 | 0.261 | 1.58 | 8.35 | 8.17 | 184.3 | 10 | 174.5 | 3.1 | 173.83 | 170.69 |
| PIPE-DMH13 | DMH 13 | DMH 14 | 170.3 | 168.3 | 0.018 | 0.01 | 12 | 108.8 | 5.957 | 0.349 | 0.349 | 2.09 | 6.28 | 7.19 | 174.5 | 3.2 | 173 | 3.7 | 170.92 | 168.7 |
| PIPE-DMH14 | DMH 14 | DMH 15 | 168.2 | 167.8 | 0.008 | 0.01 | 12 | 50.6 | 5.906 | 0.428 | 0.428 | 2.55 | 4.12 | 5.52 | 173 | 3.8 | 172.19 | 3.39 | 168.88 | 168.6 |
| PIPE-DMH15 | DMH 15 | DMH 16 | 167.7 | 167.1 | 0.005 | 0.01 | 18 | 110.1 | 5.875 | 0.915 | 0.915 | 5.42 | 10.08 | 5.81 | 172.19 | 2.99 | 172 | 3.4 | 168.6 | 167.88 |
| PIPE-DMH16 | DMH 16 | FES 11 | 167 | 165.8 | 0.01 | 0.01 | 18 | 118.2 | 5.812 | 1.104 | 1.104 | 6.47 | 13.76 | 7.67 | 172 | 3.5 | 167.59 | 0.29 | 167.98 | 166.53 |
| PIPE-DMH17 | DMH 17 | WQU 1 | 168.7 | 167.5 | 0.01 | 0.01 | 12 | 119.1 | 5.965 | 0.144 | 0.144 | 0.87 | 4.65 | 4.53 | 174 | 4.3 | 174.3 | 5.8 | 169.09 | 167.99 |
| PIPE-DMH18 | DMH 18 | WQU 1 | 167.7 | 167.5 | 0.013 | 0.01 | 12 | 15.1 | 5.974 | 0.355 | 0.355 | 2.14 | 5.33 | 6.41 | 174.2 | 5.5 | 174.3 | 5.8 | 168.33 | 167.99 |
| PIPE-DMH20 | DMH 20 | DMH 22 | 166.4 | 165.1 | 0.01 | 0.01 | 12 | 129.2 | 5.938 | 0 | 0 | 3.12 | 4.65 | 6.34 | 170.51 | 3.11 | 174.1 | 8 | 167.16 | 166.34 |
| PIPE-DMH22 | DMH 22 | DMH 23 | 165 | 163.9 | 0.01 | 0.01 | 18 | 105.5 | 5.87 | 0 | 0 | 12.77 | 13.94 | 8.95 | 174.1 | 7.6 | 173.5 | 8.1 | 166.34 | 165.04 |

| Description | Start Node | Stop Node | Upstream Invert (ft) | Downstream Invert (ft) | Slope (ft/ft) | Manning's n | Diameter (in) | Length (ft) | System Intensity (in/hr) | Upstream CA (acres) | System CA (acres) | Flow (cfs) | Capacity (cfs) | Average Velocity (ft/s) | Elevation Ground Start (ft) | Cover Start (ft) | Elevation Ground Stop (ft) | Cover Stop (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PIPE-DMH24 | DMH 24 | DMH 25 | 169.5 | 167.3 | 0.01 | 0.01 | 18 | 216.2 | 5.954 | 1.449 | 1.449 | 8.7 | 13.77 | 8.24 | 175 | 4 | 171.34 | 2.54 | 170.64 | 168.63 |
| PIPE-DMH25 | DMH 25 | DMH 26 | 167.2 | 166 | 0.008 | 0.01 | 24 | 150.8 | 5.866 | 2.67 | 2.67 | 15.79 | 26.23 | 8.73 | 171.34 | 2.14 | 177.2 | 9.2 | 168.63 | 167.13 |
| PIPE-DMH26 | DMH 26 | WQU 2 | 165.9 | 165.5 | 0.009 | 0.01 | 24 | 46 | 5.809 | 2.67 | 2.67 | 15.63 | 27.42 | 9.01 | 177.2 | 9.3 | 176.5 | 9 | 167.33 | 166.94 |
| PIPE-DMH28 | DMH 28 | DMH 29 | 165 | 162 | 0.037 | 0.01 | 18 | 82.1 | 5.989 | 0 | 0 | 17.6 | 26.1 | 15.85 | 176.9 | 10.4 | 166.8 | 3.3 | 166.45 | 162.98 |
| PIPE-DMH30 | DMH 30 | DMH 31 | 164.6 | 163 | 0.009 | 0.01 | 12 | 173 | 5.941 | 0.445 | 0.445 | 4.18 | 4.45 | 6.45 | 172.1 | 6.5 | 170.14 | 6.14 | 165.46 | 163.77 |
| PIPE-DMH31 | DMH 31 | DMH 35 | 162.9 | 161.9 | 0.011 | 0.01 | 18 | 87.9 | 5.851 | 0.445 | 0.445 | 6.13 | 14.56 | 7.89 | 170.14 | 5.74 | 169.5 | 6.1 | 163.86 | 162.59 |
| PIPE-DMH32 | DMH 32 | DMH 33 | 168.4 | 167.5 | 0.009 | 0.01 | 12 | 102.6 | 5.925 | 0.423 | 0.423 | 2.53 | 4.34 | 5.73 | 173 | 3.6 | 171.7 | 3.2 | 169.08 | 168.2 |
| PIPE-DMH33 | DMH 33 | WQU 3 | 167.4 | 166.3 | 0.009 | 0.01 | 12 | 121.1 | 5.865 | 0.599 | 0.599 | 3.54 | 4.41 | 6.25 | 171.7 | 3.3 | 171.6 | 4.3 | 168.2 | 166.98 |
| PIPE-DMH36 | DMH 36 | FES 22 | 170.7 | 168 | 0.018 | 0.01 | 12 | 150.1 | 5.886 | 0.192 | 0.192 | 1.14 | 6.21 | 6.02 | 172.8 | 1.1 | 168 | -1 | 171.15 | 168.29 |
| PIPE-DMH37 | DMH 37 | DMH 38 | 169.1 | 167.9 | 0.022 | 0.01 | 12 | 55.1 | 5.964 | 0.339 | 0.339 | 2.04 | 6.83 | 7.59 | 173.2 | 3.1 | 172 | 3.1 | 169.71 | 168.28 |
| PIPE-DMH38 | DMH 38 | DMH 39 | 166.3 | 165.8 | 0.01 | 0.01 | 12 | 51.1 | 5.939 | 0.537 | 0.537 | 3.22 | 4.58 | 6.31 | 172 | 4.7 | 172.1 | 5.3 | 167.07 | 166.43 |
| PIPE-DMH39 | DMH 39 | WQU 4 | 165.7 | 165.1 | 0.01 | 0.01 | 12 | 63.2 | 5.912 | 0.639 | 0.639 | 3.81 | 4.51 | 6.45 | 172.1 | 5.4 | 172.1 | 6 | 166.53 | 165.81 |
| PIPE-DMH46 | DMH 47 | FES 24 | 146 | 143 | 0.016 | 0.01 | 12 | 183.1 | 5.851 | 0.069 | 0.069 | 0.41 | 5.93 | 4.33 | 150.3 | 3.3 | -5.78 | -149.78 | 146.26 | 143.18 |
| PIPE-DMH48 | DMH 48 | FES 25 | 145.7 | 142 | 0.024 | 0.01 | 18 | 152 | 5.95 | 1.411 | 1.411 | 8.46 | 21.3 | 11.36 | 153 | 5.8 | 145.35 | 1.85 | 146.83 | 142.66 |
| PIPE-FES 16 | FES 16 | FES 17 | 176 | 175.8 | 0.01 | 0.01 | 12 | 19.9 | 6 | 0.047 | 0.047 | 0.28 | 4.64 | 3.27 | 178 | 1 | 177 | 0.2 | 176.22 | 175.97 |
| PIPE-FES1 | FES 1 | FES 2 | 178 | 177 | 0.018 | 0.01 | 12 | 57.1 | 6 | 0.749 | 0.749 | 4.53 | 6.13 | 8.54 | 180 | 1 | 178.62 | 0.62 | 178.89 | 177.66 |
| PIPE-FES14 | FES 14 | FES 15 | 178 | 177.8 | 0.009 | 0.01 | 12 | 21.2 | 6 | 0.289 | 0.289 | 1.75 | 4.5 | 5.37 | 180 | 1 | 179 | 0.2 | 178.56 | 178.25 |
| PIPE-LD1 | LD-1 | LD-2 | 167 | 166.1 | 0.022 | 0.01 | 12 | 40.7 | 6 | 0 | 0 | 3.9 | 6.89 | 9.05 | 171 | 3 | 171 | 3.9 | 167.84 | 166.68 |
| PIPE-LD2 | LD-2 | LD-3 | 166 | 165.1 | 0.013 | 0.01 | 12 | 67.4 | 5.985 | 0 | 0 | 3.9 | 5.35 | 7.43 | 171 | 4 | 171 | 4.9 | 166.84 | 165.74 |
| PIPE-LD3 | LD-3 | DMH 1 | 165 | 163.6 | 0.016 | 0.01 | 12 | 88.4 | 5.955 | 0 | 0 | 3.9 | 5.83 | 7.95 | 171 | 5 | 174.5 | 9.9 | 165.84 | 164.2 |
| PIPE-LD4 | LD-4 | LD-5 | 163.2 | 161.9 | 0.009 | 0.01 | 12 | 141.8 | 6 | 0 | 0 | 2.1 | 4.43 | 5.57 | 168 | 3.8 | 168 | 5.1 | 163.82 | 162.38 |
| PIPE-LD5 | LD-5 | DMH 4 | 161.8 | 160.4 | 0.014 | 0.01 | 12 | 97.1 | 5.915 | 0 | 0 | 2.1 | 5.56 | 6.59 | 168 | 5.2 | 173.9 | 12.5 | 162.42 | 160.83 |
| PIPE-LD6 | LD-6 | DMH 7 | 166.4 | 165.5 | 0.022 | 0.01 | 18 | 41.8 | 6 | 0 | 0 | 7.2 | 20.04 | 10.4 | 171 | 3.1 | 174.1 | 7.1 | 167.44 | 167.3 |
| PIPE-LD7 | LD-7 | LD-8 | 170.6 | 170.5 | 0.003 | 0.01 | 12 | 39.1 | 6 | 0 | 0 | 0.99 | 2.34 | 2.85 | 175 | 3.4 | 175 | 3.5 | 171.05 | 170.92 |
| PIPE-LD8 | LD-8 | DMH 21 | 170.4 | 169.2 | 0.013 | 0.01 | 12 | 91.8 | 5.954 | 0 | 0 | 0.99 | 5.3 | 5.17 | 175 | 3.6 | 175.2 | 5 | 170.82 | 169.49 |
| PIPE-LD9 | LD-9 | LD-10 | 169.6 | 169.5 | 0.003 | 0.01 | 12 | 29.4 | 6 | 0 | 0 | 2.12 | 2.7 | 3.8 | 174 | 3.4 | 174 | 3.5 | 170.27 | 170.12 |
| PIPE-LD10 | LD-10 | DMH 21 | 169.4 | 169.2 | 0.006 | 0.01 | 18 | 34.1 | 5.974 | 0 | 0 | 2.12 | 10.46 | 4.64 | 174 | 3.1 | 175.2 | 4.5 | 169.95 | 169.66 |
| PIPE-LD11 | LD-11 | DMH 30 | 168 | 167.3 | 0.011 | 0.01 | 12 | 65.7 | 6 | 0 | 0 | 1.52 | 4.78 | 5.4 | 172 | 3 | 172.1 | 3.8 | 168.52 | 167.69 |
| PIPE-LD12 | LD-12 | DMH 31 | 166 | 164.7 | 0.102 | 0.01 | 12 | 12.8 | 6 | 0 | 0 | 1.99 | 14.78 | 13.12 | 170 | 3 | 170.14 | 4.44 | 166.6 | 165 |
| PIPE-LD13 | LD-13 | DMH 43 | 155.9 | 155.7 | 0.012 | 0.01 | 12 | 17 | 6 | 0 | 0 | 1.66 | 5.02 | 5.73 | 163 | 6.1 | 161.07 | 4.37 | 156.45 | 156.13 |
| PIPE-OCS1 | OCS-1 | DMH 20 | 166.9 | 166.5 | 0.005 | 0.01 | 12 | 85.4 | 6 | 0 | 0 | 3.12 | 3.17 | 4.6 | 175.2 | 7.3 | 170.51 | 3.01 | 167.71 | 167.26 |
| PIPE-OCS2 | OCS-2 | DMH 22 | 169 | 167 | 0.012 | 0.01 | 18 | 169.9 | 6 | 0 | 0 | 9.65 | 14.81 | 8.93 | 174.8 | 4.3 | 174.1 | 5.6 | 170.2 | 167.88 |
| PIPE-OCS3 | OCS-3 | DMH 23 | 169 | 167.2 | 0.036 | 0.01 | 18 | 49.5 | 6 | 0 | 0 | 21.25 | 26.05 | 16.43 | 175 | 4.5 | 173.5 | 4.8 | 170.47 | 168.37 |
| PIPE-OCS4 | OCS 4 | DMH 28 | 167 | 165.1 | 0.035 | 0.01 | 18 | 53.7 | 6 | 0 | 0 | 17.6 | 25.68 | 15.65 | 177.8 | 9.3 | 176.9 | 10.3 | 168.45 | 166.14 |
| PIPE-OCS5 | OCS-5 | DMH 29 | 162 | 161.8 | 0.008 | 0.01 | 18 | 24.4 | 6 | 0 | 0 | 7.65 | 12.36 | 7.36 | 165 | 1.5 | 166.8 | 3.5 | 163.07 | 162.72 |
| PIPE-OCS6 | OCS 6 | DMH 35 | 165.9 | 165.5 | 0.016 | 0.01 | 12 | 25 | 6 | 0 | 0 | 0.81 | 5.85 | 5.24 | 170.3 | 3.4 | 169.5 | 3 | 166.28 | 165.76 |

| Description | Start Node | Stop Node | Upstream Invert (ft) | Downstream Invert (ft) | Slope (ft/ft) | Manning's n | Diameter (in) | Length (ft) | System Intensity (in/hr) | Upstream CA (acres) | System CA (acres) | Flow (cfs) | Capacity (cfs) | Average Velocity (ft/s) | Elevation Ground Start (ft) | Cover Start (ft) | Elevation Ground Stop (ft) | Cover Stop (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PIPE-OCS7 | OCS-7 | DMH 41 | 164.4 | 161.8 | 0.024 | 0.01 | 12 | 110.2 | 6 | 0 | 0 | 3.89 | 7.12 | 9.26 | 172 | 6.6 | 169 | 6.2 | 165.24 | 162.33 |
| PIPE-OCS8 | OCS-8 | DMH 42 | 164 | 163.8 | 0.007 | 0.01 | 12 | 27.2 | 6 | 0 | 0 | 1.61 | 3.97 | 4.79 | 170 | 5 | 170 | 5.2 | 164.54 | 164.25 |
| PIPE-OCS9 | OCS-9 | DMH 49 | 138 | 137.5 | 0.042 | 0.01 | 18 | 11.8 | 6 | 0 | 0 | 11.3 | 28.12 | 15.04 | 143 | 3.5 | 144 | 5 | 139.28 | 138.43 |
| PIPE-WQU1 | WQU 1 | DMH 19 | 167.25 | 167.1 | 0.022 | 0.01 | 12 | 6.8 | 5.878 | 0.5 | 0.5 | 2.96 | 6.88 | 8.43 | 174.3 | 6.05 | 171.18 | 3.08 | 167.99 | 167.68 |
| PIPE-WQU2 | WQU 2 | DMH 27 | 165.4 | 165.3 | 0.008 | 0.01 | 24 | 11.8 | 5.792 | 3.14 | 3.14 | 18.33 | 27.1 | 9.26 | 176.5 | 9.1 | 176.6 | 9.3 | 166.94 | 166.69 |
| PIPE-WQU3 | WQU 3 | DMH 34 | 166.2 | 166 | 0.01 | 0.01 | 12 | 19.5 | 5.801 | 0.786 | 0.786 | 4.6 | 4.69 | 6.8 | 171.6 | 4.4 | 172.1 | 5.1 | 167.09 | 166.83 |
| PIPE-WQU4 | WQU 4 | DMH 40 | 165 | 164.5 | 0.009 | 0.01 | 12 | 54.4 | 5.88 | 0.727 | 0.727 | 4.31 | 4.44 | 6.44 | 172.1 | 6.1 | 173.4 | 7.9 | 165.87 | 165.3 |

# Appendix C: Standard 3 Computations and Supporting Information

- Recharge Locus Figure
- Groundwater Recharge Calculations
- NRCS Soils Report
- Geotechnical Locus Figure
- Scituate Precast 8′ diameter drywell
- StormTech STC-740 infiltration unit
- StormTech MC-3500 infiltration unit

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# Recharge Calculations

**Project Name:** Danforth **Proj. No.:** 12004.00

**Date:** 4/13/2013

**Project Location:** Framingham, MA **Calculated by:** SAW

## Proposed Impervious Surface Summary

**Proposed Impervious Areas by Hydrologic Soil Group (HSG) in acres**

| Recharge Area | Subcatchment | | HSG A | HSG B | HSG C | HSG D | Total Area |
|---|---|---|---|---|---|---|---|
| INF-E-2 | RG-E-4A | | - | 0.15 | - | - | 0.15 |
| | ROOF-11MAIL | | - | 0.00 | - | - | 0.00 |
| | S-INF-E-2 | | - | 0.69 | - | - | 0.69 |
| INF-E-2 Total | | 0 | - | 0.84 | - | - | 0.84 |
| INF-E-3 | ROOF-7 | | - | 0.11 | - | - | 0.11 |
| | ROOF-PL6 | | - | 0.03 | - | - | 0.03 |
| | S-CB-INF-E-3 | | - | 0.48 | - | - | 0.48 |
| | S-INF-E-3 | | - | 0.72 | - | - | 0.72 |
| | S-LD-2 | | - | 0.15 | - | - | 0.15 |
| | S-LD-4 | | - | 0.60 | - | - | 0.60 |
| INF-E-3 Total | | 0 | - | 2.10 | - | - | 2.10 |
| INF-E-4A | RG-E-7 | | - | 0.74 | - | - | 0.74 |
| | RG-E-8 | | - | 0.24 | - | - | 0.24 |
| INF-E-4A Total | | 0 | - | 0.97 | - | - | 0.97 |
| INF-E-4B | S-CB-INF-E-4A | | - | 0.53 | - | - | 0.53 |
| INF-E-4B Total | | 0 | - | 0.53 | - | - | 0.53 |
| INF-ROOF-100 | ROOF-100 | | - | 0.03 | - | - | 0.03 |
| | ROOF-101 | | - | 0.03 | - | - | 0.03 |
| | ROOF-102 | | - | 0.03 | - | - | 0.03 |
| | ROOF-103 | | - | 0.03 | - | - | 0.03 |
| | ROOF-98 | | - | 0.03 | - | - | 0.03 |
| | ROOF-99 | | - | 0.03 | - | - | 0.03 |
| INF-ROOF-100 Total | | 0 | - | 0.17 | - | - | 0.17 |
| INF-ROOF-110 | ROOF-104 | | - | 0.03 | - | - | 0.03 |
| | ROOF-106 | | - | 0.05 | - | - | 0.05 |
| | ROOF-107 | | - | 0.03 | - | - | 0.03 |
| | ROOF-108 | | - | 0.03 | - | - | 0.03 |
| | ROOF-109 | | - | 0.03 | - | - | 0.03 |
| INF-ROOF-110 Total | | 0 | - | 0.16 | - | - | 0.16 |
| INF-ROOF-114 | ROOF-110 | | - | 0.04 | - | - | 0.04 |
| | ROOF-111 | | - | 0.07 | - | - | 0.07 |
| | ROOF-112 | | - | 0.04 | - | - | 0.04 |
| | ROOF-113 | | - | 0.04 | - | - | 0.04 |
| | ROOF-114 | | - | 0.07 | - | - | 0.07 |
| INF-ROOF-114 Total | | 0 | - | 0.25 | - | - | 0.25 |
| INF-ROOF-117 | ROOF-115 | | - | 0.06 | - | - | 0.06 |
| | ROOF-117 | | - | 0.05 | - | - | 0.05 |
| INF-ROOF-117 Total | | 0 | - | 0.11 | - | - | 0.11 |
| INF-ROOF-123 | ROOF-118 | | - | 0.06 | - | - | 0.06 |
| | ROOF-119 | | - | 0.05 | - | - | 0.05 |
| | ROOF-120 | | - | 0.05 | - | - | 0.05 |
| | ROOF-121 | | 0.00 | 0.06 | - | - | 0.06 |
| | ROOF-122 | | 0.03 | - | - | - | - |
| | ROOF-123 | | 0.06 | - | - | - | - |
| INF-ROOF-123 Total | | 0 | 0.09 | 0.22 | - | - | 0.22 |
| INF-ROOF-16 | ROOF-14 | | - | 0.03 | - | - | 0.03 |
| | ROOF-15 | | - | 0.03 | - | - | 0.03 |
| | ROOF-16 | | - | 0.05 | - | - | 0.05 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| INF-ROOF-16 Total | | 0 | - | 0.11 | - | - | 0.11 |
| INF-ROOF-19 | ROOF-17 | | - | 0.07 | - | - | 0.07 |
| | ROOF-18 | | - | 0.03 | - | - | 0.03 |
| | ROOF-19 | | - | 0.03 | - | - | 0.03 |
| INF-ROOF-19 Total | | 0 | - | 0.14 | - | - | 0.14 |
| INF-ROOF-23 | ROOF-20 | | - | 0.03 | - | - | 0.03 |
| | ROOF-21 | | - | 0.03 | - | - | 0.03 |
| | ROOF-22 | | - | 0.03 | - | - | 0.03 |
| | ROOF-23 | | - | 0.03 | - | - | 0.03 |
| INF-ROOF-23 Total | | 0 | - | 0.13 | - | - | 0.13 |
| INF-ROOF-25 | ROOF-24 | | - | 0.07 | - | - | 0.07 |
| | ROOF-25 | | - | 0.04 | - | - | 0.04 |
| INF-ROOF-25 Total | | 0 | - | 0.11 | - | - | 0.11 |
| INF-ROOF-3 | ROOF-30 | | - | 0.11 | - | - | 0.11 |
| | ROOF-31 | | - | 0.06 | - | - | 0.06 |
| | ROOF-32 | | - | 0.03 | - | - | 0.03 |
| | ROOF-33 | | - | 0.03 | - | - | 0.03 |
| | ROOF-37 | | - | 0.03 | - | - | 0.03 |
| | ROOF-38 | | - | 0.03 | - | - | 0.03 |
| | ROOF-39 | | - | 0.03 | - | - | 0.03 |
| | ROOF-40 | | 0.01 | 0.02 | - | - | 0.02 |
| | ROOF-44 | | 0.03 | - | - | - | - |
| INF-ROOF-3 Total | | 0 | 0.04 | 0.32 | - | - | 0.32 |
| INF-ROOF-36 | ROOF-29 | | - | 0.11 | - | - | 0.11 |
| | ROOF-34 | | - | 0.04 | - | - | 0.04 |
| | ROOF-35 | | - | 0.04 | - | - | 0.04 |
| | ROOF-36 | | - | 0.04 | - | - | 0.04 |
| INF-ROOF-36 Total | | 0 | - | 0.21 | - | - | 0.21 |
| INF-ROOF-43 | ROOF-41 | | 0.03 | 0.01 | - | - | 0.01 |
| | ROOF-42 | | 0.02 | 0.02 | - | - | 0.02 |
| | ROOF-43 | | 0.01 | 0.02 | - | - | 0.02 |
| INF-ROOF-43 Total | | 0 | 0.05 | 0.05 | - | - | 0.05 |
| INF-ROOF-53 | ROOF-45 | | 0.03 | - | - | - | - |
| | ROOF-47 | | 0.03 | - | - | - | - |
| | ROOF-49 | | 0.03 | - | - | - | - |
| | ROOF-51 | | 0.03 | - | - | - | - |
| | ROOF-53 | | 0.07 | - | - | - | - |
| INF-ROOF-53 Total | | 0 | 0.17 | - | - | - | - |
| INF-ROOF-55 | ROOF-46 | | 0.03 | - | - | - | - |
| | ROOF-48 | | 0.03 | - | - | - | - |
| | ROOF-50 | | 0.03 | - | - | - | - |
| | ROOF-52 | | 0.03 | - | - | - | - |
| | ROOF-54 | | 0.07 | - | - | - | - |
| | ROOF-55 | | 0.07 | - | - | - | - |
| INF-ROOF-55 Total | | 0 | 0.25 | - | - | - | - |
| INF-ROOF-62 | ROOF-57 | | 0.07 | 0.00 | - | - | 0.00 |
| | ROOF-62 | | - | 0.07 | - | - | 0.07 |
| INF-ROOF-62 Total | | 0 | 0.07 | 0.07 | - | - | 0.07 |
| INF-ROOF-63 | ROOF-56 | | 0.11 | - | - | - | - |
| | ROOF-58 | | 0.07 | - | - | - | - |
| | ROOF-59 | | 0.10 | - | - | - | - |
| | ROOF-60 | | 0.07 | - | - | - | - |
| | ROOF-61 | | 0.10 | - | - | - | - |
| | ROOF-63 | | - | 0.07 | - | - | 0.07 |
| INF-ROOF-63 Total | | 0 | 0.44 | 0.07 | - | - | 0.07 |
| INF-ROOF-67 | ROOF-65 | | - | 0.10 | - | - | 0.10 |
| | ROOF-67 | | - | 0.11 | - | - | 0.11 |
| INF-ROOF-67 Total | | 0 | - | 0.21 | - | - | 0.21 |
| INF-ROOF-71 | ROOF-64 | | - | 0.10 | - | - | 0.10 |
| | ROOF-66 | | - | 0.07 | - | - | 0.07 |
| | ROOF-68 | | - | 0.10 | - | - | 0.10 |
| | ROOF-70 | | 0.02 | 0.04 | - | - | 0.04 |
| | ROOF-71 | | 0.03 | - | - | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| INF-ROOF-71 Total | | 0 | 0.05 | 0.31 | - | - | 0.31 |
| INF-ROOF-76 | ROOF-69 | | - | 0.07 | - | - | 0.07 |
| | ROOF-72 | | 0.00 | 0.02 | - | - | 0.02 |
| | ROOF-74 | | 0.01 | 0.02 | - | - | 0.02 |
| | ROOF-76 | | 0.01 | 0.02 | - | - | 0.02 |
| | ROOF-78 | | 0.03 | 0.02 | - | - | 0.02 |
| INF-ROOF-76 Total | | 0 | 0.06 | 0.14 | - | - | 0.14 |
| INF-ROOF-89 | ROOF-73 | | 0.03 | - | - | - | - |
| | ROOF-75 | | 0.03 | - | - | - | - |
| | ROOF-77 | | 0.03 | - | - | - | - |
| | ROOF-79 | | 0.05 | - | - | - | - |
| | ROOF-81 | | 0.03 | - | - | - | - |
| | ROOF-83 | | 0.03 | - | - | - | - |
| | ROOF-85 | | 0.03 | - | - | - | - |
| | ROOF-87 | | 0.03 | - | - | - | - |
| | ROOF-89 | | 0.07 | - | - | - | - |
| INF-ROOF-89 Total | | 0 | 0.32 | - | - | - | - |
| INF-ROOF-90 | ROOF-80 | | 0.01 | 0.01 | - | - | 0.01 |
| | ROOF-82 | | 0.01 | 0.02 | - | - | 0.02 |
| | ROOF-84 | | 0.00 | 0.03 | - | - | 0.03 |
| | ROOF-86 | | - | 0.03 | - | - | 0.03 |
| | ROOF-88 | | - | 0.03 | - | - | 0.03 |
| | ROOF-90 | | - | 0.11 | - | - | 0.11 |
| INF-ROOF-90 Total | | 0 | 0.02 | 0.23 | - | - | 0.23 |
| INF-ROOF-94 | ROOF-105 | | - | 0.05 | - | - | 0.05 |
| | ROOF-92 | | - | 0.05 | - | - | 0.05 |
| | ROOF-94 | | - | 0.03 | - | - | 0.03 |
| INF-ROOF-94 Total | | 0 | - | 0.14 | - | - | 0.14 |
| INF-ROOF-95 | ROOF-91 | | 0.03 | 0.04 | - | - | 0.04 |
| | ROOF-93 | | 0.03 | 0.03 | - | - | 0.03 |
| | ROOF-95 | | 0.02 | 0.00 | - | - | 0.00 |
| INF-ROOF-95 Total | | 0 | 0.08 | 0.08 | - | - | 0.08 |
| INF-ROOF-96 | ROOF-96 | | - | 0.10 | - | - | 0.10 |
| | ROOF-97 | | - | 0.11 | - | - | 0.11 |
| INF-ROOF-96 Total | | 0 | - | 0.21 | - | - | 0.21 |
| N/A | E 1.1B-2 | | 0.23 | 0.48 | - | - | 0.48 |
| | E 1.1B-4 | | - | 0.03 | - | - | 0.03 |
| | E 1.2A-2 | | - | 0.00 | - | - | 0.00 |
| | E 1.2B-1 | | - | 0.01 | - | - | 0.01 |
| | E 1.2C-1 | | - | 0.05 | - | - | 0.05 |
| | E 1.2C-2 | | - | 0.00 | - | - | 0.00 |
| | RG-W-1 | | 0.59 | 0.19 | - | - | 0.19 |
| | RG-W-2 | | 0.29 | 0.51 | - | - | 0.51 |
| | RG-W-4 | | 0.00 | 0.79 | - | - | 0.79 |
| | RG-W-5 | | 0.00 | 0.21 | - | - | 0.21 |
| | ROOF-1 | | 0.03 | 0.07 | - | - | 0.07 |
| | ROOF-MAIL29 | | - | 0.00 | - | - | 0.00 |
| | ROOF-MAIL64 | | - | 0.00 | - | - | 0.00 |
| | ROOF-MAIL8 | | - | 0.00 | - | - | 0.00 |
| | ROOF-MAIL91 | | - | 0.00 | - | - | 0.00 |
| | S-LD-1 | | - | 0.08 | - | - | 0.08 |
| | W-CULV-N | | 0.13 | 0.01 | - | - | 0.01 |
| N/A Total | | 0 | 1.28 | 2.44 | - | - | 2.44 |
| RG-E-1 | RG-E-1 | | 0.10 | 0.73 | - | - | 0.73 |
| RG-E-1 Total | | 0 | 0.10 | 0.73 | - | - | 0.73 |
| RG-E-2 | RG-E-2 | | - | 0.22 | - | - | 0.22 |
| RG-E-2 Total | | 0 | - | 0.22 | - | - | 0.22 |
| RG-E-9 | RG-E-9A | | 0.15 | 0.38 | - | - | 0.38 |
| | RG-E-9B | | 0.02 | 0.14 | - | - | 0.14 |
| | ROOF-BS1 | | - | 0.00 | - | - | 0.00 |
| | ROOF-POOL | | - | 0.01 | - | - | 0.01 |
| | ROOF-RECY | | - | 0.02 | - | - | 0.02 |
| | S-CB-E-1 | | - | 0.51 | - | - | 0.51 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| RG-E-9 Total | | 0 | 0.17 | 1.07 | - | - | 1.07 |
| RG-W-3 | RG-W-3 | | 0.30 | 0.08 | - | - | 0.08 |
| | RG-W-3A | | 0.19 | 0.41 | - | - | 0.41 |
| RG-W-3 Total | | 0 | 0.49 | 0.49 | - | - | 0.49 |
| DET-3 | ROOF-2 | | - | 0.12 | - | - | 0.12 |
| | ROOF-3 | | - | 0.25 | - | - | 0.25 |
| | ROOF-4 | | - | 0.22 | - | - | 0.22 |
| | ROOF-MAIL20 | | - | 0.00 | - | - | 0.00 |
| | S-DET-3 | | - | 0.06 | - | - | 0.06 |
| DET-3 Total | | 0 | - | 0.66 | - | - | 0.66 |
| DET-2 | ROOF-5 | | - | 0.23 | - | - | 0.23 |
| | ROOF-6 | | - | 0.23 | - | - | 0.23 |
| | ROOF-9 | | - | 0.11 | - | - | 0.11 |
| | ROOF-MAIL5 | | - | 0.00 | - | - | 0.00 |
| | S-LD-11 | | - | 0.06 | - | - | 0.06 |
| DET-2 Total | | 0 | - | 0.63 | - | - | 0.63 |
| DET-1 | ROOF-10 | | - | 0.10 | - | - | 0.10 |
| | ROOF-11 | | - | 0.11 | - | - | 0.11 |
| | ROOF-8 | | - | 0.26 | - | - | 0.26 |
| | ROOF-MAINT11 | | - | 0.03 | - | - | 0.03 |
| | S-DET-1 | | - | 0.02 | - | - | 0.02 |
| DET-1 Total | | 0 | - | 0.52 | - | - | 0.52 |
| INF-E-1 | ROOF-PL11 | | - | 0.03 | - | - | 0.03 |
| | S-INF-E-1 | | - | 0.56 | - | - | 0.56 |
| INF-E-1 Total | | 0 | - | 0.59 | - | - | 0.59 |
| P-RG-W-3 | W-D-1 | | 0.04 | 0.00 | - | - | 0.00 |
| P-RG-W-3 Total | | 0 | 0.04 | 0.00 | - | - | 0.00 |
| RG-E-4B | RG-E-4B | | - | 0.31 | - | - | 0.31 |
| RG-E-4B Total | | 0 | - | 0.31 | - | - | 0.31 |
| INF-ROOF-13 | ROOF-12 | | - | 0.05 | - | - | 0.05 |
| | ROOF-13 | | - | 0.03 | - | - | 0.03 |
| INF-ROOF-13 Total | | 0 | - | 0.08 | - | - | 0.08 |
| INF-ROOF-28 | ROOF-26 | | - | 0.11 | - | - | 0.11 |
| | ROOF-27 | | - | 0.10 | - | - | 0.10 |
| | ROOF-28 | | - | 0.07 | - | - | 0.07 |
| INF-ROOF-28 Total | | 0 | - | 0.27 | - | - | 0.27 |
| Grand Total | | | 3.72 | 15.91 | - | - | 19.63 |

## Required Recharge Volume (Cubic Feet)

| HSG | Area (acres) | Recharge Depth* (in.) | Volume (c.f.) |
|---|---|---|---|
| **A** | 3.7 | 0.60 | 8,101 |
| **B** | 15.9 | 0.35 | 20,213 |
| **C** | 0.0 | 0.25 | 0 |
| **D** | 0.0 | 0.10 | 0 |
| **TOTAL** | 19.6 | 1.3 | **28,314** |

Assumptions:

* Massachusetts DEP Infiltration requirement: HSG A = 0.60 in; HSG B = 0.35 in; HSG C = 0.25 in; HSG D = 0.10 in.

## Capture Area Adjustment

| | | |
|---|---|---|
| Required Recharge Volume | 28,314 | c.f. |
| Total Site Impervious Area | 19.63 | acres |
| Total Site Impervious Area Draining to Recharge Facilities | 17.19 | acres |
| Capture Area Adjustment Factor | 1.14 | - |

**Adjusted Required Recharge Volume: 32,325 c.f.**

**Subsurface (and surface) Infiltration Structures (Recharge Volume and Drawdown Time)**

Infiltration Volumes Provided in Basin below Overflow Weir

| Basin | Area (s.f.) | Volume Stored* (c.f.) | Drawdown (in/hr)** | Infiltration Rate (c.f.s) | Drawdown (hours) | Volume Infiltrated in 72 hours (c.f) |
|---|---|---|---|---|---|---|
| **INF-E-1** | 1,721 | 2,722 | **0.27** | 0.011 | 70 | 2,722 |
| **INF-E-2** | 1,721 | 2,759 | **0.27** | 0.011 | 71 | 2,759 |
| **INF-E-3** | 6,284 | 6,400 | **0.17** | 0.025 | 72 | 6,400 |
| **INF-E-4A** | 2,089 | 3,372 | **0.27** | 0.013 | 72 | 3,372 |
| **INF-E-4B** | 1,273 | 2,050 | **0.27** | 0.008 | 72 | 2,050 |
| **DET-1** | 3,630 | 5,881 | **0.27** | 0.023 | 72 | 5,881 |
| **DET-2** | 1,079 | 1,748 | **0.27** | 0.007 | 72 | 1,748 |
| **DET-3** | 1,458 | 2,362 | **0.27** | 0.009 | 72 | 2,362 |
| **Totals** | | 27,294 | | | | |

* Volume stored in the infiltration structure and stone bedding below the bleeder in the outlet control structure.

** Rawls infiltration rates assumed. Will be verified in the field prior to construction.

| Rain Garden | Bottom Area (s.f.) | Volume Stored** (c.f.) | Drawdown (in/hr)*** | Infiltration Rate (c.f.s) | Drawdown (hours) | Volume Infiltrated in 72 hours (c.f) |
|---|---|---|---|---|---|---|
| **RG-E-1** | 1,669 | 2,870 | **0.30** | 0.012 | 69 | 2,870 |
| **RG-E-2** | 959 | 866 | **0.17** | 0.004 | 64 | 866 |
| **RG-E-4A*** | 371 | 424 | 1.00 | 0.009 | 14 | 424 |
| **RG-E-4B*** | 1,097 | 1,060 | 1.00 | 0.025 | 12 | 1,060 |
| **RG-E-7*** | 3,678 | 2,434 | 1.00 | 0.085 | 8 | 2,434 |
| **RG-E-8*** | 2,972 | 1,042 | 1.00 | 0.069 | 4 | 1,042 |
| **RG-E-9** | 2,666 | 4,521 | **0.30** | 0.019 | 68 | 4,521 |
| **RG-W-2*** | 3,744 | 5,251 | 1.00 | 0.087 | 17 | 5,251 |
| **RG-W-3** | 1,954 | 9,915 | **0.85** | 0.038 | 72 | 9,915 |
| **RG-W-4*** | 1,710 | 2,825 | 1.00 | 0.040 | 20 | 2,825 |
| **RG-W-5** | 534 | 318 | **0.10** | 0.001 | 71 | 318 |
| **Totals** | | 8,697 | | | | |

* These rain gardens exfiltrate to the stormwater management system, not to groundwater.

**Cumulative Volume Below Outlet Structure

** *Minimum infiltration rate to achieve infiltration in 72 hours. Will be verified in the field prior to construction.

## Recharge Volume Summary

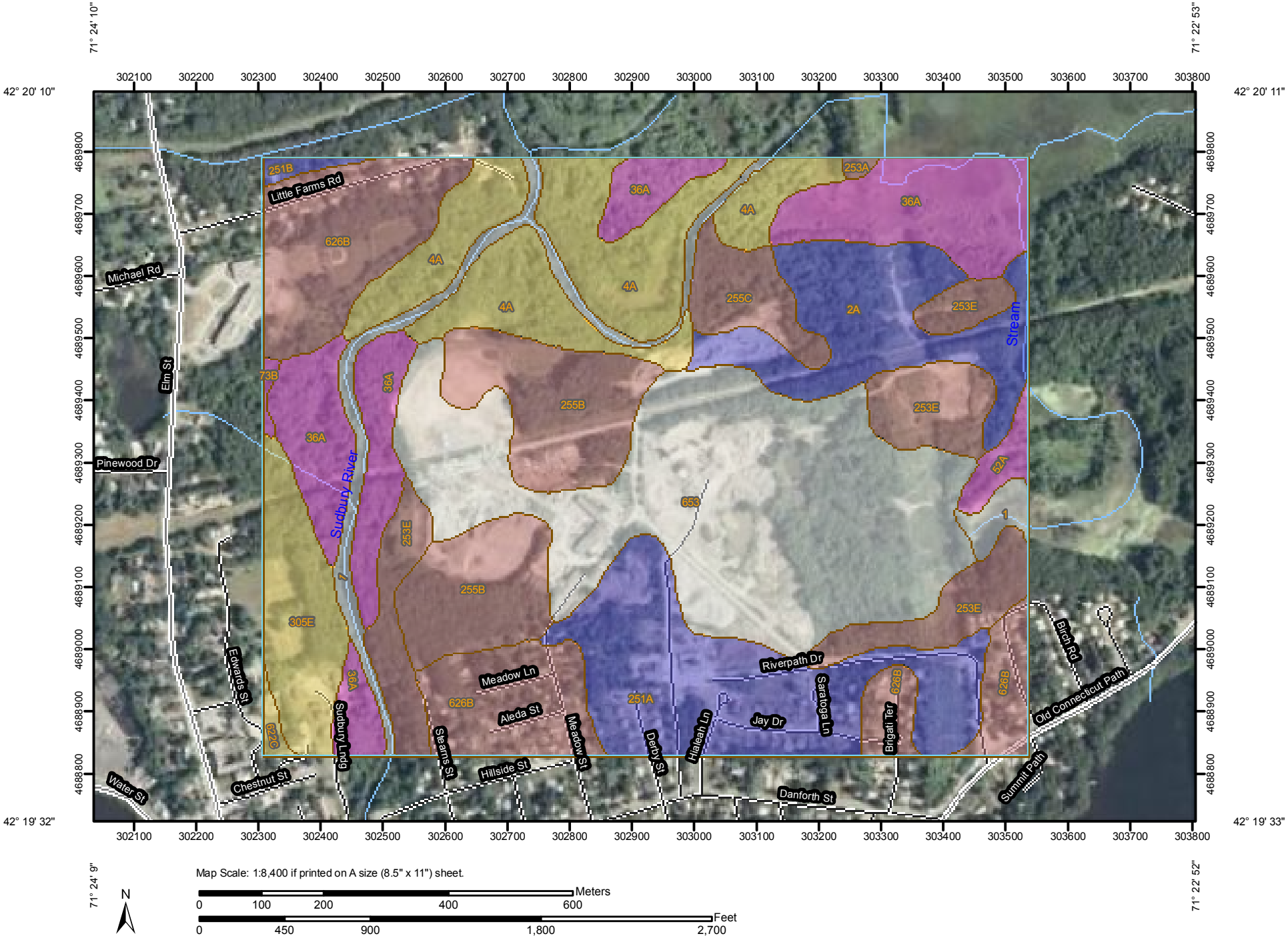
| Recharge Volume Provided Per Basin | Total Volume Provided | in 72 hours |
|---|---|---|
| **INF-E-1** | 2,722 | 2,722 c.f. |
| **INF-E-2** | 2,759 | 2,759 c.f. |
| **INF-E-3** | 6,400 | 6,400 c.f. |
| **INF-E-4A** | 3,372 | 3,372 c.f. |
| **INF-E-4B** | 2,050 | 2,050 c.f. |
| **DET-1** | 5,881 | 5,881 c.f. |
| **DET-2** | 1,748 | 1,748 c.f. |
| **DET-3** | 2,362 | 2,362 |
| **RG-E-1** | 2,870 | 2,870 c.f. |
| **RG-E-2** | 866 | 866 c.f. |
| **RG-E-4A*** | | 0 |
| **RG-E-4B*** | | 0 |
| **RG-E-7*** | | 0 |
| **RG-E-8*** | | 0 |
| **RG-E-9** | 4,521 | 4,521 |
| **RG-W-2*** | | 0 |
| **RG-W-3** | 9,915 | 9,915 c.f. |
| **RG-W-4*** | | 0 |
| **RG-W-5** | 318 | 318 c.f. |
| **Dry Wells (qty = 106 x 524 cu. ft. each) **** | 55,544 | |
| **Total Recharge Volume Provided:** | **101,329 c.f.** | **45,785 c.f.** |

* These rain gardens exfiltrate to the stormwater management system, not to groundwater.

** The 72-hour infiltration volume provided by the individual dry wells will vary. To be conservative, the volume recharged by the dry wells in 72 hours is not included in this calculation.

**Adjusted Required Recharge Volume:** **32,325 c.f.**

The project provides sufficient recharge volume to meet the groundwater recharge requirements within the 72-hour period following storm events.


71° 24' 10"
71° 22' 53"
42° 20' 10"
42° 20' 11"
42° 19' 32"
42° 19' 33"
71° 24' 9"
71° 22' 52"
302100
302200
302300
302400
302500
302600
302700
302800
302900
303000
303100
303200
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303800
4689800
4689700
4689600
4689500
4689400
4689300
4689200
4689100
4689000
4688900
4688800
251B
Little Farms Rd
626B
4A
36A
253A
Michael Rd
Elm St
73B
Pinewood Dr
Sudbury River
255B
255C
2A
253E
Stream
52A
653
1
305E
Edwards St
Meadow Ln
Riverpath Dr
Saratoga Ln
Birch Rd
Old Connecticut Path
626C
Sudbury Lndg
Aleda St
Stearns St
Meadow St
251A
Derby St
Hialeah Ln
Jay Dr
Brigati Ter
Water St
Chestnut St
Hillside St
Danforth St
Summit Path
Map Scale: 1:8,400 if printed on A size (8.5" x 11") sheet.
N
Meters
0
100
200
400
600
Feet
0
450
900
1,800
2,700

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

- Soil Map Units

**Soil Ratings**

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

**Political Features**

- Cities

**Water Features**

- Streams and Canals

**Transportation**

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

## MAP INFORMATION

Map Scale: 1:8,400 if printed on A size (8.5" × 11") sheet.

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 19N NAD83

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

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 12, Feb 26, 2010

Date(s) aerial images were photographed: 7/10/2003

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

# Hydrologic Soil Group

| Hydrologic Soil Group— Summary by Map Unit — Middlesex County, Massachusetts (MA017) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 1 | Water | | 9.9 | 3.4% |
| 2A | Pootatuck fine sandy loam, 0 to 3 percent slopes | B | 19.9 | 6.8% |
| 4A | Rippowam fine sandy loam, 0 to 3 percent slopes | C | 31.9 | 10.9% |
| 36A | Saco mucky silt loam, 0 to 1 percent slopes | D | 33.3 | 11.4% |
| 52A | Freetown muck, 0 to 1 percent slopes | D | 2.4 | 0.8% |
| 73B | Whitman fine sandy loam, 0 to 5 percent slopes, extremely stony | D | 0.5 | 0.2% |
| 251A | Haven silt loam, 0 to 3 percent slopes | B | 30.4 | 10.4% |
| 251B | Haven silt loam, 3 to 8 percent slopes | B | 1.0 | 0.3% |
| 253A | Hinckley loamy sand, 0 to 3 percent slopes | A | 0.4 | 0.1% |
| 253E | Hinckley loamy sand, 25 to 35 percent slopes | A | 20.9 | 7.2% |
| 255B | Windsor loamy sand, 3 to 8 percent slopes | A | 25.5 | 8.7% |
| 255C | Windsor loamy sand, 8 to 15 percent slopes | A | 6.4 | 2.2% |
| 305E | Paxton fine sandy loam, 25 to 35 percent slopes | C | 11.7 | 4.0% |
| 622C | Paxton-Urban land complex, 3 to 15 percent slopes | C | 0.9 | 0.3% |
| 626B | Merrimac-Urban land complex, 0 to 8 percent slopes | A | 35.1 | 12.0% |
| 653 | Udorthents, sandy | | 62.0 | 21.2% |
| **Totals for Area of Interest** | | | **292.1** | **100.0%** |

## Description

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

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

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

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

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

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

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

## Rating Options

*Aggregation Method:* Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

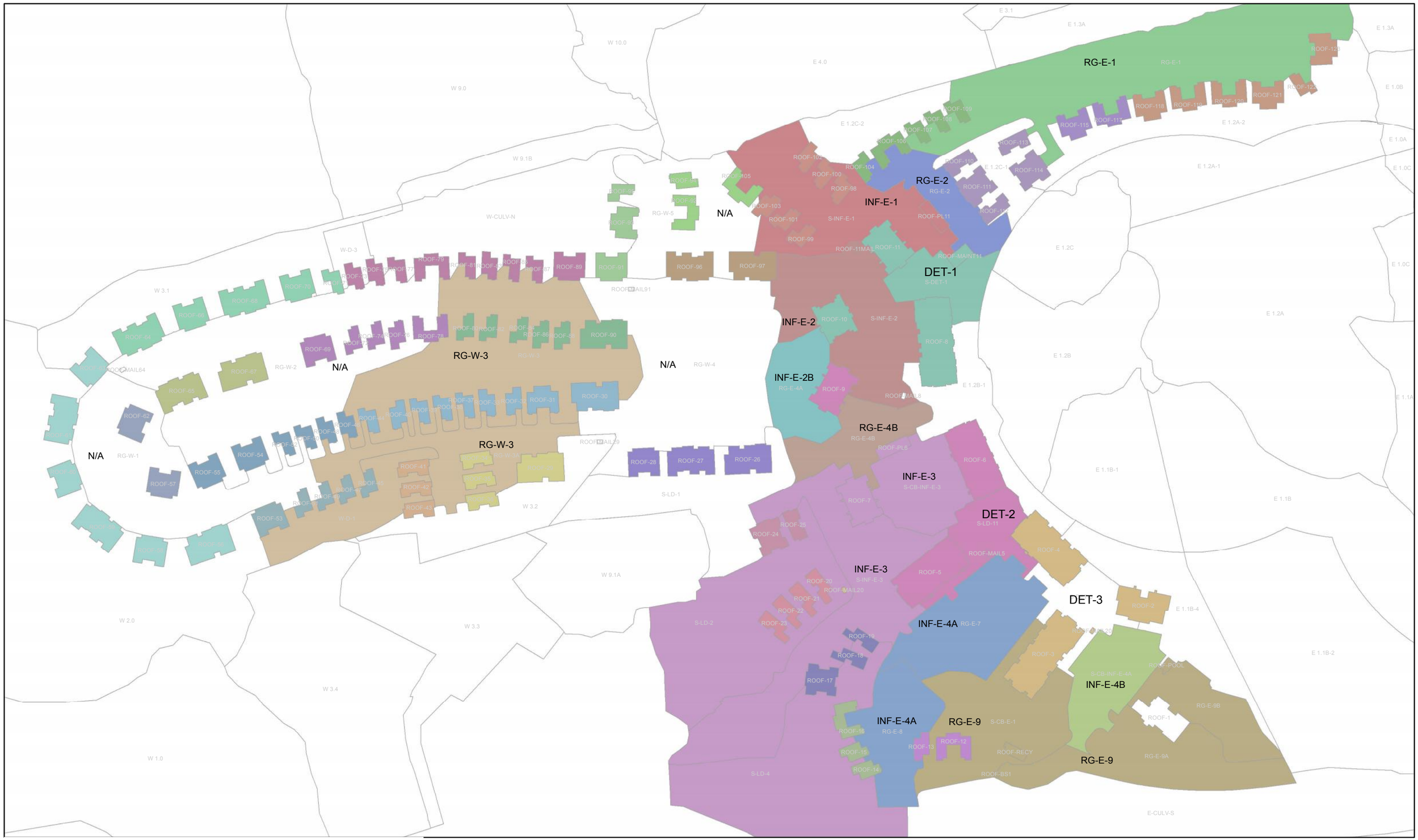
The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

*Component Percent Cutoff: None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

*Tie-break Rule:* Higher

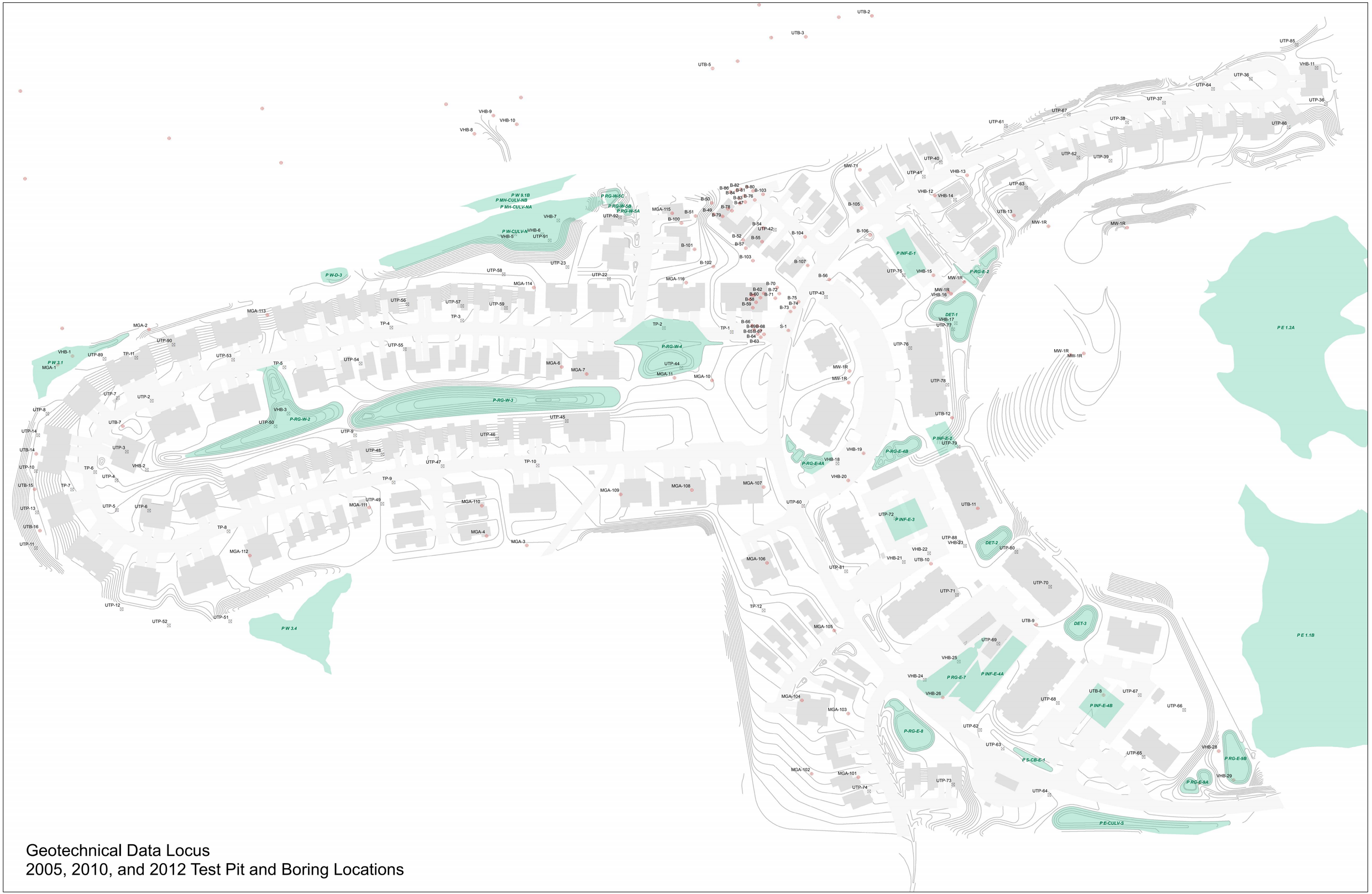
The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.




Vanasse Hangen Brustlin, Inc.

Danforth Green
Riverpath Drive
Framingham, MA

Figure
Stormwater Report
Recharge



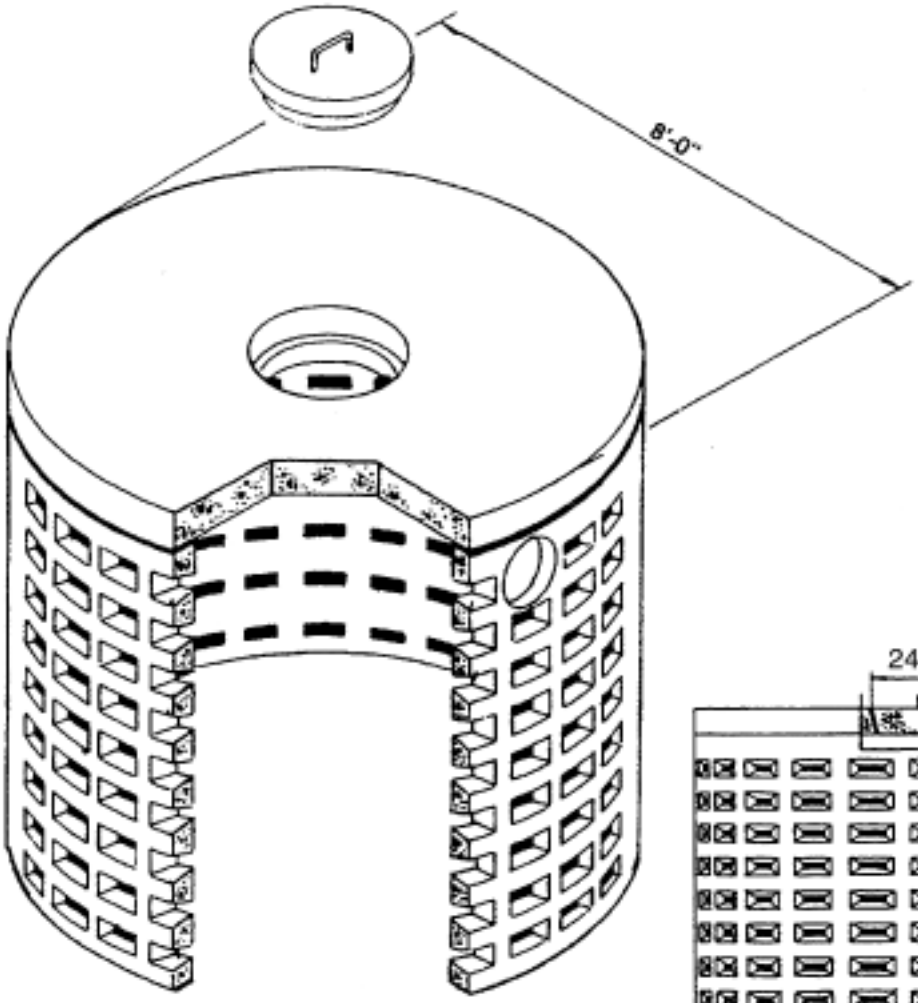

Geotechnical Data Locus
2005, 2010, and 2012 Test Pit and Boring Locations

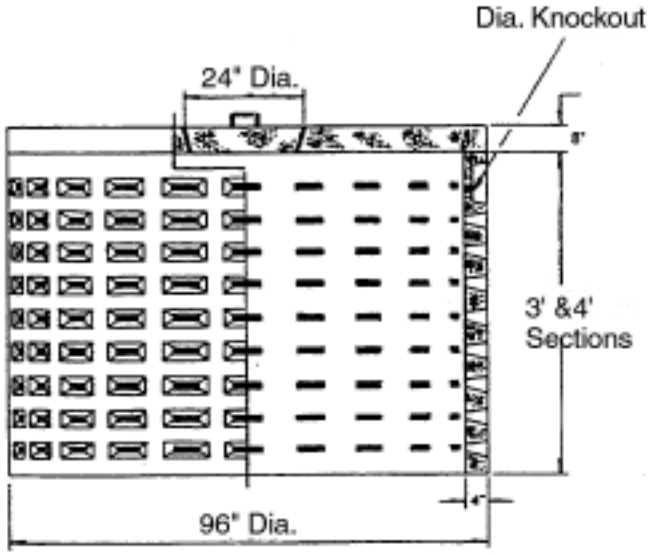
SRP
SCITUATE PRECAST
*If You Can Draw it - We Can Build it*
1-800-440-0009 • 781-837-1747 • fax 781-837-4320
Box 636 • Clay Pit Road • Marshfield, MA 02050

**Leaching Chambers**
8FT Dia. Precast Dry Well

Design notes:
1. Concrete 4,000 P.S.I. @28 days
2. Cement: Portland type II per ASTM C-150-81
3. Steel reinforcement per ASTM A-615 grade 60
4. Design loading per AASHTO HS-10 or HD
5. One foot in height = 313 gallons
6. Covers are AASHTO HS-20

DW 8'-3' High
DW 8'-4' High
DW 8'-6' High
DW 8'-7' High
DW 8'-8' High
DW 8'-9' High
DW 8'-10' High



# StormTech SC-740 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.

StormTech®
*Detention • Retention • Recharge*
Subsurface Stormwater Management℠

**StormTech SC-740 Chamber**
(not to scale)

Nominal Chamber Specifications

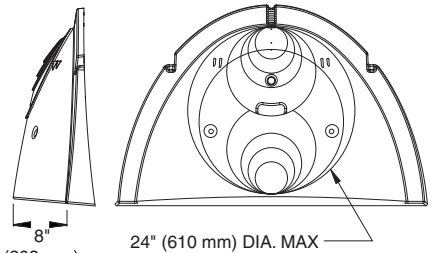
**Size** (L x W x H)
85.4" x 51.0" x 30.0"
(2170 x 1295 x 762 mm)

**Chamber Storage**
45.9 ft³ (1.30 m³)

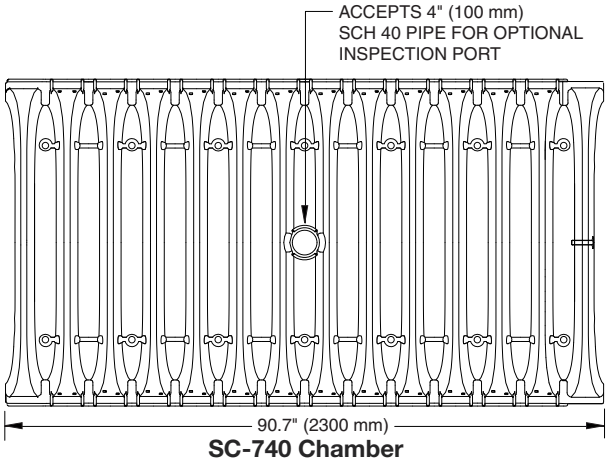
**Minimum Installed Storage***
74.9 ft³ (2.12 m³)

**Weight**
74.0 lbs (33.6 kg)

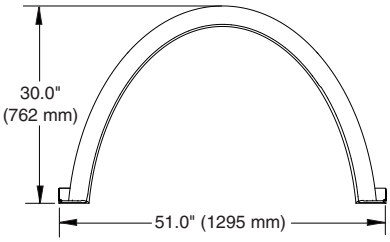
**Shipping**
30 chambers/pallet
60 end caps/pallet
12 pallets/truck

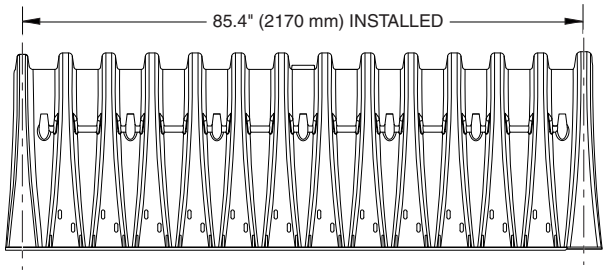



**SC-740 End Cap**

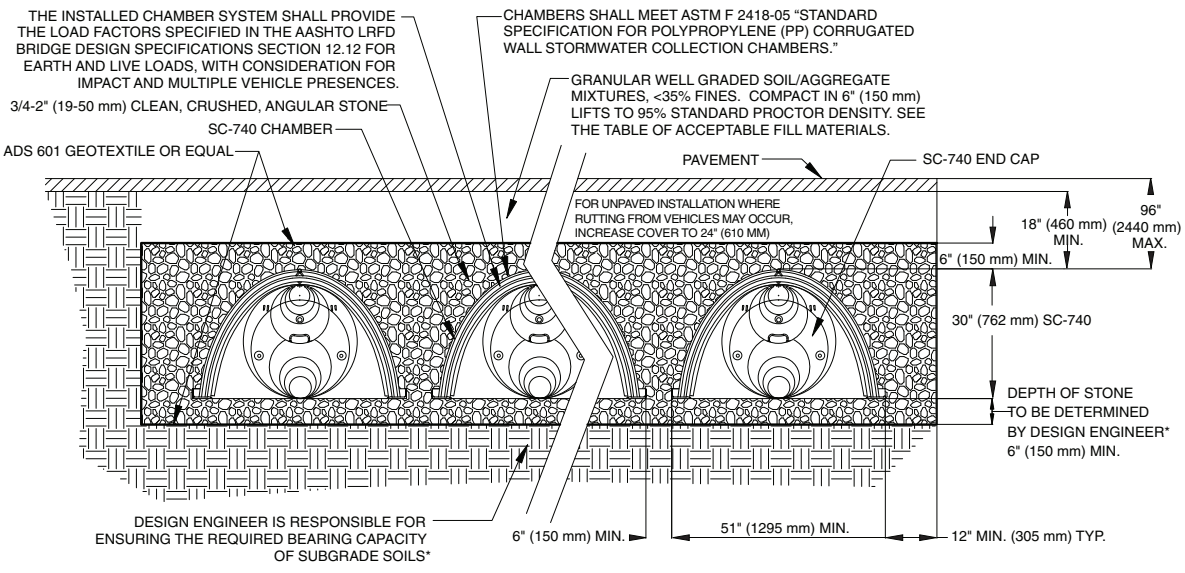



**SC-740 Chamber**




**Typical Cross Section Detail**
(not to scale)




THIS CROSS SECTION DETAILS THE REQUIREMENTS NECESSARY TO SATISFY THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS USING STORMTECH CHAMBERS

MADE IN THE U.S.A.

**SC-740 Cumulative Storage Volumes Per Chamber**

*Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (152 mm) Stone Base Under the Chambers.*

| Depth of Water in System Inches (mm) | Cumulative Chamber Storage Ft³ (m³) | Total System Cumulative Storage Ft³ (m³) |
|---|---|---|
| 42 (1067) | 45.90 (1.300) | 74.90 (2.121) |
| 41 (1041) | 45.90 (1.300) | 73.77 (2.089) |
| 40 (1016) | Stone 45.90 (1.300) | 72.64 (2.057) |
| 39 (991) | Cover 45.90 (1.300) | 71.52 (2.025) |
| 38 (965) | 45.90 (1.300) | 70.39 (1.993) |
| 37 (948) | 45.90 (1.300) | 69.26 (1.961) |
| 36 (914) | 45.90 (1.300) | 68.14 (1.929) |
| 35 (889) | 45.85 (1.298) | 66.98 (1.897) |
| 34 (864) | 45.69 (1.294) | 65.75 (1.862) |
| 33 (838) | 45.41 (1.286) | 64.46 (1.825) |
| 32 (813) | 44.81 (1.269) | 62.97 (1.783) |
| 31 (787) | 44.01 (1.246) | 61.36 (1.737) |
| 30 (762) | 43.06 (1.219) | 59.66 (1.689) |
| 29 (737) | 41.98 (1.189) | 57.89 (1.639) |
| 28 (711) | 40.80 (1.155) | 56.05 (1.587) |
| 27 (686) | 39.54 (1.120) | 54.17 (1.534) |
| 26 (660) | 38.18 (1.081) | 52.23 (1.479) |
| 25 (635) | 36.74 (1.040) | 50.23 (1.422) |
| 24 (610) | 35.22 (0.977) | 48.19 (1.365) |
| 23 (584) | 33.64 (0.953) | 46.11 (1.306) |
| 22 (559) | 31.99 (0.906) | 44.00 (1.246) |
| 21 (533) | 30.29 (0.858) | 41.85 (1.185) |
| 20 (508) | 28.54 (0.808) | 39.67 (1.123) |
| 19 (483) | 26.74 (0.757) | 37.47 (1.061) |
| 18 (457) | 24.89 (0.705) | 35.23 (0.997) |
| 17 (432) | 23.00 (0.651) | 32.96 (0.939) |
| 16 (406) | 21.06 (0.596) | 30.68 (0.869) |
| 15 (381) | 19.09 (0.541) | 28.36 (0.803) |
| 14 (356) | 17.08 (0.484) | 26.03 (0.737) |
| 13 (330) | 15.04 (0.426) | 23.68 (0.670) |
| 12 (305) | 12.97 (0.367) | 21.31 (0.608) |
| 11 (279) | 10.87 (0.309) | 18.92 (0.535) |
| 10 (254) | 8.74 (0.247) | 16.51 (0.468) |
| 9 (229) | 6.58 (0.186) | 14.09 (0.399) |
| 8 (203) | 4.41 (0.125) | 11.66 (0.330) |
| 7 (178) | 2.21 (0.063) | 9.21 (0.264) |
| 6 (152) | 0 | 6.76 (0.191) |
| 5 (127) | 0 | 5.63 (0.160) |
| 4 (102) | Stone Foundation 0 | 4.51 (0.125) |
| 3 (76) | 0 | 3.38 (0.095) |
| 2 (51) | 0 | 2.25 (0.064) |
| 1 (25) | 0 | 1.13 (0.032) |

*Note: Add 1.13 cu. ft. (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.*

**Storage Volume Per Chamber**

| | Bare Chamber Storage ft³ (m³) | Chamber and Stone Stone Foundation Depth in. (mm) | | |
|---|---|---|---|---|
| | | 6 (150) | 12 (305) | 18 (460) |
| **StormTech SC-740** | 45.9 (1.3) | 74.9 (2.1) | 81.7 (2.3) | 88.4 (2.5) |

*Note: Storage volumes are in cubic feet per chamber. Assumes 40% porosity for the stone plus the chamber volume.*

**Amount of Stone Per Chamber**

| | Stone Foundation Depth | | |
|---|---|---|---|
| ENGLISH TONS (CUBIC YARDS) | 6" | 12" | 18" |
| **StormTech SC-740** | 3.8 (2.8 yd³) | 4.6 (3.3 yd³) | 5.5 (3.9 yd³) |
| METRIC KILOGRAMS (METER³) | **150 mm** | **305 mm** | **460 mm** |
| **StormTech SC-740** | 3450 (2.1 m³) | 4170 (2.5 m³) | 4490 (3.0 m³) |

*Note: Assumes 6" (150 mm) of stone above, and between chambers.*

**Volume of Excavation Per Chamber**

| | Stone Foundation Depth | | |
|---|---|---|---|
| | 6" (150 mm) | 12" (305 mm) | 18" (460 mm) |
| **StormTech SC-740** | 5.5 (4.2) | 6.2 (4.7) | 6.8 (5.2) |

*Note: Volumes are in cubic yards (cubic meters) per chamber. Assumes 6" (150 mm) of separation between chamber rows and 18" (460 mm) of cover. The volume of excavation will vary as the depth of the cover increases.*

**STANDARD LIMITED WARRANTY OF STORMTECH LLC ("STORMTECH"): PRODUCTS**

(A) This Limited Warranty applies solely to the StormTech chambers and endplates manufactured by StormTech and sold to the original purchaser (the "Purchaser"). The chambers and endplates are collectively referred to as the "Products."

(B) The structural integrity of the Products, when installed strictly in accordance with StormTech's written installation instructions at the time of installation, are warranted to the Purchaser against defective materials and workmanship for one (1) year from the date of purchase. Should a defect appear in the Limited Warranty period, the Purchaser shall provide StormTech with written notice of the alleged defect at StormTech's corporate headquarters within ten (10) days of the discovery of the defect. The notice shall describe the alleged defect in reasonable detail. StormTech agrees to supply replacements for those Products determined by StormTech to be defective and covered by this Limited Warranty. The supply of replacement products is the sole remedy of the Purchaser for breaches of this Limited Warranty. StormTech's liability specifically excludes the cost of removal and/or installation of the Products.

(C) **THIS LIMITED WARRANTY IS EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE PRODUCTS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANT-ABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.**

(D) This Limited Warranty only applies to the Products when the Products are installed in a single layer. **UNDER NO CIRCUMSTANCES, SHALL THE PRODUCTS BE INSTALLED IN A MULTI-LAYER CONFIGURATION.**

(E) No representative of StormTech has the authority to change this Limited Warranty in any manner or to extend this Limited Warranty. This Limited Warranty does not apply to any person other than to the Purchaser.

(F) Under no circumstances shall StormTech be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the Products, or the cost of other goods or services related to the purchase and installation of the Products. For this Limited Warranty to apply, the Products must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and StormTech's written installation instructions.

(G) **THE LIMITED WARRANTY DOES NOT EXTEND TO INCIDENTAL, CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES. STORMTECH SHALL NOT BE LIABLE FOR PENALTIES OR LIQUIDATED DAMAGES, INCLUDING LOSS OF PRODUCTION AND PROFITS; LABOR AND MATERIALS; OVERHEAD COSTS; OR OTHER LOSS OR EXPENSE INCURRED BY THE PURCHASER OR ANY THIRD PARTY. SPECIFICALLY EXCLUDED FROM LIMITED WARRANTY COVERAGE ARE DAMAGE TO THE PRODUCTS ARISING FROM ORDINARY WEAR AND TEAR; ALTERATION, ACCIDENT, MISUSE, ABUSE OR NEGLECT; THE PRODUCTS BEING SUBJECTED TO VEHICLE TRAFFIC OR OTHER CONDITIONS WHICH ARE NOT PERMITTED BY STORMTECH'S WRITTEN SPECIFICATIONS OR INSTALLATION INSTRUCTIONS; FAILURE TO MAINTAIN THE MINIMUM GROUND COVERS SET FORTH IN THE INSTALLATION INSTRUCTIONS; THE PLACEMENT OF IMPROPER MATERIALS INTO THE PRODUCTS; FAILURE OF THE PRODUCTS DUE TO IMPROPER SITING OR IMPROPER SIZING; OR ANY OTHER EVENT NOT CAUSED BY STORMTECH. THIS LIMITED WARRANTY REPRESENTS STORMTECH'S SOLE LIABILITY TO THE PURCHASER FOR CLAIMS RELATED TO THE PRODUCTS, WHETHER THE CLAIM IS BASED UPON CONTRACT, TORT, OR OTHER LEGAL THEORY.**

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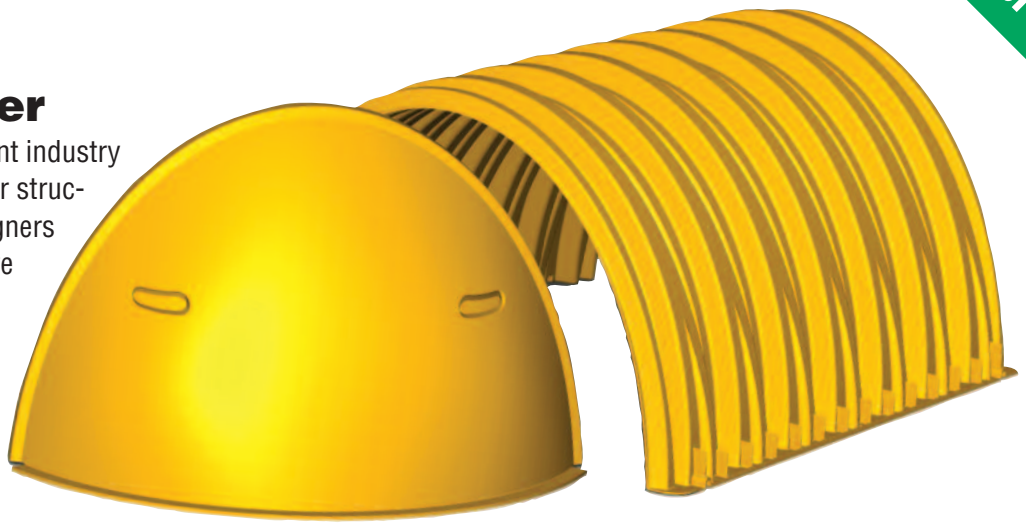
StormTech®
*Detention • Retention • Water Quality*

MC-3500 Chamber

# StormTech MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.



**StormTech MC-3500 Chamber** (not to scale)

Nominal Chamber Specifications

| | |
|---|---|
| Size (L x W x H) | 90" (2286 mm) x 77" (1956 mm) x 45" (1143 mm) |
| Chamber Storage | 109.9 ft³ (3.11 m³) |
| Min. Installed Storage* | 178.9 ft³ (5.06 m³) |
| Weight | 134 lbs (60.8 kg) |

* This assumes a minimum of 12" (305 mm) of stone above, 9" (229 mm) of stone below chambers, 9" (229 mm) row spacing, and 40% stone porosity.

**StormTech MC-3500 End Cap** (not to scale)

Nominal End Cap Specifications

| | |
|---|---|
| Size (L x W x H) | 26.5" (673 mm) x 71" (1803 mm) x 45.1" (1145 mm) |
| End Cap Storage | 15.6 ft³ (0.44 m³) |
| Min. Installed Storage* | 46.9 ft³ (1.33 m³) |
| Weight | 43 lbs (19.5 kg) |

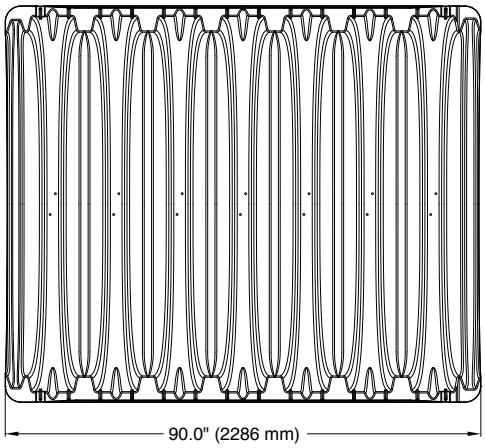
*This assumes a minimum of 12" (305 mm) of stone above, 9" (229 mm) of stone below, 9" (229 mm) row spacing, 6" (152 mm) of stone perimeter, and 40% stone porosity.

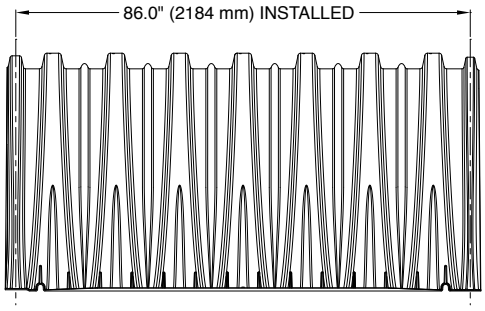
Shipping

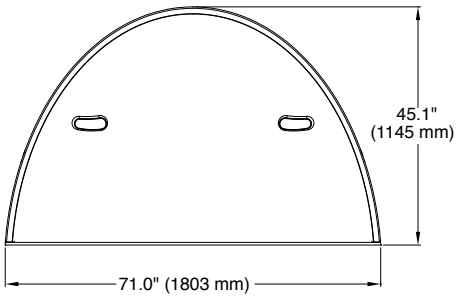
15 chambers/pallet

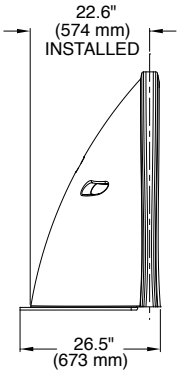
16 end caps/pallet

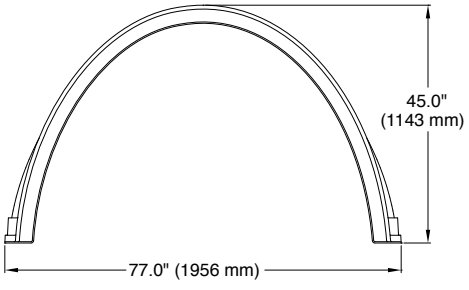
7 pallets/truck



### Storage Volume Per Chamber/End Cap ft³ (m³)

| | Bare Unit Storage | Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm) | | | |
|---|---|---|---|---|---|
| | ft³ (m³) | 9 (229) | 12 (305) | 15 (381) | 18 (457) |
| **MC-3500 Chamber** | 109.9 (3.11) | 178.9 (5.06) | 184.0 (5.21) | 189.2 (5.36) | 194.3 (5.5) |
| **MC-3500 End Cap** | 15.64 (0.44) | 46.9 (1.33) | 48.6 (1.38) | 50.3 (1.43) | 52.0 (1.47) |

*NOTE: Assumes 9" (229 mm) row spacing, 40% stone porosity 12" (305 mm) stone above and includes the bare chamber/end cap volume. End Cap volume assumes 6" (152 mm) stone perimeter.*

### Volume of Excavation Per Chamber/End Cap in yd³ (m³)

| | Stone Foundation Depth in. (mm) | | | |
|---|---|---|---|---|
| | 9 (229) | 12 (305) | 15 (381) | 18 (457) |
| **MC-3500** | 12.4 (9.5) | 12.8 (9.8) | 13.3 (10.2) | 13.8 (10.5) |
| **End Cap** | 4.1 (3.1) | 4.3 (3.3) | 4.4 (3.4) | 4.6 (3.5) |

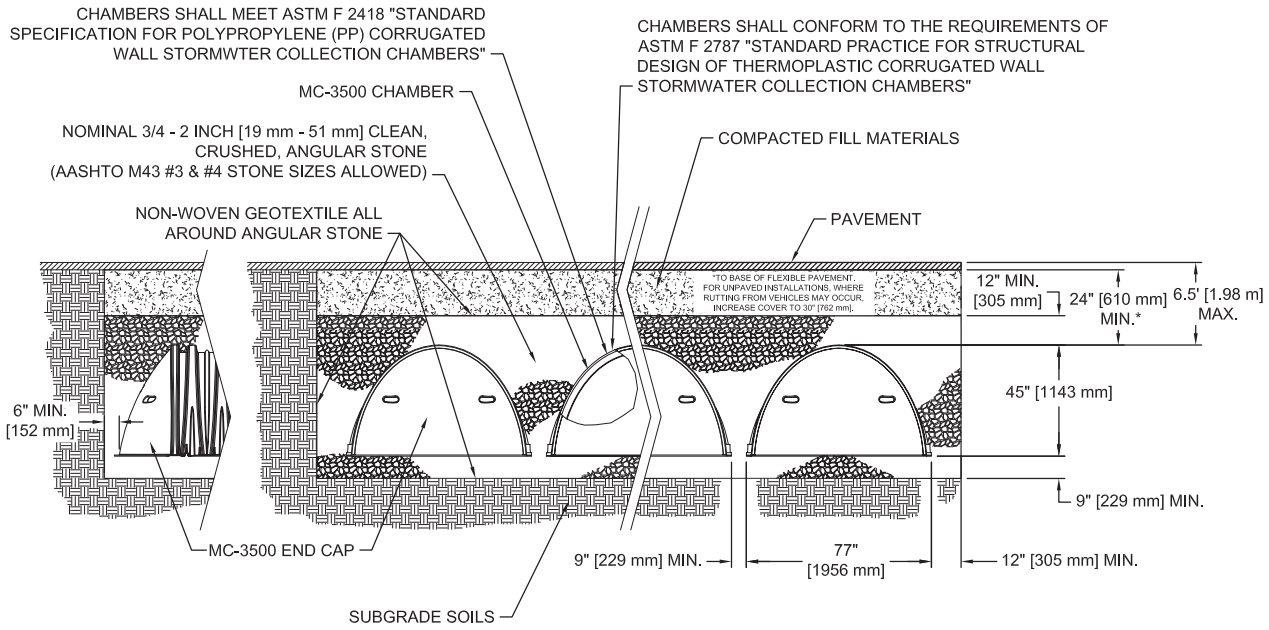
*NOTE: Assumes 9" (229 mm) of separation between chamber rows and 24" (610 mm) of cover. The volume of excavation will vary as the depth of cover increases.*

### Amount of Stone Per Chamber

| ENGLISH tons (yd³) | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in. | 12 in. | 15 in. | 18 in. |
| **MC-3500** | 9.1 (6.4) | 9.7 (6.9) | 10.4 (7.3) | 11.1 (7.8) |
| **End Cap** | 4.1 (2.9) | 4.3 (3.1) | 4.6 (3.2) | 4.8 (3.4) |
| METRIC kg (m³) | **229 mm** | **305 mm** | **381 mm** | **457 mm** |
| **MC-3500** | 8220 (4.9) | 8831 (5.3) | 9443 (5.6) | 10054 (6.0) |
| **End Cap** | 3729 (2.2) | 3933 (2.3) | 4136 (2.5) | 4339 (2.6) |

*NOTE: Assumes 12" (305 mm) of stone above, and 9" (229 mm) between chambers/end caps.*

### General Cross Section




NOTES:

1. THIS CROSS SECTION PROVIDES GENERAL INFORMATION FOR THE MC-3500 CHAMBER. STORMTECH MC-3500 CHAMBERS MUST BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE MC-3500 DESIGN MANUAL AND MC-3500 CONSTRUCTION GUIDE.
2. PROPERLY INSTALLED MC-3500 CHAMBERS PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR EARTH AND LIVE LOADS WITH CONSIDERATION FOR IMPACT AND MULTIPLE PRESENCES.
3. PERIMETER STONE MUST ALWAYS BE BROUGHT UP EVENLY WITH BACKFILL OF BED. PERIMETER STONE MUST EXTEND HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH STRAIGHT OR SLOPED SIDEWALLS.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S150909 06/12



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# Appendix D: Standard 4 Computations and Supporting Information

- Treatment Locus Figure
- TSS Removal Calculation Worksheets
- Water Quality Treatment Volume Summary
- Water Quality Treatment Volume Detail
- StormCeptor Design Summaries
- WQU-1
- WQU-2
- WQU-3
- WQU-4

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Vanasse Hangen Brustlin, Inc.

Danforth Green
Riverpath Drive
Framingham, MA

Figure
Stormwater Report
TSS Treatment Trains

# TSS Removal Calculation Worksheet

***Vanasse Hangen Brustlin, Inc***.
Consulting Engineers and Planners
101 Walnut Street
Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **1 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP West** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-W-2** | | |

| A | B | C | D | E |
|---|---|---|---|---|
| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
| **Rain Garden** | **90%** | **1.00** | **0.90** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.
Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

*Vanasse Hangen Brustlin, Inc.*
Consulting Engineers and Planners
101 Walnut Street
Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **2 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP North** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-W-3** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Deep Sump and Hooded Catch Basin** | **25%** | **100%** | **25%** | **75%** |
| **Sediment Forebay** | **25%** | **75%** | **19%** | **56%** |
| | **0%** | **56%** | **0%** | **56%** |
| | | **Pre-Treatment TSS Removal =** | | **44%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

***Vanasse Hangen Brustlin, Inc***.
Consulting Engineers and Planners
101 Walnut Street
Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **3 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP North** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-W-4** | | |

| A | B | C | D | E |
|---|---|---|---|---|
| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
| **Rain Garden** | **90%** | **1.00** | **0.90** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |
| | **0%** | **0.10** | **0.00** | **0.10** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.
Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

*Vanasse Hangen Brustlin, Inc.*
Consulting Engineers and Planners
101 Walnut Street
Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **4 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP North** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-W-5** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Sediment Forebay** | **25%** | **100%** | **25%** | **75%** |
| **Sediment Forebay** | **25%** | **75%** | **19%** | **56%** |
| | **0%** | **56%** | **0%** | **56%** |
| | | | **Pre-Treatment TSS Removal =** | **44%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

*Vanasse Hangen Brustlin, Inc.*
Consulting Engineers and Planners
101 Walnut Street
Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **5 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-E-1** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Deep Sump and Hooded Catch Basin** | **25%** | **100%** | **25%** | **75%** |
| **Sediment Forebay** | **25%** | **75%** | **19%** | **56%** |
| | **0%** | **56%** | **0%** | **56%** |
| | | **Pre-Treatment TSS Removal =** | | **44%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

*Vanasse Hangen Brustlin, Inc.*
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101 Walnut Street
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(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **6 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-E-2** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Sediment Forebay** | **25%** | **100%** | **25%** | **75%** |
| **Sediment Forebay** | **25%** | **75%** | **19%** | **56%** |
| | **0%** | **56%** | **0%** | **56%** |
| | | | **Pre-Treatment TSS Removal =** | **44%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

*Vanasse Hangen Brustlin, Inc.*
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101 Walnut Street
Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **7 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-E-4A to INF-E-2B** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Sediment Forebay** | **25%** | **100%** | **25%** | **75%** |
| **Sediment Forebay** | **25%** | **75%** | **19%** | **56%** |
| | **0%** | **56%** | **0%** | **56%** |
| | | **Pre-Treatment TSS Removal =** | | **44%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

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(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **8 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-E-4B to INF-E-2B** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Sediment Forebay** | **25%** | **100%** | **25%** | **75%** |
| **Sediment Forebay** | **25%** | **75%** | **19%** | **56%** |
| | **0%** | **56%** | **0%** | **56%** |
| | | **Pre-Treatment TSS Removal =** | | **44%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **90%**

# TSS Removal Calculation Worksheet

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Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **9 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-E-7 to INF-E-4A** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | | | **Pre-Treatment TSS Removal =** | **90%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Subsurface Infiltration Structure** | **80%** | **100%** | **80%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **80%**

# TSS Removal Calculation Worksheet

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(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **10 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-E-8 to INF-E-4A** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Rain Garden** | **90%** | **100%** | **90%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | **0%** | **10%** | **0%** | **10%** |
| | | | **Pre-Treatment TSS Removal =** | **90%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Subsurface Infiltration Structure** | **80%** | **100%** | **80%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **80%**

# TSS Removal Calculation Worksheet

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(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **11 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **P-RG-E-9** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Sediment Forebay** | **25%** | **100%** | **25%** | **75%** |
| **Sediment Forebay** | **25%** | **75%** | **19%** | **56%** |
| | **0%** | **56%** | **0%** | **56%** |
| | | | **Pre-Treatment TSS Removal =** | **44%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Infiltration Basin** | **80%** | **100%** | **80%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **80%**

# TSS Removal Calculation Worksheet

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101 Walnut Street
Watertown, MA 02471
(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **12 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **INF-E-1** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Deep Sump and Hooded Catch Basin** | **25%** | **100%** | **25%** | **75%** |
| **STC-450i** | **83%** | **75%** | **62%** | **13%** |
| | **0%** | **13%** | **0%** | **13%** |
| | | | **Pre-Treatment TSS Removal =** | **87%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Subsurface Infiltration Structure** | **80%** | **100%** | **80%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **80%**

# TSS Removal Calculation Worksheet

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(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **13 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **INF-E-4B** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Deep Sump and Hooded Catch Basin** | **25%** | **100%** | **25%** | **75%** |
| **STC-450I** | **81%** | **75%** | **61%** | **14%** |
| | **0%** | **14%** | **0%** | **14%** |
| | | | **Pre-Treatment TSS Removal =** | **86%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Subsurface Infiltration Structure** | **80%** | **100%** | **80%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **80%**

# TSS Removal Calculation Worksheet

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(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **14 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **INF-E-4B** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Deep Sump and Hooded Catch Basin** | **25%** | **100%** | **25%** | **75%** |
| **STC 900** | **80%** | **75%** | **60%** | **15%** |
| | **0%** | **15%** | **0%** | **15%** |
| | | | **Pre-Treatment TSS Removal =** | **85%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Subsurface Infiltration Structure** | **80%** | **100%** | **80%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **80%**

# TSS Removal Calculation Worksheet

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(617) 924-1770

| | | | |
|---|---|---|---|
| Project Name: | **Danforth Green** | Sheet: | **15 OF 15** |
| Project Number: | **12004.00** | Date: | **16-Apr-2013** |
| Location: | **Framingham, MA** | Computed by: | **BG** |
| Discharge Point: | **DP East** | Checked by: | **SAW** |
| Drainage Area(s): | **INF-E-3** | | |

## 1. Pre-Treatment prior to Infiltration

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Deep Sump and Hooded Catch Basin** | **25%** | **100%** | **25%** | **75%** |
| **STC-450i** | **84%** | **75%** | **63%** | **12%** |
| | **0%** | **12%** | **0%** | **12%** |
| | | | **Pre-Treatment TSS Removal =** | **88%** |

## 2. Total TSS Removal including Pretreatment 1.

| BMP* | TSS Removal Rate* | Starting TSS Load** | Amount Removed (C*D) | Remaining Load (D-E) |
|---|---|---|---|---|
| **Subsurface Infiltration Structure** | **80%** | **100%** | **80%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |
| | **0%** | **20%** | **0%** | **20%** |

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1. Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).
** Equals remaining load from previous BMP (E)
*** Stormceptor sizing calculation gives a TSS removal rate of 87%. To be conservative, 80% removal is used for this calculation (Change name of device and the claimed removal rate shown on the calc. sheet. Remove this sentence if not applicable.

**Treatment Train TSS Removal =** **80%**

# Water Quality Treatment Volume Summary

**Project Name:** Danforth **Proj. No.:** 12004.00

**Date:** 4/13/2013

**Project Location:** Framingham, MA **Calculated by:** SAW

**Rain Gardens and Forebays**

| BMP ID | Pathway | Total Impervious Area (Roadway) (sq ft) | Forebay Volume Required (cu ft) | Forebay Volume Provided (cu ft) | Treatment Volume Required (cu ft) | Treatment Volume Provided (cu ft) |
|---|---|---|---|---|---|---|
| RG-E-1 | CB-->FB-->RG | 32,697 | 272 | 694 | 2,725 | 2,870 |
| RG-E-2 | FB-->FB-->RG | 9,131 | 76 | 132 | 761 | 866 |
| RG-E-4A | FB-->FB-->RG | 4,883 | 41 | 102 | 407 | 424 |
| RG-E-4B | FB-->FB-->RG | 11,895 | 99 | 203 | 991 | 1,060 |
| RG-E-7 | FB-->RG-->INF | 28,458 | 237 | 275 | 2,371 | 2,434 |
| RG-E-8 | FB-->RG-->INF | 9,134 | 76 | 208 | 761 | 1,042 |
| RG-E-9 | FB-->FB-->RG | 38,709 | 323 | 482 | 3,226 | 4,521 |
| RG-W-2 | FB-->FB-->RG | 60,741 | 506 | 506 | 5,062 | 5,251 |
| RG-W-3 | CB-->FB-->RG | 37,401 | 312 | 554 | 3,117 | 9,915 |
| RG-W-4 | VEG-->FB-->RG* | 32,121 | 268 | 251 | 2,677 | 2,825 |
| RG-W-5 | FB-->FB-->RG | 8,189 | 68 | 178 | 682 | 701 |

* Runoff from approximately half of the contributing impervious area flows through a vegetated swale, therefore the required FB volume is less than the required volume presented in this table.

**Subsurface Infiltration Structures**

| BMP ID | Pathway | Total Impervious Area (Roadway) (sq ft) | Treatment Volume Required (cu ft) | Treatment Volume Provided (cu ft) | Bleeder Elevation (feet) | Unit | RowsxUnits |
|---|---|---|---|---|---|---|---|
| INF-E-1 | CB-->WQU-->INF | 21,115 | 1,760 | 2,722 | 168.4 | STC-740 | 3x15 |
| INF-E-2 | CB-->WQU-->INF AND RG-->INF | 28,520 | 2,377 | 2,759 | 166.4 | STC-740 | 3x15 |
| INF-E-3 | CB-->WQU-->INF | 76,403 | 6,367 | 6,400 | 171.1 | STC-3500 | 6x19 |
| INF-E-4A | RG-->INF | 37,591 | 3,133 | 3,372 | 169.9 | STC-3500 | 3x12 |
| INF-E-4B | CB-->WQU-->INF | 23,055 | 1,921 | 2,050 | 169.9 | STC-3500 | 3x7 |

# Water Quality Treatment Volume Detail

Project Name: Danforth

**Proj. No.:** 12004.00

**Date:** 4/13/2013

Project Location: Framingham, MA

**Calculated by:** SAW

| P-RG-E-1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 140 | 1,669 | - | - | Water Quality Treatment Volume | 2,725 | cubic feet | |
| | 141 | 2,558 | 2,114 | 2,114 | Elevation of WQTV | 141.2 | feet | |
| | 142 | 3,495 | 3,027 | 5,140 | Elevation of Outlet | 141.3 | feet | |
| | 143 | 4,489 | 3,992 | 9,132 | WQTV Provided | 2,870 | cubic feet | < OK |
| | | | | | 10-year WSE (from HydroCAD) | 141.67 | feet | |
| Outlet - qty (1) landscape drains | | | | | Freeboard | 1.3 | feet | < OK |

| P-RG-E-1 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 139 | 29 | - | - | Forebay Volume | 272 | cubic feet | |
| | 140 | 117 | 73 | 73 | | | | |
| | 141 | 292 | 205 | 278 | | | | |
| | 142 | 541 | 417 | 694 | Forebay Volume Provided | 694 | cubic feet | < OK |

| P-RG-E-2 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 162 | 959 | - | - | Water Quality Treatment Volume | 761 | cubic feet | |
| | 163 | 1,929 | 1,444 | 1,444 | Elevation of WQTV | 162.5 | feet | |
| | | | | | Elevation of Outlet | 162.6 | feet | |
| Outlet - qty (1) landscape drains | | | | | WQTV Provided | 866 | cubic feet | < OK |
| | | | | | 10-year WSE (from HydroCAD) | 162.7 | feet | |
| | | | | | Freeboard | 1.0 | feet | < OK |

| P-RG-E-2 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 162.0 | 311 | - | - | Forebay Volume | 76 | cubic feet | |
| | 162.5 | 537 | 212 | 212 | Forebay Volume Provided | 212 | cubic feet | < OK |

| P-RG-E-2 Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 162.0 | 163 | - | - | Forebay Volume | 76 | cubic feet | |
| | 162.5 | 363 | 132 | 132 | Forebay Volume Provided | 132 | cubic feet | < OK |

| P-RG-E-4A | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 171 | 371 | - | - | Water Quality Treatment Volume | 407 | cubic feet | |
| | 172 | 1,041 | 706 | 706 | Elevation of WQTV | 171.6 | feet | |
| | 173 | 2,506 | 1,774 | 2,480 | Elevation of Outlet | 171.6 | feet | |
| | | | | | WQTV Provided | 424 | cubic feet | < OK |
| Outlet - qty (1) landscape drains | | | | | 10-year WSE (from HydroCAD) | 171.8 | feet | |
| | | | | | Freeboard | 1.3 | feet | < OK |

| P-RG-E-4A Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 172.0 | 162 | - | - | Forebay Volume | 41 | cubic feet | |
| | 172.5 | 244 | 102 | 102 | Forebay Volume Provided | 102 | cubic feet | < OK |

| P-RG-E-4A Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 172.0 | 235 | - | - | Forebay Volume | 41 | cubic feet | |
| | 172.5 | 332 | 142 | 142 | Forebay Volume Provided | 142 | cubic feet | < OK |

| P-RG-E-4B | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 169 | 1,097 | - | - | Water Quality Treatment Volume | 991 | cubic feet | |
| | 170 | 1,933 | 1,515 | 1,515 | Elevation of WQTV | 169.7 | feet | |
| | 171 | 2,920 | 2,427 | 3,942 | Elevation of Outlet | 169.7 | feet | |
| | | | | | WQTV Provided | 1,060 | cubic feet | < OK |
| Outlet - qty (3) landscape drains | | | | | 10-year WSE (from HydroCAD) | 170.0 | feet | |
| | | | | | Freeboard | 1.0 | feet | < OK |

| P-RG-E-4B Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 168.0 | 53 | - | - | Forebay Volume | 99 | cubic feet | |
| | 169.0 | 145 | 99 | 99 | Forebay Volume Provided | 203 | cubic feet | < OK |
| | 169.5 | 271 | 104 | 203 | | | | |

| P-RG-E-4B Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 168.5 | 80 | - | - | Forebay Volume | 99 | cubic feet | |
| | 169.0 | 149 | 57 | 57 | Forebay Volume Provided | 166 | cubic feet | < OK |
| | 169.5 | 285 | 109 | 166 | | | | |

| P-RG-E-7 | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 173 | 2,408 | - | - | Water Quality Treatment Volume | 2,371 | cubic feet | |
| | 174 | 3,678 | 3,043 | 3,043 | Elevation of WQTV | 173.8 | feet | |
| | 175 | 7,929 | 5,804 | 8,847 | Elevation of Outlet | 173.8 | feet | |
| | | | | | WQTV Provided | 2,434 | cubic feet | < OK |
| Outlet - qty (2) landscape drains | | | | | 10-year WSE (from HydroCAD) | 174.0 | feet | |
| | | | | | Freeboard | 1.0 | feet | < OK |

| P-RG-E-7 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 173.0 | 165 | - | - | Forebay Volume | 95 | cubic feet | |
| | 173.5 | 252 | 104 | 104 | Forebay Volume Provided | 104 | cubic feet | < OK |

| P-RG-E-7 Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 173.0 | 89 | - | - | Forebay Volume | 95 | cubic feet | |
| | 173.5 | 362 | 113 | 113 | Forebay Volume Provided | 113 | cubic feet | < OK |

| P-RG-E-7 Forebay 3 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 173.0 | 61 | - | - | Forebay Volume | 47 | cubic feet | |
| | 173.5 | 170 | 58 | 58 | Forebay Volume Provided | 58 | cubic feet | < OK |

| P-RG-E-8 | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 174 | 2,972 | - | - | Water Quality Treatment Volume | 761 | cubic feet | |
| | 175 | 3,977 | 3,475 | 3,475 | Elevation of WQTV | 174.2 | feet | |
| | 176 | 5,077 | 4,527 | 8,002 | Elevation of Outlet | 174.3 | feet | |
| | | | | | WQTV Provided | 1,042 | cubic feet | < OK |
| Outlet - qty (2) landscape drains | | | | | 10-year WSE (from HydroCAD) | 174.4 | feet | |
| | | | | | Freeboard | 1.6 | feet | < OK |

| P-RG-E-8 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 175.0 | 358 | - | - | Forebay Volume | 76 | cubic feet | |
| | 175.5 | 475 | 208 | 208 | Forebay Volume Provided | 208 | cubic feet | < OK |

| P-RG-E-9 | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 149 | 2,666 | - | - | Water Quality Treatment Volume | 3,226 | cubic feet | |
| | 150 | 3,362 | 3,014 | 3,014 | Elevation of WQTV | 150.1 | feet | |
| | 151 | 4,178 | 3,770 | 6,785 | Elevation of Outlet | 150.5 | feet | |
| | | | | | WQTV Provided | 4,521 | cubic feet | < OK |
| Weir outlet | | | | | 10-year WSE (from HydroCAD) | 150.7 | feet | |
| | | | | | Freeboard | 1.0 | feet | < OK |

| P-RG-E-9 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 165.5 | 318 | - | - | Forebay Volume | 323 | cubic feet | |
| | 166.0 | 423 | 185 | 185 | Forebay Volume Provided | 482 | cubic feet | < OK |
| | 166.5 | 763 | 297 | 482 | | | | |

| P-RG-E-9 Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 165.0 | 265 | - | - | Forebay Volume | 323 | cubic feet | |
| | 166.0 | 474 | 370 | 370 | Forebay Volume Provided | 638 | cubic feet | < OK |
| | 166.5 | 600 | 269 | 638 | | | | |

| P-RG-W-2 | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 170 | 3,744 | - | - | Water Quality Treatment Volume | 5,062 | cubic feet | |
| | 171 | 5,803 | 4,774 | 4,774 | Elevation of WQTV | 171.0 | feet | |
| | 172 | 8,132 | 6,968 | 11,742 | Elevation of Outlet | 171.1 | feet | |
| | 173 | 10,892 | 9,512 | 21,254 | WQTV Provided | 5,251 | cubic feet | < OK |
| | 174 | 14,642 | 12,767 | 34,021 | 10-year WSE (from HydroCAD) | 171.4 | feet | |
| | | | | | Freeboard | 2.6 | feet | < OK |
| Outlet - qty (2) landscape drains | | | | | | | | |

| P-RG-W-2 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 173.0 | 209 | - | - | Forebay Volume | 169 | cubic feet | |
| | 173.8 | 454 | 265 | 265 | Forebay Volume Provided | 265 | cubic feet | < OK |

| P-RG-W-2 Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 171.0 | 271 | - | - | Forebay Volume | 337 | cubic feet | |
| | 172.0 | 625 | 448 | 448 | Forebay Volume Provided | 1,549 | cubic feet | < OK |
| | 173.5 | 843 | 1,101 | 1,549 | | | | |

| P-RG-W-3 | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 167 | 1,954 | - | - | Water Quality Treatment Volume | 3,117 | cubic feet | |
| | 168 | 4,656 | 3,305 | 3,305 | Elevation of WQTV | 167.9 | feet | |
| | 169 | 8,325 | 6,491 | 9,796 | Elevation of Outlet | 170.0 | feet | |
| | 170 | 11,764 | 10,045 | 19,840 | WQTV Provided | 9,915 | cubic feet | < OK |
| | 171 | 14,923 | 13,344 | 33,184 | 10-year WSE (from HydroCAD) | 170.1 | feet | |
| | 172 | 19,196 | 17,060 | 50,243 | Freeboard | 2.9 | feet | < OK |
| | 173 | 24,206 | 21,701 | 71,944 | | | | |

Outlet - qty (3) landscape drains

| P-RG-W-3 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 167.5 | 146 | - | - | Forebay Volume | 156 | cubic feet | |
| | 168.0 | 273 | 105 | 105 | Forebay Volume Provided | 270 | cubic feet | < OK |
| | 168.5 | 389 | 166 | 270 | | | | |

| P-RG-W-3 Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 167.5 | 107 | - | - | Forebay Volume | 156 | cubic feet | |
| | 168.0 | 289 | 99 | 99 | Forebay Volume Provided | 284 | cubic feet | < OK |
| | 168.5 | 449 | 185 | 284 | | | | |

| P-RG-W-4 | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 170 | 1,710 | - | - | Water Quality Treatment Volume | 2,677 | cubic feet | |
| | 171 | 2,999 | 2,355 | 2,355 | Elevation of WQTV | 171.1 | feet | |
| | 172 | 5,024 | 4,012 | 6,366 | Elevation of Outlet | 171.2 | feet | |
| | 173 | 13,618 | 9,321 | 15,687 | WQTV Provided | 2,825 | cubic feet | < OK |
| | | | | | 10-year WSE (from HydroCAD) | 171.5 | feet | |
| Outlet - qty (2) landscape drains | | | | | Freeboard | 1.5 | feet | < OK |

| P-RG-W-4 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | (cont. area-weighted) | | |
|---|---|---|---|---|---|---|---|---|
| | 171 | 361 | - | - | Forebay Volume | 201 | cubic feet | |
| | 172 | 642 | 251 | 251 | Forebay Volume Provided | 251 | cubic feet | < OK |

| P-RG-W-5 | Stage | Area | Inc Vol | cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 160.5 | 624 | - | - | Water Quality Treatment Volume | 682 | cubic feet | |
| | 161.0 | 778 | 351 | 351 | Elevation of WQTV | 161.5 | feet | |
| | 161.5 | 946 | 431 | 782 | Elevation of Outlet | 161.5 | feet | |
| | 162.0 | 1046 | 498 | 1,280 | WQTV Provided | 701 | cubic feet | < OK |
| | | | | | 10-year WSE (from HydroCAD) | 161.6 | feet | |
| | | | | | Freeboard | 1.0 | feet | < OK |

| P-RG-W-5 Forebay 1 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 163 | 94 | - | - | Forebay Volume | 68 | cubic feet | |
| | 164 | 184 | 70 | 70 | Forebay Volume Provided | 70 | cubic feet | < OK |

| P-RG-W-5 Forebay 2 | Stage | Area | Inc Vol | Cum Vol | | | | |
|---|---|---|---|---|---|---|---|---|
| | 162 | 23 | - | - | Forebay Volume | 68 | cubic feet | |
| | 162 | 115 | | | Forebay Volume Provided | 178 | cubic feet | < OK |
| | 163 | 218 | 178 | 178 | | | | |

# Stormceptor Design Summary

**PCSWMM for Stormceptor**

## Project Information

| | |
|---|---|
| Date | 4/15/2013 |
| Project Name | N/A |
| Project Number | N/A |
| Location | INF-E-1 |

## Designer Information

| | |
|---|---|
| Company | N/A |
| Contact | N/A |

## Notes

N/A

## Drainage Area

| | |
|---|---|
| Total Area (ac) | 1.39 |
| Imperviousness (%) | 35 |

The Stormceptor System model STC 450i achieves the water quality objective removing 83% TSS for a Fine (organics, silts and sand) particle size distribution.

## Rainfall

| | |
|---|---|
| Name | WORCESTER WSO AP |
| State | MA |
| ID | 9923 |
| Years of Records | 1948 to 2005 |
| Latitude | 42°16'2"N |
| Longitude | 71°52'34"W |

## Water Quality Objective

| | |
|---|---|
| TSS Removal (%) | 80 |

## Upstream Storage

| Storage (ac-ft) | Discharge (cfs) |
|---|---|
| 0 | 0 |

## Stormceptor Sizing Summary

| Stormceptor Model | TSS Removal % |
|---|---|
| **STC 450i** | **83** |
| STC 900 | 90 |
| STC 1200 | 90 |
| STC 1800 | 90 |
| STC 2400 | 92 |
| STC 3600 | 93 |
| STC 4800 | 94 |
| STC 6000 | 94 |
| STC 7200 | 96 |
| STC 11000 | 97 |
| STC 13000 | 97 |
| STC 16000 | 98 |

## Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

| Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s | | Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s |
|---|---|---|---|---|---|---|---|---|
| 20 | 20 | 1.3 | 0.0013 | | | | | |
| 60 | 20 | 1.8 | 0.0051 | | | | | |
| 150 | 20 | 2.2 | 0.0354 | | | | | |
| 400 | 20 | 2.65 | 0.2123 | | | | | |
| 2000 | 20 | 2.65 | 0.9417 | | | | | |

## Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

**Inlet and Outlet Pipe Invert Elevations Differences**

| Inlet Pipe Configuration | STC 450i | STC 900 to STC 7200 | STC 11000 to STC 16000 |
|---|---|---|---|
| Single inlet pipe | 3 in. | 1 in. | 3 in. |
| Multiple inlet pipes | 3 in. | 3 in. | Only one inlet pipe. |

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

# Stormceptor Design Summary

**PCSWMM for Stormceptor**

## Project Information

| | |
|---|---|
| Date | 4/15/2013 |
| Project Name | N/A |
| Project Number | N/A |
| Location | INF-E-2 |

## Designer Information

| | |
|---|---|
| Company | N/A |
| Contact | N/A |

## Notes

N/A

## Drainage Area

| | |
|---|---|
| Total Area (ac) | 1.169 |
| Imperviousness (%) | 56 |

The Stormceptor System model STC 450i achieves the water quality objective removing 81% TSS for a Fine (organics, silts and sand) particle size distribution.

## Rainfall

| | |
|---|---|
| Name | WORCESTER WSO AP |
| State | MA |
| ID | 9923 |
| Years of Records | 1948 to 2005 |
| Latitude | 42°16'2"N |
| Longitude | 71°52'34"W |

## Water Quality Objective

| | |
|---|---|
| TSS Removal (%) | 80 |

## Upstream Storage

| Storage (ac-ft) | Discharge (cfs) |
|---|---|
| 0 | 0 |

## Stormceptor Sizing Summary

| Stormceptor Model | TSS Removal % |
|---|---|
| **STC 450i** | **81** |
| STC 900 | 88 |
| STC 1200 | 88 |
| STC 1800 | 88 |
| STC 2400 | 91 |
| STC 3600 | 91 |
| STC 4800 | 93 |
| STC 6000 | 93 |
| STC 7200 | 95 |
| STC 11000 | 96 |
| STC 13000 | 96 |
| STC 16000 | 97 |

## Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

| Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s | | Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s |
|---|---|---|---|---|---|---|---|---|
| 20 | 20 | 1.3 | 0.0013 | | | | | |
| 60 | 20 | 1.8 | 0.0051 | | | | | |
| 150 | 20 | 2.2 | 0.0354 | | | | | |
| 400 | 20 | 2.65 | 0.2123 | | | | | |
| 2000 | 20 | 2.65 | 0.9417 | | | | | |

## Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

**Inlet and Outlet Pipe Invert Elevations Differences**

| Inlet Pipe Configuration | STC 450i | STC 900 to STC 7200 | STC 11000 to STC 16000 |
|---|---|---|---|
| Single inlet pipe | 3 in. | 1 in. | 3 in. |
| Multiple inlet pipes | 3 in. | 3 in. | Only one inlet pipe. |

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

# Stormceptor Design Summary

**PCSWMM for Stormceptor**

## Project Information

| | |
|---|---|
| Date | 4/15/2013 |
| Project Name | N/A |
| Project Number | N/A |
| Location | INF-E-3 |

## Designer Information

| | |
|---|---|
| Company | N/A |
| Contact | N/A |

## Notes

N/A

## Drainage Area

| | |
|---|---|
| Total Area (ac) | 6.824 |
| Imperviousness (%) | 25 |

The Stormceptor System model STC 900 achieves the water quality objective removing 80% TSS for a Fine (organics, silts and sand) particle size distribution.

## Rainfall

| | |
|---|---|
| Name | WORCESTER WSO AP |
| State | MA |
| ID | 9923 |
| Years of Records | 1948 to 2005 |
| Latitude | 42°16'2"N |
| Longitude | 71°52'34"W |

## Water Quality Objective

| | |
|---|---|
| TSS Removal (%) | 80 |

## Upstream Storage

| Storage (ac-ft) | Discharge (cfs) |
|---|---|
| 0 | 0 |

## Stormceptor Sizing Summary

| Stormceptor Model | TSS Removal % |
|---|---|
| STC 450i | 71 |
| **STC 900** | **80** |
| STC 1200 | 80 |
| STC 1800 | 80 |
| STC 2400 | 84 |
| STC 3600 | 85 |
| STC 4800 | 88 |
| STC 6000 | 88 |
| STC 7200 | 90 |
| STC 11000 | 92 |
| STC 13000 | 93 |
| STC 16000 | 94 |

## Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

| Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s | | Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s |
|---|---|---|---|---|---|---|---|---|
| 20 | 20 | 1.3 | 0.0013 | | | | | |
| 60 | 20 | 1.8 | 0.0051 | | | | | |
| 150 | 20 | 2.2 | 0.0354 | | | | | |
| 400 | 20 | 2.65 | 0.2123 | | | | | |
| 2000 | 20 | 2.65 | 0.9417 | | | | | |

## Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

**Inlet and Outlet Pipe Invert Elevations Differences**

| Inlet Pipe Configuration | STC 450i | STC 900 to STC 7200 | STC 11000 to STC 16000 |
|---|---|---|---|
| Single inlet pipe | 3 in. | 1 in. | 3 in. |
| Multiple inlet pipes | 3 in. | 3 in. | Only one inlet pipe. |

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

# Stormceptor Design Summary

**PCSWMM for Stormceptor**

## Project Information

| | |
|---|---|
| Date | 4/15/2013 |
| Project Name | N/A |
| Project Number | N/A |
| Location | INF-E-4B |

## Designer Information

| | |
|---|---|
| Company | N/A |
| Contact | N/A |

## Notes

N/A

## Drainage Area

| | |
|---|---|
| Total Area (ac) | 0.59 |
| Imperviousness (%) | 89 |

The Stormceptor System model STC 450i achieves the water quality objective removing 84% TSS for a Fine (organics, silts and sand) particle size distribution.

## Rainfall

| | |
|---|---|
| Name | WORCESTER WSO AP |
| State | MA |
| ID | 9923 |
| Years of Records | 1948 to 2005 |
| Latitude | 42°16'2"N |
| Longitude | 71°52'34"W |

## Water Quality Objective

| | |
|---|---|
| TSS Removal (%) | 80 |

## Upstream Storage

| Storage (ac-ft) | Discharge (cfs) |
|---|---|
| 0 | 0 |

## Stormceptor Sizing Summary

| Stormceptor Model | TSS Removal % |
|---|---|
| **STC 450i** | **84** |
| STC 900 | 90 |
| STC 1200 | 90 |
| STC 1800 | 90 |
| STC 2400 | 92 |
| STC 3600 | 93 |
| STC 4800 | 94 |
| STC 6000 | 94 |
| STC 7200 | 96 |
| STC 11000 | 97 |
| STC 13000 | 97 |
| STC 16000 | 98 |

## Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

| Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s | | Particle Size µm | Distribution % | Specific Gravity | Settling Velocity ft/s |
|---|---|---|---|---|---|---|---|---|
| 20 | 20 | 1.3 | 0.0013 | | | | | |
| 60 | 20 | 1.8 | 0.0051 | | | | | |
| 150 | 20 | 2.2 | 0.0354 | | | | | |
| 400 | 20 | 2.65 | 0.2123 | | | | | |
| 2000 | 20 | 2.65 | 0.9417 | | | | | |

## Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

**Inlet and Outlet Pipe Invert Elevations Differences**

| Inlet Pipe Configuration | STC 450i | STC 900 to STC 7200 | STC 11000 to STC 16000 |
|---|---|---|---|
| Single inlet pipe | 3 in. | 1 in. | 3 in. |
| Multiple inlet pipes | 3 in. | 3 in. | Only one inlet pipe. |

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

# Appendix E: Project Plans and Details

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**Project Plans and Details are provided separately from this report.**

# Appendix F: FEMA Flood Insurance Rate Map

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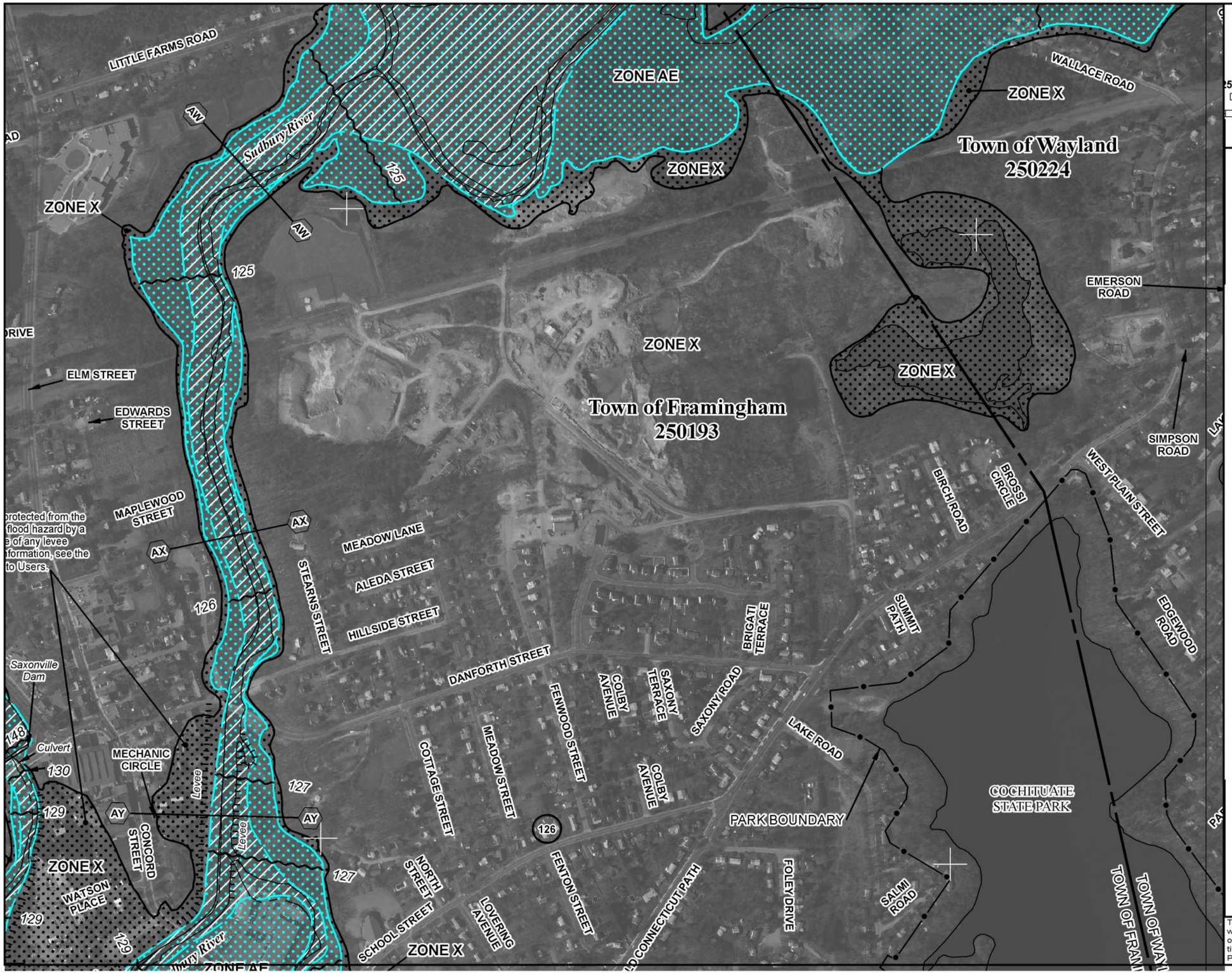


This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

# Appendix G: Stormwater Management System O&M Manual

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**Stormwater Management System Operations and Maintenance Manual**

# *Danforth Green*
# *Riverpath Drive*
# *Framingham, Massachusetts*

**Prepared for** **Danforth Green**
Riverpath Drive
Framingham, Massachusetts 01702

**Prepared by**

Vanasse Hangen Brustlin, Inc.
Transportation, Land Development, Environmental Services
Union Station, Suite 219
2 Washington Square
Worcester, MA 01604
(508) 752-1001

**April, 2013**

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**List of Attachments**

Attachment A: Spill Contingency Plan
Attachment B: Example Manufacturer's O&M Manual, Subsurface Infiltration System
Attachment C: Example Manufacturer's O&M Manual, Structural Water Quality Unit

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## A. Disclaimer

**THIS STORMWATER MANAGEMENT SYSTEM OPERATIONS & MAINTENANCE MANUAL (O&M MANUAL) IS TO BE CONSIDERED A TEMPLATE FOR USE BY THE PROJECT OWNER AND ASSOCIATION TO PREPARE A FINAL LONG-TERM SITE STORMWATER O&M MANUAL. THE FINAL SITE STORMWATER O&M MANUAL WILL BE PREPARED FOLLOWING THE COMPLETION OF CONSTRUCTION BUT BEFORE OCCUPANCY. THE FINAL MANUAL WILL INCLUDE UPDATED AS BUILT INFORMATION IN PLACE OF THE DESIGN INFORMATION INCLUDED AT THIS TIME. CONSTRUCTION PHASE STORMWATER MANAGEMENT SHALL BE IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARED BY THE CONTRACTOR WHEN FILING FOR THE NPDES NOI.**

## B. Project Information

### Site

Riverpath Drive
Framingham, Massachusetts 01702

### Owner

Danforth Green, LLC
21 Center Street
Weston, MA 02493
(781) 894-9898

### Site Supervisor / Contact

To Be Determined

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# Section A – Source Control

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# A. Source Control

A comprehensive source control program will be implemented by the Project Owner and Association, which includes the following components:

- Regular pavement sweeping
- Catch basin grate cleaning
- Limiting the use of deicing chemicals
- Clearing litter from the parking area, islands, and perimeter landscape areas
- Maintenance of vegetation and landscape areas
- Spill Prevention training

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# Section B – Spill Prevention

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# B. Spill Prevention

A comprehensive Spill Prevention Control and Countermeasure (SPCC) plan is included as Attachment A. At a minimum, the SPCC discusses:

- Spill prevention equipment;
- Spill prevention supplies provided on-site; and
- Spill prevention training to be provided by the Owner and/or Association to designated employees.

## B.1 Initial Notification

In the event of a spill the facility and/or construction manager or supervisor will be notified immediately.

Facility Manager (name): _____

Facility Manager (phone): _____

Construction Manager (name): _____

Construction Manager (phone): _____

The supervisor will first contact the Fire Department and then notify the Police Department, the Board of Health and the Conservation Commission.

## B.2 Further Notification

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The Massachusetts Department of Environmental Protection (DEP) and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of cleanup and notification required. The attached list of emergency phone numbers shall be posted in the main construction/facility office and readily accessible to all employees. A hazardous waste spill report shall be completed as necessary using the attached form.

## B.3 Emergency Notification Phone Numbers

| | | |
|---|---|---|
| 1. | FACILITY MANAGER<br>NAME: _____<br><br>ALTERNATE CONTACT:<br>NAME: _____ | PHONE: _____<br>BEEPER/CELL: _____, _____<br>HOME PHONE: _____<br><br>PHONE: _____<br>BEEPER/CELL: _____, _____<br>HOME PHONE: _____ |
| 2. | FIRE & POLICE DEPARTMENT | EMERGENCY: **911** |
| 3. | CLEANUP CONTRACTOR:<br>_____<br>ADDRESS:<br>_____<br>_____ | PHONE: _____ |
| 4. | MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) | EMERGENCY PHONE: (800) 304-1133 |
| 5. | NATIONAL RESPONSE CENTER<br><br>ALTERNATE: U.S. ENVIRONMENTAL PROTECTION AGENCY | PHONE: (800) 424-8802<br><br>EMERGENCY: (800) 424-8802<br>BUSINESS: (888) 372-7341 |
| 6. | FRAMINGHAM BOARD OF HEALTH<br><br>FRAMINGHAM CONSERVATION COMMISSION | PHONE: (508) 532-5470 or (508) 532-5478 (hotline)<br><br>PHONE: (508) 532-5460 |

## B.4 Hazardous Waste / Oil Spill Report

Date: ____/____/_____ Time: _____ AM / PM

Exact location _____

Type of equipment:_____ Make:_____ Size:_____

License or S/N:_____ Weather Conditions:_____

On or near water ☐ Yes If yes, name of body of water:_____

☐ No

Type of chemical / oil spilled: _____

Amount of chemical / oil spilled: _____

Cause of spill: _____

_____

_____

Measures taken to contain or clean up spill: _____

_____

_____

Amount of chemical / oil recovered: _____ Method:_____

Material collected as a result of clean up

_____ drums containing: _____

_____ drums containing: _____

_____ drums containing: _____

Location and method of debris disposal:_____

Name and address of any person, firm, or corporation suffering damages:_____

_____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring:_____

_____

Spill reported to General Office by:_____Time: _____AM / PM

Spill reported to DEP / National Response Center by:_____

DEP Date: ____/_____/_____ Time:_____AM / PM Inspector:_____

NRC Date: ____/_____/_____ Time:_____AM / PM Inspector: _____

Additional comments: _____

_____

_____

## B.5 Assessment - Initial Containment

The supervisor or manager will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. A list of recommended spill equipment to be kept on site is included on the following page.

| | |
|---|---|
| **Fire / Police Department:** | **911** |
| **Framingham Health Department:** | **(508) 532-5470**<br>**(508) 532-5478 (hotline)** |
| **Framingham Conservation Commission:** | **(508) 532-5460** |

## B.6 Emergency Response Equipment

The following is an example of an equipment and materials list that must be prepared by the Owner and Association. Equipment and Supplies on this list shall be maintained at all times and stored in a secure area for long-term emergency response need.

| Supplies | | Recommended Suppliers |
|---|---|---|
| ➤ SORBENT PILLOWS/"PIGS" | **2** | ➤ http://www.newpig.com |
| ➤ SORBENT BOOM/SOCK | **25 FEET** | ➤ Item # KIT276 — mobile container with two pigs, 26 feet of sock, 50 pads, and five pounds of absorbent (or equivalent) |
| ➤ SORBENT PADS | **50** | ➤ http://www.forestry-suppliers.com |
| ➤ LITE-DRI® ABSORBENT | **5 POUNDS** | ➤ Item # 43210 — Manhole cover pick (or equivalent) |
| ➤ SHOVEL | **1** | ➤ Item # 33934 — Shovel (or equivalent) |
| ➤ PRY BAR | **1** | ➤ Item # 90926 — Gloves (or equivalent) |
| ➤ GOGGLES | **1 PAIR** | ➤ Item # 23334 — Goggles (or equivalent) |
| ➤ GLOVES – HEAVY | **1 PAIR** | |

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# Section C – Snow Management

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## C. Snow Management

Snow will be stored on Site as described below. Upon completion of the Project the Owner and Association in conjunction with the snow plow contractor will develop a detailed plan for snow management that will be updated annually or as needed.

- Snow will be stored within landscape areas that drain back to the Site drainage system or in areas where excess parking exists.
- Snow storage areas will be managed to prevent blockage of storm drain catch basins and stormwater drainage swales.
- Sand and debris deposited on vegetated or paved areas shall be cleared from the site and properly disposed of at the end of the snow season, no later than May 15.
- Snow shall not be dumped into any water body, pond, or wetland resource area.
- Limited deicing chemicals will be utilized.

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# Section D - Maintenance of Stormwater Management Systems

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# D. Maintenance of Stormwater Management Systems

- Please refer to sheets C-4.1 through C-4.4 of the Site Plans prepared by Vanasse Hangen Brustlin, Inc., issued on April 16, 2013 for stormwater management system device and component locations. Please refer to sheets C-7.1 through C-7.4 for details of stormwater devices and components.

## D.1 Pavement Systems

### D.1.1 Standard Asphalt Pavement

- Sweep or vacuum standard asphalt pavement areas at least two times per year with a rotary brush sweeper, vacuum or regenerative air sweeper and properly dispose of removed material.
- Recommended sweeping schedule:
  - Oct/Nov
  - Apr/May
  - More frequent sweeping of paved surfaces will result in less accumulation in catch basins, less cleaning of subsurface structures, and less disposal costs.
- Check loading docks and dumpster areas frequently for spillage and/or pavement staining and clean as necessary.

## D.2 Structural Stormwater Management Devices

### D.2.1 Catch Basins

The proper removal of sediments and associated pollutants and trash by catch basins occurs when catch basin inlets and sumps are cleaned out regularly. The more frequent the cleaning, the less likely sediments will be re-suspended and subsequently discharged. In addition, frequent cleaning also results in more volume available for future deposition and enhances the overall performance. As noted in the pavement Operation and Maintenance (O&M) section, more frequent sweeping of paved surfaces will result in less accumulation in catch basins, less cleaning of subsurface structures, and less disposal costs.

Catch basins installed as part of the Project are to be constructed with sumps (minimum 4 feet) and hooded outlets to trap debris, sediments, and floating contaminants. Disposal of all sediments must be in accordance with applicable local,

state, and federal guidelines. Proposed catch basin locations are shown on the Project Plans prepared by VHB. Project Owner and Association to update plans with as-built information following the completion of construction.

### Inspections and Cleaning

- All catch basins shall be inspected at least four times per year and cleaned a minimum of at least once per year or when sediment reaches a depth of 6".
- Sediment (if more than six inches deep) and/or floatable pollutants shall be pumped from the basin and disposed of at an approved offsite facility in accordance with all applicable regulations.
- Any structural damage or other indication of malfunction will be reported to the site manager and repaired as necessary
- During colder periods, the catch basin grates must be kept free of snow and ice.
- During warmer periods, the catch basin grates must be kept free of leaves, litter, sand, and debris.

## D.2.2 Structural Water Quality Devices

The stormwater drainage system has four (4) structural water quality devices. These are Stormceptor water quality units, manufactured by Rinker Materials, which efficiently remove sediment and hydrocarbons from stormwater runoff. Please refer to sheets C-4.1 through C-4.4 of the Site Plans prepared by VHB for water quality unit locations.

- Inspect devices monthly for the first three months after construction.
- After initial three month period, all water quality units are to be inspected at least four times per year and cleaned a minimum of at least once per year (when sediment reaches 8" in depth).
- Remove oil through inspection/oil port.
- Remove sediment through inlet or outlet riser pipe.
- In addition to the above, water quality unit maintenance shall be in accordance with unit manufacturer's recommendations. Attachment C is an example of manufacturer's maintenance requirements from one manufacturer. In preparing the final plan the Association and/or Owner will attach maintenance requirements for the final, installed system.

## D.2.3 Subsurface Infiltration Systems, Leaching Chambers, and Perimeter Perforated Pipe

The subsurface infiltration basins are used to detain and infiltrate roadway and rooftop runoff. The perimeter perforated pipe is used to carry stormwater off the site around the well head area. There are five (5) proposed subsurface infiltration systems, 111 leaching chambers, and 1 perforated perimeter pipe proposed as part of the Project. Proposed subsurface infiltration system, leaching chamber, and perimeter perforated pipe locations are shown on the Project Plans prepared by VHB. Project Owner and Association to update plans with as-built information following the completion of construction.

### Inspections and Cleaning

- The subsurface infiltration systems will be inspected at least twice each year by removing the manhole covers and determining the thickness of sediment that has accumulated in isolator rows. The leaching chambers will be inspected at least once each year by removing the manhole covers and determining the thickness of sediment that has accumulated at the bottom of the structure. If sediment is more than six inches deep, it must be removed. The perimeter perforated pipe will be inspected at least once each year by removing manhole covers and determining the condition of the pipes.
- Emergency overflow pipes for subsurface infiltration systems will be examined at least once each year and emergency overflow pipes for leaching chambers will be examined at least four times each year to verify proper function and that no blockage has occurred.
- Systems will be observed after rainfalls to see if they are properly draining.
- In addition to the above, subsurface infiltration system maintenance shall be in accordance with unit manufacturer's recommendations. Attachment B is an example of manufacturer's maintenance requirements from one manufacturer. In preparing the final plan the Association and/or Owner will attach maintenance requirements for the final, installed system.

## D.2.4 Stormwater Outfalls

The stormwater drainage system has five (5) outfall locations where treated stormwater is discharged. Proposed outfall locations are shown on the Project Plans prepared by VHB. The following inspections and maintenance shall be completed at all stormwater outfalls.

- Inspect outfall locations monthly for the first three months after construction to ensure proper functioning and correct any areas that have settled or experienced washouts.

- Inspect outfalls annually after initial three month period.
- Annual inspections should be supplemented after large storms, when washouts may occur.
- Maintain vegetation around outfalls to prevent blockages at the outfall.
- Maintain rip rap apron below each outfall and replace any washouts.
- Remove and dispose of any trash or debris at the outfall.

### D.2.5 Roof Drain Leader

As sown on the Project Plans prepared by VHB, roof runoff from buildings may be directed to leaching chambers, surface infiltration systems, or to subsurface infiltration systems.

- Perform routine roof inspections quarterly.
- Keep roofs clean and free of debris.
- Clean roof drainage systems at least twice per year, or as necessary.

## D.3 Vegetated Stormwater Management Devices

### D.3.1 Rain Gardens

The rain gardens are excavated shallow surface depressions planted with specially-selected native vegetation to treat and capture runoff. The vegetation in the rain gardens serves to filter runoff, improving water quality. The soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the infiltration bed provides additional volume control. Properly designed rain gardens may mimic natural forest ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

Rain gardens require routine maintenance (similar to conventional landscaping maintenance) to ensure that the system both functions well as a stormwater management practice while also maintaining an aesthetic quality compatible with the surrounding land uses.

Replacement of mulch is an important part of rain garden maintenance. Mulch keeps the soil moist, allowing for easy infiltration of rain water. Un-mulched surfaces may develop into a hardpan, a condition in which the soil surface becomes cemented together, forming a hard, impervious layer. Mulching also protects plants and reduces weed growth.

### Initial Post-Construction Inspection

- During the initial period of vegetation establishment pruning and weeding are required twice in first year by contractor.
- Any dead vegetation found after the first year must be replaced.
- Proper mulching is mandatory and regular watering may be required initially to ensure proper establishment of new vegetation.

### Long-term Maintenance

- Weeds and invasive plant species shall be removed by hand.
- Leaf litter and other detritus shall be removed twice per year.
- If needed to maintain aesthetic appearance, perennial plantings may be trimmed at the end of the growing season.
- Trees and shrubs should be inspected twice per year to evaluate health and attended to as necessary.
- Re-mulch rain gardens with well-aged hardwood mulch to a depth of 3 inches each spring or whenever erosion is evident. The entire area may require mulch replacement once every two to three years. Mulch depth shall not exceed 3 inches and the depth of the depression shall not be compromised by the accumulation of vegetation or old mulch.
- Seeded ground cover or grass areas shall not receive mulching.
- Fertilizers should not be used in the rain garden as excessive nutrients in the rain garden may migrate to the underdrain and be discharged to adjacent surface waters.
- Test pH of the soils in the planting bed annually. If the pH is below 5.2, limestone should be applied to increase it. If the pH is above 8.0, iron sulfate plus sulfur should be added to reduce it.
- Rain gardens may require watering during periods of extended drought.

### Inspections and Cleaning

- Rain gardens shall be inspected twice during for the first year and annually thereafter for sediment buildup, erosion, vegetative conditions, etc. If sediment build-up is found, sediment removal and core aeration or cultivating of un-vegetated areas may be required to ensure adequate filtration.
- The inflow location should be inspected annually for clogging. Sediment build up is a common problem where runoff leaves an impervious surface and enters a vegetative or earthen surface. Any built-up sediment should be removed to prevent runoff from bypassing the facility. Sources of sediment should be prevented.

- The overflow structure and underdrain standpipes should be inspected annually to ensure that they are functioning.
- Inspect rain gardens after a large storm event to ensure that proper drainage is occurring. Water that remains ponded on the surface of the rain garden after 48 hours of dry weather could indicate a problem with the subsurface drainage system or clogging of the underdrain. While the plants selected for the rain garden are tolerant of wet soils, they are not wetland species that can survive long periods of inundation. Immediate attention is required to prevent the loss of plant materials.

## D.3.2 Detention Basins

As shown on the Project Plans prepared by VHB, there are six (6) surface detention basins included as part of this project. The detention basins are partially vegetated basins that are designed to detain, clean and infiltrate roadway and rooftop runoff. The maintenance of the detention basins may affect the functioning of stormwater management practices. This includes the condition of the side slope vegetation and the sediment deposits in the bottom of the basins.

### Initial Post-construction Inspection

- Infiltration basins should be inspected after every major storm for the first few months to ensure proper stabilization and function.

### Long-term Maintenance

- The grass on the side slopes and in the buffer areas should be mowed, and grass clippings, organic matter, and accumulated trash and debris removed, at least twice during the growing season.
- Eroded or barren spots should be reseeded immediately after inspection to prevent additional erosion and accumulation of sediment.
- Deep tilling can be used to break up a clogged surface area.
- Sediment should be removed from the basin as necessary. Removal procedures should not take place until the floor of the basin is thoroughly dry.

### Inspections and Cleaning

- Detention basins should be inspected at least twice each year to ensure proper stabilization and function.
- Light equipment, which will not compact the underlying soil, should be used to remove the top layer.

### D.3.3 Vegetated Areas and Swales

Swales are incorporated into the stormwater management system, and are intended to be grassed in order to stabilize the soil and help control the flow of stormwater. Although not a structural component of the drainage system, the maintenance of other vegetated areas such as lawns can improve the functioning of the stormwater management system. This includes the health/density of vegetative cover and activities such as the application and disposal of lawn and garden care products, disposal of leaves and yard trimmings and proper aeration of soils. The following are required to maintain swales and other vegetated areas:

- Inspect planted areas on a semi-annual basis and remove any litter.
- Maintain planted areas adjacent to pavement to prevent soil washout.
- Immediately clean any soil deposited on pavement.
- Re-seed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
- Consult landscape architect and plant alternative mixture of grass species in the event of unsuccessful establishment.
- Pesticide/Herbicide Usage – No pesticides are to be used unless a single spot treatment is required for a specific control application.
- Fertilizer usage should be avoided. If deemed necessary, slow release fertilizer should be used. Fertilizer may be used to begin the establishment of vegetation in bare or damaged areas, but should not be applied on a regular basis unless necessary.
- Annual application of compost amendments is recommended.
- A general clean-up in the spring shall include the removal of all leaves, branches, twigs and debris from all swales, lawn areas, tree and shrub beds and from individual tree beds. Also included is de-thatching of all lawn areas and cutting of the grass. The work shall take place between April 15 and May 15. All debris shall be removed from the site and disposed of legally.
- Mulching shall be performed between April 15 and May 30. All shrub and tree beds and individual trees previously mulched shall be mulched with one inch (1") of fine-shredded pine bark mulch. Immediately before the installation of mulch, all areas shall receive an application of pre-emergent herbicide applied at the manufacturer's recommended rates.
- The edging of all bed lines, walkways, and curb lines shall be completed between April 15 and May 15.
- All lawn and grassed swale areas shall be cut at least once every seven (7) days from May 1 thru October 31 to maintain a height of two and a half inches (2 ½"). The mowing frequency may be increased or decreased depending on the growth rate of the grass. The mowing operation shall result in a stand of evenly mowed grass two

and a half inches (2 ½") tall. As a rule, the grass should be cut so that no more than one third (1/3) of its total length is removed during cutting operations.

- Neat trimming shall be performed around all poles, curbs, posts, signs, mulched areas, and other structures falling within the lawn areas. Trimming shall be conducted simultaneously with the mowing operation. All sidewalks, mulch areas, and road surfaces shall be left free of all grass clippings. Extreme care shall be taken to prevent trimmer damage of any kind to trees and shrubs.
- The contractor shall manually remove all weed growth, including grass from tree and shrub beds and from individual tree beds. Woody growth, vines, and other undesirable volunteers shall be removed and legally disposed of. Weed control activities shall be performed in such a manner so as not to disturb or destroy plant material or mulched areas. This task shall be performed on an as-needed basis throughout the duration of the maintenance contract.
- Trees and shrubs shall be pruned in a manner which promotes the typical or natural shape and symmetry of the plant. All broken, dead, or injured branches shall be removed. All sucker growth and die back shall be removed. The leader of the tree shall not be cut. Tree pruning shall be performed by or under the direct supervision of a state licensed arborist and in accordance with currently accepted horticultural practices.
- The contractor shall aerate all lawn areas between September 15 and October 15. A core aeration machine with tines measuring approximately three inches (3") long by a half inch (1/2") in diameter shall be used.
- Prior to the application of a standard pelletized dolomitic limestone, the contractor shall take soil samples from seven (7) different locations throughout the lawn area and for each site. An analysis of the existing nutrients (N-P-K) and pH shall be performed. Based on the soil analysis, apply lime to all lawn areas as required to maintain a proper pH. All liming shall be performed between August 15 and September 15.
- During the fall season (October, November, and early December) the contractor shall, twice-monthly, remove all leaves, branches, twigs, and other debris from grass and landscape areas. All debris shall be removed from the site and legally disposed of.
- Periodic inspection of vegetation shall be made seasonally. If any vegetation requires removal because of death, injury, disease or other reasons, a good faith and reasonable effort shall be made to replace trees and shrubs with same or similar species, at a reasonable readily available size and at the same or similar location.

# Section E - Operations and Maintenance Plan Summary

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# E. Operations & Maintenance Plan Summary

This Operation and Maintenance Plan has been prepared in accordance with the Stormwater Management Policy developed by the DEP and local regulations as applicable. It specifies operational practices and drainage system maintenance requirements for the Project. Requirements should be adjusted by the Owner and Association as necessary to ensure successful functioning of system components.

## E.1 Routine Maintenance Checklists

Routine required maintenance is described in Sections A – D. The following checklists are to be used by the property manager to implement and document the required maintenance and inspection tasks.

## E.2 Reporting and Documentation

The Owner and Association shall be responsible for ensuring that the scheduled tasks as described in this and the final plan are appropriately completed and recorded in the Maintenance Log. Accurate records of all inspections, routine maintenance and repairs shall be documented and these records shall be available for inspection by members of the Town of Framingham Conservation Commission or other designated body, or their designated agent, upon request.

The Maintenance Log shall:

- Document the completion of required maintenance tasks.
- Identify the person responsible for the completion of tasks.
- Identify any outstanding problems, malfunctions or inconsistencies identified during the course of routine maintenance.
- Document specific repairs or replacements.

## E.3 Long Term Maintenance/ Evaluation Checklist – Draft To Be Updated Following Construction

### Danforth Green – Framingham, Massachusetts

The following checklists are provided for the maintenance crew to photocopy and use when conducting inspections and cleaning activities to the stormwater management systems.

**Catch Basins & Landscape Drains – Inspect 4 times per year, clean at least once per year, or when sediment in catch basins reaches a depth of 6"**

| Structure | Inspected (Y/N) | Sediment Depth (inches) | Cleaning needed (Y/N) | Date Cleaned | Comments (Trash, Oil, Pet Waste, Lawn Debris, Damaged) |
|---|---|---|---|---|---|
| CB 1 | | | | / / | |
| CB 2 | | | | / / | |
| CB 3 | | | | / / | |
| CB 4 | | | | / / | |
| CB 5 | | | | / / | |
| CB 6 | | | | / / | |
| CB 7 | | | | / / | |
| CB 8 | | | | / / | |
| CB 9 | | | | / / | |
| CB 10 | | | | / / | |
| CB 11 | | | | / / | |
| CB 12 | | | | / / | |
| CB 13 | | | | / / | |
| CB 14 | | | | / / | |
| CB 15 | | | | / / | |
| CB 16 | | | | / / | |
| CB 17 | | | | / / | |
| CB 18 | | | | / / | |
| CB 19 | | | | / / | |
| CB 20 | | | | / / | |
| DCB 21 | | | | / / | |
| DCB 22 | | | | / / | |
| CB 23 | | | | / / | |
| CB 24 | | | | / / | |
| CB 25 | | | | / / | |
| CB 26 | | | | / / | |
| CB 27 | | | | / / | |
| CB 28 | | | | / / | |
| CB 29 | | | | / / | |
| CB 30 | | | | / / | |
| CB 31 | | | | / / | |
| CB 32 | | | | / / | |
| CB 33 | | | | / / | |
| CB 34 | | | | / / | |

| | | | | | |
|---|---|---|---|---|---|
| **LD 1** | | | | / / | |
| **LD 2** | | | | / / | |
| **LD 3** | | | | / / | |
| **LD 4** | | | | / / | |
| **LD 5** | | | | / / | |
| **LD 6** | | | | / / | |
| **LD 7** | | | | / / | |
| **LD 8** | | | | / / | |
| **LD 9** | | | | / / | |
| **LD 10** | | | | / / | |
| **LD 11** | | | | / / | |
| **LD 12** | | | | / / | |
| **LD 13** | | | | / / | |

**Water Quality/Pretreatment Devices – Inspect 4 times per year, clean at least once per year or when sediment reaches a depth of 8 inches**

| Device | Inspected (Y/N) | Sediment Depth (inches) (3" Max.) | Cleaning needed (Y/N) | Date Cleaned | Comments |
|---|---|---|---|---|---|
| WQU 1 | | | | / / | |
| Manhole baffle intact? | | | | | |
| WQU 2 | | | | / / | |
| Manhole baffle intact? | | | | | |
| WQU 3 | | | | / / | |
| Manhole baffle intact? | | | | | |
| WQU 4 | | | | / / | |
| Manhole baffle intact? | | | | | |

**Street Sweeping – Sweep at least 2 times per year using a vacuum sweeper (Sweeping recommended in Oct/Nov, Apr/May)**

| | Date Inspected | Cleaning Needed (Y/N) | Date Cleaned | Comments (Trash, Oil, Pet waste, Asphalt/Concrete Condition) |
|---|---|---|---|---|
| **Impervious Areas** | / / | | / / | |

| Subsurface Infiltration Systems – Inspect Subsurface Infiltration Basins twice per year. | | | | | |
|---|---|---|---|---|---|
| **System/Inspection Item** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments** |
| **SIS E-1** | | | | / / | |
| Proper drainage/ function | | | | / / | |
| Sediment carryover | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **SIS E-2** | | | | / / | |
| Proper drainage/ function | | | | / / | |
| Sediment carryover | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **SIS E-3** | | | | / / | |
| Proper drainage/ function | | | | / / | |
| Sediment carryover | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **SIS E-4A** | | | | / / | |
| Proper drainage/ function | | | | / / | |
| Sediment carryover | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |

| Subsurface Infiltration Systems – Inspect Subsurface Infiltration Basins twice per year. | | | | | |
|---|---|---|---|---|---|
| **System/Inspection Item** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments** |
| **SIS E-4B** | | | | / / | |
| Proper drainage/ function | | | | / / | |
| Sediment carryover | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |

| Infiltration and Detention Basins and Rain Gardens – Inspect twice per year. If sediment build-up is found, core aeration or cultivating of unvegetated areas may be required to ensure adequate filtration. | | | | | |
|---|---|---|---|---|---|
| **Infiltration Basin/Inspection Item** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| **DB CULV-N** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG W-1** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG W-3** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |

| **Infiltration and Detention Basins and Rain Gardens – Inspect twice per year. If sediment build-up is found, core aeration or cultivating of unvegetated areas may be required to ensure adequate filtration.** | | | | | |
|---|---|---|---|---|---|
| **Infiltration Basin/Inspection Item** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG W-4** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG W-5** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **IB E-1** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG E-2** | | | | / / | |

| **Infiltration and Detention Basins and Rain Gardens – Inspect twice per year. If sediment build-up is found, core aeration or cultivating of unvegetated areas may be required to ensure adequate filtration.** | | | | | |
|---|---|---|---|---|---|
| **Infiltration Basin/Inspection Item** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **IB E-3** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG E-4A** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG E-4B** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |

| **Infiltration and Detention Basins and Rain Gardens – Inspect twice per year. If sediment build-up is found, core aeration or cultivating of unvegetated areas may be required to ensure adequate filtration.** | | | | | |
|---|---|---|---|---|---|
| **Infiltration Basin/Inspection Item** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **IB E-5** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **IB E-6** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG E-7** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |

| **Infiltration and Detention Basins and Rain Gardens – Inspect twice per year. If sediment build-up is found, core aeration or cultivating of unvegetated areas may be required to ensure adequate filtration.** | | | | | |
|---|---|---|---|---|---|
| **Infiltration Basin/Inspection Item** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **RG E-8** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |
| | | | | | |
| **IB E-9** | | | | / / | |
| Sediment buildup and erosion | | | | / / | |
| Monthly trash/debris removal | | | | / / | |
| Mulching (at least every spring) and watering as necessary | | | | / / | |
| Test soil pH | | | | / / | |
| Bi-annual pruning and vegetation maintenance | | | | / / | |
| Major rainfall inspection | | | | / / | |
| Immediate oil/hazardous material removal | | | | / / | |
| Integrity/ function of structures and underdrain | | | | / / | |
| Other maintenance as necessary | | | | / / | |

| Roof Gutters, Downspouts, and Leaching Chambers – Inspect & clean gutters and downspouts at least twice per year. Inspect & clean leaching chambers once per year. | | | | | |
|---|---|---|---|---|---|
| **Bldg #** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Bldg 1 | | | | / / | |
| Bldg 2 | | | | / / | |
| Bldg 3 | | | | / / | |
| Bldg 4 | | | | / / | |
| Bldg 5 | | | | / / | |
| Bldg 6 | | | | / / | |
| Bldg 7 | | | | / / | |
| Bldg 8 | | | | / / | |
| Bldg 9 | | | | / / | |
| Bldg 10 | | | | / / | |
| Bldg 11 | | | | / / | |
| Bldg 12 | | | | / / | |
| Bldg 13 | | | | / / | |
| Bldg 14 | | | | / / | |
| Bldg 15 | | | | / / | |
| Bldg 16 | | | | / / | |
| Bldg 17 | | | | / / | |
| Bldg 18 | | | | / / | |
| Bldg 19 | | | | / / | |
| Bldg 20 | | | | / / | |
| Bldg 21 | | | | / / | |
| Bldg 22 | | | | / / | |
| Bldg 23 | | | | / / | |
| Bldg 24 | | | | / / | |
| Bldg 25 | | | | / / | |
| Bldg 26 | | | | / / | |
| Bldg 27 | | | | / / | |
| Bldg 28 | | | | / / | |
| Bldg 29 | | | | / / | |
| Bldg 30 | | | | / / | |
| Bldg 31 | | | | / / | |
| Bldg 32 | | | | / / | |
| Bldg 33 | | | | / / | |

| Roof Gutters, Downspouts, and Leaching Chambers – Inspect & clean gutters and downspouts at least twice per year. Inspect & clean leaching chambers once per year. | | | | | |
|---|---|---|---|---|---|
| **Bldg #** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Bldg 34 | | | | / / | |
| Bldg 35 | | | | / / | |
| Bldg 36 | | | | / / | |
| Bldg 37 | | | | / / | |
| Bldg 38 | | | | / / | |
| Bldg 39 | | | | / / | |
| Bldg 40 | | | | / / | |
| Bldg 41 | | | | / / | |
| Bldg 42 | | | | / / | |
| Bldg 43 | | | | / / | |
| Bldg 44 | | | | / / | |
| Bldg 45 | | | | / / | |
| Bldg 46 | | | | / / | |
| Bldg 47 | | | | / / | |
| Bldg 48 | | | | / / | |
| Bldg 49 | | | | / / | |
| Bldg 50 | | | | / / | |
| Bldg 51 | | | | / / | |
| Bldg 52 | | | | / / | |
| Bldg 53 | | | | / / | |
| Bldg 54 | | | | / / | |
| Bldg 55 | | | | / / | |
| Bldg 56 | | | | / / | |
| Bldg 57 | | | | / / | |
| Bldg 58 | | | | / / | |
| Bldg 59 | | | | / / | |
| Bldg 60 | | | | / / | |
| Bldg 61 | | | | / / | |
| Bldg 62 | | | | / / | |
| Bldg 63 | | | | / / | |
| Bldg 64 | | | | / / | |
| Bldg 65 | | | | / / | |
| Bldg 66 | | | | / / | |

| Roof Gutters, Downspouts, and Leaching Chambers – Inspect & clean gutters and downspouts at least twice per year. Inspect & clean leaching chambers once per year. | | | | | |
|---|---|---|---|---|---|
| **Bldg #** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Bldg 67 | | | | / / | |
| Bldg 68 | | | | / / | |
| Bldg 69 | | | | / / | |
| Bldg 70 | | | | / / | |
| Bldg 71 | | | | / / | |
| Bldg 72 | | | | / / | |
| Bldg 73 | | | | / / | |
| Bldg 74 | | | | / / | |
| Bldg 75 | | | | / / | |
| Bldg 76 | | | | / / | |
| Bldg 77 | | | | / / | |
| Bldg 78 | | | | / / | |
| Bldg 79 | | | | / / | |
| Bldg 80 | | | | / / | |
| Bldg 81 | | | | / / | |
| Bldg 82 | | | | / / | |
| Bldg 83 | | | | / / | |
| Bldg 84 | | | | / / | |
| Bldg 85 | | | | / / | |
| Bldg 86 | | | | / / | |
| Bldg 87 | | | | / / | |
| Bldg 88 | | | | / / | |
| Bldg 89 | | | | / / | |
| Bldg 90 | | | | / / | |
| Bldg 91 | | | | / / | |
| Bldg 92 | | | | / / | |
| Bldg 93 | | | | / / | |
| Bldg 94 | | | | / / | |
| Bldg 95 | | | | / / | |
| Bldg 96 | | | | / / | |
| Bldg 97 | | | | / / | |
| Bldg 98 | | | | / / | |
| Bldg 99 | | | | / / | |

| Roof Gutters, Downspouts, and Leaching Chambers – Inspect & clean gutters and downspouts at least twice per year. Inspect & clean leaching chambers once per year. | | | | | |
|---|---|---|---|---|---|
| **Bldg #** | **Inspected (Y/N)** | **Sediment Depth (inches)** | **Cleaning needed (Y/N)** | **Date Cleaned** | **Comments (Trash, Oil, Pet waste, Lawn Debris, Damage)** |
| Bldg 100 | | | | / / | |
| Bldg 101 | | | | / / | |
| Bldg 102 | | | | / / | |
| Bldg 103 | | | | / / | |
| Bldg 104 | | | | / / | |
| Bldg 105 | | | | / / | |
| Bldg 106 | | | | / / | |
| Bldg 107 | | | | / / | |
| Bldg 108 | | | | / / | |
| Bldg 109 | | | | / / | |
| Bldg 110 | | | | / / | |
| Bldg 111 | | | | / / | |
| Bldg 112 | | | | / / | |
| Bldg 113 | | | | / / | |
| Bldg 114 | | | | / / | |
| Bldg 115 | | | | / / | |
| Bldg 116 | | | | / / | |
| Bldg 117 | | | | / / | |
| Bldg 118 | | | | / / | |
| Bldg 119 | | | | / / | |
| Bldg 120 | | | | / / | |
| Bldg 121 | | | | / / | |
| Bldg 122 | | | | / / | |
| Maint | | | | / / | |
| Recycle | | | | / / | |
| Cabana | | | | / / | |

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# Attachment A – Spill Contingency Plan

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**Draft Spill Contingency Plan**

# *Danforth Green*

## Riverpath Drive

## Framingham, Massachusetts


**Prepared for** **Danforth Green**
Riverpath Drive
Framingham, Massachusetts 01702

**Prepared by** VHB Vanasse Hangen Brustlin, Inc.
101 Walnut Street
Watertown, MA 02471


**May 2013**

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## A. Disclaimer

**THIS SPILL CONTINGENCY PLAN IS TO BE CONSIDERED A TEMPLATE FOR USE BY THE PROJECT OWNER AND ASSOCIATION TO PREPARE A FINAL LONG-TERM SITE SPILL CONTINGENCY PLAN. THE FINAL SITE SPILL CONTINGENCY PLAN WILL BE PREPARED FOLLOWING THE COMPLETION OF CONSTRUCTION BUT BEFORE OCCUPANCY. THE FINAL PLAN WILL INCLUDE UPDATED AS BUILT INFORMATION IN PLACE OF THE DESIGN INFORMATION INCLUDED AT THIS TIME. CONSTRUCTION PHASE SPILL CONTINGENCY MANAGEMENT SHALL BE IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARED BY THE CONTRACTOR WHEN FILING FOR THE NPDES NOI.**

## B. Project Information

Site: Riverpath Drive
Framingham, Massachusetts 01702

Owner: Danforth Green, LLC
21 Center Street
Weston, MA 02493
(781) 894-9898

Site Contact: To Be Determined

Danforth Green, LLC proposes to construct a residential development known as Danforth Green (the Project) on an approximately 145 acre site in Framingham, Massachusetts (the Site). The Project includes the construction of 353 for sale and rental housing units in both town homes and apartment buildings along with appurtenant roadways, utility infrastructure and a stormwater management system designed in accordance with the Massachusetts Stormwater Management Regulations. The Project also includes a complete erosion and sedimentation control program with provisions to minimize areas of disturbance, limit erosion through stabilization, and prevent sediment from leaving the Site.

As described in the Notice of Intent (NOI) prepared for the Project and submitted under separate cover, no portions of the Project will occur within resource areas regulated under the Massachusetts Wetlands Protection Act (WPA) or within buffer zones of areas regulated under the WPA. Portions of the Site do contain isolated depressions that are regulated under the Town of Framingham Wetlands By-Law (By-Law) and the Project will impact some of these areas.

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This Spill Contingency Plan is to be considered a template for use by the project owner. The final Spill Contingency Plan will be prepared following the completion of construction but before occupancy. A Stormwater Management System Operations and Maintenance (O&M) Manual and Stormwater Pollution Prevention Plan (SWPPP) have also been prepared for this project.

# C. Spill Contingency Plan

During construction, construction personnel will be instructed regarding the following spill prevention practices and procedures. Notices stating these practices will be posted in the offices and trailers, and the site construction supervisor will be responsible for seeing that these procedures are followed. Following construction, the facility manager will be responsible for following the procedures.

## C.1 Material Management Practices

The following material management practices will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. These include good housekeeping practices and guidelines for the handling of hazardous products.

The following good housekeeping practices will be followed on-site during the construction period.

- No storage, stockpiling or staging of construction-related materials or products will occur within 100 feet of a wetland or waterway without adequate erosion control protection and without approval of the Massachusetts Department of Environmental Protection.
- An effort will be made to store only enough product required to do the job.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers, and (if necessary) under a roof or other 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.
- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The project superintendent will inspect the storage area(s) daily to ensure proper use and disposal of materials on-site.

The following practices will reduce the risks associated with hazardous materials (e.g., petroleum products, solvents).

- A copy of all Material Safety Data Sheets (MSDS) for materials or products used during construction will be kept in the office trailer.
- Products will be kept in original containers unless they are not re-sealable.

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- Original labels and material safety data (MSD sheets) will be retained; they contain important product information.
- If surplus product must be disposed, manufacturer's or local- and state-recommended methods for proper disposal will be followed.

## C.2 Product-Specific Practices

The following product-specific practices will be followed on-site. Recommendations are provided for petroleum products, fertilizers, solvents, paints, and other hazardous substances, and concrete.

### C.2.1 Petroleum Products

During Construction all on-site construction vehicles will be monitored for leaks and will receive regular preventive maintenance to reduce the chance of leakage. No vehicle maintenance or handling of petroleum products will occur within 100 feet of a wetland. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used on-site will be applied according to manufacturer's recommendations. No petroleum-based or asphalt substances will be stored within 100 feet of a wetland.

### C.2.2 Fertilizers

Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, the fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered shed; and the contents of any partially used bags will be transferred to a sealable, plastic bin to avoid spills. No fertilizer storage will occur within 100 feet of a wetland.

### C.2.3 Solvents, Paints, Maintenance Materials, and other Hazardous Substances

These substances will be used to facilitate construction and minor amounts will also be present in the facility maintenance building. All containers will be tightly sealed and stored when not required for use. Excess materials will not be discharged to the storm sewer system, but will be properly disposed according to manufacturer's instructions or state and local regulations. No storage will occur within 100 feet of a wetland.

### C.2.4 Procedures for Fueling Construction Equipment from Tanker Trucks

The following standard procedures shall be followed during transfer of fuel from tanker trucks to construction equipment to reduce the likelihood of a spill or release of diesel fuel:

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- No fuel deliveries will take place without operating personnel in attendance;
- Unless emergency deliveries are required due to availability of equipment or work schedules and upon approval of designated Contractor personnel, fuel deliveries will be accepted during daylight hours only;
- The level of fuel in the tank in the equipment will be checked before each delivery is initiated;
- The delivery truck wheels are chocked as soon as the truck is parked in the fuel transfer position.
- The truck driver making the delivery will be present at the point of transfer to supervise the operation;
- The flexible transfer hoses will be inspected for cuts, abrasion, and damaged ends;
- The tanker truck tank valves will be checked to ensure that they are in the correct position before the transfer pump is started;
- The tanks of the equipment will not be filled to overflow capacity;
- The tanks of the equipment will not be filled beyond 90% capacity, so sufficient volume is available for product expansion; and
- Final inspection of the tank truck tank and transfer lines will be conducted to determine that there are no sources of leaks from damage like dents, tears, cuts, abrasions, etc. and that all valves and ports are closed and that no leaks have occurred before removal of the wheel chocks and departure from the fueling location.

The Contractor should also retain an Emergency Response Contractor and a Licensed Site Professional under on-call contracts so that in the event of an emergency, Contractor can contact either or both and obtain an immediate response and a reasonable negotiated rate.

### C.2.5 Concrete Trucks

Concrete trucks will not be allowed to wash out or discharge surplus concrete or drum wash water within 100 feet of wetland resources or into catch basins that are already in place. The concrete washout will occur in a lined washout basin.

### C.2.6 Pool Maintenance Supplies

Following construction, a pool will be located on the property. Pool maintenance chemicals should be stored in an indoor location. All containers will be labeled, tightly sealed, and stored when not required for use. Excess materials will not be discharged to the storm sewer system, but will be properly disposed according to manufacturer's instructions or state and local regulations.

## C.3 Spill Control/Notification Practices

In addition to the good housekeeping and material management practices discussed above, the following practices will be followed for spill control, notification and cleanup.

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- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be informed of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area on-site. Equipment and materials will include, but will not be limited to, shovels, wheel barrows, brooms, dust pans, mops, rags, gloves, goggles, kitty litter or Speedi-Dry, sand, sawdust, and plastic and metal trash containers specifically designated for this purpose.
- In the case of stationary equipment, all service vehicles will be equipped with spill kits that are designed to hold the full volume of the vehicles fuel tank and will be described in the SWPPP.
- All spills will be cleaned immediately after discovery.
- The spill area will be kept well-ventilated and personnel will wear protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material in excess of reportable quantities, as established in the Massachusetts Contingency Plan (MCP), will be reported to the Massachusetts Department of Environmental Protection Division of Hazardous Waste [617) 292- 5500 or (978) 694-3200]. The Emergency Spill Response Procedure is provided on page 7.
- The construction superintendent responsible for the daily operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel to receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of the responsible spill personnel will be posted in the material storage area and in the on-site office trailer.

## C.4 Source Control

A comprehensive source control program will be implemented by the Project Owner and Association, which includes the following components:

- Regular pavement sweeping;
- Catch basin grate cleaning;
- Limiting the use of deicing chemicals;
- Clearing litter from the parking area, islands, and perimeter landscape areas;
- Maintenance of vegetation and landscape areas; and
- Spill Prevention training, as required.

These steps will reduce the pollutant load in the site's stormwater management system. Certain procedures are detailed below.

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### C.4.1 Construction Trash Removal

Daily loose trash removal will prevent litter, construction debris, and construction chemicals exposed to stormwater from becoming a pollutant source for stormwater discharges. All loose trash will be placed in appropriate storage containers until disposed of properly off-site.

### C.4.2 Covered Trash/Storage Areas

Areas to be used for storing dumpsters, compactors or other raw or waste materials will be covered to prevent contact with stormwater.

### C.4.3 Pavement Sweeping

Paved surfaces at the site will be swept at least twice annually (fall and spring). The sweeping program will remove contaminants directly from paved surfaces before their release into stormwater runoff. Pavement sweeping has been demonstrated to be an effective initial treatment for reducing pollutant loading into stormwater.

### C.4.4 Fertilizer

Only slow-release organic fertilizers will be used in landscaped areas. This will limit the amount of nutrients that could enter the stormwater and wetland systems. Fertilizer use will be reduced once the proposed landscaping is established.

### C.4.5 Deicing Agents

The use of road salt (sodium chloride) for maintenance of parking areas and circulation drives during the winter will be minimized. Sand will be the primary agent used during ice and snow conditions. De-icing or anti-caking agents, added to enhance performance and application characteristics of the sand mixture, will be included only as necessary and at minimum application rates. This will help to limit the amount of dissolved pollutants in snowmelt and stormwater runoff.

## C.5 Waste Disposal

All non-demolition waste materials will be collected and stored in metal dumpsters. The dumpster will meet all local and state solid waste management regulations. All trash and non-demolition construction debris from the site will be deposited in the dumpster; and the dumpster will be emptied as necessary. Trash will be hauled by a licensed contractor and disposed in accordance with federal, state, and local environmental regulations. No trash or construction waste will be buried

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on-site, and personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and the site construction supervisor will be responsible for seeing that these procedures are followed.

### C.5.1 Hazardous Waste

Hazardous waste materials (e.g., petroleum products, solvents) will be disposed in the manner specified by local and state regulation, or by the manufacturer. Site personnel will be instructed in these practices, and the site construction supervisor will be responsible for seeing that these procedures are followed.

### C.5.2 Sanitary Waste

Sanitary waste will be handled by the municipal sewer system. There will be no holding tanks on Site.

## C.1 Spill Response Procedure

**Procedures for Responding to a Petroleum or Hazardous Material Release**

The Contractor's Project Manager/Superintendent or their designee will act as the Emergency Response Coordinator (ERC) and notice of this designation will be posted to notify Contractor personnel and all others on the project site. The ERC, to be qualified, must complete the 40 hour OSHA HazWoper training per 29 CFR 1910.120. The ERC is the central contact and incident commander for all spills or releases, unless the Framingham Fire Department, State or Federal agents take command of the incident. The ERC is responsible for all site activities and response measures during and following a petroleum and/or hazardous material release. When a spill is reported, the ERC assesses the impact on operations, determines the level of response, coordinates the response and clean-up activities (including calling in outside professional responders), contacts appropriate regulatory agencies, informs Contractor personnel and others on the project site when an evacuation is indicated and when the emergency is over, and completes required written reports. The Framingham Fire Department must be notified immediately if a spill or release poses a risk of fire or danger to the public. The MassDEP and/or the Massachusetts State Police must be contacted if a sudden uncontrolled spill or release equal to or greater than 10 gallons of diesel fuel or oil is spilled. The ERC also organizes training and drills and oversees equipment purchase activities and maintenance. The Project Manager/Superintendent and any personnel delegated as ERC are listed in Appendix [Contractor designates letter/number].

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The Contractor will maintain trained response personnel (First Responders) on-site to provide initial containment and notification to appropriate individuals in the event of a spill. The First Responders will have spill response training in accordance with the requirements of OSHA HazWoper regulations 29 CFR 1910.120. First Responders will be trained in defensive response techniques including but not limited to applying absorbents on the leading edge of a spreading oil release to prevent or limit contamination of the environment as applicable. For minor spills, the First Responders will completely manage the spill from initial response to final cleanup, as directed by the ERC. A list of the First Responders is provided in Appendix [Contractor to designate letter/number].

## C.2 Initial Notification

In the event of a spill the facility and/or construction manager or supervisor will be notified immediately.

Project Manager: (name)

(phone)

Project Superintendent: (name)

(phone)

## C.3 Assessment - Initial Containment

The supervisor or manager will assess the incident and initiate containment control measures with the appropriate spill containment equipment included in the spill kit kept on-site. The supervisor will first contact the ***Framingham*** Fire Department and then notify the ***Framingham*** Police Department, ***Framingham*** Board of Health and Conservation Commission. The fire department is ultimately responsible for matters of public health and safety and should be notified immediately.

Fire Department Phone: (508) 532-5930

Police Department: (508) 872-1212

Board of Health Phone: (508) 532-5470 or (508) 532-5478 (hotline)

Conservation Commission Phone: (508) 532-5460

## C.4 Further Notification

Based on the assessment from the Fire Chief, additional notification to a cleanup contractor may be made. The Massachusetts Department of Environmental Protection (MassDEP) and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of cleanup and notification required. The attached list of emergency phone numbers shall be posted in the main construction/facility office and readily accessible to all employees.

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## C.5 Hazardous Waste/Oil Spill Report

Date____/____/____ Time_____ AM / PM

Exact location (Transformer #)_____

Type of equipment_____Make_____Size_____

S / N_____Weather Conditions_____

On or near water ☐ Yes If yes, name of body of water_____
☐ No

Type of chemical / oil spilled_____

Amount of chemical / oil spilled_____

Cause of spill_____

_____

_____

Measures taken to contain or clean up spill_____

_____

_____

Amount of chemical / oil recovered_____Method_____

Material collected as a result of clean up

_____drums containing_____

_____drums containing_____

_____drums containing_____

Location and method of debris disposal_____

_____

Name and address of any person, firm, or corporation suffering damages_____

_____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring___

_____

Spill reported to General Office by_____Time_____AM / PM

Spill reported to DEP / National Response Center by_____

DEP Date____/____/____ Time_____ AM / PM Inspector_____

NRC Date____/____/____ Time_____ AM / PM Inspector_____

Additional comments_____

_____

_____

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## C.6 Emergency Response Equipment Inventory

The following equipment and materials shall be maintained at all times and stored in a secure area for long-term emergency response need.

| Supplies | | Recommended Suppliers |
|---|---|---|
| SORBENT PILLOWS/"PIGS" | **2** | http://www.newpig.com |
| SORBENT BOOM/SOCK | **25 FEET** | Item # KIT276 — mobile container with 2 pigs, 26 feet of sock, 50 pads, and 5 lbs of absorbent (or equivalent) |
| SORBENT PADS | **50** | |
| LITE-DRI® ABSORBENT | **5 POUNDS** | http://www.forestry-suppliers.com |
| SHOVEL | **1** | Item # 43210 — Manhole cover pick (or equivalent) |
| PRY BAR | **1** | Item # 33934 — Shovel (or equivalent) |
| GOGGLES | **1 PAIR** | Item # 90926 — Gloves (or equivalent) |
| GLOVES – HEAVY | **1 PAIR** | Item # 23334 — Goggles (or equivalent) |

The following items shall be placed in a convenient, readily accessible location on site.

| | | |
|---|---|---|
| -- | HAY BALES & GRADE STAKES | 10 |
| -- | SAND | 10 CUBIC YARDS |

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## D. Emergency Notification Phone Numbers

**1. CONSTRUCTION COORDINATOR**
NAME: (name)
OFFICE PHONE: (number)
MOBILE PHONE: (number)

**2. ENVIRONMENTAL MONITOR**
NAME: (name)
OFFICE PHONE: (number)
MOBILE PHONE: (number)

**3. PROJECT MANAGER**
NAME: (name)
OFFICE PHONE: (number)
MOBILE PHONE: (number)

**PROJECT SUPERINTENDENT:**
NAME: (name)
OFFICE PHONE: (number)
MOBILE PHONE: (number)

**4. FRAMINGHAM FIRE DEPARTMENT**
EMERGENCY: 911
BUSINESS: (508) 532-5930

**FRAMINGHAM POLICE DEPARTMENT**
GENERAL NUMBER: (508) 872-1212

**5. CLEANUP CONTRACTOR**:

ADDRESS:
PHONE:

**6. MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION**
EMERGENCY: (888) 304-1133
NORTHEAST REGION: (978) 694-3200

**7. NATIONAL RESPONSE CENTER**
PHONE: (800) 424-8802

**ALTERNATE: U.S. ENVIRONMENTAL PROTECTION AGENCY**
EMERGENCY: 1-800-424-8802
BUSINESS: 1-888-372-7341

**8. FRAMINGHAM CONSERVATION COMMISSION**
CONTACT: MAEGHAN WALTERS
PHONE: (508) 532-5460

**FRAMINGHAM BOARD OF HEALTH**
CONTACT: JENNIFER L. THOMPSON
PHONE: (508) 532-5470

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# Attachment B - Example Manufacturer's O&M Manual, Subsurface Infiltration System

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**Save Valuable Land and Protect Water Resources**

StormTech®
*Detention • Retention • Water Quality*
Subsurface Stormwater Management℠

# Isolator™ Row O&M Manual

StormTech® Chamber System for Stormwater Management

# 1.0 The Isolator™ Row

## 1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

*Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.*

## 1.2 THE ISOLATOR™ ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-740, DC-780 or MC-3500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

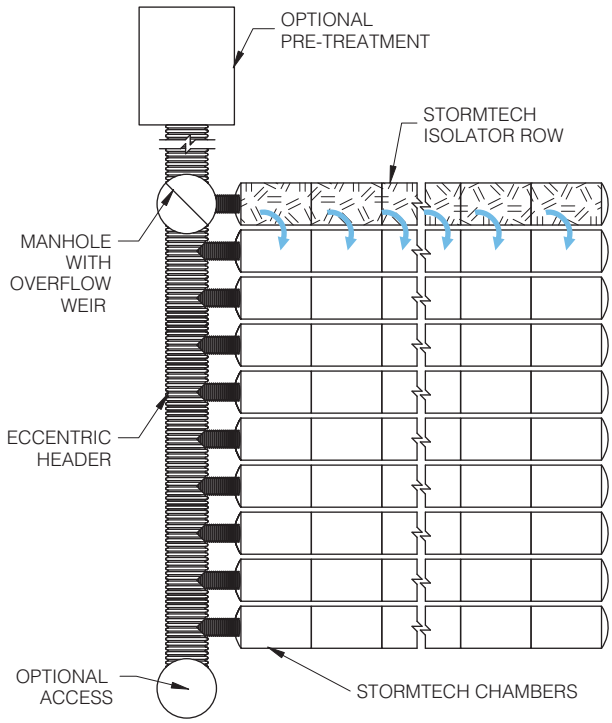
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber.

The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

*Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*

**StormTech Isolator Row with Overflow Spillway**
(not to scale)



# 2.0 Isolator Row Inspection/Maintenance

## 2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

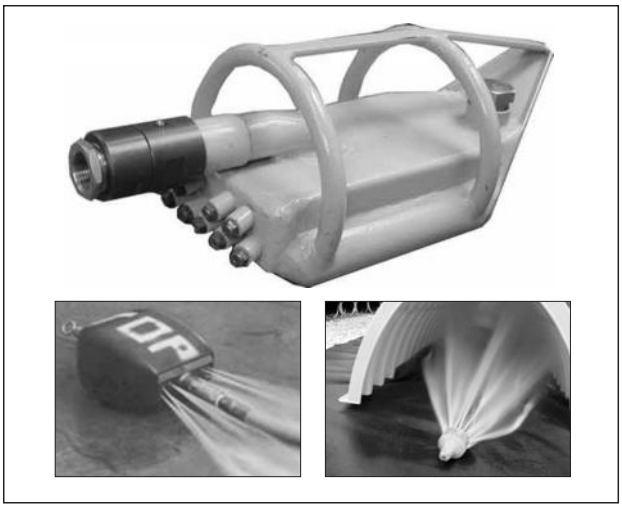
At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

## 2.2 MAINTENANCE

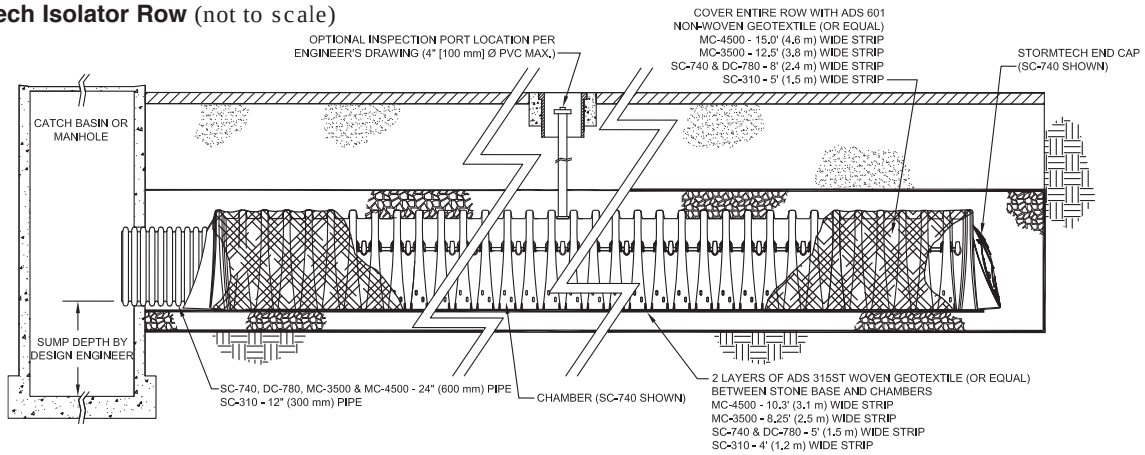
The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



*Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)*

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

**StormTech Isolator Row** (not to scale)




**Note:** For many applications, the non-woven geotextile over the DC-780, MC-3500 and MC-4500 Isolator Row chambers can be eliminated or substituted with the AASHTO Class 1 woven geotextile. Contact your StormTech representative for assistance.

# 3.0 Isolator Row Step By Step Maintenance Procedures

**Step 1)** Inspect Isolator Row for sediment

A) Inspection ports (if present)

i. Remove lid from floor box frame

ii. Remove cap from inspection riser

iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.

iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.

B) All Isolator Rows

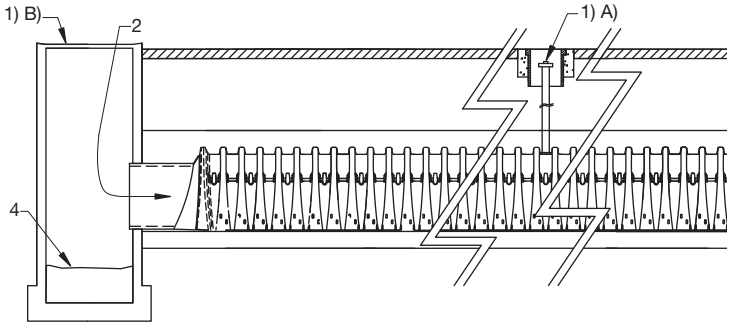
i. Remove cover from manhole at upstream end of Isolator Row

ii. Using a flashlight, inspect down Isolator Row through outlet pipe

1. Mirrors on poles or cameras may be used to avoid a confined space entry
2. Follow OSHA regulations for confined space entry if entering manhole

iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

**StormTech Isolator Row** (not to scale)




**Step 2)** Clean out Isolator Row using the JetVac process

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable

B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required

**Step 3)** Replace all caps, lids and covers, record observations and actions

**Step 4)** Inspect & clean catch basins and manholes upstream of the StormTech system

**Sample Maintenance Log**

| Date | Stadia Rod Readings | | Sediment Depth (1) - (2) | Observations/Actions | Inspector |
|---|---|---|---|---|---|
| | Fixed point to chamber bottom (1) | Fixed point to top of sediment (2) | | | |
| 3/15/01 | 6.3 ft. | none | | New installation. Fixed point is CI frame at grade | djm |
| 9/24/01 | | 6.2 | 0.1 ft. | Some grit felt | sm |
| 6/20/03 | | 5.8 | 0.5 ft. | Mucky feel, debris visible in manhole and in Isolator row, maintenance due | rv |
| 7/7/03 | 6.3 ft. | | 0 | System jetted and vacuumed | djm |


StormTech®

*Detention • Retention • Water Quality*

Subsurface Stormwater Management℠

70 Inwood Road, Suite 3 | Rocky Hill | Connecticut | 06067

860.529.8188 | 888.892.2694 | fax 866.328.8401 | www.stormtech.com



StormTech products are covered by one or more of the following patents: U.S. Patents: 5,401,459; 5,511,903; 5,716,163; 5,588,778; 5,839,844; Canadian Patents: 2,158,418 Other U.S. and Foreign Patents Pending Printed in U.S.A.

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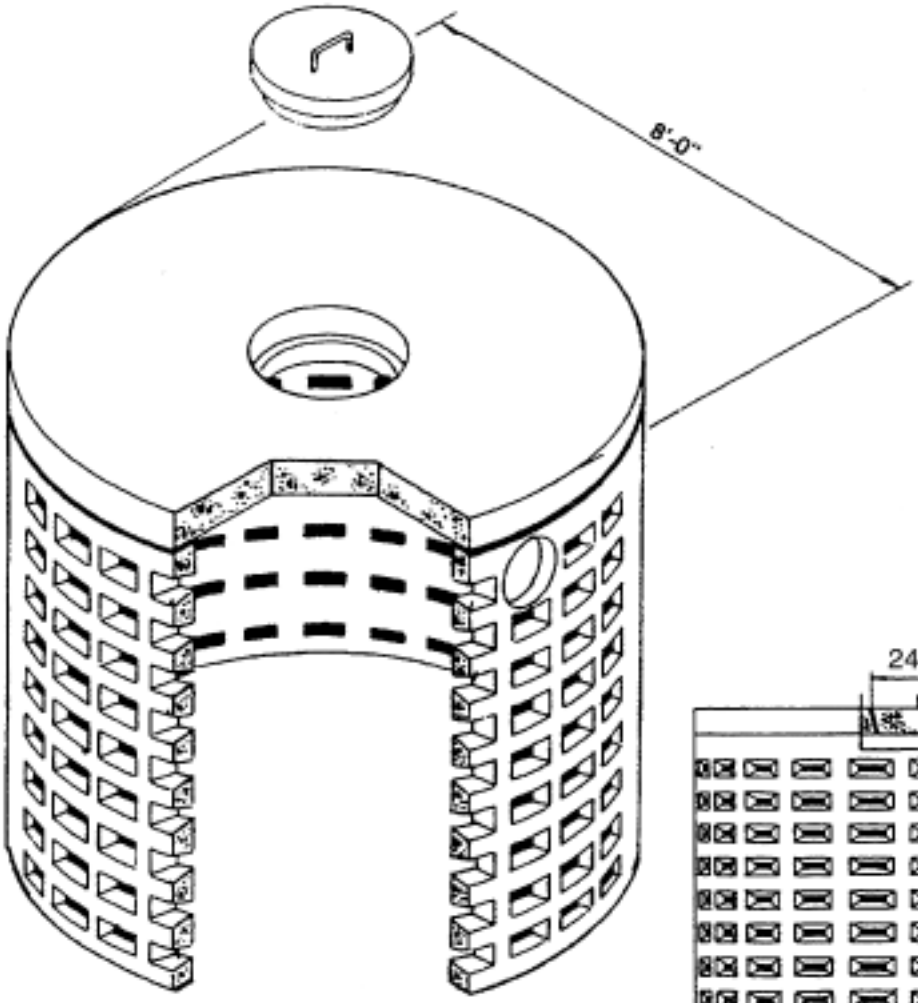
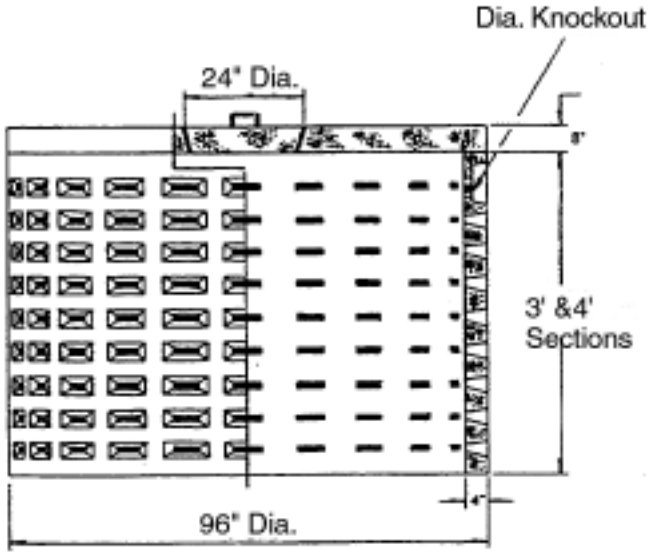
SRP
SCITUATE PRECAST
*If You Can Draw it - We Can Build it*
1-800-440-0009 • 781-837-1747 • fax 781-837-4320
Box 636 • Clay Pit Road • Marshfield, MA 02050

**Leaching Chambers**
8FT Dia. Precast Dry Well

Design notes:
1. Concrete 4,000 P.S.I. @28 days
2. Cement: Portland type II per ASTM C-150-81
3. Steel reinforcement per ASTM A-615 grade 60
4. Design loading per AASHTO HS-10 or HD
5. One foot in height = 313 gallons
6. Covers are AASHTO HS-20

DW 8'-3' High
DW 8'-4' High
DW 8'-6' High
DW 8'-7' High
DW 8'-8' High
DW 8'-9' High
DW 8'-10' High



# Attachment C - Example Manufacturer's O&M Manual, Structural Water Quality Unit

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# Inspection and Maintenance. Easy. Convenient.

When it rains, oils, sediment and other contaminants are captured and contained by over 20,000 Stormceptor units operating worldwide. While Stormceptor's patented scour prevention technology ensures captured pollutants remain in the unit during all rainfall events, the accumulated pollutants must eventually be removed as part of a regular maintenance program.

If neglected, oil and sediment gradually build up and diminish any BMP's efficiency, harming the environment and leaving owners and operators vulnerable to fines, surcharges and bad publicity.

## Maintenance is a must

Ease, frequency and cost of maintenance are often overlooked by specifiers when considering the merits of a stormwater treatment system. In reality, maintenance is fundamental to the long-term performance of any stormwater quality treatment device.

While regular maintenance is crucial, it shouldn't be complicated. An ongoing maintenance program with Stormceptor is convenient and practically effortless. With virtually no disruptions, you can concentrate on your core business.

## Quick inspections

Inspections are easily carried out above ground from any standard surface access cover through a visual inspection of the orifice and drop tee components. A sludge judge and oil dip-stick are all that are needed for sediment and oil depth measurements.

## Easy unit access

Maintenance is typically conducted from the same surface access cover, eliminating the need for confined space entry into the unit. Your site remains undisturbed, saving you time and money.

## No muss, no fuss and fast

Maintenance is performed quickly and inexpensively with a standard vacuum truck. Servicing usually takes less than two hours, with no disruption to your site.

A complete stormwater management plan for Stormceptor extends beyond installation and performance to regular maintenance. It's the smart, cost-effective way to ensure your unit continues to remove more pollutants than any other separator for decades to come.

## Stormceptor maintenance recommendations

- Units should be inspected post-construction, prior to being put into service.
- Inspect every six months for the first year of operation to determine the oil and sediment accumulation rate.
- In subsequent years, inspections can be based on first-year observations or local requirements.
- Cleaning is required once the sediment depth reaches 15% of storage capacity, (generally taking one year or longer). Local regulations for maintenance frequency may vary.
- Inspect the unit immediately after an oil, fuel or chemical spill.
- A licensed waste management company should remove captured petroleum waste products from any oil, chemical or fuel spills and dispose responsibly.

**With over 20,000 units operating worldwide, Stormceptor performs and protects every day, in every storm.**

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# Appendix H: Geotechnical Report

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# HYDROGEOLOGIC REPORT

**DANFORTH GREEN RESIDENTIAL DEVELOPMENT**
**River Path Drive**
**Framingham, Massachusetts**

**Prepared For:**

**Danforth Green LLC**
**Avalon Bay Communities, Inc.**
**21 Center Street**
**Weston, Massachusetts 02493**

**Prepared By:**

**McArdle Gannon Associates, Inc**
**1125 Main Street**
**Hanover, Massachusetts 02339**

DRAFT

**MGA No. G0232.01**
**October 2012**

McArdle Gannon Associates, Inc.
Engineers & Consultants

October 31, 2012
MGA No. G0232.01

Danforth Green LLC
Avalon Bay Communities, Inc.
c/o Todd S. MacDowell
Baystone Development
21 Center Street
Weston, MA 02493

RE: Hydrogeologic Report, proposed Danforth Green residential development on Riverpath Drive in Framingham, Massachusetts.

Dear Todd:

McArdle Gannon Associates, Inc. is pleased to present the attached report summarizing the results of our hydrogeologic studies at the above referenced site. The purpose of our studies was to assess subsurface conditions at the site and develop geotechnical engineering recommendations for use in the design of storm-water management areas at the property.

We look forward to assisting you through the design and construction phases of the project. If you have any questions regarding this report or require additional input, please do not hesitate to call us.

Regards,

MCARDLE GANNON ASSOCIATES, INC.

Sherry L. Holmes, P.E.
Geotechnical Engineer

John J. Gannon
Principal

SLH/JJG/jjg

DRAFT

1125 Main Street | Hanover, MA 02339
Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

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**APPENDICES**


Appendix A – Statement of Limitations
Appendix B – Test Boring Logs
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# 1.00 INTRODUCTION

This report summarizes the results of our hydrogeologic studies for the proposed Storm-water Infiltration Basins at Danforth Green Residential Development in Framingham, Massachusetts. A site locus is attached as Figure No. 1 of this report. We conducted subsurface explorations, limited field permeability testing, laboratory tests and hydrogeologic analyses as part of our studies. Our recommendations for use in the design of storm-water infiltration basins are contained in the report.

This report has been prepared in accordance with our proposal to Danforth Green LLC (Danforth) and Avalon Bay Communities, Inc. (Avalon) dated September 25, 2012 and is subject to the Statement of Limitations attached as Appendix A.

## 1.10 Site and Project Description

Our understanding of the site and proposed project is based on our discussions with you and Vanasse Hangen Brustlin, Inc. (VHB) and our review of the following documents:

- Our "Hydrogeologic Report – Proposed Infiltration Basins" dated July 2010,
- A sketch entitled "Danforth Green" dated May 4, 2012 by VHB,
- A plan entitled "Schematic Design Layout and Materials Plan" dated August 8, 2012 by VHB, and
- AutoCad file 12004 00_Grading-PRELIMINARY by VHB.

The subject property consists of about 127 acres located in the northeasterly corner of Framingham. A residential development scaled down from the one previously proposed consisting of 360 units including 42 townhouse, 11 multi-story apartments, and 7 town house apartment buildings, a Clubhouse and recycling center is planned at the site. Paved roadways and landscaped areas are also planned as part of the development. Surface and subsurface retention/infiltration basins are proposed as part of the storm-water control system for the proposed development.

We completed hydrogeological studies at the property for Vanasse Hangen Brustlin, Inc. (VHB), the project civil engineers, for a past owner in July 2010. Several of the exploration and test locations implemented for those studies are within or near proposed surface and subsurface retention/infiltration basins for the currently proposed development. Refer to the referenced "Hydrogeologic Report – Proposed Infiltration Basins" for additional information.

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## 2.00 SUBSURFACE EXPLORATIONS AND FIELD TESTING

MGA observed and logged fifteen (15) test borings and fourteen (14) test pits performed at the site for this hydrogeological study. An MGA representative observed and logged the explorations, described the conditions encountered in general accordance with Burmister descriptions and observed field permeability tests. VHB determined by survey the approximate boring locations shown on the Exploration Location Plan attached as Figure No. 2. VHB provided a ground surface elevation at each staked exploration location. We estimated ground surface elevations at the exploration locations that were moved from the staked locations based on ground surface contours shown on the referenced AutoCad file.

The explorations are summarized under the following subheadings:

### 2.10 Soil Test Borings

New Hampshire Boring, Inc. (NHB) of Brockton, Massachusetts performed fifteen (15) test borings (VHB-1, 4, 8, 9, 10, 12, 13, 15, 16, 19, 20, and 26 through 29) at the site on October 1 through 5, 2012 using truck and all-terrain vehicle (ATV) mounted drill rigs.

NHB performed the borings by advancing 4.25-inch inside diameter hollow stem augers to complete the majority of the borings. NHB advanced 3-inch inside diameter flush jointed casing and/or hollow stem augers to complete borings VHB-1, 8, 9, 10, 13, 15, and 16. NHB generally advanced the borings through existing fill, and terminated each in natural granular soils (sand, sand and gravel, or silt and sand) at depths between about 12 and 37± feet below ground surface (bgs).

NHB generally conducted standard penetration tests (SPT) both continuously and at 5 foot intervals during advancement of the borings. NHB performed the SPT by driving a standard two-inch outside diameter split spoon sampler a distance of up to twenty-four inches (or to refusal) with a 140 pound safety hammer falling a distance of thirty inches at each sampling depth. The number of blows required to drive the sampler in six-inch increments is recorded on the boring logs attached in Appendix B. The sum of the blows required to drive the sampler from the 6 to 12 and 12 to 18 inch increments, defined as the Standard Penetration Resistance of the soil, is used as a measure of soil density and strength based upon empirically derived correlations.

MGA visually assessed and described the soil samples retrieved in the 2 inch outside diameter (1-3/8 inch inside diameter) split spoon sampler following each standard penetration test in the field. The descriptions are shown on the boring logs attached in Appendix B. Note that these descriptions do not account for soil fractions larger than 1-3/8 inches in diameter that may be present within the strata sampled.

NHB conducted borehole permeability tests under MGA's observation in borings VHB-13 and VHB-15. NHB conducted falling head wick tests as described by the U.S. Department of Navy, Naval Facilities Engineering Command and the U.S. Corps of Engineers using 3 inch inside diameter flush joint casing at depths below the proposed bottom of storm-water basin elevations.

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### 2.20 Test Pits

Silversmith Excavating Co., Inc. (Silversmith) of Wilmington, Massachusetts excavated fourteen (14) test pits (VHB-2, 3, 5, 6, 7, 11, 14, 17, 18, and 21 through 25) at the site on October 3 and 4, 2012. Silversmith excavated the pits with a Caterpillar 315D tracked excavator. Silversmith generally excavated the test pits through existing fill and into natural granular soils (sand, sand and gravel, or silt and sand) to depths between about 8 and 17 feet bgs. Silversmith terminated test pits VHB-14 and VHB-17 within existing fill at the excavator's maximum reach.

The subsurface conditions encountered are summarized on the test pit logs attached as Appendix C. Pictures that we took during excavation of the pits are attached as Appendix D.

## 3.00 LABORATORY TESTING

A geotechnical laboratory conducted 24 sieve-hydrometer analyses on representative existing fill and natural soil samples at or below the bottom of basin elevations that we selected. The laboratory tests were conducted to aid in classifying the soil and for comparison of permeability estimates based on the grain size distribution of the soil with the borehole permeability testing results. The laboratory also classified the soils tested using the USDA Textural Triangle. The test results are attached to this report in Appendix E.

## 4.00 SUBSURFACE CONDITIONS

Subsurface conditions in the areas of the proposed storm water drainage basins were assessed based on the results of our test borings and laboratory test results. The general subsurface conditions encountered at the recent exploration locations consist of an intermittent surficial layer of fill (up to 30 feet deep) underlain by natural granular soils (sands / sands and silts / sands and gravels). Subsurface conditions were typically variable between each infiltration basin and rain garden locations. Below is a general description of each stratum encountered in the recent explorations. More information can be found on the boring and test pit logs attached as Appendices B and C.

Existing fill was encountered at the majority of exploration locations with the exception of borings VHB-8, 9, 10 and 26 through 29 and test pits VHB-5, 6, and 7. The density, consistency, and thickness of the fills encountered at the exploration locations is variable. Where encountered, the fill ranged in thickness from about 2 to 30 feet. The fill layer was not fully penetrated in test pits VHB-14 and VHB-17 where the fill depth exceeded the reach of the excavator (about 16 to 17 feet). The fill varied from a granular fill to dense grade fill to silty fill (possible wash pond sediment) to fill mixed with construction debris. The granular and dense grade fill generally consisted of very loose to very dense, gray-brown/brown/gray/tan, fine to coarse sand with about 20 to 50 percent fine to coarse gravel and about 5 to 30 percent silt. About 5 to 40 percent debris (concrete fragments, boulders, brick, wood, plastic, wire, steel, rubber, cloth, asphalt, and roots) was encountered within the fill layer at several exploration locations.

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Topsoil and subsoil was encountered at ground surface at test pits VHB-5, 6, and 7. The combined thickness was about 2 to 2.5 feet thick. An approximately 1.5 feet thick layer of buried topsoil was encountered below the fill in test pit VHB-2.

The natural sand and gravel generally consists of a dense to very dense, brown, fine to coarse sand with about 20 to 50+ percent fine to coarse gravel and about 5 to 20 percent silt.

The natural sand/gravelly sand generally consists of loose to very dense, tan/brown/gray, fine / fine to medium sand with about 5 to 20 percent silt and 0 to 20 percent fine gravel.

The sand and silt/silty sand generally consists of loose to very dense, brown/tan/gray, fine sand with 25 to 98 percent silt.

Groundwater levels for our study were measured in the completed test borings and test pits at the times and under the conditions noted on the logs. Groundwater was not encountered at the majority of the boring locations during drilling, with the exception of VHB-29 where groundwater was encountered at about 25 feet below the existing ground surface at that time. Based on ground surface elevations provided by VHB, this depth corresponds to about Elevation 127.9 feet. Groundwater was generally not encountered at the test pit locations during excavation, however, perched water was encountered at a depth of about 2 feet in test pits VHB-2 and VHB-3 in silty soils.

It should be expected that groundwater levels will fluctuate due to variations in temperature, rainfall and other factors. Therefore, groundwater levels at any given time may be different than those reported herein.

## 5.00 CONCLUSIONS

The hydraulic conductivity values calculated based on the results of the borehole permeability testing varied from 0.8 ft/day to 1.3 ft/day at the locations of the testing. The results are the average estimated values from the tests performed in each borehole using the falling head formulas for the determination of permeability as described by Hvorslev (1951). Refer to Table No.1 for a summary of relevant information pertaining to the borehole permeability testing.

**TABLE 1 – BOREHOLE PERMEABILITY TESTING SUMMARY**

| Boring No. | Test Depth (ft) | Test Elev.(1) | Burmister Soil Description | GW Elev.(1) (10/2-10/3/12) | Hydraulic Conductivity (ft/day) |
|---|---|---|---|---|---|
| VHB-13 | 32-33± | 152-153± | Silt, little fine Sand | <150 | 0.8± |
| VHB-15 | 28-29± | 147.5-148.5± | Silt, some fine Sand | <145.5 | 1.3± |

(1) Based on ground surface elevations/contours provided by VHB.

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The results of the laboratory testing are summarized in Table No.2 below.

**TABLE 2 – LABORATORY TESTING SUMMARY**

| Boring No. | Sample No. | Sample Depth (ft) | Sample Elevation[(1)] (ft) | USDA Textural Class | Infiltration Rate[(3)] In./Hour |
|---|---|---|---|---|---|
| VHB-1 | S-1 | 4-6± | 149-151± | Loamy Sand[(2)] | 2.41 |
| VHB-1 | S-2 | 9-11± | 144-146± | Silt | 0.27 |
| VHB-2 | S-1 | 2-7± | 161.7-166.7± | Sandy Loam[(2)] | 1.02 |
| VHB-2 | S-2 | 10-13± | 155.7-158.7± | Loamy Sand | 2.41 |
| VHB-3 | S-1 | 2-4.5± | 161-163.5± | Silt | 0.27 |
| VHB-3 | S-2 | 4.5-6± | 159.5-161± | Sand | 8.27 |
| VHB-4 | S-5 | 15-17± | 163-165± | Sandy Loam[(2)] | 1.02 |
| VHB-4 | S-6 | 20-22± | 158-160± | Loamy Sand | 2.41 |
| VHB-7 | S-1 | 2-4± | 148.9-150.9± | Sand | 8.27 |
| VHB-7 | S-2 | 4-8± | 144.9-148.9± | Silt | 0.27 |
| VHB-9 | S-1 | 4-6± | 139-141± | Silt | 0.27 |
| VHB-11 | S-1 | 4-10± | 139.4-145.4± | Sand | 8.27 |
| VHB-13 | S-4 | 19-21± | 164.1-166.1± | Sandy Loam[(2)] | 1.02 |
| VHB-13 | S-8 | 33-35± | 150.1-152.1± | Silt | 0.27 |
| VHB-15 | S-10 | 29-31± | 145.4-147.5± | Silt Loam | 0.27 |
| VHB-18 | S-1 | 7-12± | 163.4-168.4± | Sand | 8.27 |
| VHB-19 | S-3 | 15-17± | 157.2-159.2± | Sand | 8.27 |
| VHB-20 | S-2 | 10-12± | 162-164± | Silt Loam[(2)] | 0.27 |
| VHB-22 | S-3 | 10-14± | 142.6-146.6± | Sand | 8.27 |
| VHB-23 | S-1 | 0-13± | 142-155± | Silt Loam[(2)] | 0.27 |
| VHB-24 | S-1 | 6-9.5± | 162.2-165.7± | Sand | 8.27 |
| VHB-25 | S-1 | 2.5-11± | 160.7-169.2± | Sand | 8.27 |
| VHB-27 | S-1 | 5-7± | 146.3-148.3± | Sand | 8.27 |
| VHB-28 | S-1 | 5-7± | 144.7-146.7± | Silt Loam | 0.27 |

(1) Based on ground surface elevations/contours provided by VHB.
(2) USDA Textural class of existing fill material.
(3) Rates from *Table 2.3.3. 1982 Rawls Rates on Page 22 of Chapter 1 of Volume 3: Documenting Compliance with the Massachusetts Stormwater Management Standards.*

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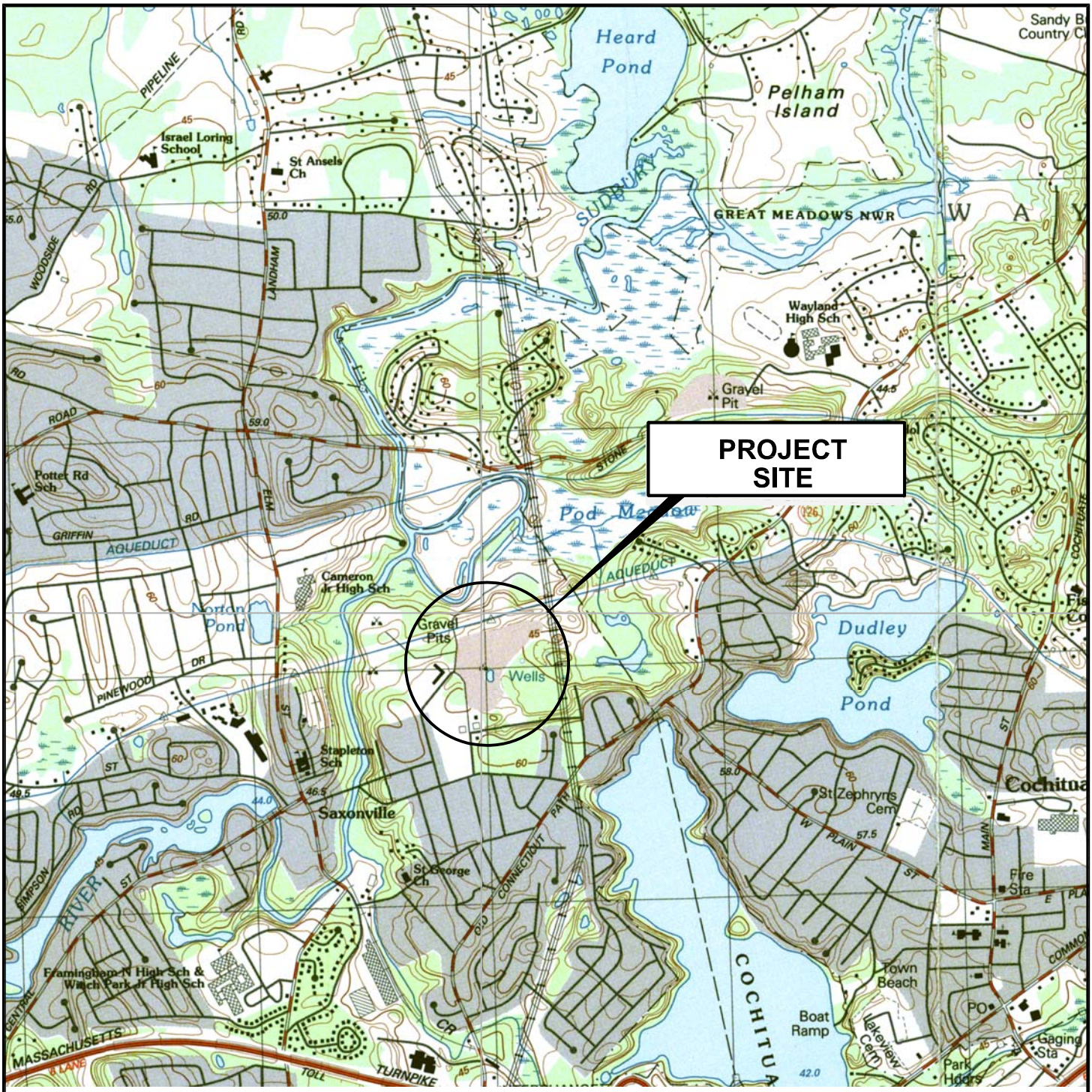
# FIGURES




SCALE: 1"=1500'

0 750 1500 3000 FEET

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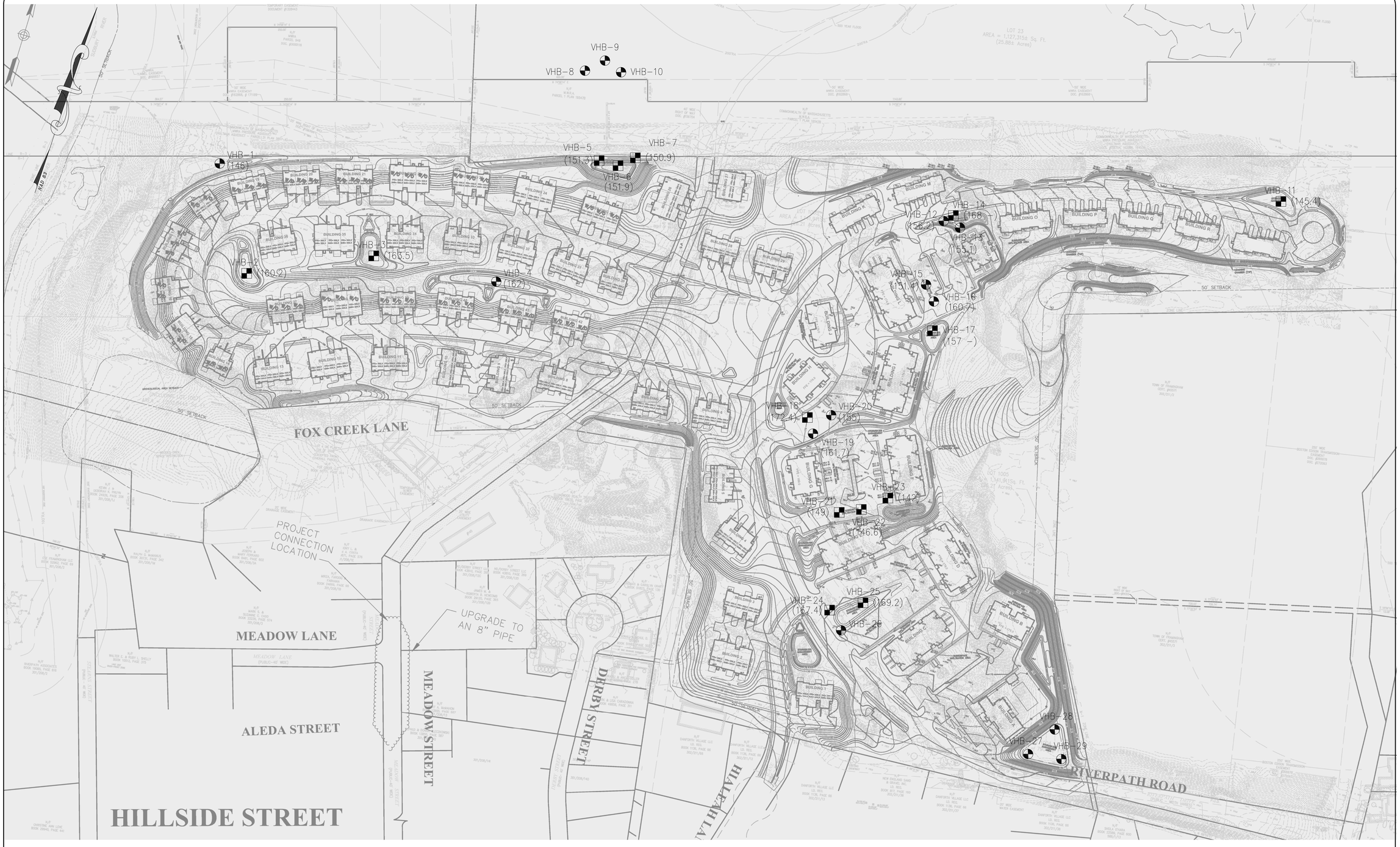
Engineers & Consultants
1125 Main Street
Hanover, MA 02339
781.982.2881 phone
781.735.0418 fax

LOCUS PLAN
DANFORTH GREEN
RIVER PATH DRIVE
FRAMINGHAM, MA

PROJECT: G0232.01 | DATE: 10/2012 | SCALE: AS NOTED

SKETCH NO.:
FIG. No. 1

DRAWN: SLH
CHECKED: JJG




NOTES:

1. BASE PLAN DEVELOPED FROM AUTOCAD FILE 12004 00_Grading–PRELIMINARY PROVIDED BY VANASSE HANGEN BRUSTLIN, INC. (VHB).
2. VHB SURVEY LOCATED THE EXPLORATIONS LOCATIONS SHOWN.
3. MGA PERSONNEL OBSERVED AND LOGGED THE EXPLORATIONS AND FIELD PERMEABILITY TESTS.

LEGEND:

- TEST BORING PERFORMED BY NEW HAMPSHIRE BORING OF DERRY, NH BETWEEN 10/1/2012 AND 10/5/2012.
- TEST PIT EXCAVATED BY SILVERSMITH EXCAVATING CO., INC. OF WILMINGTON, MA ON 10/3/2012 AND 10/4/2012.

(150) INDICATES APPROXIMATE BOTTOM OF FILL/ORGANIC SOILS WHERE ENCOUNTERED AT EXPLORATION LOCATION, (–) AFTER NUMBER INDICATES THAT EXPLORATON ENDED IN FILL.

GRAPHIC SCALE
100 0 50 100 200 300
( IN FEET )
1 inch = 100 ft.

REVISIONS

DRAWN BY: JJG

DESIGNED BY: JJG

CHECKED BY: JJG

McArdle Gannon Associates, Inc.
Engineers & Consultants
1125 Main Street
Hanover, MA 02339
781.982.2881 phone
781.735.0418 fax

# EXPLORATION LOCATION PLAN

## DANFORTH GREEN BASINS

RIVER PATH DRIVE FRAMINGHAM, MA

OCTOBER 2012

AS SHOWN

JOB No. G0232.01

FIG No.2

SHEET 1 OF 1

# APPENDIX A: STATEMENT OF LIMITATIONS

# STATEMENT OF LIMITATIONS

## Explorations

The analysis and recommendations submitted in this report are based in part upon the data obtained from subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

The stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

Water level readings have been made in the explorations at the time and under the conditions stated on the logs. This data has been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors that are different from the time the measurements were made.

## Review

In the event that any change in the nature, design or location of the proposed structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

It is recommended that this firm be provided the opportunity for a general review of final design and specifications in order that earthwork recommendations may be properly interpreted and implemented in the design and specifications.

## Construction

It is recommended that this firm be retained to provide soil engineering services during the construction phase of the work. This is to observe compliance with design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

## Use of Report

This report has been prepared for the exclusive use of Danforth Green LLC and Avalon Bay Communities, Inc. for specific application to the proposed Danforth Green residential development on Riverpath Drive in Framingham, Massachusetts, in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

# APPENDIX B: TEST BORING LOGS

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-1

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 155'±
**DATE START :** 10/5/12
**END :** 10/5/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | NW | Split Spoon | --- |
| 10/5/12 | | NE (1) | out | 21' | Size I.D. | 3" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 10<br>26<br>43<br>53 | S-1 | 4.0<br>6.0 | 14 | | Very dense, brown, fine to coarse GRAVEL and fine to coarse SAND, trace Silt. |
| 8 | | | | | | | | -FILL- |
| | | | | | | | 146.0 | |
| | | | 11<br>14<br>16<br>17 | S-2 | 9.0<br>11.0 | 19 | 9.0 | Medium dense, tan, SILT, trace fine Sand. |
| 12 | | | | | | | | -SANDY SILT- |
| 16 | | | 8<br>10<br>15<br>15 | S-3 | 14.0<br>16.0 | 14 | | Medium dense, tan, SILT, some fine Sand. |
| 20 | | | 6<br>5<br>9<br>7 | S-4 | 19.0<br>21.0 | 18 | | Medium dense, tan, SILT, some fine Sand. |
| | | | | | | | 134.0 | |
| | | | | | | | 21.0 | BOTTOM OF BORING AT 21 FEET. |
| | | | | | | | | (1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-1**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-4

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 180'±
**DATE START :** 10/1/12
**END :** 10/1/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** John Gannon

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/1/12 | 10:29 | NE (1) | 25' | 29' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 13<br>64<br>65<br>35 | S-1 | 0.0<br>2.0 | 14 | | Very dense, gray, CONCRETE PIECES. |
| 4 | | | | | | | | -FILL- |
| | | | 7<br>5<br>2<br>8 | S-2 | 5.0<br>7.0 | 2 | | Loose, moist, tan, fine to medium SAND, some Silt, little fine to coarse Concrete Pieces. |
| 8 | | | 4<br>65<br>23<br>5 | S-3 | 7.0<br>9.0 | 3 | | Very dense, wet, brown/gray, CONCRETE PIECES, little fine to medium Sand, some(-) Silt, trace fine Gravel.<br>[Rebar, wire, concrete pieces in auger cuttings] |
| 12 | | | 5<br>15<br>16<br>13 | S-4 | 10.0<br>12.0 | 3 | | Medium dense, moist, tan, fine to coarse SAND, little(+) Silt, little fine to coarse Gravel (Concrete Fragments).<br>[see Picture x of rebar around augers] |
| 16 | | | 3<br>2<br>1<br>2 | S-5 | 15.0<br>17.0 | 20 | | Very loose, tan, fine to coarse SAND, Clayey Silt, little Organic Matter/ Wood, trace fine Gravel. |
| | | | | | | | 162.0<br>18.0 | [Change in strata estimated from auger resistance] |
| 20 | | | 9<br>10<br>6<br>10 | S-6 | 20.0<br>22.0 | 24 | | Medium dense, moist, fine SAND, little Silt (layers of wet fine SAND and SILT).<br>-SILTY SAND- |
| | | | 8<br>15<br>16 | S-7 | 22.0<br>24.0 | 18 | | Medium dense, moist, fine SAND, little Silt (layers of wet fine SAND and SILT). |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-4**

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING VHB-4 |
|---|---|---|
| **PROJECT:** Danforth Green Riverpath Drive Framingham, MA<br>**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc. | | **MGA NO. : G0232.01**<br>**SHEET NO. : 2 of 2** |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 11 | | | | | |
| | | | 7<br>6<br>3<br>3 | S-8 | 25.0<br>27.0 | 15 | 153.0 | Loose, wet, tan/brown, fine SAND, little(+) Silt.<br>-SILTY SAND- |
| 28 | | | 1<br>3<br>13<br>15 | S-9 | 27.0<br>29.0 | 12 | 27.0<br>151.0 | Medium dense, damp, brown, fine to coarse SAND, little(+) fine to coarse Gravel, little (+) Silt.<br>-SILTY SAND & GRAVEL- |
| 32 | | | | | | | 29.0 | BOTTOM OF BORING AT 29 FEET.<br><br>(1) NE = Not Encountered |
| 36 | | | | | | | | |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-4**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-8

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 145'±
**DATE START :** 10/5/12
**END :** 10/5/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | NW | Split Spoon | --- |
| 10/5/12 | | NE (1) | out | 21' | Size I.D. | 3" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 9<br>10<br>10<br>11 | S-1 | | 4.0<br>6.0 | 20 | | Medium dense, tan, fine SAND, some Silt. |
| 8 | | | 11<br>11<br>14<br>14 | S-2 | | 9.0<br>11.0 | 18 | | Medium dense, tan, fine SAND, some Silt. |
| 12 | | | 10<br>11<br>12<br>19 | S-3 | | 14.0<br>16.0 | 18 | | -SAND & SILT-<br>Medium dense, tan, fine SAND, some Silt. |
| 16 | | | 15<br>14<br>16<br>16 | S-4 | | 19.0<br>21.0 | 16 | | Medium dense, tan, fine SAND, little Silt. |
| 20 | | | | | | | | 124.0<br>21.0 | BOTTOM OF BORING AT 21 FEET.<br>(1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-8**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-9

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 145'±
**DATE START :** 10/5/12
**END :** 10/5/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | NW | Split Spoon | --- |
| 10/5/12 | | NE (1) | out | 21' | Size I.D. | 3" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 10<br>13<br>18<br>15 | S-1 | | 4.0<br>6.0 | 18 | | Medium dense, tan, SILT and fine to coarse SAND, little fine Gravel. |
| 8 | | | 8<br>12<br>13<br>11 | S-2 | | 9.0<br>11.0 | 20 | | Medium dense, tan, SILT, little fine Sand. |
| 12 | | | 8<br>11<br>11<br>9 | S-3 | | 14.0<br>16.0 | 18 | | -SAND & SILT-<br>Medium dense, tan, fine SAND and SILT. |
| 16 | | | 7<br>10<br>14<br>9 | S-4 | | 19.0<br>21.0 | 16 | | Medium dense, tan, fine SAND, some Silt. |
| 20 | | | | | | | | 124.0<br>21.0 | BOTTOM OF BORING AT 21 FEET.<br>(1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-9**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-10

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 145'±
**DATE START :** 10/5/12
**END :** 10/5/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | NW | Split Spoon | --- |
| 10/5/12 | | NE (1) | out | 21' | Size I.D. | 3" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 11<br>14<br>15<br>13 | S-1 | | 4.0<br>6.0 | 17 | | Medium dense, tan, SILT, some fine Sand. |
| 8 | | | 5<br>7<br>9<br>11 | S-2 | | 9.0<br>11.0 | 18 | | Medium dense, tan, SILT, some fine Sand. |
| 12 | | | | | | | | | -SILT & SAND- |
| 16 | | | 9<br>8<br>10<br>14 | S-3 | | 14.0<br>16.0 | 17 | | Medium dense, tan, SILT, some fine Sand. |
| 20 | | | 4<br>11<br>8<br>14 | S-4 | | 19.0<br>21.0 | 18 | | Medium dense, tan, SILT and fine SAND. |
| | | | | | | | | 124.0<br>21.0 | BOTTOM OF BORING AT 21 FEET.<br><br>(1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-10**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-12

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 186.2'±
**DATE START :** 10/1/12
**END :** 10/1/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** John Gannon

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/1/12 | 16:00 | NE (1) | 30' | 34' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | [Augers grinding from 1 to 30 feet] |
| 4 | | | 62<br>32<br>39<br>26 | S-1 | | 5.0<br>7.0 | 2 | | Very dense, gray/brown, fine to coarse GRAVEL, little fine to coarse Sand. |
| 8 | | | 13<br>13<br>12<br>13 | S-2 | | 10.0<br>12.0 | 10 | | Medium dense, gray, fine to coarse SAND and fine to coarse GRAVEL (Concrete Fragments), trace (+) Silt.<br>-FILL- |
| 16 | | | 6<br>11<br>16<br>13 | S-3 | | 15.0<br>17.0 | 10 | | Medium dense, gray/brown, fine to coarse GRAVEL and CONCRETE FRAGMENTS, little fine to coarse Sand, trace Silt. |
| 20 | | | 6<br>5<br>5<br>14 | S-4 | | 20.0<br>22.0 | 4 | | Loose to medium dense, gray, fine to coarse GRAVEL and CONCRETE FRAGMENTS, little fine to coarse Sand, trace Silt. |
| | | | 22<br>12<br>7 | S-5 | | 22.0<br>24.0 | 8 | | Medium dense, gray, fine to coarse GRAVEL and CONCRETE FRAGMENTS, little fine to coarse Sand, trace Silt. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-12**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-12

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.

**MGA NO. : G0232.01**
**SHEET NO. : 2 of 2**

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 8 | | | | | |
| | | | 11<br>6<br>6<br>8 | S-6 | 25.0<br>27.0 | 4 | | Medium dense, gray, fine to coarse GRAVEL and CONCRETE FRAGMENTS, little fine to coarse Sand, trace Silt. |
| 28 | | | 10<br>15<br>9<br>9 | S-7 | 27.0<br>29.0 | 3 | | Medium dense, gray, fine to coarse GRAVEL and CONCRETE FRAGMENTS, little fine to coarse Sand, trace Silt.<br><br>-FILL- |
| | | | | | | | 156.2 | |
| 32 | | | 7<br>12<br>22<br>29 | S-8 | 30.0<br>32.0 | 15 | 30.0 | Dense, tan, fine SAND, little Silt. |
| | | | 35<br>41<br>42<br>42 | S-9 | 32.0<br>34.0 | 12 | | Very dense, tan, fine SAND, little Silt.<br><br>-SAND- |
| | | | | | | | 152.2 | |
| 36 | | | | | | | 34.0 | BOTTOM OF BORING AT 34 FEET.<br><br>(1) NE = Not Encountered |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-12**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-13

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 185.1'±
**DATE START :** 10/2/12
**END :** 10/2/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** John Gannon

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA/NW | Split Spoon | --- |
| | | | | | Size I.D. | 4-1/4/3" | 1-3/8" | --- |
| | | | | | Hammer Wt. | ---/300# | 140# | - - - - |
| | | | | | Hammer Fall | ---/24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | | | | | | | [Auger refusal at 3 feet. Boring moved 5 feet southeast]<br>[Augers grinding from 3 to 10 feet] |
| | | | 7<br>8<br>10<br>7 | S-1 | | 5.0<br>7.0 | 2 | | Medium dense, brown, fine to coarse GRAVEL, little (+) fine to coarse Sand, little Silt. |
| 8 | | | | | | | | | |
| | | | 5<br>4<br>17<br>26 | S-2 | | 10.0<br>12.0 | 2 | | Medium dense, brown, fine to coarse GRAVEL, little fine to coarse Sand, trace (+) Silt. |
| 12 | | | | | | | | | -FILL- |
| | | | 12<br>9<br>7<br>15 | S-3 | | 15.0<br>17.0 | 9 | | Medium dense, brown/gray, CONCRETE PIECES, little (+) fine to coarse Sand, little Silt, little Brick Fragments. |
| 16 | | | | | | | | | [Switched to flush jointed casing at 17 feet & continued boring] |
| | | | 45<br>50<br>47<br>15 | S-4 | | 19.0<br>21.0 | 8 | | Very dense, gray, fine to coarse CONCRETE PIECES & GRAVEL, some fine to coarse Sand, little Silt, trace Wood, trace Mortar, trace Brick. |
| 20 | | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-13**

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|---|---|---|

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.

**MGA NO. :** G0232.01
**SHEET NO. :** 2 of 2

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 15<br>29<br>35<br>11 | S-5 | 24.0<br>26.0 | 10 | | Very dense, gray, fine to coarse CONCRETE PIECES, little fine to coarse Gravel, little fine to coarse Sand, trace Silt.<br><br>-FILL- |
| 28 | | | 14<br>7 | S-6 | 29.0<br>30.0 | 5 | 155.1 | Gray, fine to coarse CONCRETE PIECES and GRAVEL, some (-) fine Sand, little Silt. |
| | | | 15<br>24 | S-6A | 30.0<br>31.0 | 6 | 30.0 | Tan, fine SAND, little Silt. |
| 32 | | | 30<br>38<br>44<br>46 | S-7 | 31.0<br>33.0 | 17 | | Very dense, tan, fine SAND, some Silt.<br>[Permeability test performed at 32-33 feet] |
| | | | 31<br>35<br>40<br>54 | S-8 | 33.0<br>35.0 | 15 | 150.1 | Very dense, tan, SILT little fine Sand.<br><br>-SILTY SAND- |
| 36 | | | | | | | 35.0 | BOTTOM OF BORING AT 35 FEET.<br><br>(1) NE = Not Encountered |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-13**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-15

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 176.4'±
**DATE START :** 10/2/12
**END :** 10/3/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** JJG/SCM

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | NW | Split Spoon | --- |
| 10/3/12 | | NE (1) | out | 31' | Size I.D. | 3" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 15<br>11<br>16<br>14 | S-1 | 4.0<br>6.0 | 17 | | Medium dense, gray, fine to coarse CONCRETE PIECES, some fine to medium Sand, little fine to coarse Gravel, little Silt. |
| 8 | | | 13<br>8<br>6<br>6 | S-2 | 9.0<br>11.0 | 18 | | Medium dense, brown, fine to coarse SAND, some Silt. |
| 12 | | | 7<br>6<br>6<br>8 | S-3<br>S-4 | 14.0<br>16.0<br>15.0<br>17.0 | 8<br>6 | | -FILL-<br>Medium dense, brown, fine to coarse GRAVEL, trace fine to coarse Sand, trace Silt.<br>Loose to medium dense, brown, fine to coarse GRAVEL, trace fine to coarse Sand, trace Silt.<br>[Boring moved 5 feet east after sample S-3 due to low recovery] |
| 16 | | | 6<br>5<br>5<br>6 | S-5 | 17.0<br>19.0 | 4 | | Medium dense, brown, fine to coarse GRAVEL. |
| 20 | | | 7<br>13<br>13<br>19 | S-6 | 20.0<br>22.0 | 10 | | Very dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt, trace Concrete Pieces. |
| | | | 26<br>33<br>33<br>24 | S-7 | 22.0<br>24.0 | 6 | | Dense, tan, fine to coarse SAND, some coarse Gravel, little Silt. |
| | | | 24<br>26 | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-15**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING VHB-15 |
|---|---|---|

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.

**MGA NO. :** G0232.01
**SHEET NO. :** 2 of 2

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 22<br>27 | | | | 151.4 | -FILL- |
| | | | 26<br>23<br>26<br>28 | S-8 | 25.0<br>27.0 | 18 | 25.0 | Dense, fine SAND, some Silt. |
| 28 | | | 16<br>37<br>35<br>36 | S-9 | 27.0<br>29.0 | 18 | | Very dense, fine SAND, some Silt.<br>[Permeability test performed from 28-29 feet] |
| | | | 22<br>29<br>40<br>57 | S-10 | 29.0<br>31.0 | 12 | 145.4 | Very dense, Brown SILT, some fine Sand.<br>-SILTY SAND- |
| 32 | | | | | | | 31.0 | BOTTOM OF BORING AT 31 FEET.<br>(1) NE = Not Encountered |
| 36 | | | | | | | | |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-15**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-16

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 175.7'±
**DATE START :** 10/3/12
**END :** 10/3/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | NW | Split Spoon | --- |
| 10/3/12 | | NE (1) | out | 37' | Size I.D. | 3" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 6<br>4<br>6<br>7 | S-1 | 5.0<br>7.0 | 12 | | -FILL-<br><br>Loose to medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |
| 8 | | | | | | | | [Augers grinding from 5 to 15 feet] |
| 12 | | | 11<br>14<br>9<br>8 | S-2 | 10.0<br>12.0 | 12 | | Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |
| | | | | | | | 160.7 | |
| 16 | | | 17<br>20<br>19<br>15 | S-3 | 15.0<br>17.0 | 12 | 15.0 | Dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt.<br><br>-SAND & GRAVEL- |
| 20 | | | 12<br>13<br>24<br>32 | S-4 | 20.0<br>22.0 | 6 | | Dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-16**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING VHB-16 |
|---|---|---|
| **PROJECT:** Danforth Green Riverpath Drive Framingham, MA<br>**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc. | | **MGA NO. : G0232.01**<br>**SHEET NO. : 2 of 2** |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | | | | | | |
| | | | 7<br>7<br>7<br>13 | S-5 | 25.0<br>27.0 | 12 | | Medium dense, brown, fine to coarse SAND, trace fine to coarse Gravel, trace Silt. |
| 28 | | | | | | | | -SAND & GRAVEL- |
| | | | 11<br>13<br>15<br>17 | S-6 | 30.0<br>32.0 | 12 | | Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |
| 32 | | | 18<br>22<br>17<br>12 | S-7 | 32.0<br>34.0 | 12 | | Dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |
| | | | | | | | | |
| 36 | | | 17<br>41<br>35<br>35 | S-8 | 35.0<br>37.0 | 6 | | Very dense, brown, fine to coarse SAND, little Silt, trace fine to coarse Gravel. |
| | | | | | | | 138.7<br>37.0 | BOTTOM OF BORING AT 37 FEET. |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-16**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-19

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174.2'±
**DATE START :** 10/1/12
**END :** 10/1/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** John Gannon

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/1/12 | 12:40 | NE (1) | 20' | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | | | | | | [Split spoon refusal at 5 feet. Auger refusal at 5.5 feet. Concrete observed in auger spoils. Boring moved 5 feet northwest and continued.] |
| | | | 6<br>5<br>4<br>6 | S-1 | 5.0<br>7.0 | 15 | | Medium dense, tan, fine SAND, little Silt. |
| 8 | | | | | | | | -FILL- |
| | | | 2<br>3<br>50/3" | S-2 | 10.0<br>11.3 | 8 | | Tan/brown, fine to coarse SAND and fine GRAVEL, trace Silt.<br>[Augers grinding from 10 to 12.5 feet] |
| 12 | | | | | | | 161.7<br>12.5 | |
| 16 | | | 1/12"<br>5<br>5 | S-3 | 15.0<br>17.0 | 12 | 157.2 | Loose, tan, fine to medium SAND, trace Silt.<br>-SAND- |
| | | | 4<br>5<br>8<br>9 | S-4 | 17.0<br>19.0 | 15 | 17.0 | Medium dense, tan/brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt.<br>-GRAVELLY SAND- |
| 20 | | | | | | | 154.2 | |
| | | | 3<br>3<br>5<br>8 | S-5 | 20.0<br>22.0 | 15 | 20.0<br>152.2 | Loose, tan, fine to coarse SAND, trace Silt.<br>-SAND- |
| | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |

(1) NE = Not Encountered

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-19**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-20

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174'±
**DATE START :** 10/1/12
**END :** 10/1/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** John Gannon

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/1/12 | 14:01 | NE (1) | 20' | 24' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 8<br>4<br>6<br>5 | S-1 | 5.0<br>7.0 | 18 | | Loose to medium dense, brown/black, fine to medium SAND, little (+) Silt, little fine to coarse Asphalt Pieces, trace fine Gravel. |
| 8 | | | | | | | | -FILL- |
| 12 | | | 6<br>8<br>6<br>6 | S-2 | 10.0<br>12.0 | 6 | | Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, some Clayey Silt, trace Wood. |
| | | | 13<br>10<br>11<br>12 | S-3 | 12.0<br>14.0 | 6 | | Medium dense, damp, brown/gray, fine to coarse SAND, little Silt, little fine to coarse Gravel. |
| 16 | | | 8<br>8<br>10<br>10 | S-4 | 15.0<br>17.0 | 20 | | Medium dense, tan/gray, fine to medium SAND, little Silt, trace fine to coarse Gravel. |
| | | | 100/3" | S-5 | 17.0<br>17.3 | 3 | | Tan, fine to coarse SAND and fine to coarse GRAVEL, little (-) Silt. [Augers grinding from 17 to 19 feet] |
| | | | | | | | 155.0<br>19.0 | |
| 20 | | | 5<br>8<br>11<br>13 | S-6 | 20.0<br>22.0 | 18 | | Medium dense, tan, fine to coarse SAND, trace Silt. |
| | | | 11<br>13<br>14 | S-7 | 22.0<br>24.0 | | | -SAND-<br>Medium dense, tan, fine to coarse SAND, trace Silt. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-20**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING VHB-20 |
|---|---|---|
| **PROJECT:** Danforth Green Riverpath Drive Framingham, MA<br>**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc. | | **MGA NO. : G0232.01**<br>**SHEET NO. : 2 of 2** |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 16 | | | | 150.0<br>24.0 | BOTTOM OF BORING AT 24 FEET.<br><br>(1) NE = Not Encountered |
| 28 | | | | | | | | |
| 32 | | | | | | | | |
| 36 | | | | | | | | |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-20**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-26

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 171.1'±
**DATE START :** 10/3/12
**END :** 10/3/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/3/12 | | NE (1) | out | 12' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 7<br>10<br>10<br>10 | S-1 | | 5.0<br>7.0 | 18 | | Medium dense, brown, fine to coarse SAND, some Silt. |
| 8 | | | | | | | | | -SILTY SAND- |
| 12 | | | 7<br>8<br>11<br>13 | S-2 | | 10.0<br>12.0 | 18 | 159.1<br>12.0 | Medium dense, brown, fine to coarse SAND, some Silt.<br>BOTTOM OF BORING AT 12 FEET.<br>(1) NE = Not Encountered |
| 16 | | | | | | | | | |
| 20 | | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-26**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-27

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 153.3'±
**DATE START :** 10/4/12
**END :** 10/4/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/4/12 | | NE (1) | out | 12' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 21<br>15<br>15<br>8 | S-1 | | 5.0<br>7.0 | 12 | | Medium dense to dense, Gray fine to coarse SAND and fine to coarse GRAVEL, little Silt. |
| 8 | | | | | | | | | -SAND & SILT- |
| 12 | | | 4<br>5<br>5<br>4 | S-2 | | 10.0<br>12.0 | 21 | 141.3<br>12.0 | Loose to medium dense, brown, fine SAND and SILT.<br>BOTTOM OF BORING AT 12 FEET.<br>(1) NE = Not Encountered |
| 16 | | | | | | | | | |
| 20 | | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-27**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-28

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 151.1'±
**DATE START :** 10/4/12
**END :** 10/4/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/4/12 | | NE (1) | out | 12' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 5<br>5<br>4<br>5 | S-1 | | 5.0<br>7.0 | 24 | | Loose, brown, CLAYEY SILT, trace(-) fine Sand. |
| 8 | | | | | | | | 141.1 | -SILT & SAND- |
| 12 | | | 2<br>4<br>10<br>22 | S-2 | | 10.0<br>12.0 | 12 | 10.0<br>139.1<br>12.0 | Medium dense, brown, fine to coarse SAND, little fine Gravel, trace Silt.<br>-GRAVELLY SAND-<br>BOTTOM OF BORING AT 12 FEET.<br>(1) NE = Not Encountered |
| 16 | | | | | | | | | |
| 20 | | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-28**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING VHB-29

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 152.9'±
**DATE START :** 10/4/12
**END :** 10/4/12
**DRILLER :** Gregg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/4/12 | | 25' | 25' | 27' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | | | | | | [Augers grinding from 3 to 5 feet] |
| | | | 4<br>11<br>18<br>23 | S-1 | 5.0<br>7.0 | 20 | | Medium dense, brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| 8 | | | | | | | | |
| | | | 5<br>8<br>10<br>8 | S-2 | 10.0<br>12.0 | 12 | | Medium dense, yellow-brown, fine to coarse SAND, little fine Gravel, trace Silt. |
| 12 | | | | | | | | -GRAVELLY SAND- |
| | | | 6<br>11<br>12<br>12 | S-3 | 15.0<br>17.0 | 12 | | Medium dense, yellow-brown, fine to coarse SAND, little fine Gravel, trace Silt. |
| 16 | | | | | | | | |
| 20 | | | | | | | 132.9 | |
| | | | 9<br>13<br>9<br>10 | S-4 | 20.0<br>22.0 | 12 | 20.0 | Medium dense, yellow-brown, fine to coarse SAND, trace fine Gravel, trace Silt. |
| | | | | | | | | -SAND- |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING VHB-29**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING VHB-29 |
|---|---|---|

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.

**MGA NO. :** G0232.01
**SHEET NO. :** 2 of 2

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | | | | | | |
| | | | 5<br>9<br>9<br>13 | S-5 | 25.0<br>27.0 | 18 | | Medium dense, wet, brown, fine to coarse SAND, little Silt.<br><br>-SAND- |
| | | | | | | | 125.9<br>27.0 | BOTTOM OF BORING AT 27 FEET. |
| 28 | | | | | | | | |
| 32 | | | | | | | | |
| 36 | | | | | | | | |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING VHB-29**

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# KEY TO SYMBOLS

**Symbol Description**

**Strata symbols**

**Fill**

**Silty sand**

**Silty Sand & Gravel**

**Sand**

**Sand and Gravel**

**Soil Samplers**

**Split Spoon**

**Notes:**

1. **New Hampshire Boring, Inc. of Derry, NH performed the test borings between October 1 and 5, 2012 with truck and all-terrain vehicle (ATV) mounted drill rigs equipped with a 140# safety hammer.**

2. **MGA estimated the test boring elevations from spot grades provided by VHB and ground surface contours shown plans prepared by VHB. Elevations are approximate.**

3. **MGA personnel observed and logged the test borings.**

# APPENDIX C: TEST PIT LOGS

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-2

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 2:40 | 2.0' | Perched in fill |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 168.7
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | Brown fine to coarse SAND, some(-) fine to coarse Gravel, little Silt. | See Photos 1 & 2 |
| | | S-1 | 2.0<br>7.0 | | Gray fine to coarse GRAVEL, some fine to coarse Sand, some Silt (Dense Grade) | |
| 4 | | | | | -FILL- | |
| | | | | 161.7 | | |
| | | | | 7.0 | Dark Brown fine to medium SAND and ORGANIC SILT, little (-) Roots. | |
| 8 | | | | 160.2 | -BURIED TOPSOIL- | |
| | | | | 8.5 | Tan fine to coarse SAND, little Silt. | |
| | | | | 158.7 | -SAND- | |
| | | S-2 | 10.0<br>13.0 | 10.0 | | S-2 |
| 12 | | | | | Brown fine to coarse SAND and fine to coarse Gravel, trace Silt. | |
| | | | | 155.7 | -SAND & GRAVEL- | |
| | | | | 13.0 | Bottom of test pit at 13 feet. | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 4' Feet<br>Length: 10' Feet | 6" to 18" Diameter= _____<br>18" to 36" Diameter= _____<br>Over 36" Diameter= _____<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. VHB-2**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-3

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

GROUNDWATER

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 2:20 | 2.0' | Perched in Fill/on Silt. |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 165.5
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | 163.5 | Tan fine to coarse SAND, trace Silt, trace Roots.<br>-FILL- | See Photos 3 & 4 |
| | | S-1 | 2.0<br>4.5 | 2.0<br>161.0 | Tan SILT, some fine to medium Sand.<br>-SILT- | S-1 |
| 4 | | S-2 | 4.5<br>6.0 | 4.5<br>159.5 | Brown fine to coarse SAND, little fine Gravel, trace Silt.<br>-SAND- | |
| 8 | | | | 6.0<br>156.5 | Tan SILT, little(-) fine Sand.<br>-SILT- | |
| | | | | 9.0<br>155.5 | Brown fine to coarse SAND, little fine Gravel, trace Silt.<br>-SAND- | |
| 12 | | | | 10.0<br>151.5 | Tan/Orange SILT, little fine Sand.<br>-SILT- | Redox (10YR/6/8) features noted at 11± |
| 16 | | | | 14.0 | Bottom of test pit at 14 feet. | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 5' E/W Feet<br>Length: 13' N/S Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 2<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. VHB-3**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-5

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 1:31 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 153.8
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | 153.3 | | See Photo 5 |
| | | | | 0.5 | Black ORGANIC SILT, little fine Sand, little Roots/Organic Matter. -TOPSOIL/FILL- | |
| | | | | | Orange fine to medium SAND, little(+) Silt, trace Roots. | |
| | | | | 151.3 | -SUBSOIL- | |
| | | | | 2.5 | Brown fine to coarse SAND, little fine Gravel, trace Silt. | |
| 4 | | | | 149.8 | -SAND- | |
| | | | | 4.0 | Tan/Yellow SILT, little(-) fine Sand. | |
| | | | | | -SILT- | |
| 8 | | | | 145.8 | | |
| | | | | 8.0 | Bottom of Test Pit at 8 feet. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

**TEST PIT DIMENSIONS**

Width: 5' Feet
Length: 12' Feet

**BOULDERS**

6" to 18" Diameter= 0
18" to 36" Diameter= 0
Over 36" Diameter= 0
(number)

**SAMPLE IDENTIFICATION**

- B - Bag
- J - Jar
- P - Percolation Test

**SUMMARY**

**Overburden:**
**Rock:**
**Samples:**

**TEST PIT NO. VHB-5**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-6

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 1:09 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 153.9
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | 152.9 | Black ORGANIC SILT, little fine Sand, little Roots/Organic Matter. | See Photo 6 |
| | | | | 1.0 | -TOPSOIL- | |
| | | | | 151.9 | Orange fine to medium SAND, little(+) Silt, trace Roots. | |
| | | | | 2.0 | -SUBSOIL- | |
| | | | | | Brown fine to coarse SAND, little fine Gravel, trace Silt. | |
| | | | | 149.9 | -SAND- | |
| 4 | | | | 4.0 | | |
| | | | | | Tan/Yellow SILT, little(-) fine Sand. | |
| | | | | | -SILT- | |
| 8 | | | | 145.9 | | |
| | | | | 8.0 | Bottom of Test Pit at 8 feet. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 5' Feet | 6" to 18" Diameter= 0 | - B - Bag | **Overburden:** |
| Length: 10' Feet | 18" to 36" Diameter= 0 | - J - Jar | **Rock:** |
| | Over 36" Diameter= 0 (number) | - P - Percolation Test | **Samples:** |

**TEST PIT NO. VHB-6**

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-7

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 12:49 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 152.9
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | 152.6 | Black ORGANIC SILT, little fine Sand, little Roots/Organic Matter. | See Photo 7 |
| | | | | 0.3 | -TOPSOIL/FILL- | |
| | | | | 150.9 | Orange fine to medium SAND, little Silt, little fine Gravel, trace Roots. | |
| | | S-1 | 2.0<br>4.0 | 2.0 | -SUBSOIL- | |
| | | | | | Brown fine to medium SAND, trace Silt, trace fine Gravel. | |
| 4 | | | | 148.9 | -SAND- | |
| | | S-2 | 4.0<br>8.0 | 4.0 | Tan/Yellow CLAYEY SILT, trace(-) fine Sand. | |
| | | | | | -SILT- | |
| 8 | | | | 144.9 | | |
| | | | | 8.0 | Bottom of Test Pit at 8 feet. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

**TEST PIT DIMENSIONS**

Width: 3.5' Feet
Length: 10' Feet

**BOULDERS**

6" to 18" Diameter= 0
18" to 36" Diameter= 7 @ grade
Over 36" Diameter= 1 @ grade
(number)

**SAMPLE IDENTIFICATION**

- B - Bag
- J - Jar
- P - Percolation Test

**SUMMARY**

**Overburden:**
**Rock:**
**Samples:**

**TEST PIT NO. VHB-7**

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# TEST PIT LOG

# TEST PIT NO. VHB-11

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 12:30 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 149.4
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | 145.4 | Orange/Brown fine to medium SAND, little(-) Silt, trace Roots.<br>-FILL- | See Photo 8 |
| 4 | | S-1 | 4.0<br>10.0 | 4.0 | Tan fine to coarse GRAVEL some fine to coarse Sand, trace Silt 30% Cobbles.<br>-SAND & GRAVEL- | |
| 8 | | | | 139.4 | | |
| | | | | 10.0 | Bottom of Test Pit at 10 feet. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 5' E/W Feet<br>Length: 15' N/S Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 7 @ grade<br>Over 36" Diameter= 1 @ grade<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:**<br>**TEST PIT NO. VHB-11** |

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-14

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

GROUNDWATER

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 12:00 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 185±
**DATE START :** 10/4/12
**END :** 10/4/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | 8 to 36± inch diameter ANGULAR BOULDERS, mixed with Brown fine to coarse SAND, some fine to coarse Gravel, little Silt, little Brick Fragments, Wood, trace Plastic Conduit.<br><br>-BOULDER FILL- | See Photos 9-11 |
| 4 | | | | | | |
| 8 | | | | | Blue/Light Gray, fine to coarse GRAVEL and fine to coarse SAND, little(-) Silt (Dense Grade).<br><br>-DENSE GRADE FILL- | |
| 12 | | | | | Gray CRUSHED CONCRETE (from fine to coarse SAND and fine to coarse Gravel sized up to 8" diameter)<br><br>-CONCRETE FILL- | |
| 16 | | | | 168.0 | | |
| | | | | 17.0 | Bottom of test pit (in fill) at 17 feet. | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 8' E/W Feet<br>Length: 20' N/S Feet | 6" to 18" Diameter= 10<br>18" to 36" Diameter= 25<br>Over 36" Diameter= 20+<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. VHB-14**

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Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-17

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | -- | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 173.0
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | Tan/Brown fine to medium SAND and 6 to 36±" square CONCRETE BLOCKS, SLAB PIECES, some(-) fine to coarse Gravel, little Silt, Wood (tree trunks, branches, board fragments) trace(+) steel rebar, rubber straps, cloth, angle steel, wire mesh. | See Photos12-14 |
| | | | | | [Concrete Slab from 5-6± feet in south end of pit] | |
| 4 | | | | | -FILL- | |
| 8 | | | | | | |
| 12 | | | | | | |
| 16 | | | | 157.0 | | |
| | | | | 16.0 | Bottom of test pit (in fill) at 16 feet. | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 5' E/W Feet | 6" to 18" Diameter= 10 | - B - Bag | **Overburden:** |
| Length: 12' N/S Feet | 18" to 36" Diameter= 25 | - J - Jar | **Rock:** |
| | Over 36" Diameter= 20+ (number) | - P - Percolation Test | **Samples:** |

**TEST PIT NO. VHB-17**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-18

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 8:26 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 175.4
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | 172.9 | Layers of Gray fine to coarse GRAVEL, some fine to coarse Sand, little Silt & Tan CONCRETE WASH. -FILL- | See Photo 15 |
| | | | | 2.5 | | |
| | | | | 172.4 | Black RECLAIMED ASPHALT layer 2.5-3'± -ASPHALT- | |
| 4 | | | | 3.0 | Brown fine to coarse SAND, trace Silt, trace fine Gravel. -SAND- | |
| | | | | 168.4 | | |
| 8 | | S-1 | 7.0 12.0 | 7.0 | Brown fine to coarse SAND and fine to coarse Gravel, trace Silt. -SAND & GRAVEL- | |
| 12 | | | | 163.4 12.0 | Bottom of Test Pit at 12 Feet. | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 2.5' N/S Feet | 6" to 18" Diameter= 0 | - B - Bag | **Overburden:** |
| Length: 10' E/W Feet | 18" to 36" Diameter= 0 | - J - Jar | **Rock:** |
| | Over 36" Diameter= 0 (number) | - P - Percolation Test | **Samples:** |

**TEST PIT NO. VHB-18**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-21

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 10:16 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 162
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | Layers of Gray/Brown/Tan fine to coarse SAND and fine to coarse GRAVEL, little Silt, trace Roots, Wire. | See Photo 16 |
| | | | | | -GRANULAR FILL- | |
| 4 | | | | | Tan/Brown CLAYEY SILT, trace fine to medium Sand (Wash Pond Sediment) | |
| | | | | | -SILT FILL- | |
| 8 | | | | | | |
| 12 | | | | 149.0 | | |
| | | | | 13.0 | Tan/Brown fine to medium SAND, trace Silt. | |
| | | | | 147.5 | -SAND- | |
| | | | | 14.5 | Bottom of Test Pit at 14.5 Feet. | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 4.5' N/S Feet | 6" to 18" Diameter= 0 | - B - Bag | **Overburden:** |
| Length: 12' E/W Feet | 18" to 36" Diameter= 0 | - J - Jar | **Rock:** |
| | Over 36" Diameter= 0 (number) | - P - Percolation Test | **Samples:** |

**TEST PIT NO. VHB-21**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-22

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 9:04 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 156.6
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>4.0 | | Tan/Gray fine to coarse GRAVEL and fine to coarse SAND, trace(-) Silt.<br><br>-GRANULAR FILL- | See Photo 17 |
| 4 | | S-2 | 4.0<br>10.0 | | Tan/Brown fine to medium SAND, some Silt, trace Roots, fine Gravel (Soil Washings)<br><br>-SILT FILL- | |
| 8 | | | | 146.6 | | |
| 12 | | S-3 | 10.0<br>14.0 | 10.0<br><br>142.6 | Tan fine to medium SAND, trace Silt.<br><br>-SAND- | |
| 16 | | | | 14.0 | Bottom of Test Pit at 14 Feet. | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 5' N/S Feet<br>Length: 12' E/W Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. VHB-22**

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| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST PIT LOG | TEST PIT NO. VHB-23 |
|---|---|---|

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

GROUNDWATER

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 9:47 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 155±
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>13.0 | | Layers of Brown/Gray CLAYEY and SILT, little Roots, trace fine coarse Sand, fine to coarse Gravel.<br>(Wash Pond Sediment)<br><br>-SILT FILL- | See Photo 18 |
| 4 | | | | | | |
| 8 | | | | | | |
| 12 | | | | 142.0 | | |
| | | S-2 | 13.0<br>15.0 | 13.0 | Brown fine to coarse SAND, some fine to coarse Gravel, little(-) Silt.<br>-SAND & GRAVEL- | |
| | | | | 140.0 | | |
| 16 | | | | 15.0 | Bottom of Test Pit at 15 Feet. | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 5' E/W Feet<br>Length: 13' N/S Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 1<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:**<br><br>**TEST PIT NO. VHB-23** |

McArdle Gannon Associates, Inc.
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# TEST PIT LOG

# TEST PIT NO. VHB-24

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/4/12 | -- | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 171.7
**DATE START :** 10/4/12
**END :** 10/4/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | Gray fine GRAVEL (Peastone) little Loam, Roots, Vegetation. | See Photo 19 |
| | | | | | -FILL- | |
| | | | | | Brown fine to coarse SAND, little fine Gravel, trace Silt. | |
| 4 | | | | 167.4 | | |
| | | | | 4.3 | Brown fine to medium SAND, trace Silt, trace fine Gravel. | |
| | | | | 165.7 | -SAND- | |
| | | S-1 | 6.0 | 6.0 | | |
| | | | 9.5 | | Tan fine to medium SAND, trace (+) Silt, trace fine Gravel. | |
| 8 | | | | | -SILTY SAND- | |
| | | | | 162.2 | | |
| | | | | 9.5 | Bottom of Test Pit at 9.5 feet. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 4.5' E/W Feet | 6" to 18" Diameter= 0 | - B - Bag | **Overburden:** |
| Length: 15' N/S Feet | 18" to 36" Diameter= 0 | - J - Jar | **Rock:** |
| | Over 36" Diameter= 0 (number) | - P - Percolation Test | **Samples:** |

**TEST PIT NO. VHB-24**

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. VHB-25

**PROJECT:** Danforth Green Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC / Avalon Bay Communities, Inc.
**CONTRACTOR:** Silversmith Excavating

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

GROUNDWATER

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 10:43 | -- | Not Encountered |
| | | | |

**MGA NO. :** G0232.01
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 171.7
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | Gray/Brown fine to coarse SAND, some fine to coarse Gravel, little Silt, little(-) Roots/ Loam. | See Photo 20 |
| | | | | 169.2 | -FILL- | |
| 4 | | S-1 | 2.5<br>11.0 | 2.5 | Tan fine to medium SAND, trace Silt.<br><br>-SAND- | |
| 8 | | | | 160.7 | | |
| 12 | | | | 11.0 | Bottom of Test Pit at 11 feet. | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 13' Feet | 6" to 18" Diameter= 2<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. VHB-25**

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|
| **Strata symbols** | |
| | Fill |
| | Topsoil |
| | Sand |
| | Sand and Gravel |
| | Silt |
| | Subsoil |
| | Asphalt |
| | Silty sand |
| **Soil Samplers** | |
| | Bulk/Grab sample |

**Notes:**

1. Silversmith Excavating Co., Inc. of Wilmington, MA excavated the test pits on October 3 and 4, 2012 with a Caterpillar 315D excavator.

2. MGA estimated the test pit elevations from spot grades provided by VHB and ground surface contours shown plans prepared by VHB. Elevations are approximate.

3. MGA personnel observed and logged the test pits.

# APPENDIX D: TEST PIT PICTURES

**Photo 1: Looking north at test pit VHB-2**

**Photo 2: Looking northwest at test pit VHB-2**

**Photo 3: Looking north at test pit VHB-3**

**Photo 4: Looking south at test pit VHB-3**

**Photo 5: Looking north at test pit VHB-5**

**Photo 6: Looking south at test pit VHB-6**

**Photo 7: Looking south at test pit VHB-7**

**Photo 8: Looking south at test pit VHB-11**

**Photo 9: Looking north at stockpiled concrete from test pit VHB-14**

**Photo 10: Looking north at stockpiled boulders from test pit VHB-14**

**Photo 11: Looking north at test pit VHB-14**

**Photo 12: Looking south at test pit VHB-17**

**Photo 13: Looking southwest at stockpile from test pit VHB-17**

**Photo 14: Looking southwest at test pit VHB-17**

**Photo 15: Looking east at test pit VHB-18**

**Photo 16: Looking northeast at test pit VHB-21**

**Photo 17: Looking east at test pit VHB-22**

**Photo 18: Looking southeast at test pit VHB-23**

**Photo 19: Looking northeast at test pit VHB-24**

**Photo 20: Looking southwest at test pit VHB-25**

# APPENDIX E: LABORATORY TEST RESULTS

# LABORATORY TESTING DATA SHEET

Project Name Danforth Green - Hydrogeo | Project Location Framingham, MA | Reviewed By

Project No. CTS-74-12-0003.14 MGA # G0232.01 | Assigned By J. Gannon

Project Engineer J. Gannon | Date 10/23/2012 | Date Reviewed 10/23/2012

| Boring/ Test Pit No. | Sample No. | Depth ft. | Lab No. | Standard Identification Tests | | | | | | | | | USDA Identification Tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Water Content % | LL % | PL % | Sieve -200 % | Hyd -2µ % | ORG % | $G_s$ | Dry unit wt. pcf | Torvane or Type Test | Sieve -200 % | Hyd -2µ % | USDA Classification | Burmister Soil Description |
| VHB-1 | S-1 | 4-6 | 231 | | | | 7 | | | | | | 14 | | USDA = Loamy Sand | Brown f-c GRAVEL and f-c SAND, trace Silt |
| VHB-1 | S-2 | 9-11 | 232 | | | | 97 | 5 | | | | | 97 | 5 | USDA = Silt | Brown SILT, trace Sand |
| VHB-2 | S-1 | 2-7 | 233 | | | | 26 | 2 | | | | | 49 | 4 | USDA = Sandy Loam | Gray f-c GRAVEL, some f-c Sand, some Silt |
| VHB-2 | S-2 | 10-13 | 234 | | | | 7 | | | | | | 15 | | USDA = Loamy Sand | Brown f-c SAND and f-c GRAVEL, trace Silt |
| VHB-3 | S-1 | 2-4.5 | 235 | | | | 82 | 3 | | | | | 82 | 3 | USDA = Silt | Brown SILT, some f-m Sand |
| VHB-3 | S-2 | 4.5-6 | 236 | | | | 5 | | | | | | 6 | | USDA = Sand | Brown f-c SAND, little fine Gravel, trace Silt |
| VHB-4 | S-5 | 15-17 | 237 | | | | 35 | 3 | | | | | 37 | 3 | USDA = Sandy Loam | Brown f-c SAND, some Clayey Silt, trace Gravel |
| VHB-4 | S-6 | 20-22 | 238 | | | | 85 | 2 | | | | | 85 | 2 | USDA = Loamy Sand | Brown SILT, little fine Sand |
| VHB-7 | S-1 | 2-4 | 239 | | | | 8 | | | | | | 9 | | USDA = Sand | Brown f-c SAND, trace Silt, trace Gravel |
| VHB-7 | S-2 | 4-8 | 240 | | | | 95 | 8 | | | | | 95 | 8 | USDA = Silt | Brown Clayey SILT, trace Sand |
| VHB-9 | S-1 | 4-6 | 241 | | | | 46 | 3 | | | | | 53 | 4 | USDA = Silt Loam | Brown SILT and f-c SAND, little fine Gravel |
| VHB-11 | S-1 | 4-10 | 242 | | | | 4 | | | | | | 10 | | USDA = Sand | Lt. Brown f-c GRAVEL, some f-c Sand, trace Silt |

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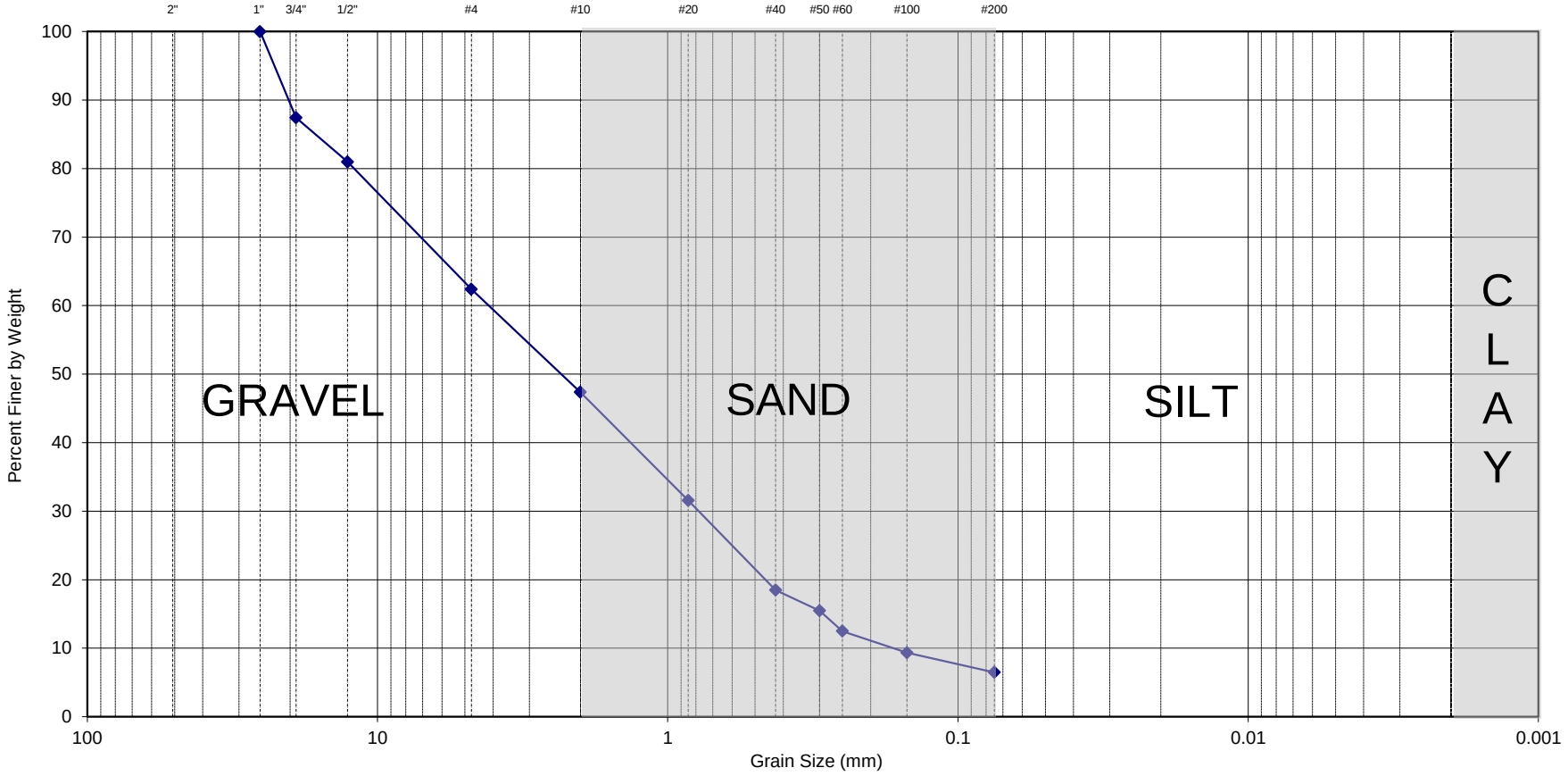
401-467-6454

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 52.6% | 40.9% | 6.5% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 231 | VHB-1 | S-1 | 4-6' | Brown f-c GRAVEL and f-c SAND, trace Silt | | | | |

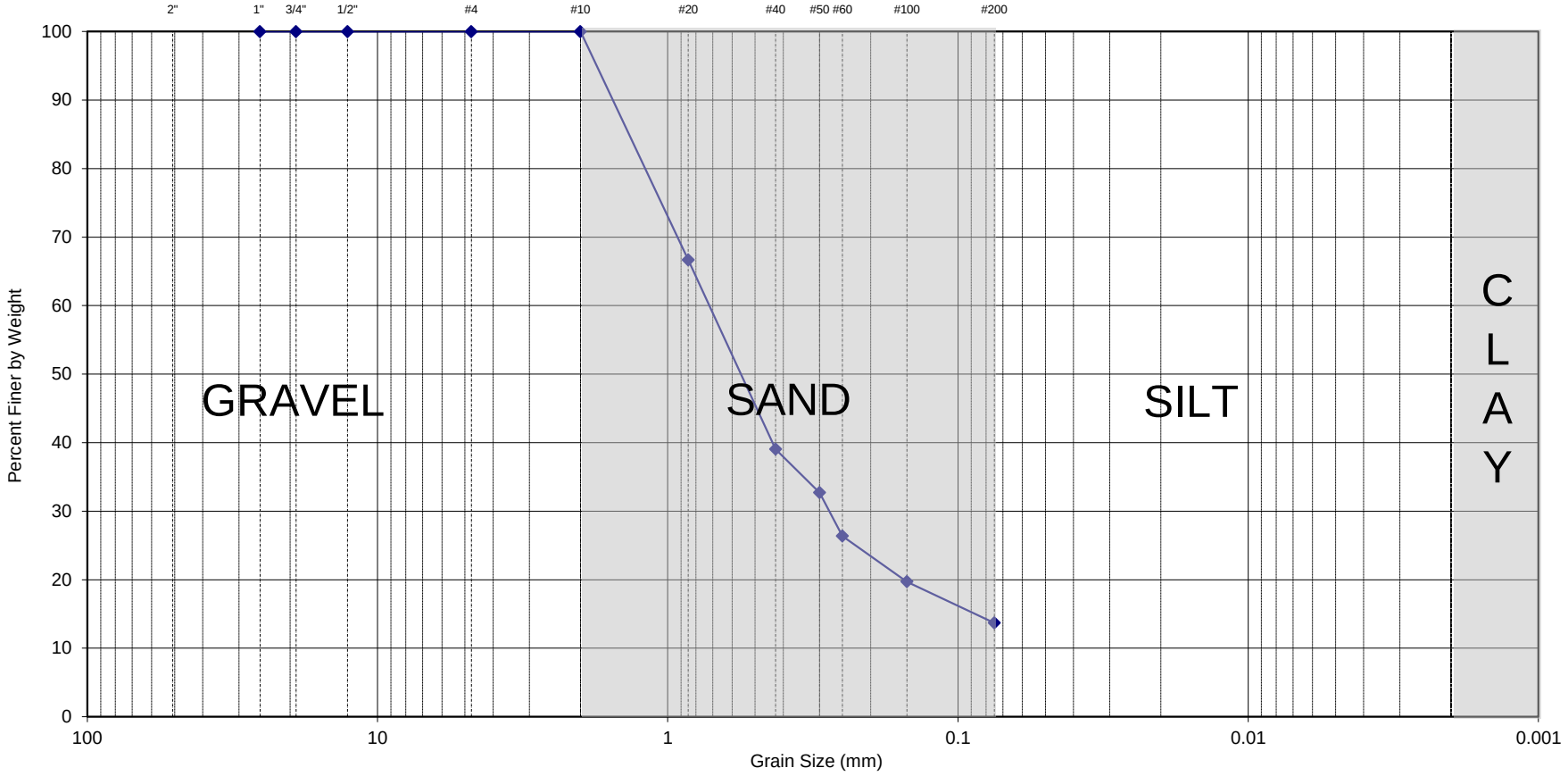
| Sieve Size | % Passing |
|---|---|
| ½" | 81.0 |
| #4 | 62.4 |
| #10 | 47.4 |
| #20 | 31.6 |
| #40 | 18.5 |
| #50 | 15.5 |
| #60 | 12.5 |
| #100 | 9.3 |
| #200 | 6.5 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 86.3% | 13.7% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 231 - USDA | VHB-1 | S-1 | 4-6' | USDA = Loamy Sand | | | | |

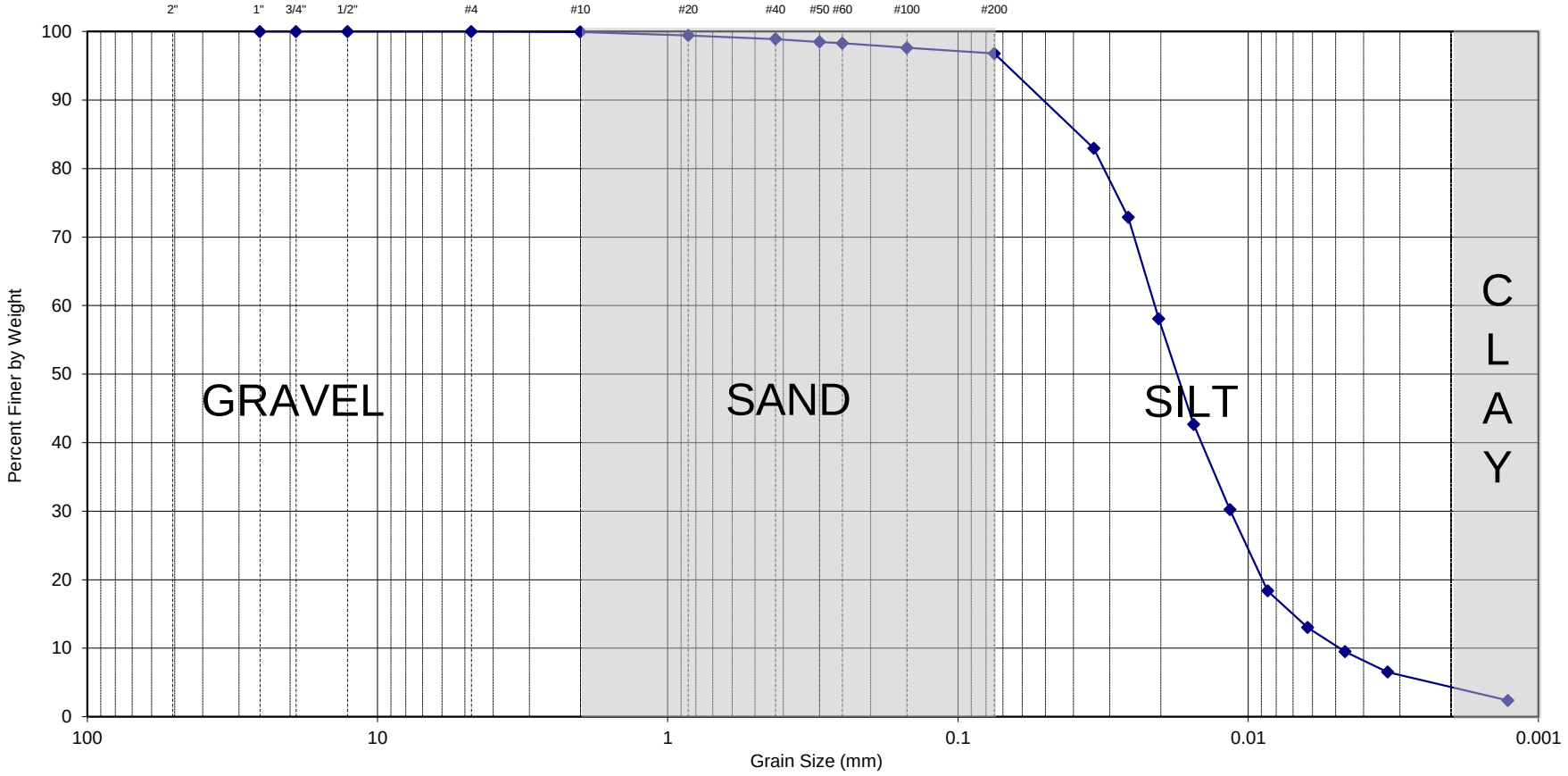
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 66.7 |
| #40 | 39.0 |
| #50 | 32.7 |
| #60 | 26.4 |
| #100 | 19.7 |
| #200 | 13.7 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC Date: 10/18/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.1% | 3.2% | 96.8% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 232 | VHB-1 | S-2 | 9-11' | Brown SILT, trace Sand | | | | |

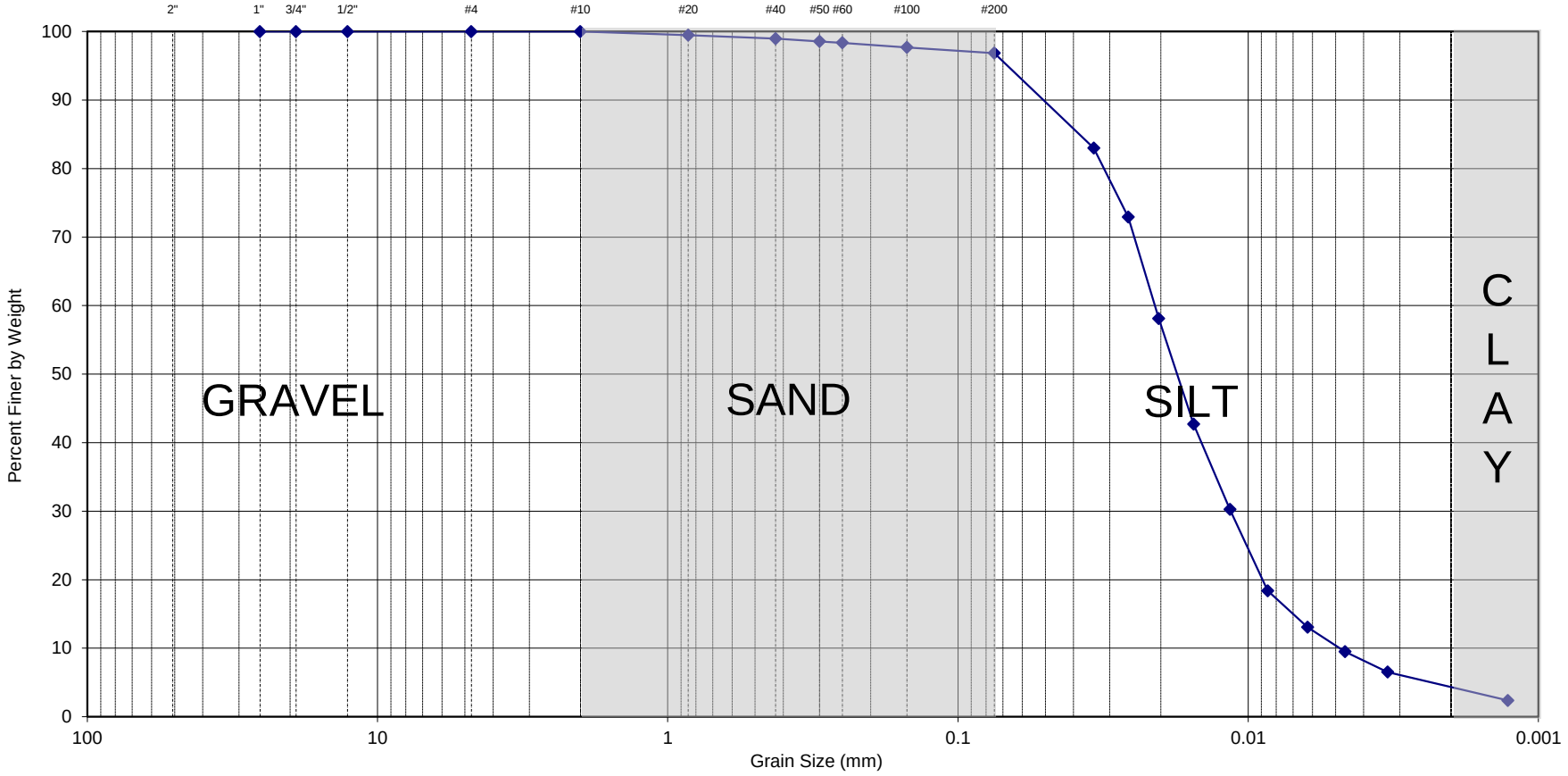
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 99.9 |
| #20 | 99.4 |
| #40 | 98.9 |
| #50 | 98.5 |
| #60 | 98.3 |
| #100 | 97.6 |
| #200 | 96.8 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 3.2% | 96.8% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 232-USDA | VHB-1 | S-2 | 9-11' | USDA = Silt | | | | |

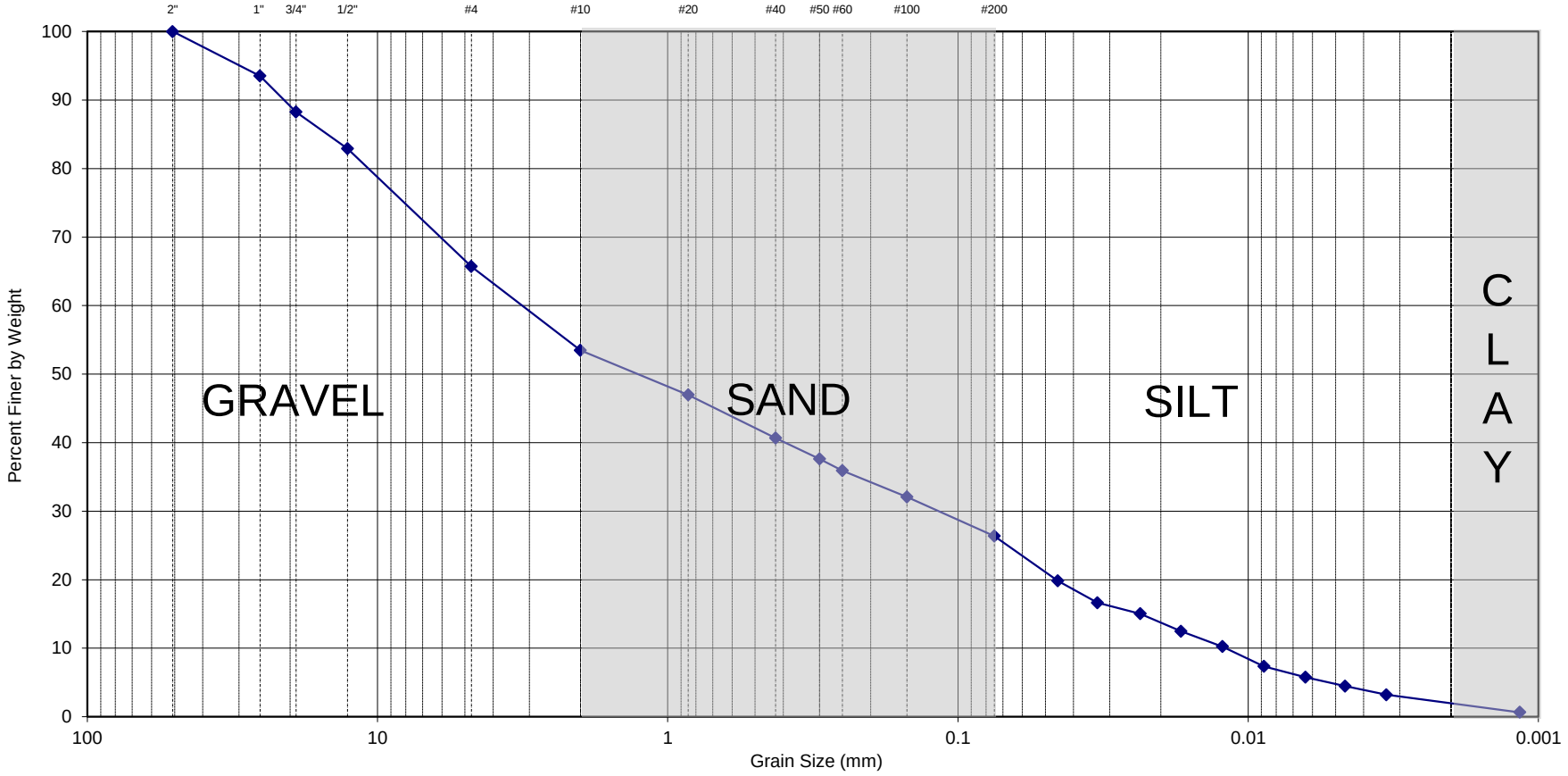
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.5 |
| #40 | 99.0 |
| #50 | 98.5 |
| #60 | 98.3 |
| #100 | 97.7 |
| #200 | 96.8 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 46.5% | 27.1% | 26.3% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 233 | VHB-2 | S-1 | 2-7' | Gray f-c GRAVEL, some f-c Sand, some Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 82.9 |
| #4 | 65.7 |
| #10 | 53.5 |
| #20 | 47.0 |
| #40 | 40.7 |
| #50 | 37.6 |
| #60 | 35.9 |
| #100 | 32.1 |
| #200 | 26.3 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrgeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
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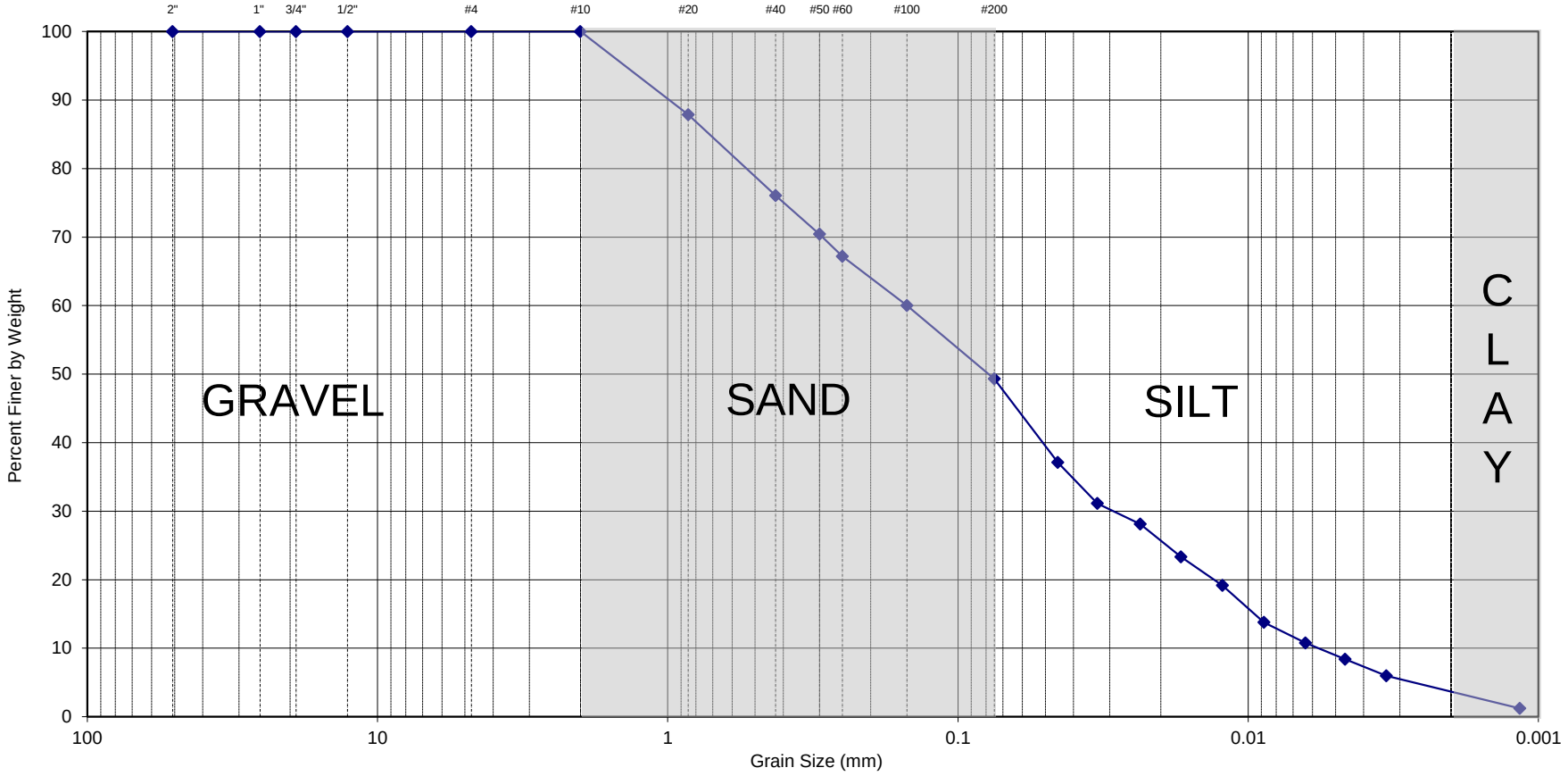
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 50.7% | 49.3% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 233 - USDA | VHB-2 | S-1 | 2-7' | USDA = Sandy Loam | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 87.9 |
| #40 | 76.1 |
| #50 | 70.4 |
| #60 | 67.2 |
| #100 | 60.0 |
| #200 | 49.3 |

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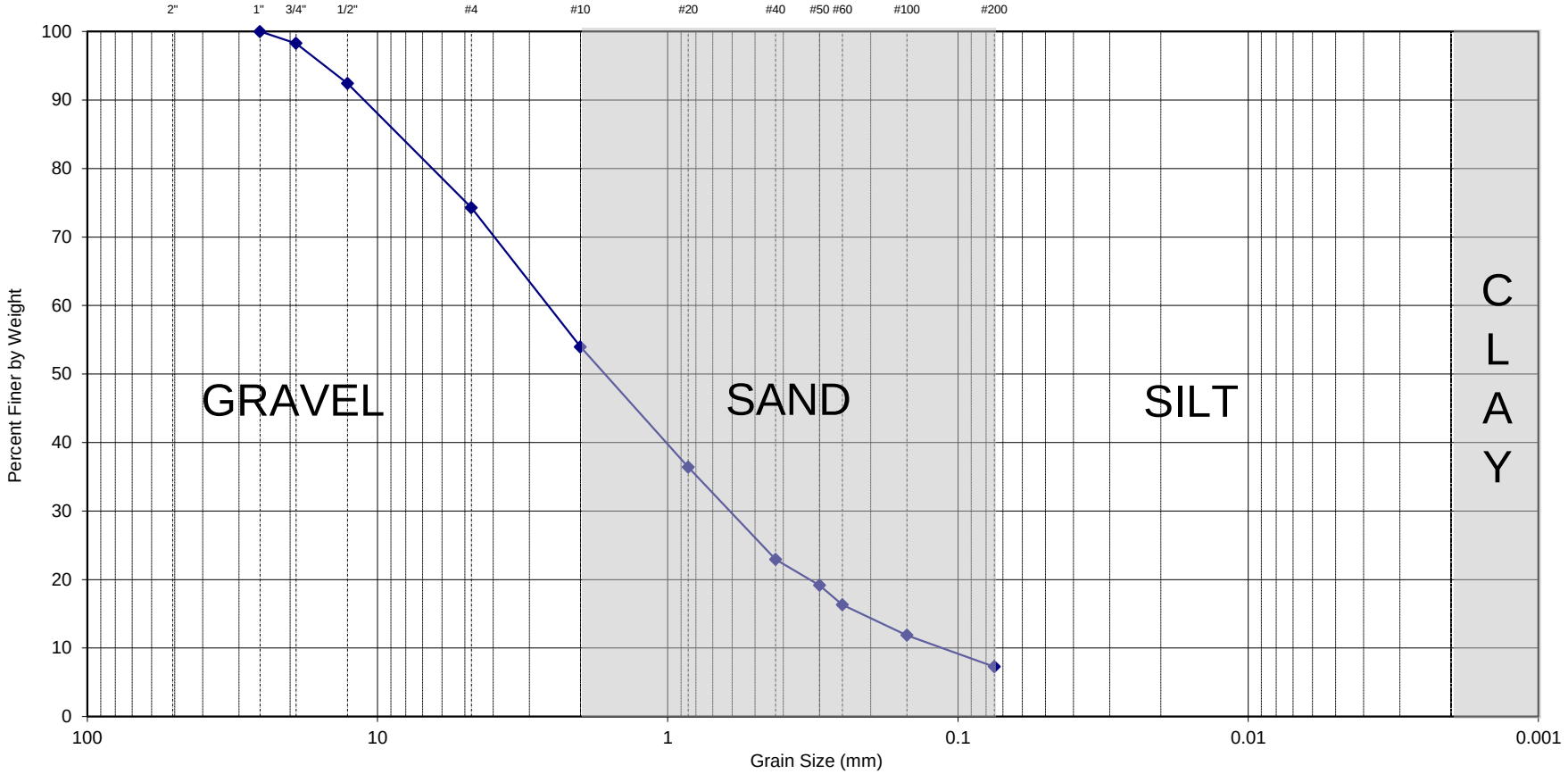
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 46.0% | 46.7% | 7.3% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 234 | VHB-2 | S-2 | 10-13' | Brown f-c SAND and f-c GRAVEL, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 92.4 |
| #4 | 74.3 |
| #10 | 54.0 |
| #20 | 36.4 |
| #40 | 22.9 |
| #50 | 19.2 |
| #60 | 16.3 |
| #100 | 11.8 |
| #200 | 7.3 |

THIELSCH ENGINEERING

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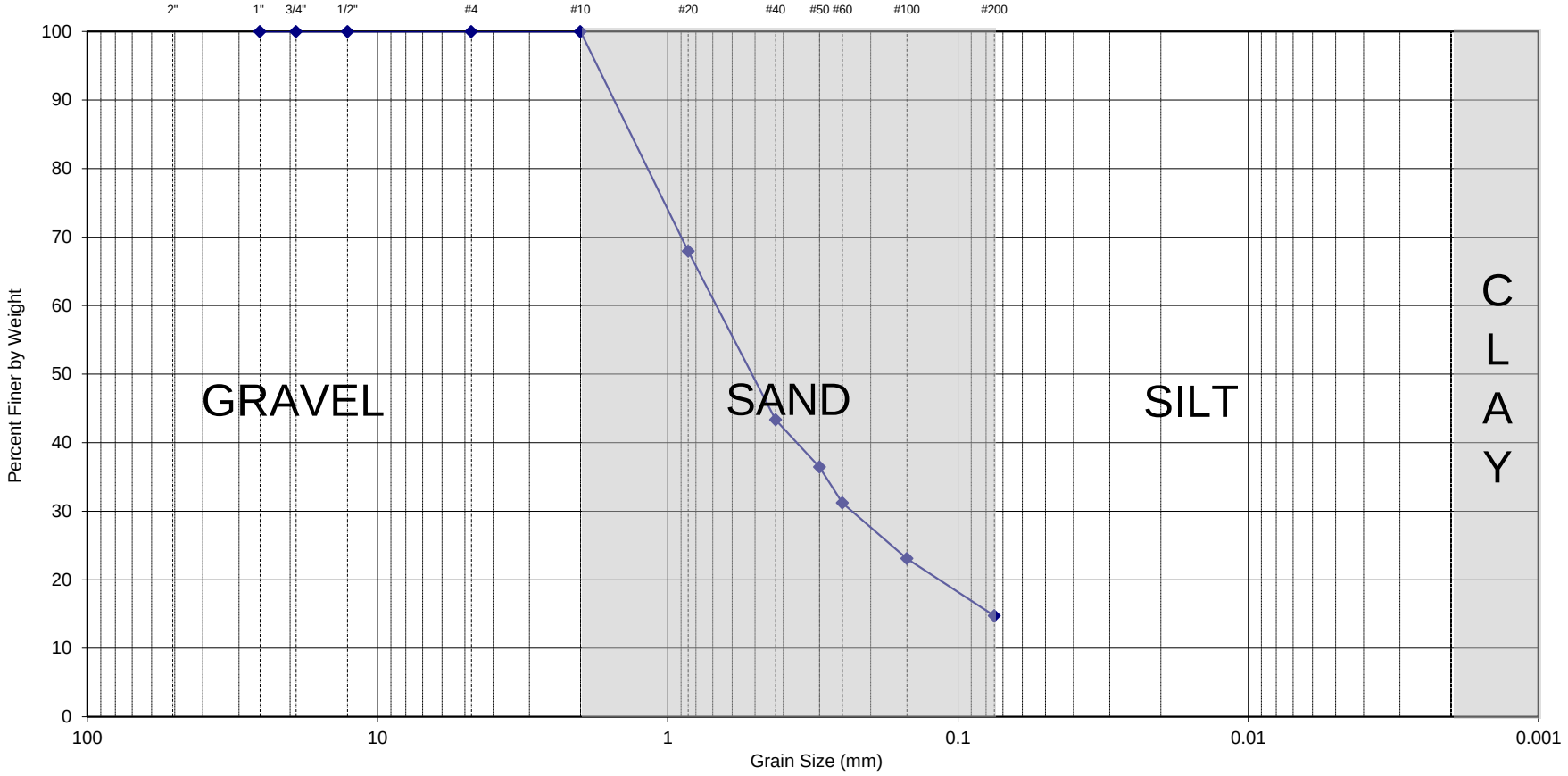
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 85.3% | 14.7% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 234 - USDA | VHB-2 | S-2 | 10-13' | USDA = Loamy Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 67.9 |
| #40 | 43.3 |
| #50 | 36.4 |
| #60 | 31.2 |
| #100 | 23.1 |
| #200 | 14.7 |

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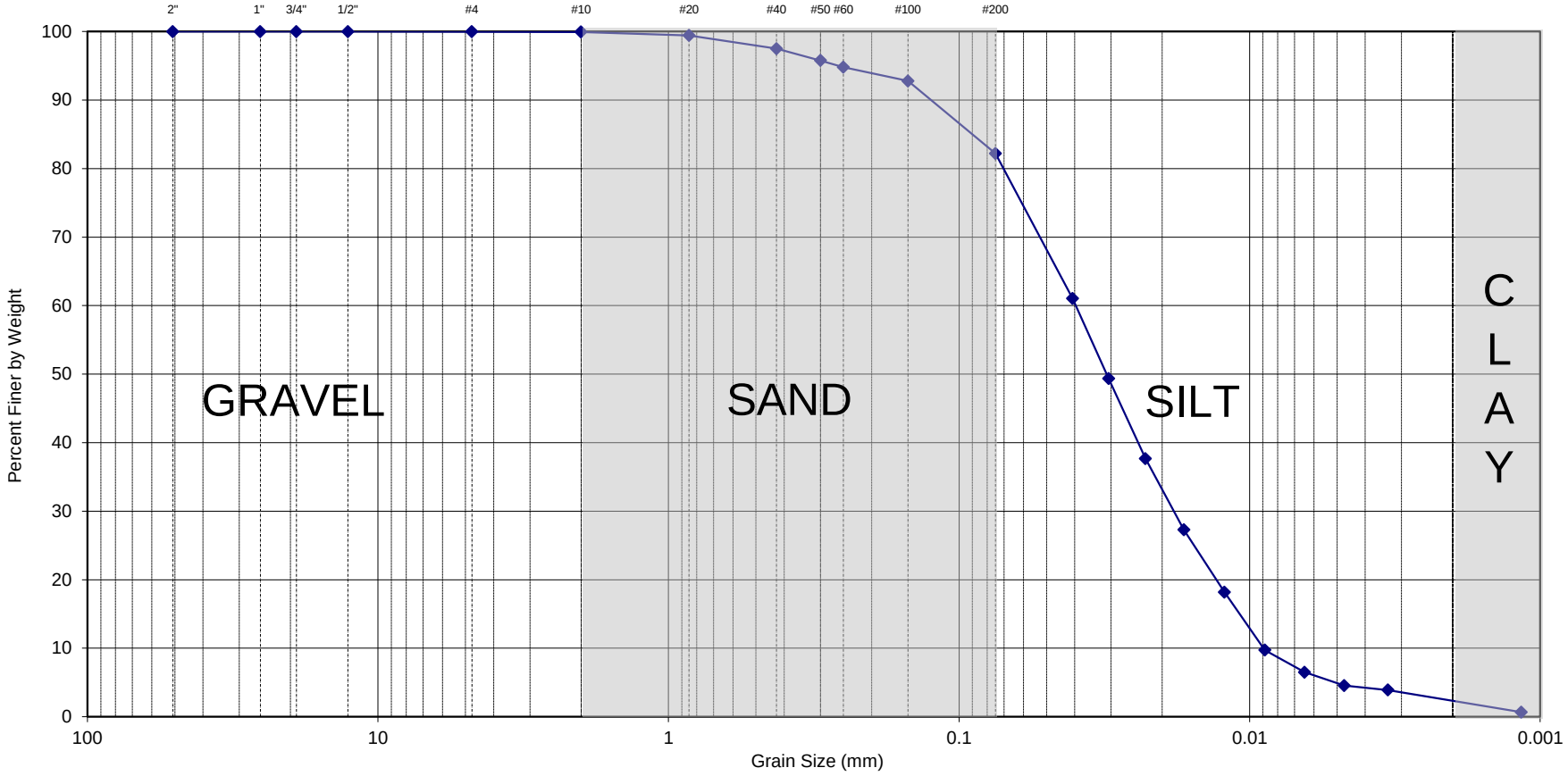
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.1% | 17.7% | 82.2% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 235 | VHB-3 | S-1 | 2-4.5' | Brown SILT, some f-m Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 99.9 |
| #20 | 99.4 |
| #40 | 97.5 |
| #50 | 95.8 |
| #60 | 94.8 |
| #100 | 92.8 |
| #200 | 82.2 |

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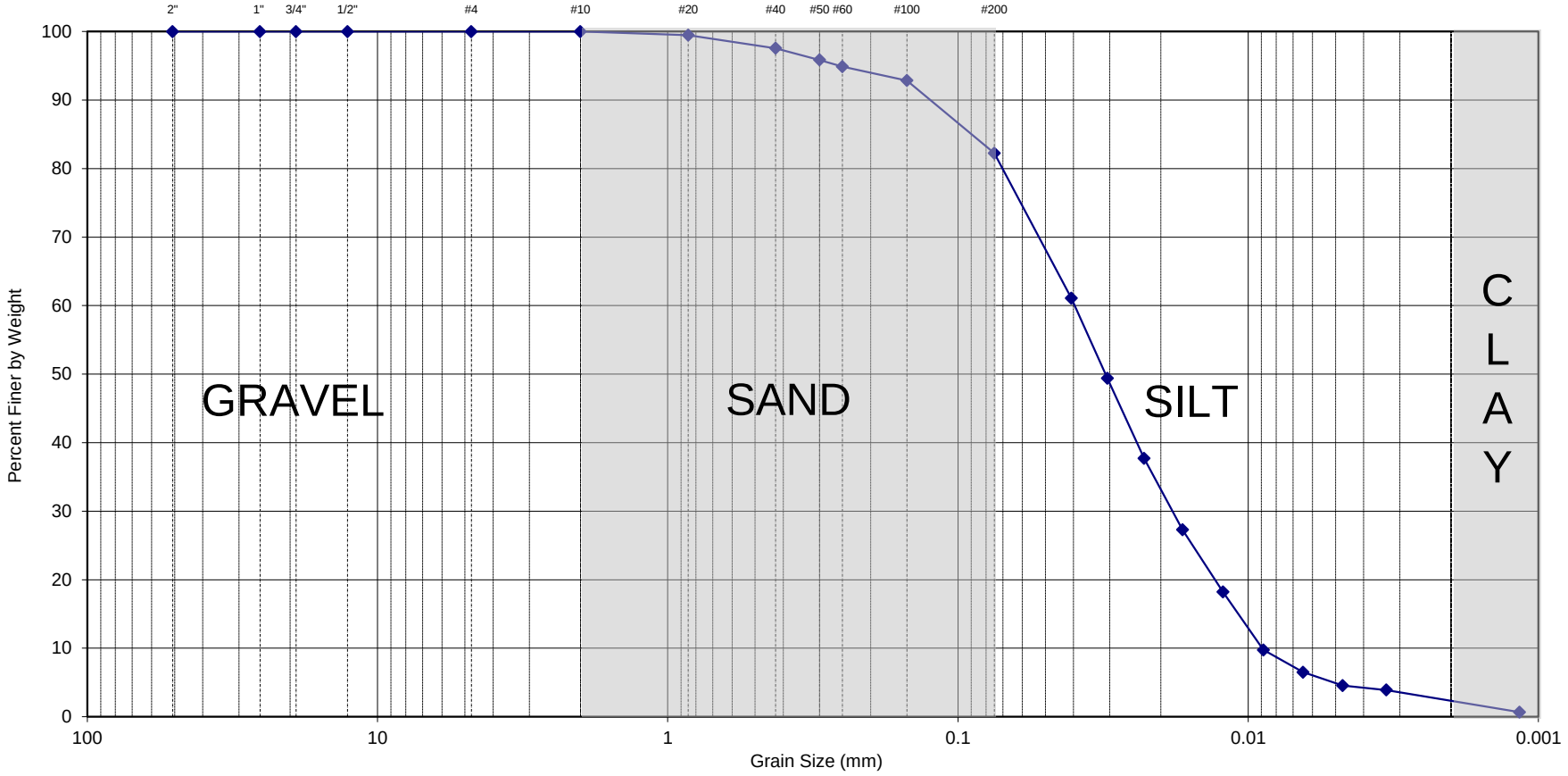
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 17.7% | 82.3% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 235 - USDA | VHB-3 | S-1 | 2-4.5' | USDA = Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.5 |
| #40 | 97.6 |
| #50 | 95.8 |
| #60 | 94.9 |
| #100 | 92.8 |
| #200 | 82.3 |

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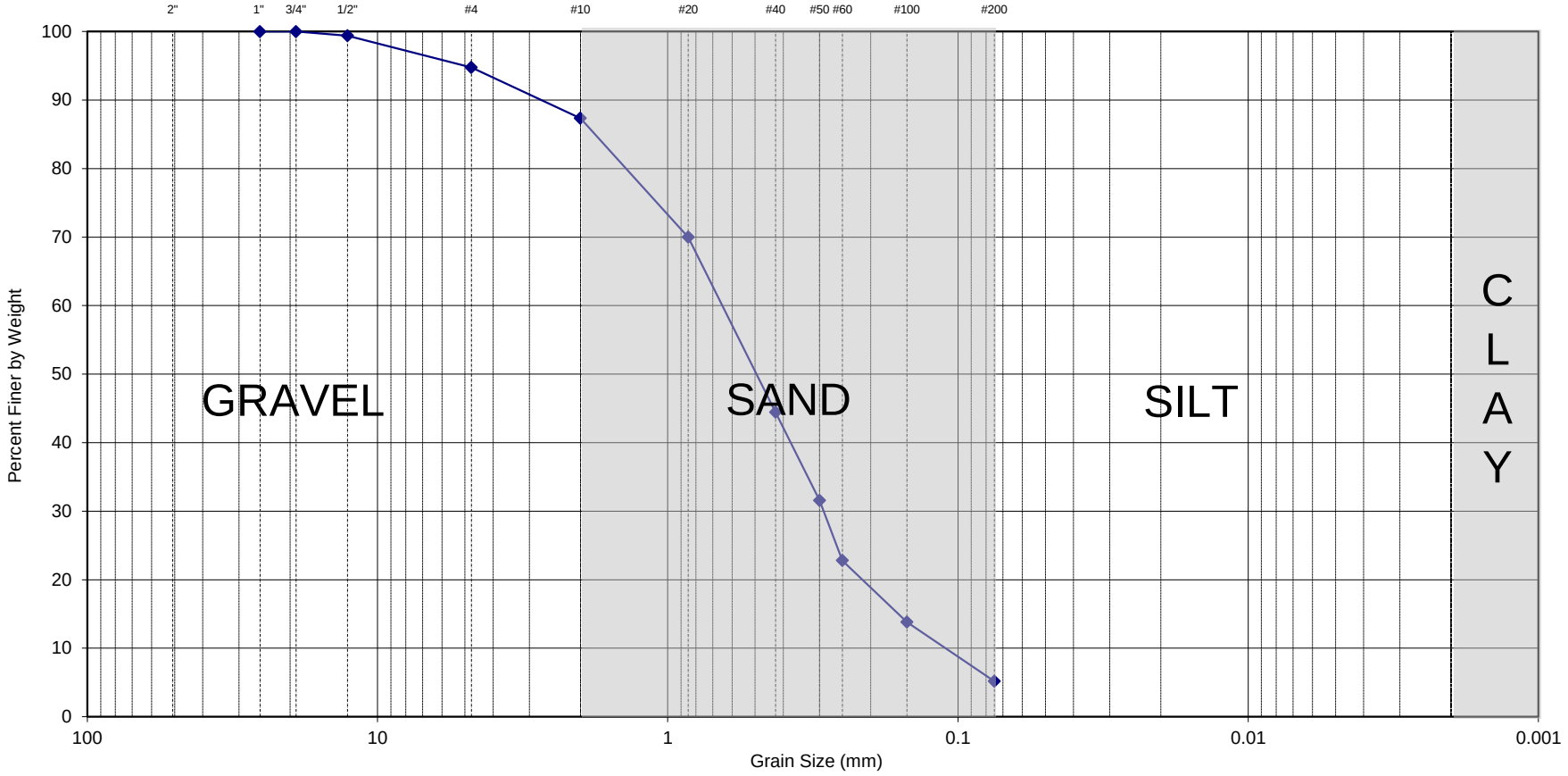


| Gravel | Sand | Fines |
|---|---|---|
| 12.7% | 82.2% | 5.2% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 236 | VHB-3 | S-2 | 4.5-6' | Brown f-c SAND, little fine Gravel, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 99.4 |
| #4 | 94.8 |
| #10 | 87.3 |
| #20 | 70.0 |
| #40 | 44.4 |
| #50 | 31.6 |
| #60 | 22.8 |
| #100 | 13.8 |
| #200 | 5.2 |

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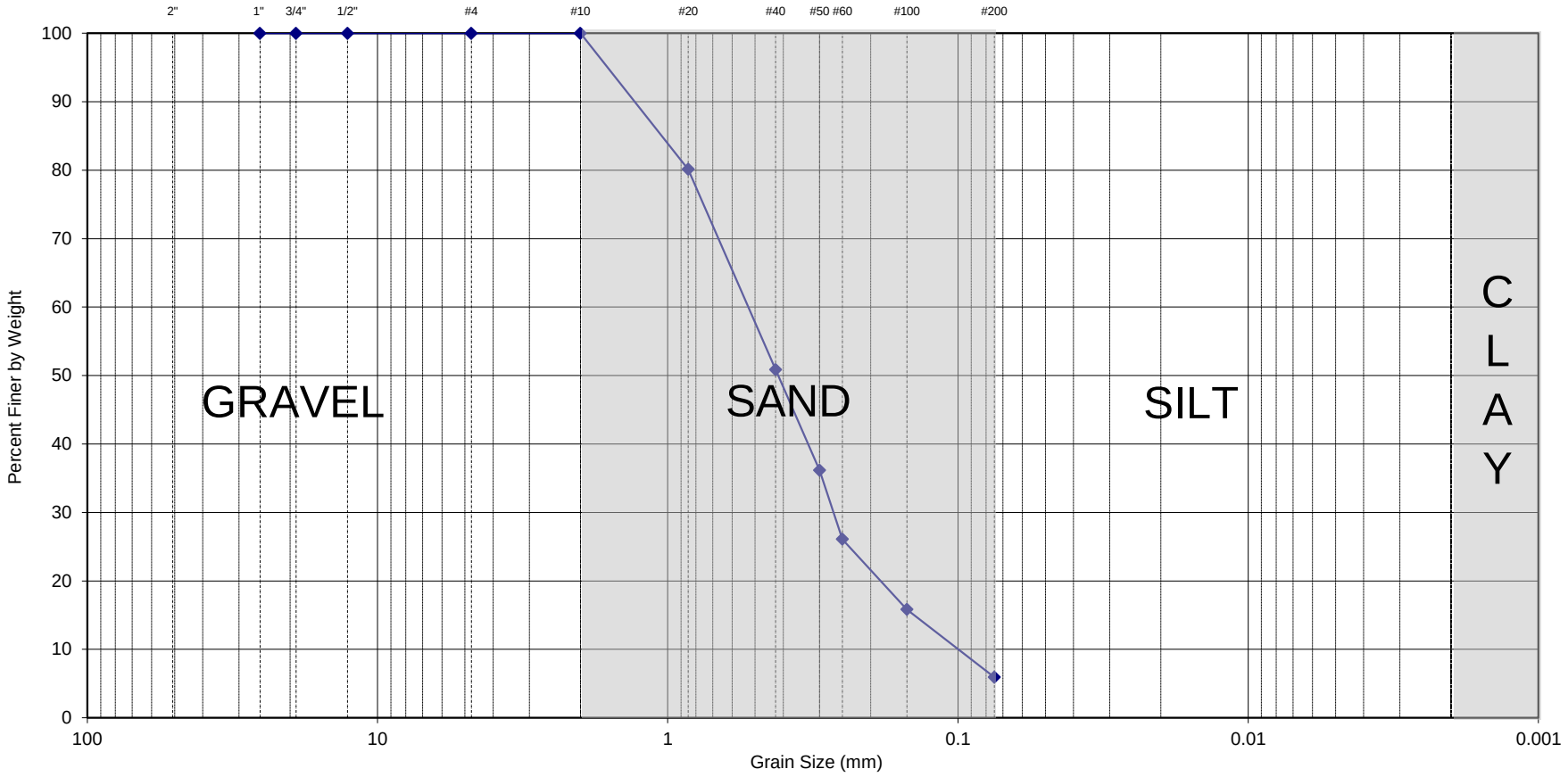


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 94.1% | 5.9% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 236 - USDA | VHB-3 | S-2 | 4.5-6' | USDA = Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 80.1 |
| #40 | 50.9 |
| #50 | 36.1 |
| #60 | 26.1 |
| #100 | 15.8 |
| #200 | 5.9 |

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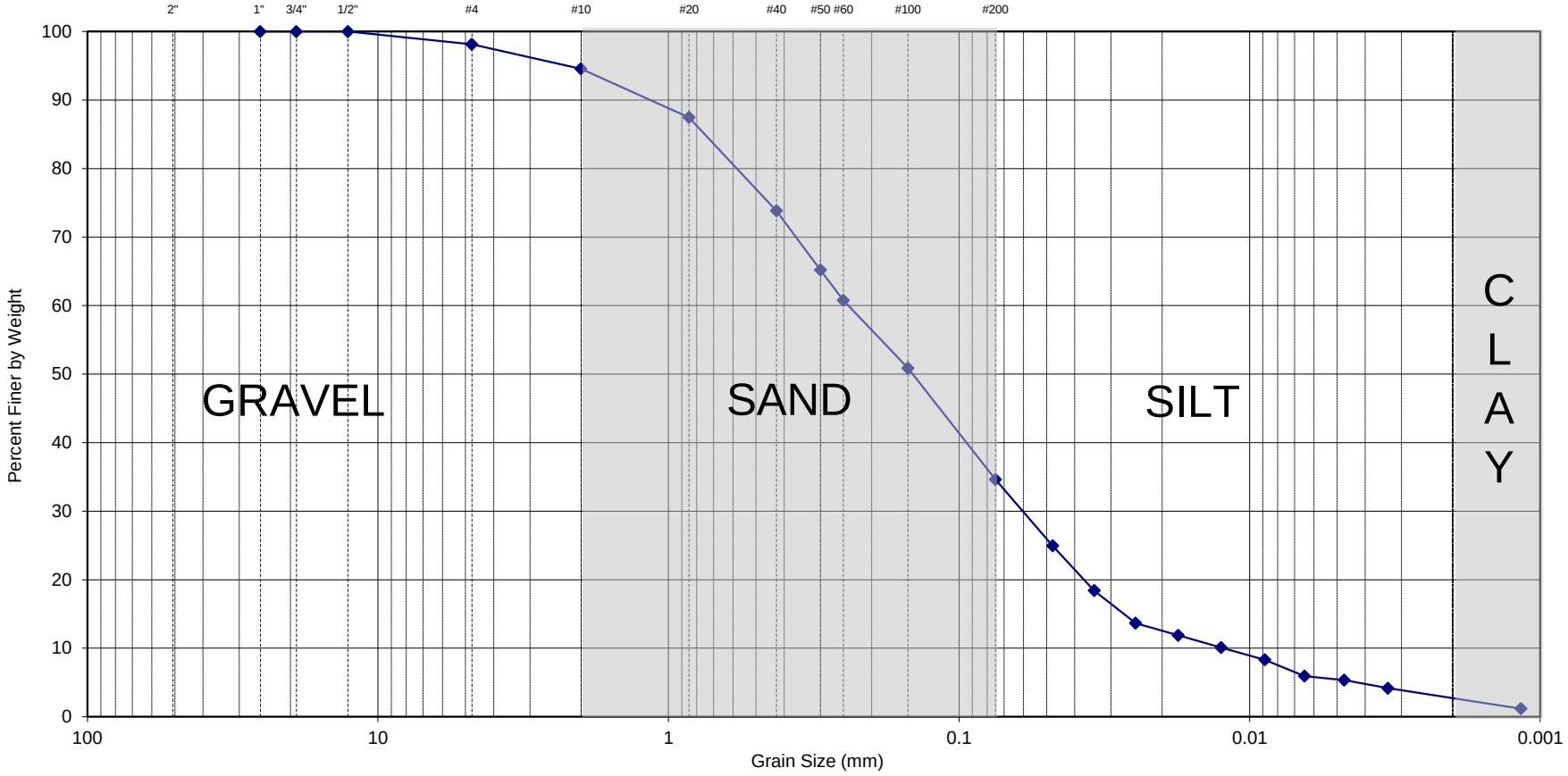


| Gravel | Sand | Fines |
|---|---|---|
| 5.4% | 59.9% | 34.6% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 237 | VHB-4 | S-5 | 15-17' | Brown f-c SAND, some Clayey Silt, trace Gravel | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 98.1 |
| #10 | 94.6 |
| #20 | 87.5 |
| #40 | 73.8 |
| #50 | 65.2 |
| #60 | 60.8 |
| #100 | 50.9 |
| #200 | 34.6 |

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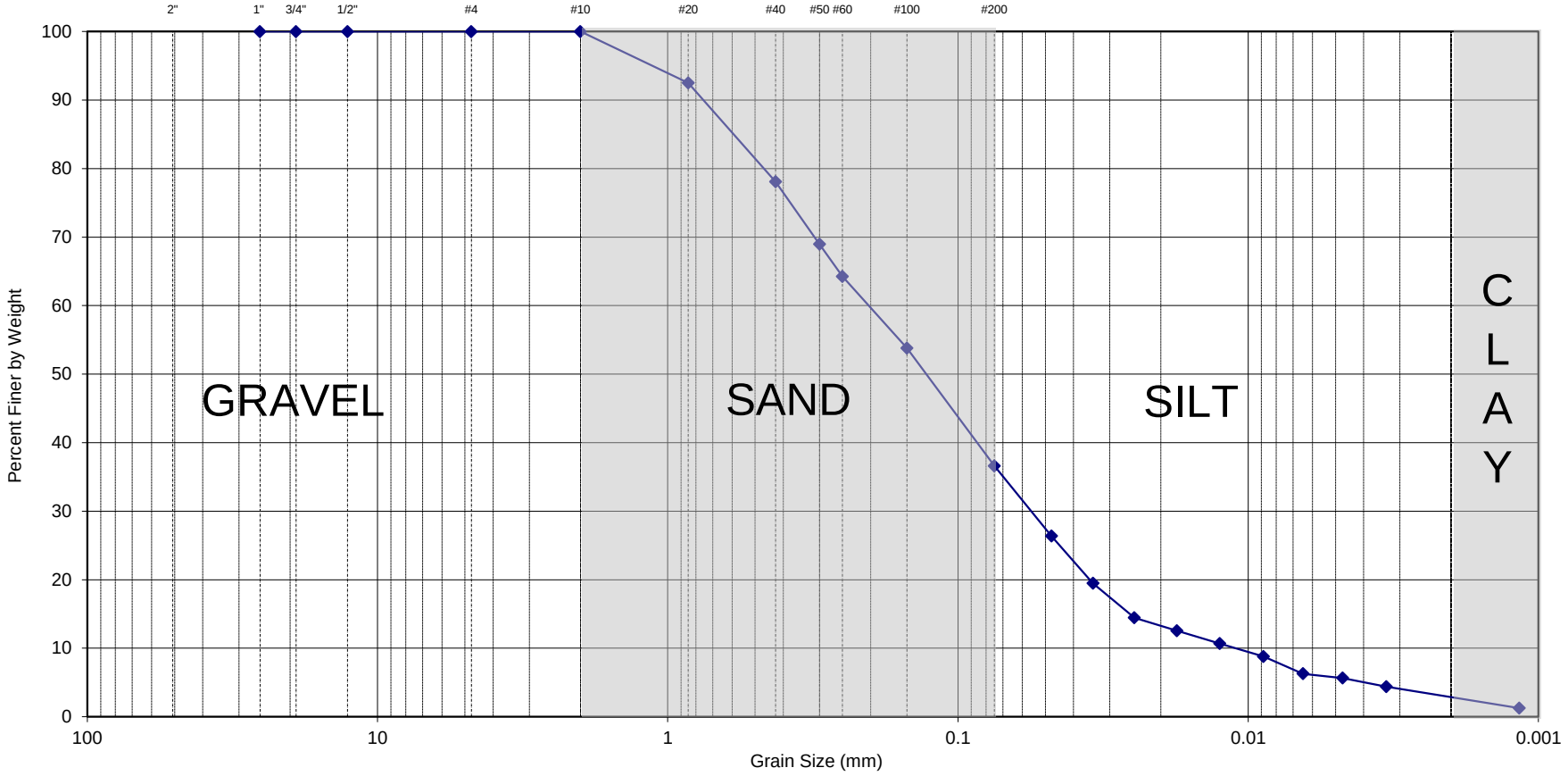
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 63.4% | 36.6% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 237-USDA | VHB-4 | S-5 | 15-17' | USDA = Sandy Loam | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 92.5 |
| #40 | 78.1 |
| #50 | 69.0 |
| #60 | 64.3 |
| #100 | 53.8 |
| #200 | 36.6 |

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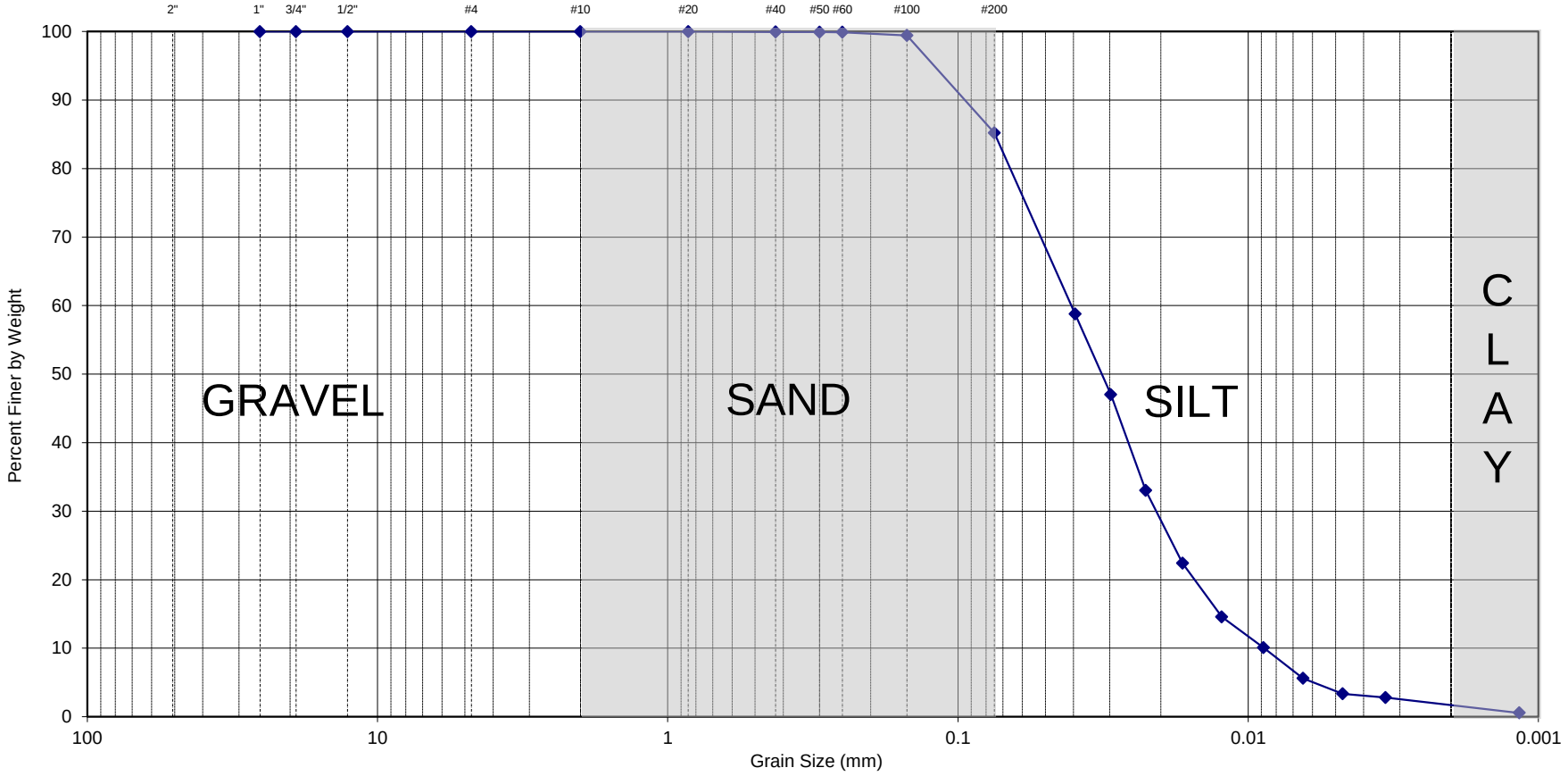
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 14.8% | 85.2% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 238 | VHB-4 | S-6 | 20-22' | Brown SILT, little fine Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 100.0 |
| #40 | 99.9 |
| #50 | 99.9 |
| #60 | 99.9 |
| #100 | 99.4 |
| #200 | 85.2 |

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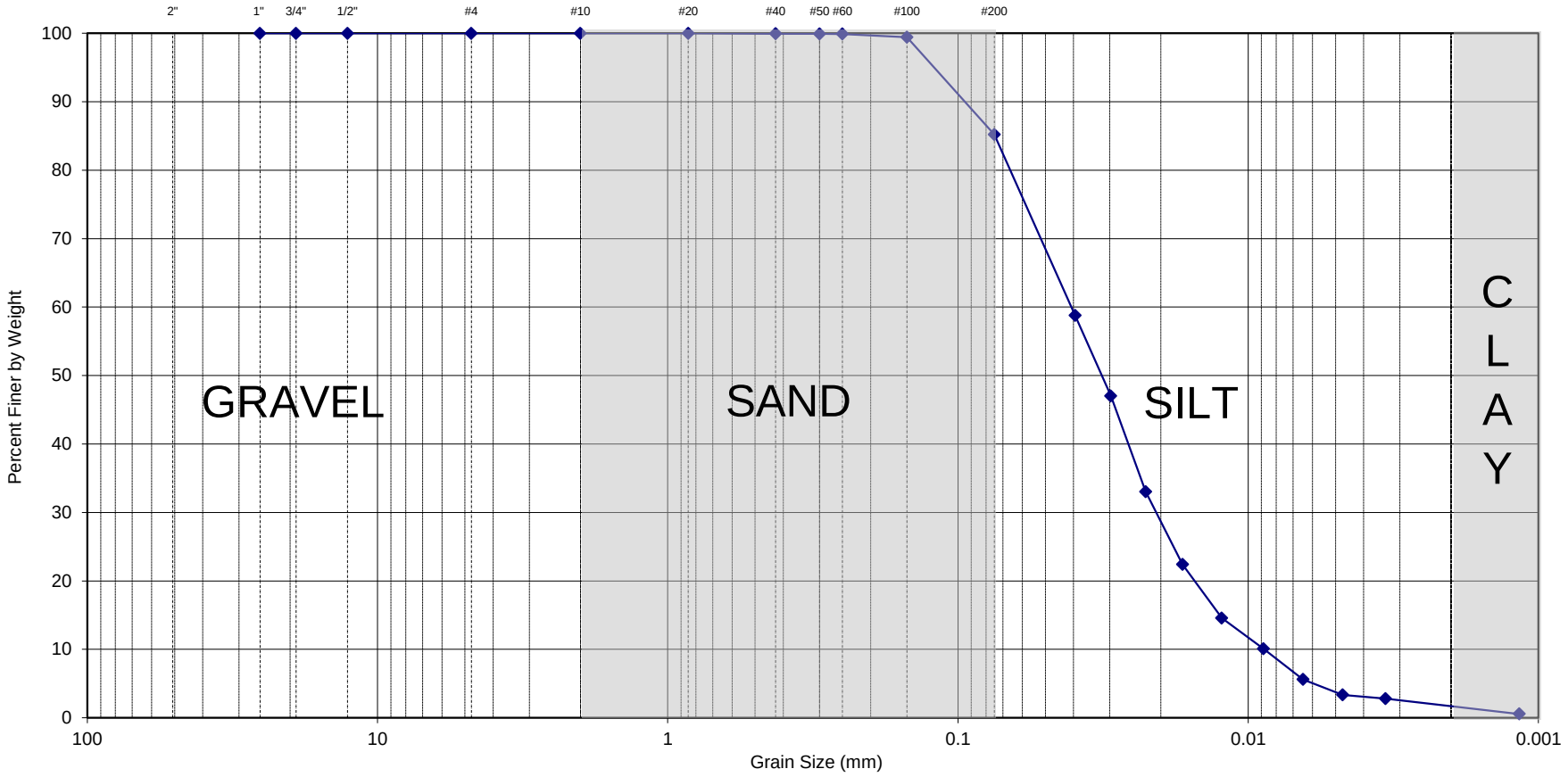


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 14.8% | 85.2% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 238 - USDA | VHB-4 | S-6 | 20-22' | USDA = Loamy sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 100.0 |
| #40 | 99.9 |
| #50 | 99.9 |
| #60 | 99.9 |
| #100 | 99.4 |
| #200 | 85.2 |

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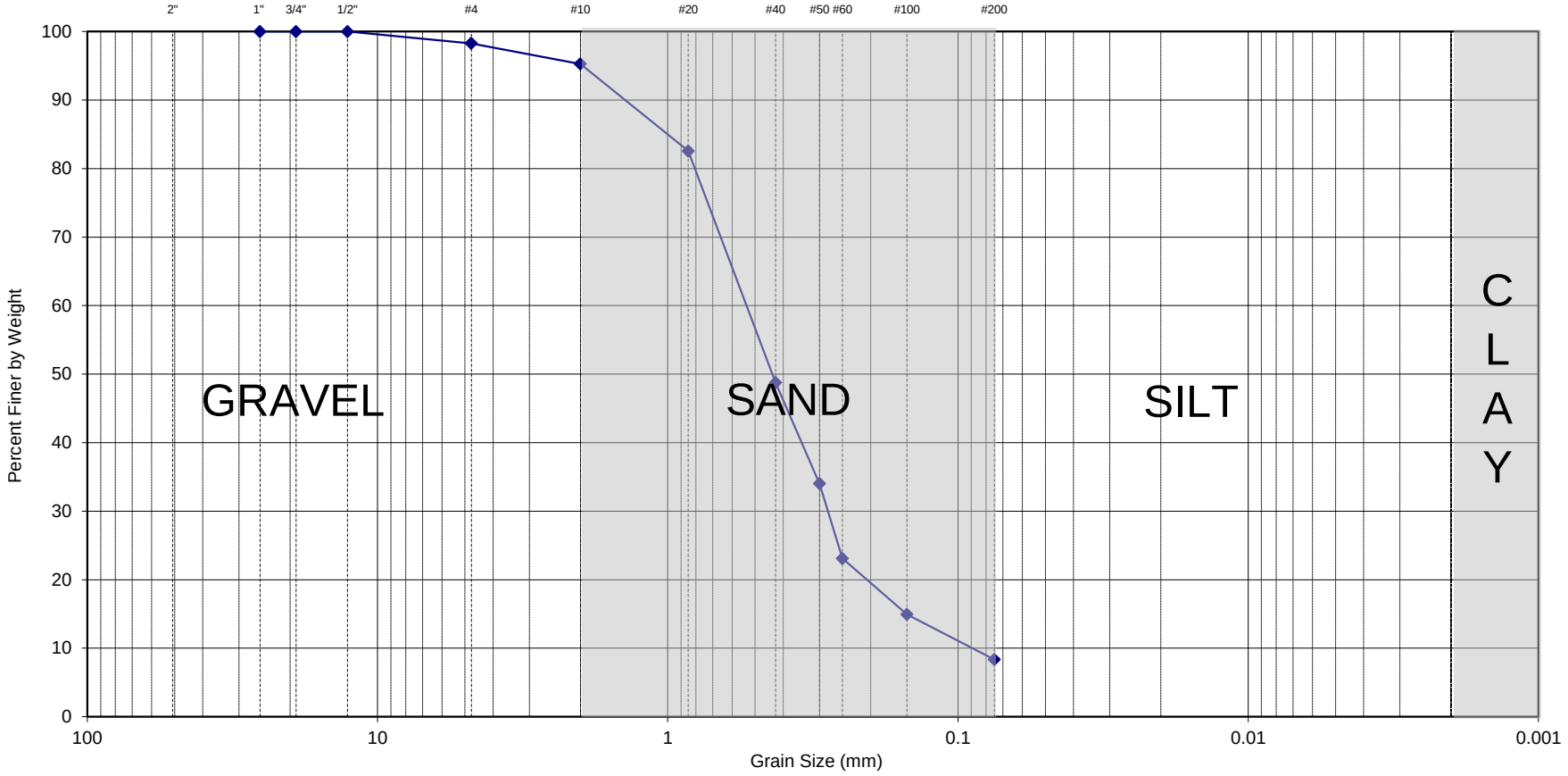


| Gravel | Sand | Fines |
|---|---|---|
| 4.7% | 86.9% | 8.4% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 239 | VHB-7 | S-1 | 2-4' | Brown f-c SAND, trace Silt, trace Gravel | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 98.3 |
| #10 | 95.3 |
| #20 | 82.6 |
| #40 | 48.8 |
| #50 | 34.0 |
| #60 | 23.1 |
| #100 | 14.9 |
| #200 | 8.4 |

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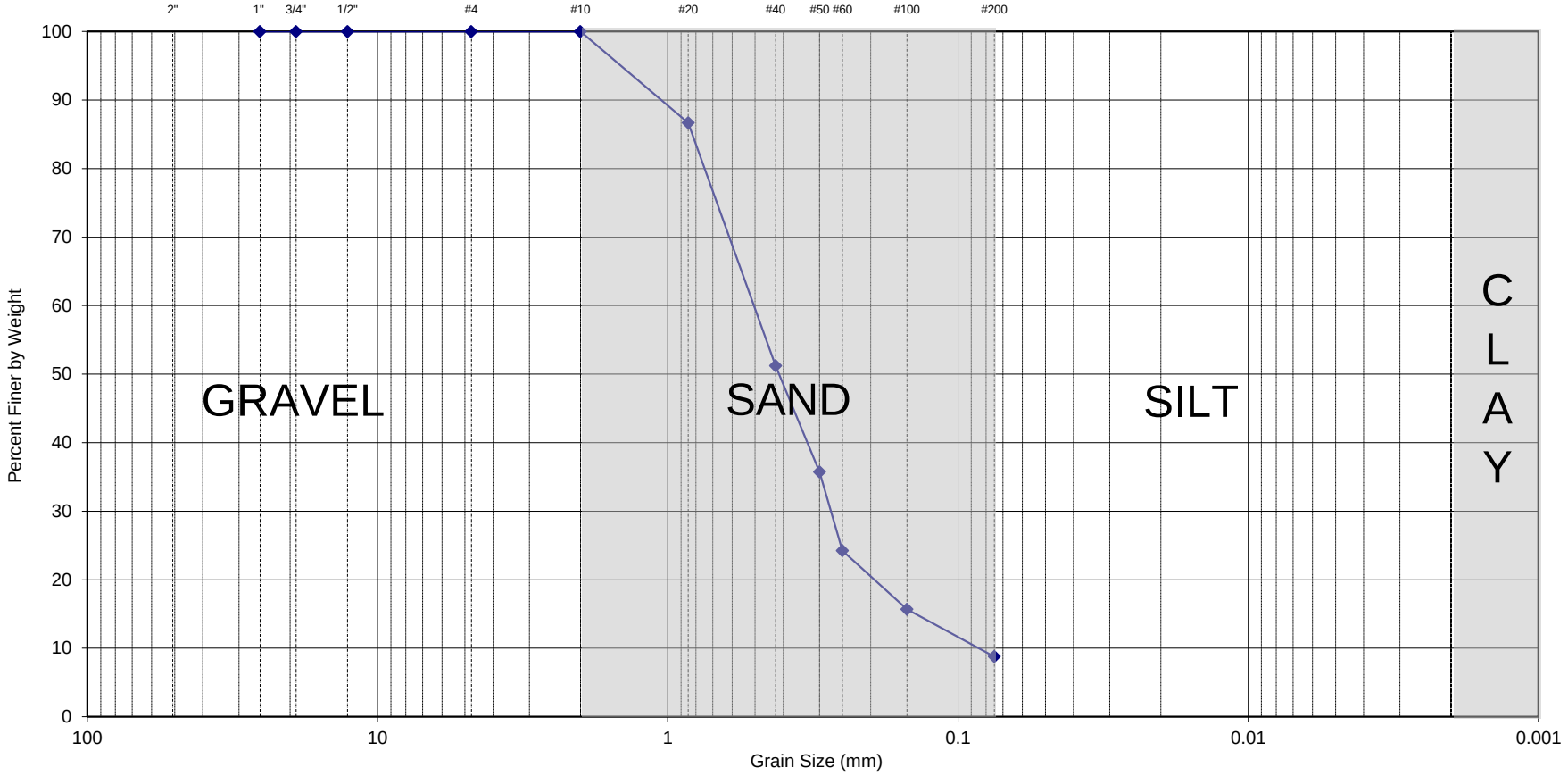


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 91.2% | 8.8% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 239 - USDA | VHB-7 | S-1 | 2-4' | USDA = Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 86.7 |
| #40 | 51.2 |
| #50 | 35.7 |
| #60 | 24.2 |
| #100 | 15.7 |
| #200 | 8.8 |

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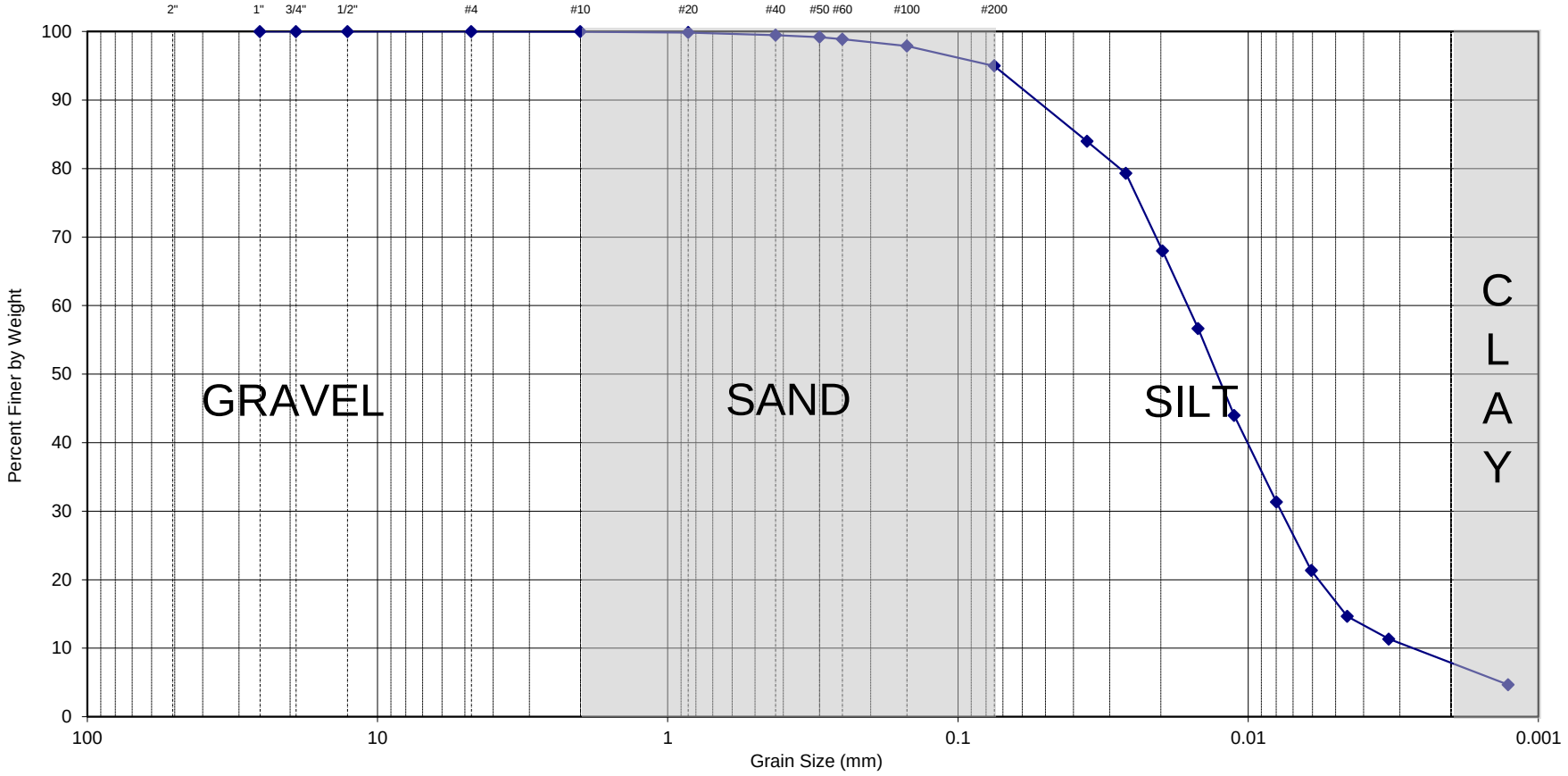


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 5.0% | 95.0% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 240 | VHB-7 | S-2 | 4-8' | Brown Clayey SILT, trace Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.9 |
| #40 | 99.5 |
| #50 | 99.2 |
| #60 | 98.9 |
| #100 | 97.9 |
| #200 | 95.0 |

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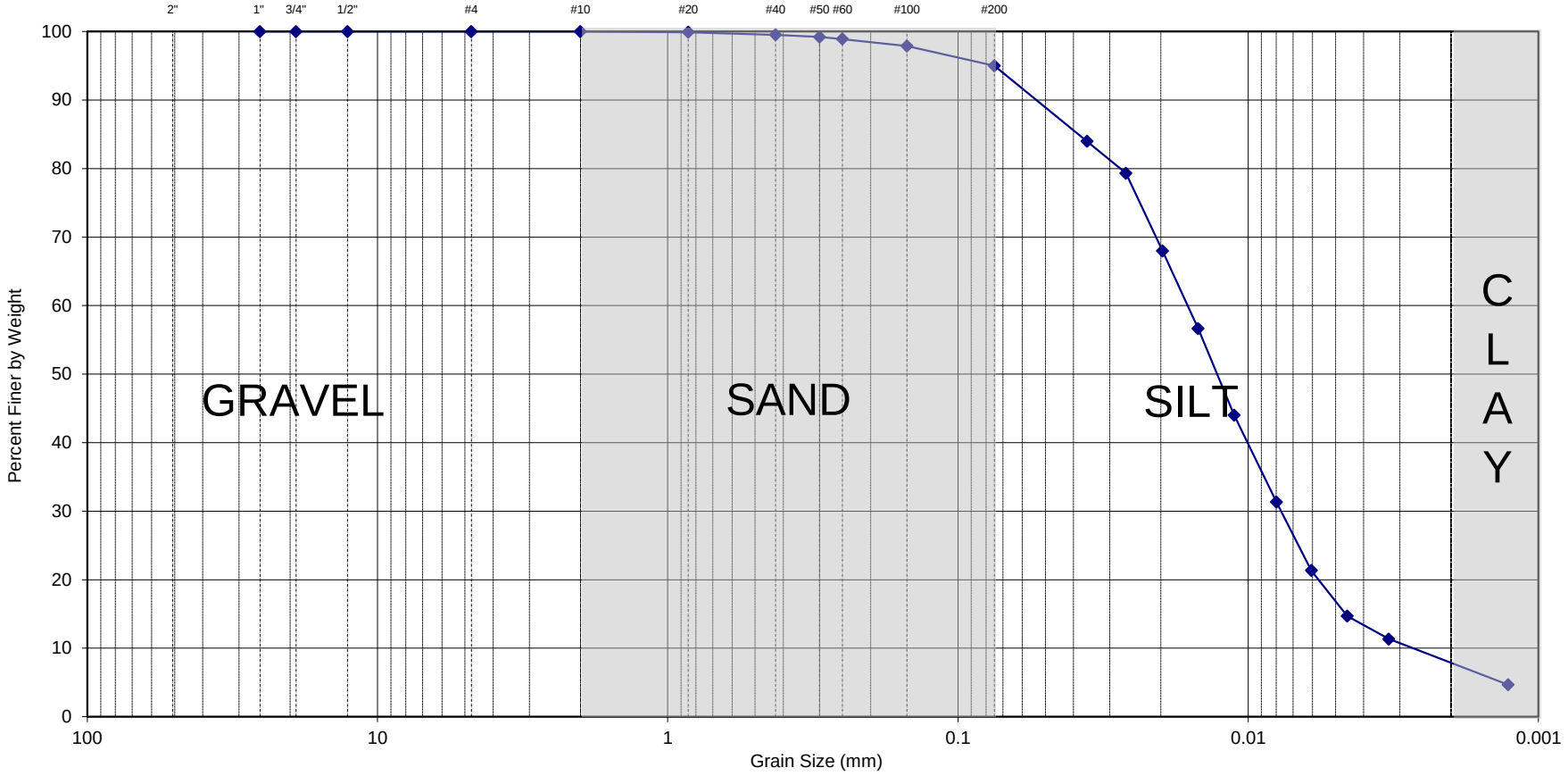


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 5.0% | 95.0% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 240 - USDA | VHB-7 | S-2 | 4-8' | USDA = Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.9 |
| #40 | 99.5 |
| #50 | 99.2 |
| #60 | 98.9 |
| #100 | 97.9 |
| #200 | 95.0 |

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Framingham, Ma
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Tested by: PC/GG Date: 10/22/12
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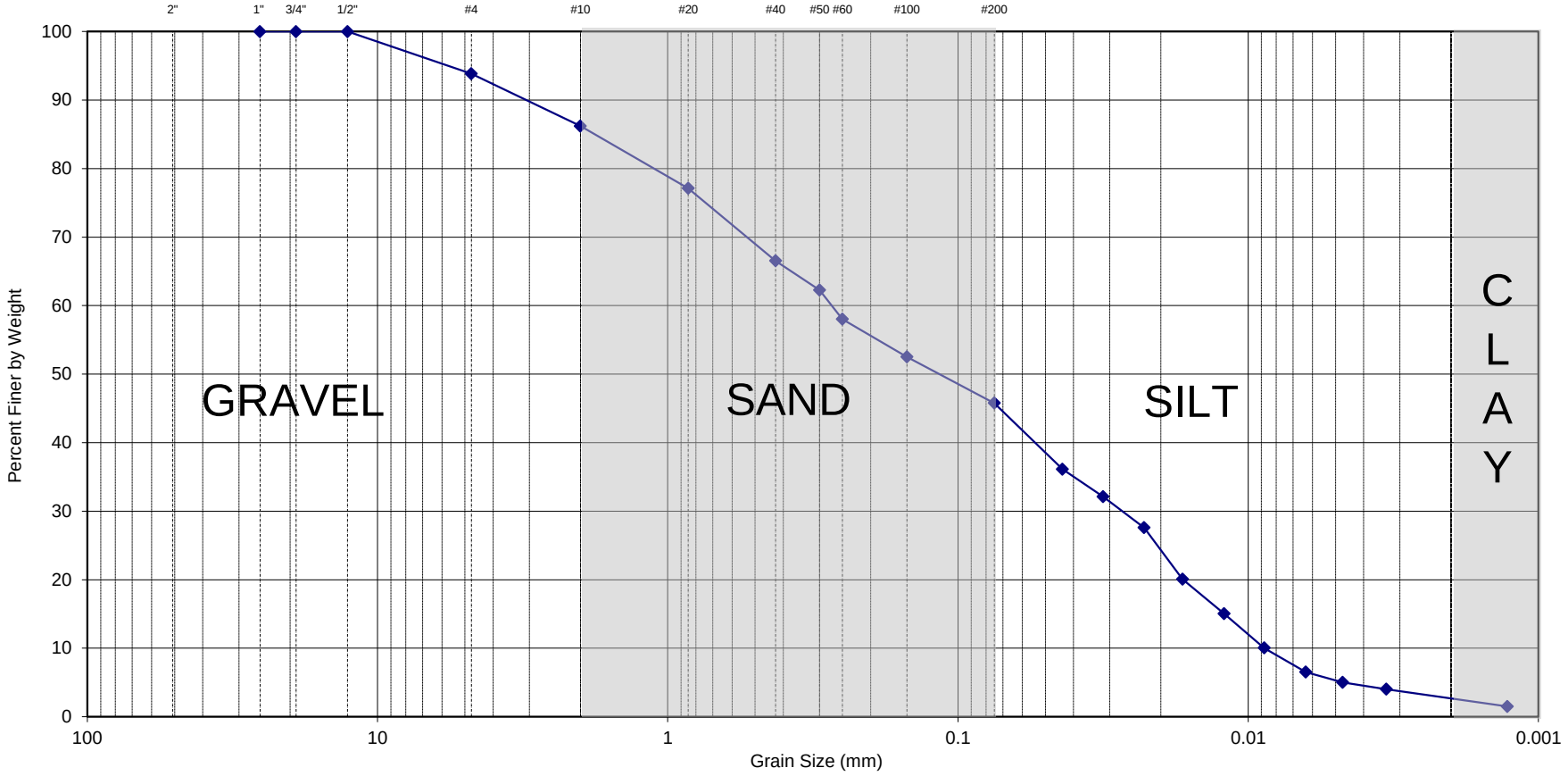


| Gravel | Sand | Fines |
|---|---|---|
| 13.8% | 40.4% | 45.8% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 241 | VHB-9 | S-1 | 4-6' | Brown SILT and f-c SAND, little fine Gravel | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 93.8 |
| #10 | 86.2 |
| #20 | 77.1 |
| #40 | 66.5 |
| #50 | 62.3 |
| #60 | 58.0 |
| #100 | 52.5 |
| #200 | 45.8 |

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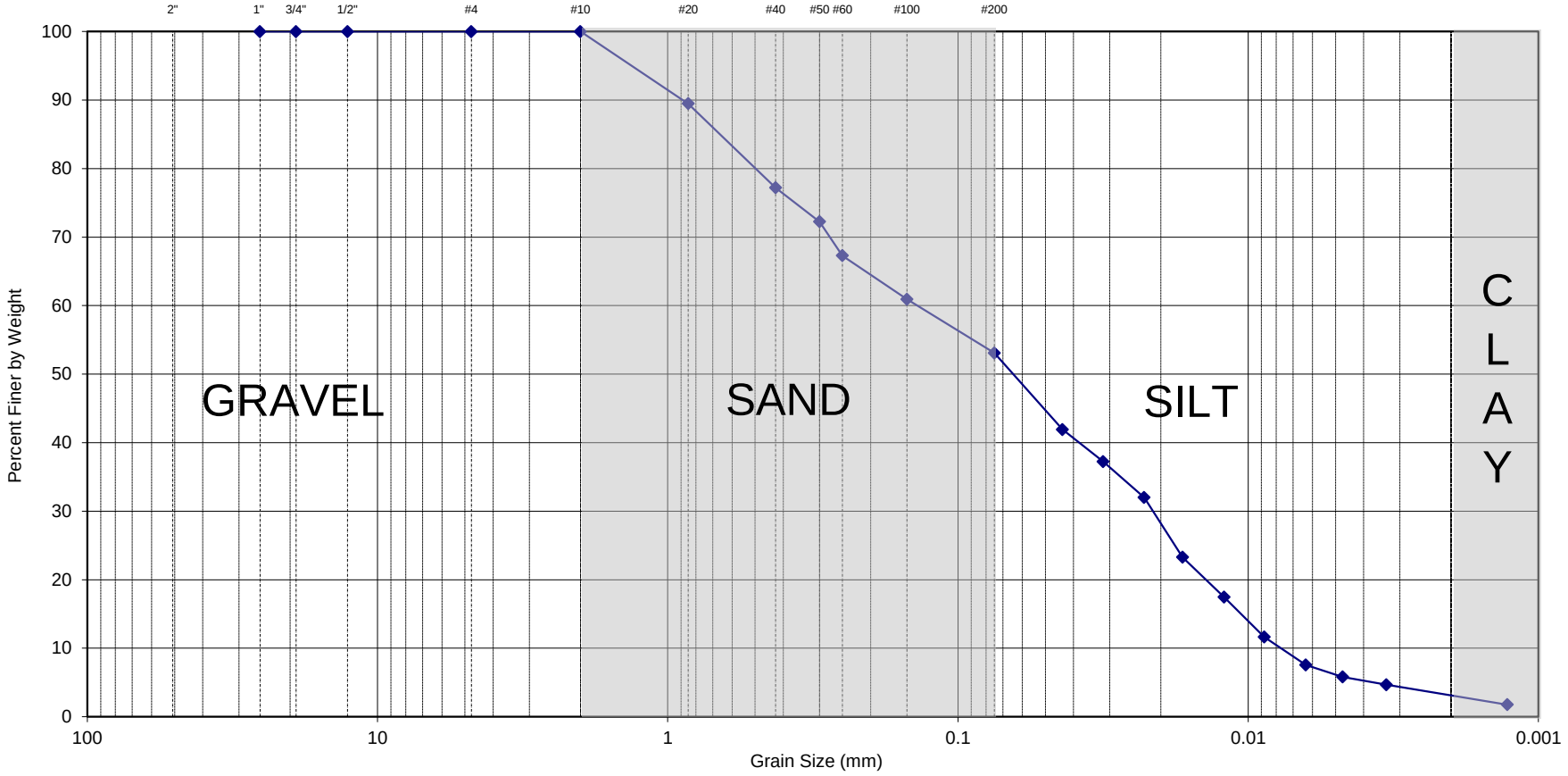



| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 46.9% | 53.1% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 241 - USDA | VHB-9 | S-1 | 4-6' | USDA = Silt Loam | | | | |

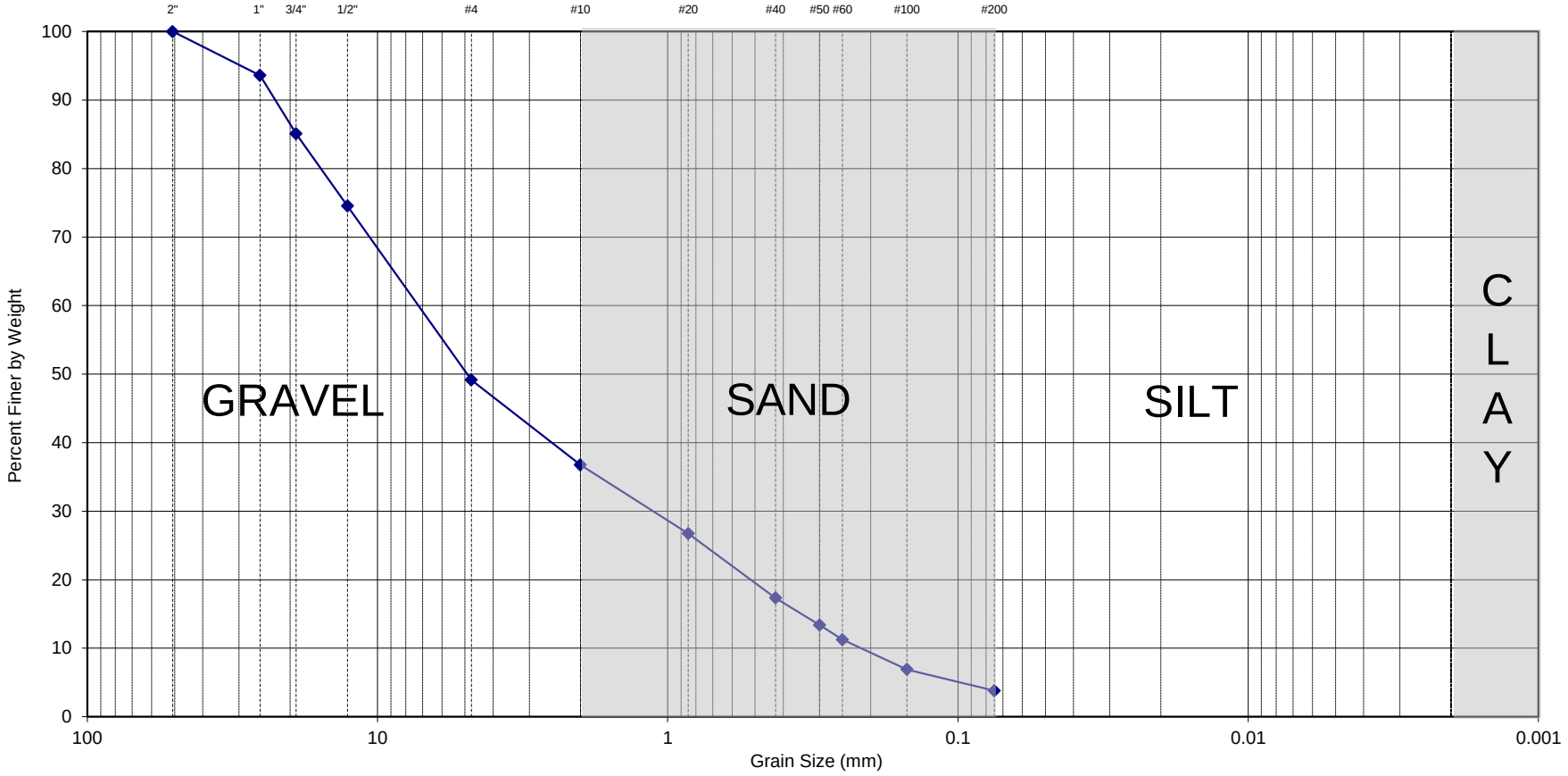
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 89.5 |
| #40 | 77.2 |
| #50 | 72.2 |
| #60 | 67.3 |
| #100 | 60.9 |
| #200 | 53.1 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 63.2% | 33.0% | 3.8% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 242 | VHB-11 | S-1 | 4-10' | Lt. Brown f-c GRAVEL, some f-c Sand, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 74.5 |
| #4 | 49.1 |
| #10 | 36.8 |
| #20 | 26.7 |
| #40 | 17.3 |
| #50 | 13.4 |
| #60 | 11.2 |
| #100 | 6.9 |
| #200 | 3.8 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC Date: 10/18/12
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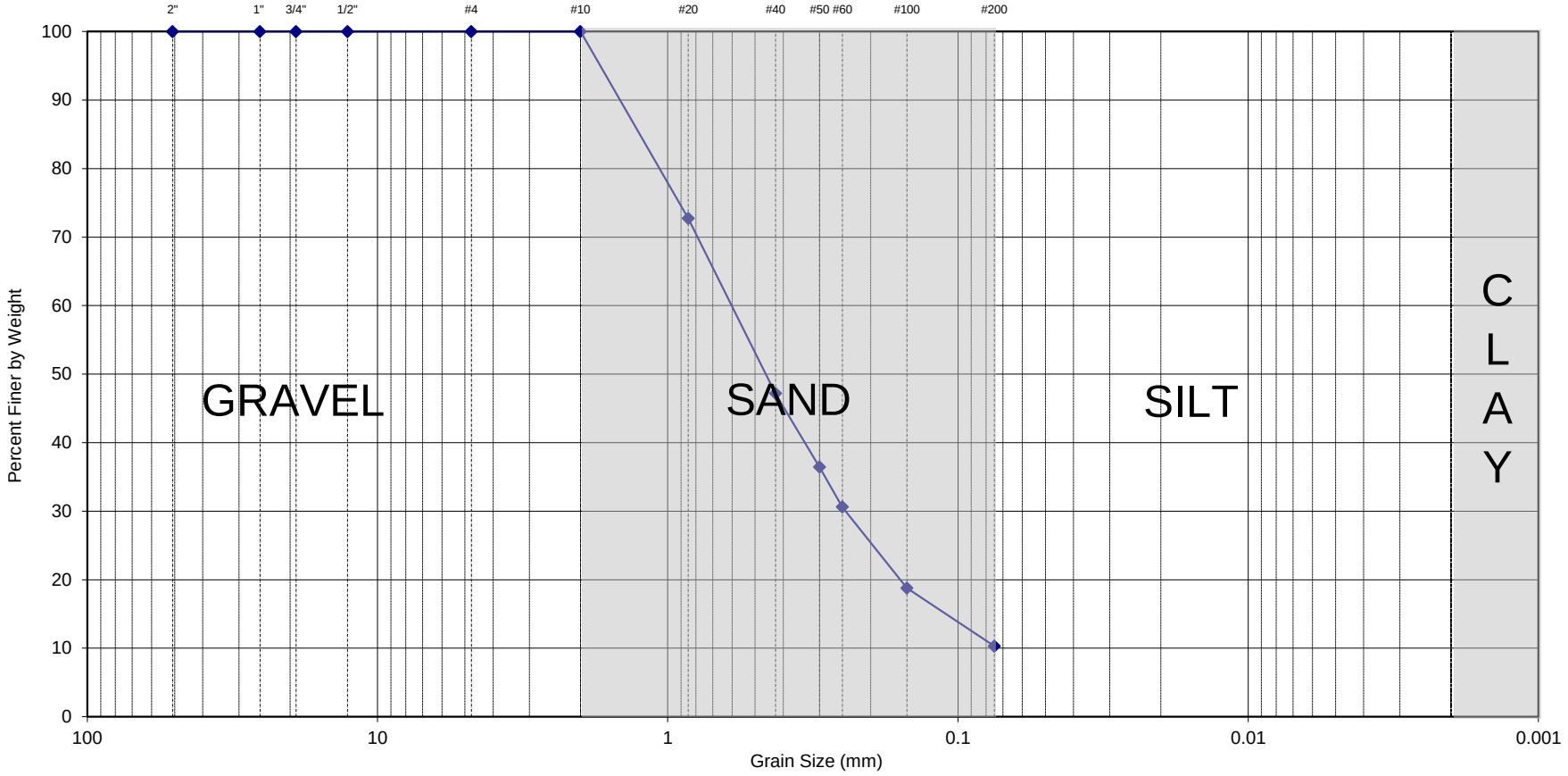
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 89.7% | 10.3% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 242 - USDA | VHB-11 | S-1 | 4-10' | USDA = Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 72.7 |
| #40 | 47.1 |
| #50 | 36.4 |
| #60 | 30.6 |
| #100 | 18.8 |
| #200 | 10.3 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC Date: 10/18/12
Reviewed by: MBP Date: 10/22/12

# LABORATORY TESTING DATA SHEET

Project Name Danforth Green - Hydrogeo | Project Location Framingham, MA | Reviewed By

Project No. CTS-74-12-0003.14 MGA # G0232.01 | Assigned By J. Gannon

Project Engineer J. Gannon | Date 10/23/2012 | Date Reviewed 10/23/2012

| Boring/ Test Pit No. | Sample No. | Depth ft. | Lab No. | Standard Identification Tests | | | | | | | | | USDA Identification Tests | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Water Content % | LL % | PL % | Sieve -200 % | Hyd -2μ % | ORG % | $G_s$ | Dry unit wt. pcf | Torvane or Type Test | Sieve -200 % | Hyd -2μ % | USDA Classification | Burmister Soil Description |
| VHB-13 | S-4 | 19-21 | 243 | | | | 14 | 3 | | | | | 30 | 7 | USDA = Sandy Loam | Brown f-c GRAVEL, some f-c Sand, little Silt |
| VHB-13 | S-8 | 33-35 | 244 | | | | 83 | 2 | | | | | 83 | 2 | USDA = Silt | Brown SILT, little fine Sand |
| VHB-15 | S-10 | 29-31 | 245 | | | | 75 | 1 | | | | | 75 | 1 | USDA = Silt Loam | Brown SILT, some fine Sand |
| VHB-18 | S-1 | 7-12 | 246 | | | | 4 | | | | | | 6 | | USDA = Sand | Brown f-c SAND and f-c GRAVEL, trace Silt |
| VHB-19 | S-3 | 15-17 | 247 | | | | 5 | | | | | | 5 | | USDA = Sand | Brown f-m SAND, trace Silt |
| VHB-20 | S-2 | 10-12 | 248 | | | | 28 | 3 | | | | | 42 | 5 | USDA = Silt Loam | Brown f-c SAND, some f-c Gravel, some Clayey Silt |
| VHB-22 | S-3 | 10-14 | 249 | | | | 7 | | | | | | 7 | | USDA = Sand | Brown f-m SAND, trace Silt |
| VHB-23 | S-1 | 0-13 | 250 | | | | 99 | 27 | | | | | 99 | 27 | USDA = Silt Loam | Brown CLAY & SILT, trace Sand |
| VHB-24 | S-1 | 6-9.5 | 251 | | | | 8 | | | | | | 8 | | USDA = Sand | Brown f-m SAND, trace Silt, trace Gravel |
| VHB-25 | S-1 | 2.5-11 | 252 | | | | 9 | | | | | | 9 | | USDA = Sand | Brown f-m SAND, trace Silt, trace Gravel |
| VHB-27 | S-1 | 5-7 | 253 | | | | 11 | 1 | | | | | 24 | 3 | USDA = Sand | Gray f-c SAND and f-c GRAVEL, little Silt |
| VHB-28 | S-1 | 5-7 | 254 | | | | 98 | 13 | | | | | 98 | 13 | USDA = Silt Loam | Brown Clayey SILT, trace Sand |

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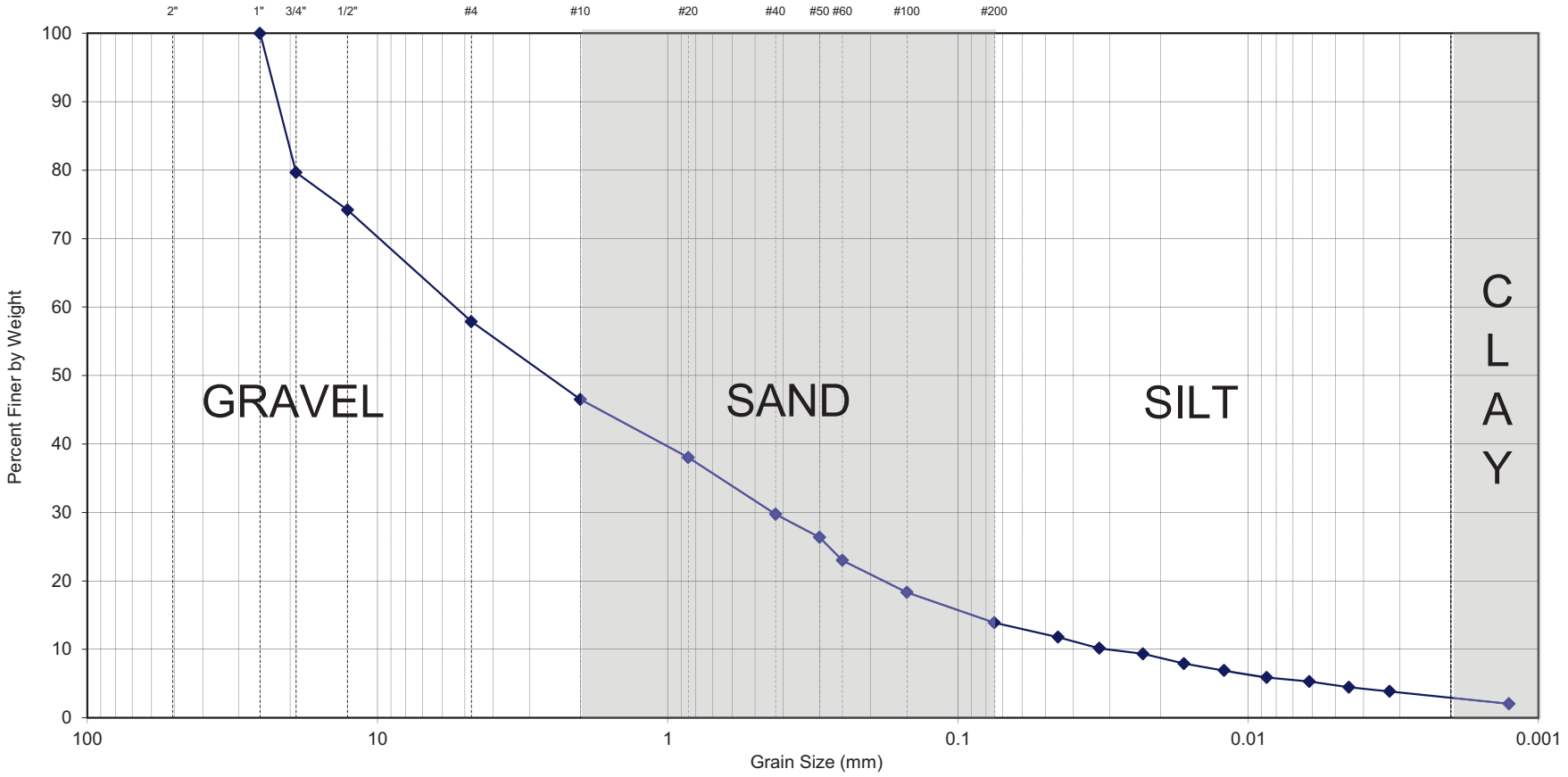
195 Frances Avenue
Cranston, RI 02910

401-467-6454

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 53.5% | 32.6% | 13.9% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 243 | VHB-13 | S-4 | 19-21' | Brown f-c GRAVEL, some f-c Sand, little Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 74.2 |
| #4 | 57.9 |
| #10 | 46.5 |
| #20 | 38.0 |
| #40 | 29.7 |
| #50 | 26.4 |
| #60 | 23.0 |
| #100 | 18.3 |
| #200 | 13.9 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
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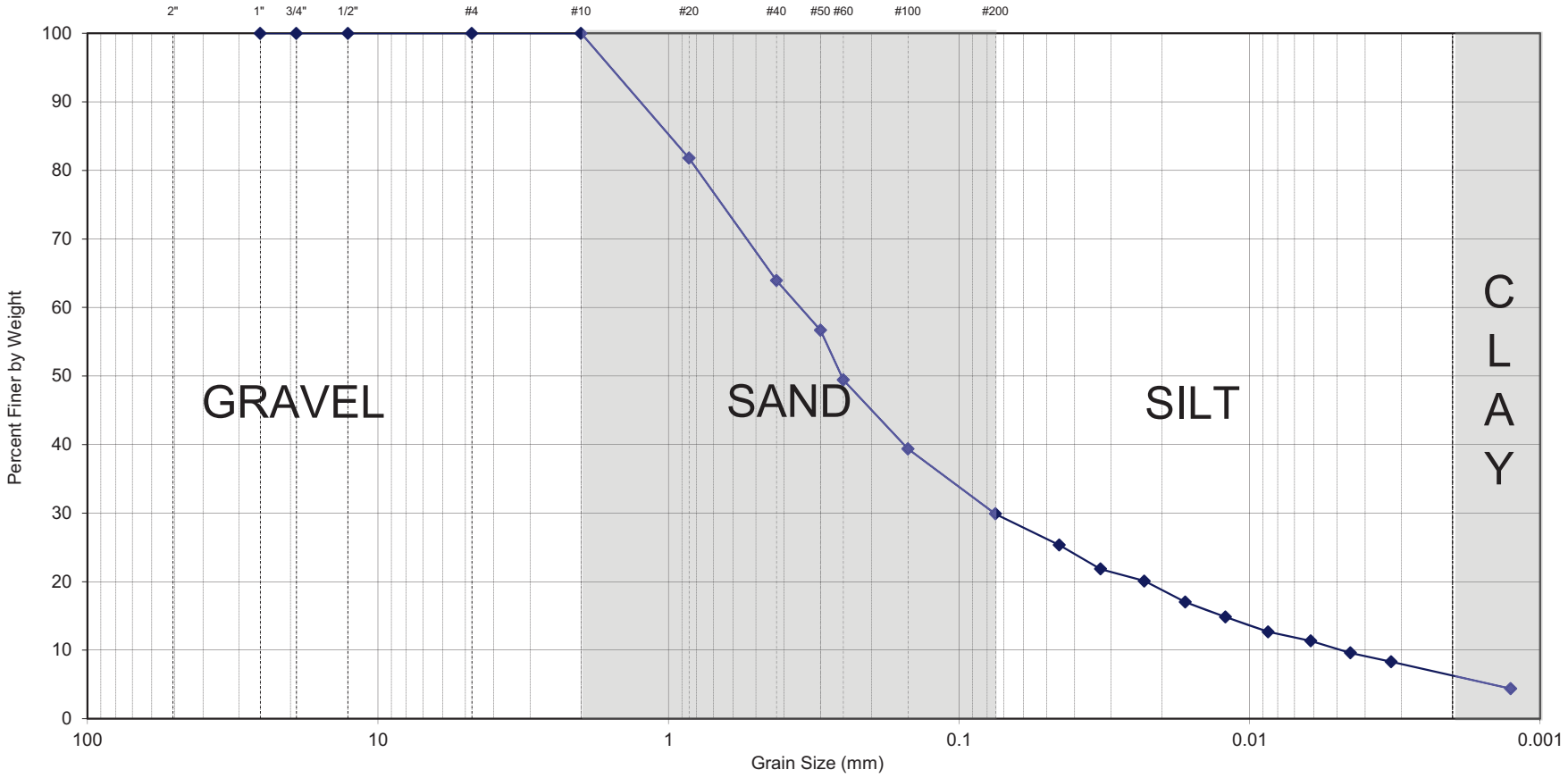
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 70.1% | 29.9% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 243 - USDA | VHB-13 | S-4 | 19-21' | USDA = Sandy Loam | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 81.8 |
| #40 | 63.9 |
| #50 | 56.7 |
| #60 | 49.4 |
| #100 | 39.4 |
| #200 | 29.9 |

THIELSCH ENGINEERING

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GZA File # 74-12-0003.14

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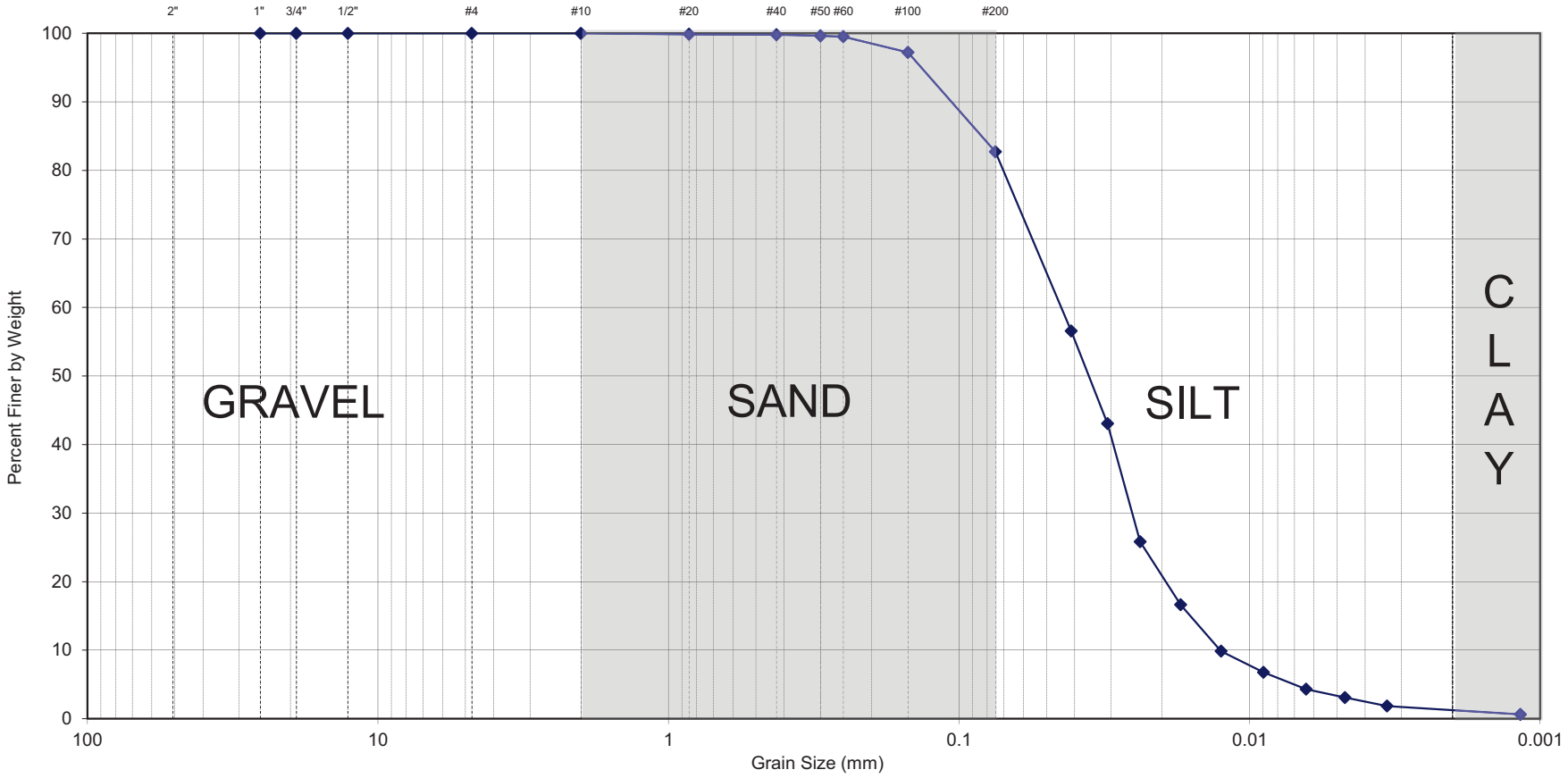
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 17.3% | 82.7% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 244 | VHB-13 | S-8 | 33-35' | Brown SILT, little fine Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.9 |
| #40 | 99.8 |
| #50 | 99.6 |
| #60 | 99.5 |
| #100 | 97.2 |
| #200 | 82.7 |

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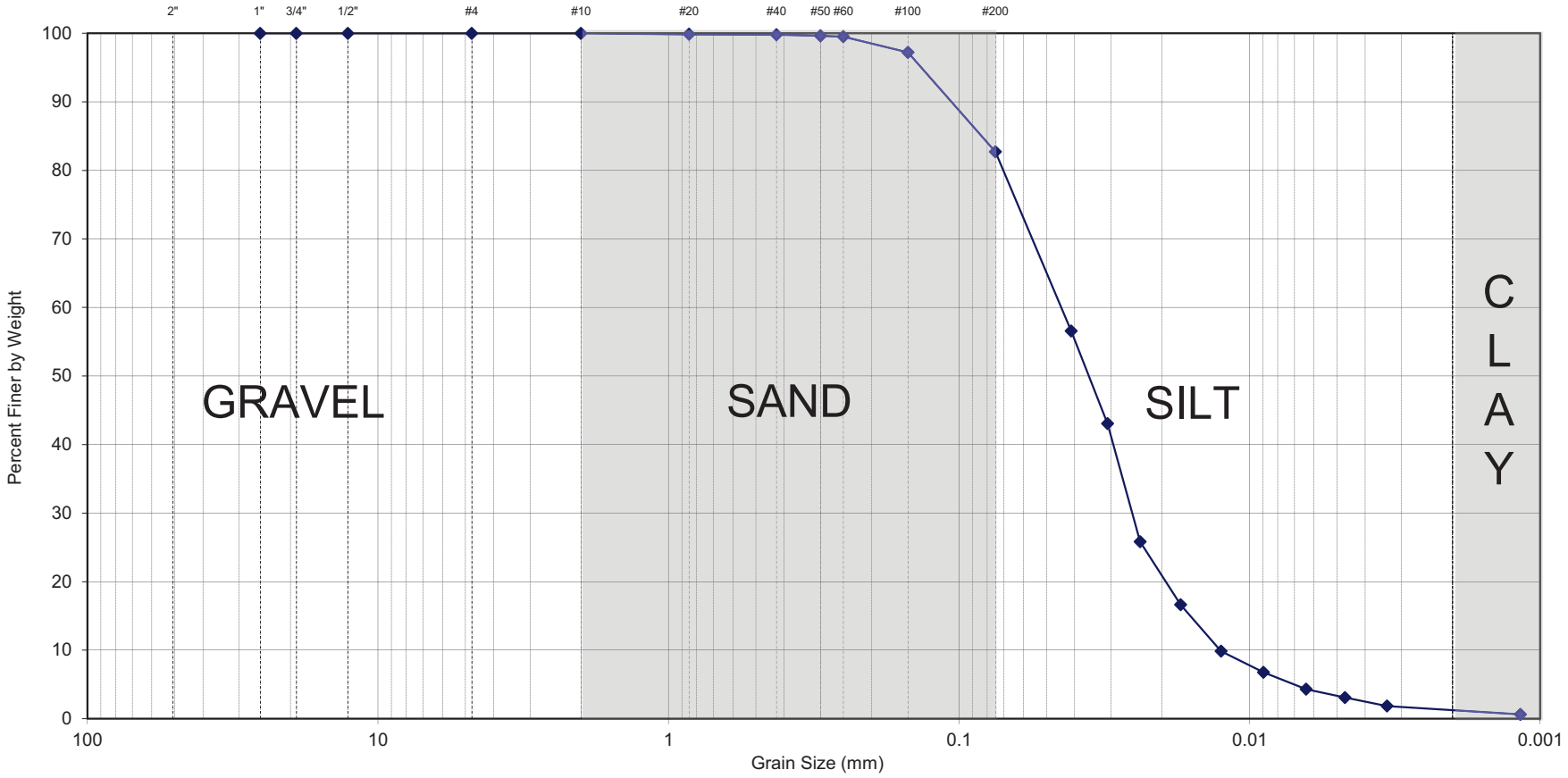


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 17.3% | 82.7% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 244 - USDA | VHB-13 | S-8 | 33-35' | USDA = Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.9 |
| #40 | 99.8 |
| #50 | 99.6 |
| #60 | 99.5 |
| #100 | 97.2 |
| #200 | 82.7 |

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Framingham, Ma
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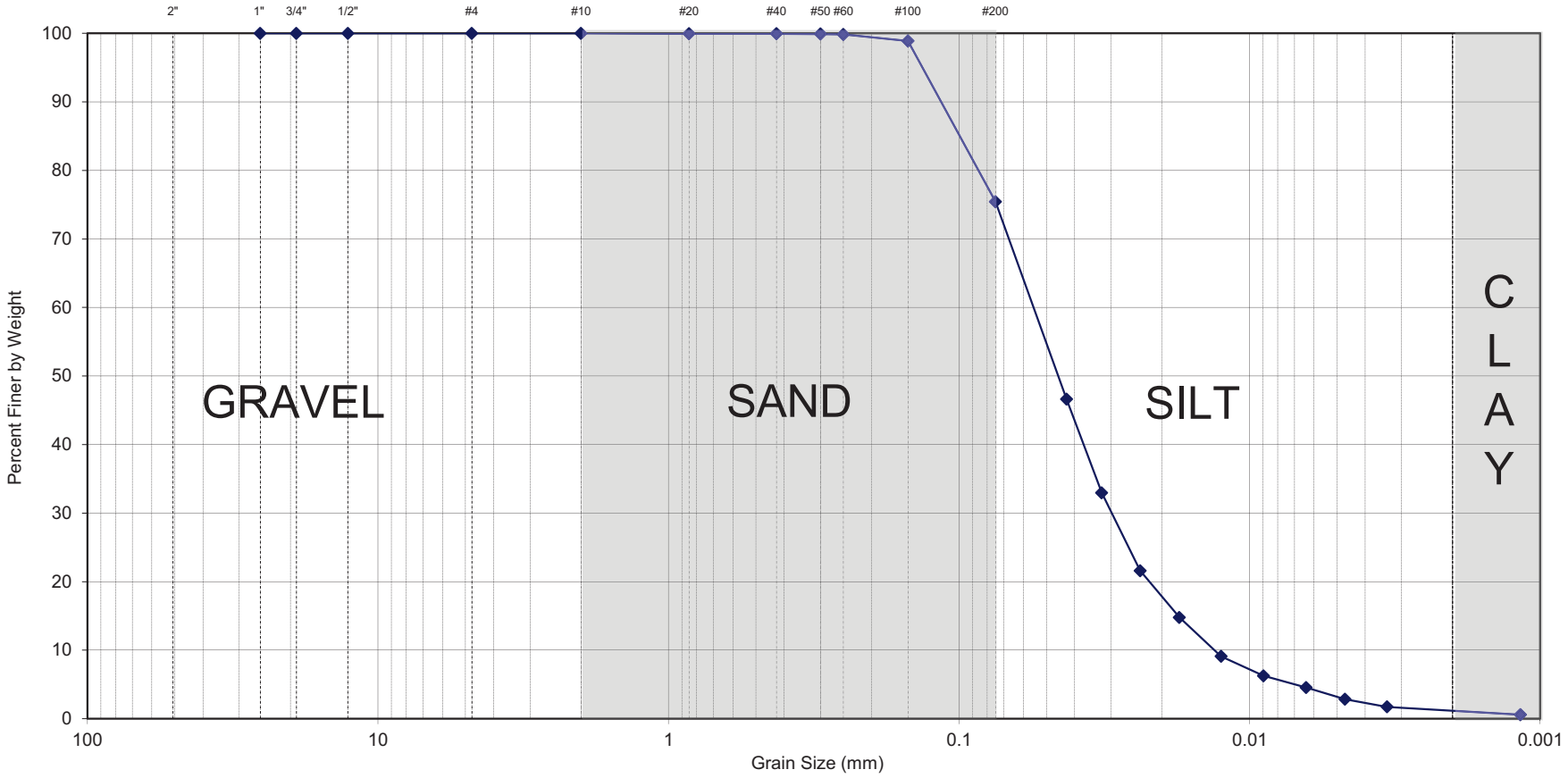


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 24.6% | 75.4% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 245 | VHB-15 | S-10 | 29-31' | Brown SILT, some fine Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.9 |
| #40 | 99.9 |
| #50 | 99.9 |
| #60 | 99.8 |
| #100 | 98.9 |
| #200 | 75.4 |

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Framingham, Ma
GZA File # 74-12-0003.14

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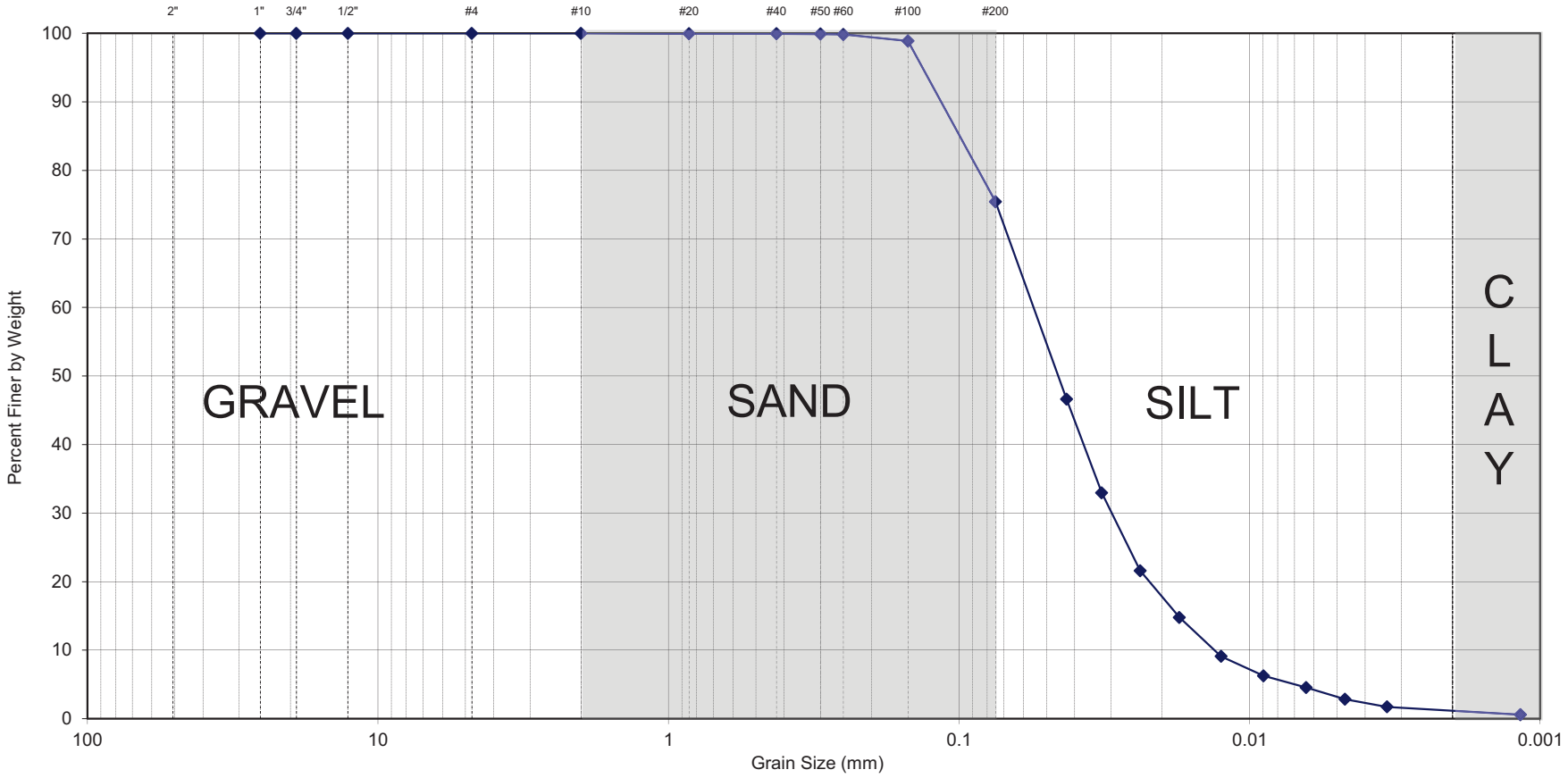
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 24.6% | 75.4% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 245 - USDA | VHB-15 | S-10 | 29-31' | USDA = Silt Loam | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.9 |
| #40 | 99.9 |
| #50 | 99.9 |
| #60 | 99.8 |
| #100 | 98.9 |
| #200 | 75.4 |

THIELSCH ENGINEERING

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Framingham, Ma
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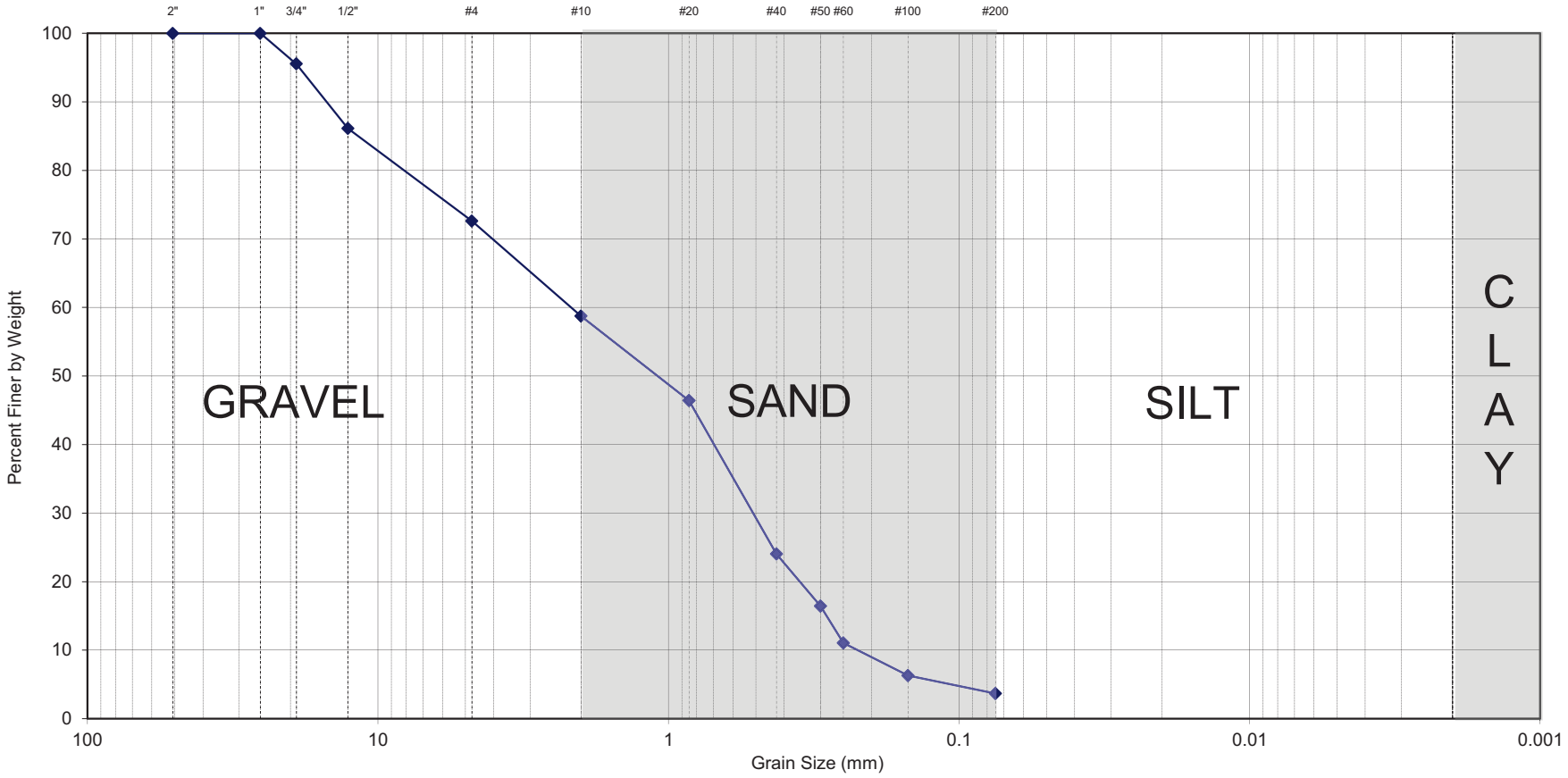
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 41.3% | 55.1% | 3.7% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 246 | VHB-18 | S-1 | 7-12' | Brown f-c SAND and f-c GRAVEL, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 86.1 |
| #4 | 72.6 |
| #10 | 58.7 |
| #20 | 46.4 |
| #40 | 24.0 |
| #50 | 16.4 |
| #60 | 11.1 |
| #100 | 6.3 |
| #200 | 3.7 |

THIELSCH ENGINEERING

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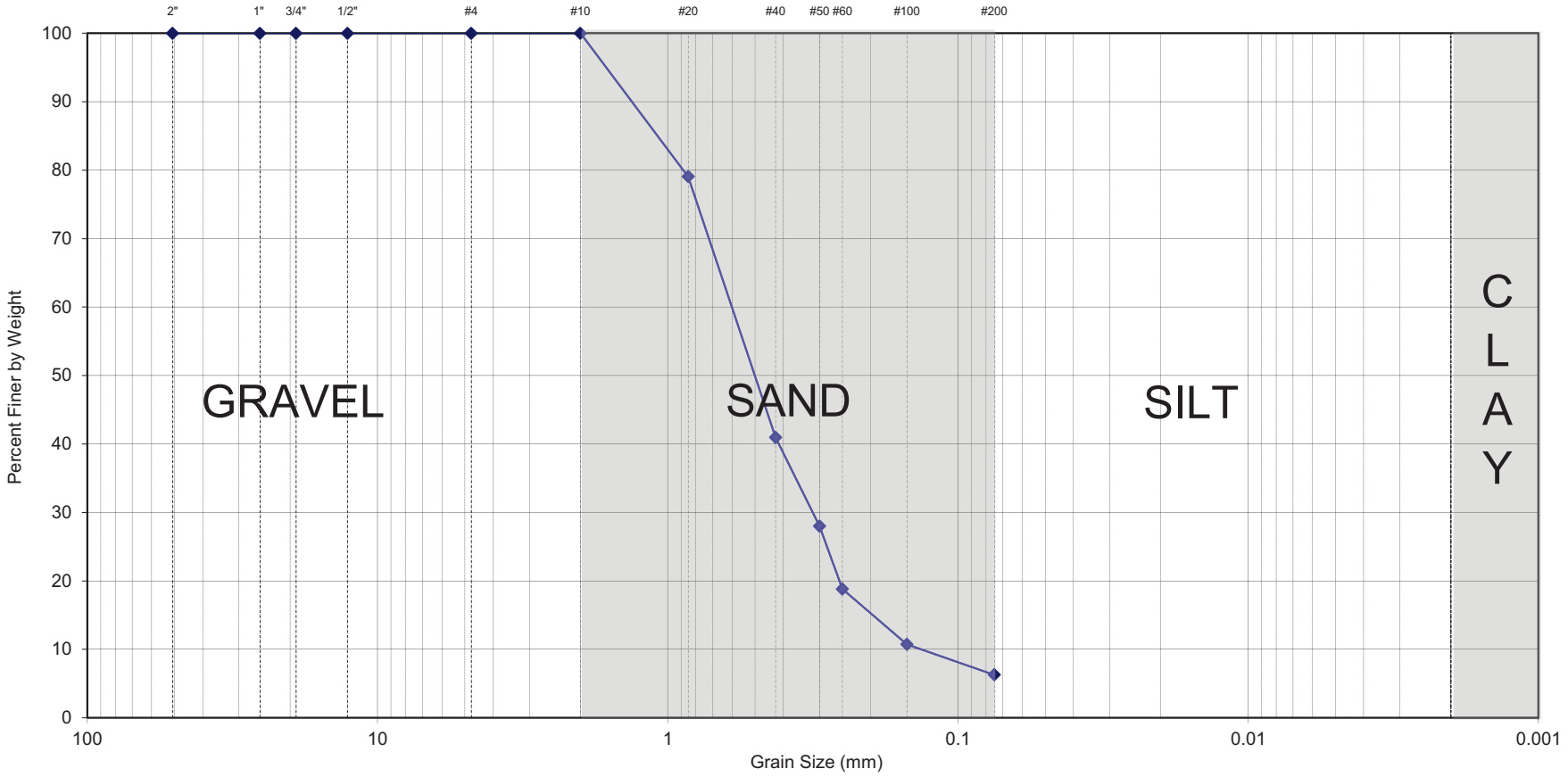
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 93.7% | 6.3% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 246 -USDA | VHB-18 | S-1 | 7-12' | USDA = Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 79.0 |
| #40 | 40.9 |
| #50 | 28.0 |
| #60 | 18.8 |
| #100 | 10.7 |
| #200 | 6.3 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
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Framingham, Ma
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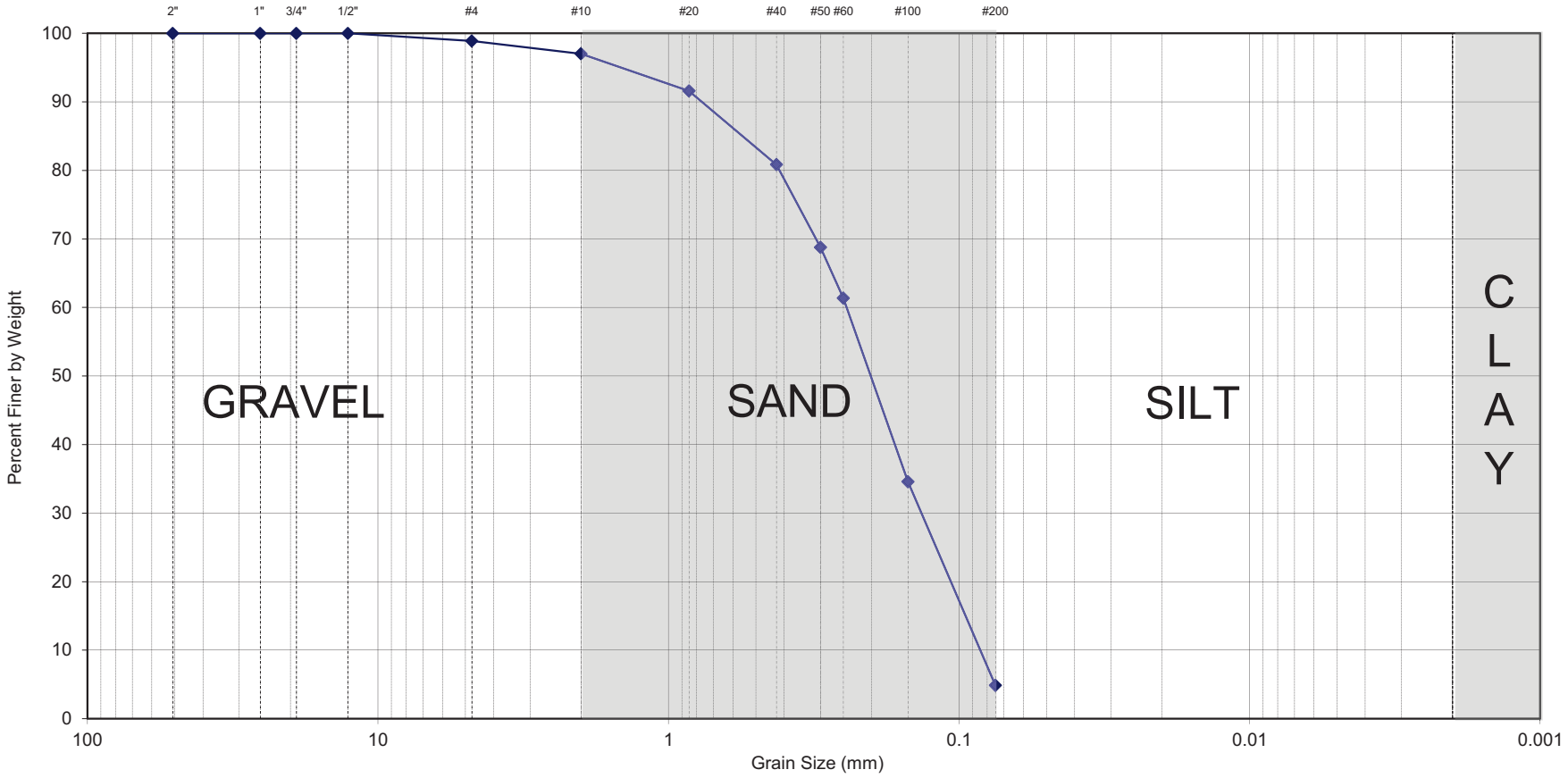
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 3.0% | 92.2% | 4.9% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 247 | VHB-19 | S-3 | 15-17' | Brown f-m SAND, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 98.9 |
| #10 | 97.0 |
| #20 | 91.6 |
| #40 | 80.8 |
| #50 | 68.8 |
| #60 | 61.3 |
| #100 | 34.6 |
| #200 | 4.9 |

THIELSCH ENGINEERING

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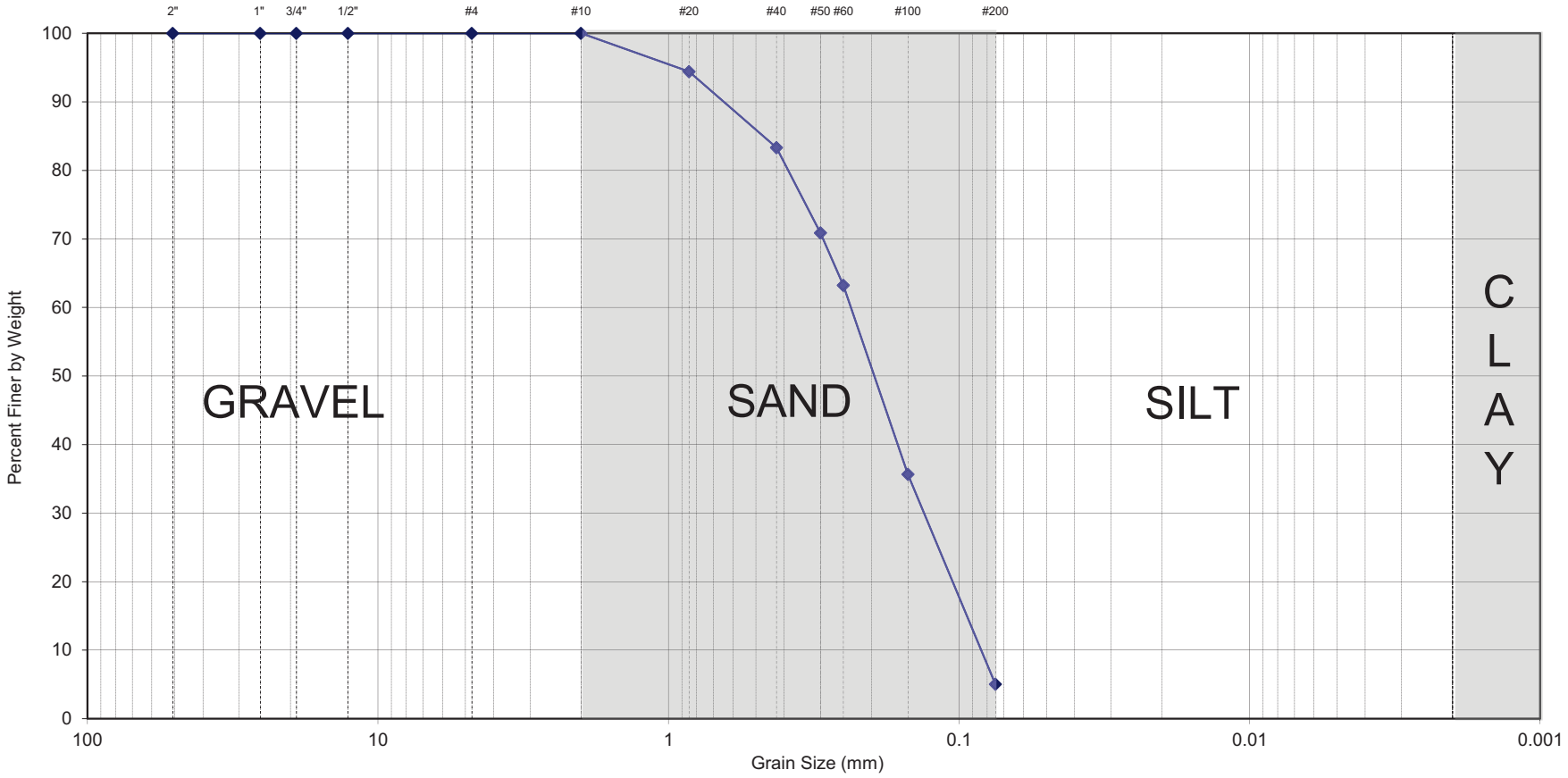
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 95.0% | 5.0% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 247 - USDA | VHB-19 | S-3 | 15-17' | USDA = Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 94.4 |
| #40 | 83.3 |
| #50 | 70.9 |
| #60 | 63.2 |
| #100 | 35.6 |
| #200 | 5.0 |

THIELSCH ENGINEERING

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Framingham, Ma
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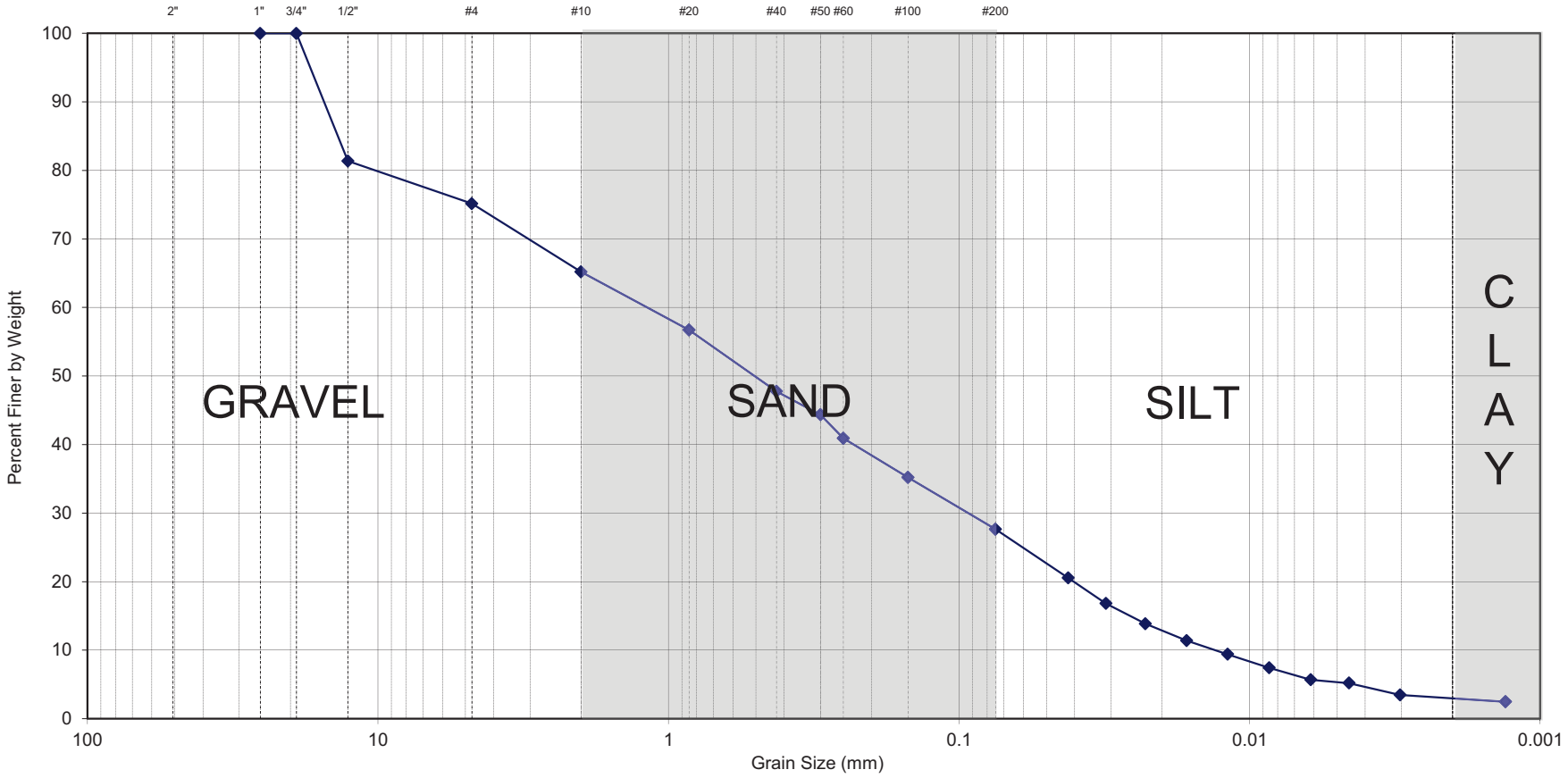
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 34.8% | 37.6% | 27.6% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 248 | VHB-20 | S-2 | 10-12' | Brown f-c SAND, some f-c Gravel, some Clayey Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 81.4 |
| #4 | 75.1 |
| #10 | 65.2 |
| #20 | 56.7 |
| #40 | 47.8 |
| #50 | 44.3 |
| #60 | 40.9 |
| #100 | 35.2 |
| #200 | 27.6 |

THIELSCH ENGINEERING

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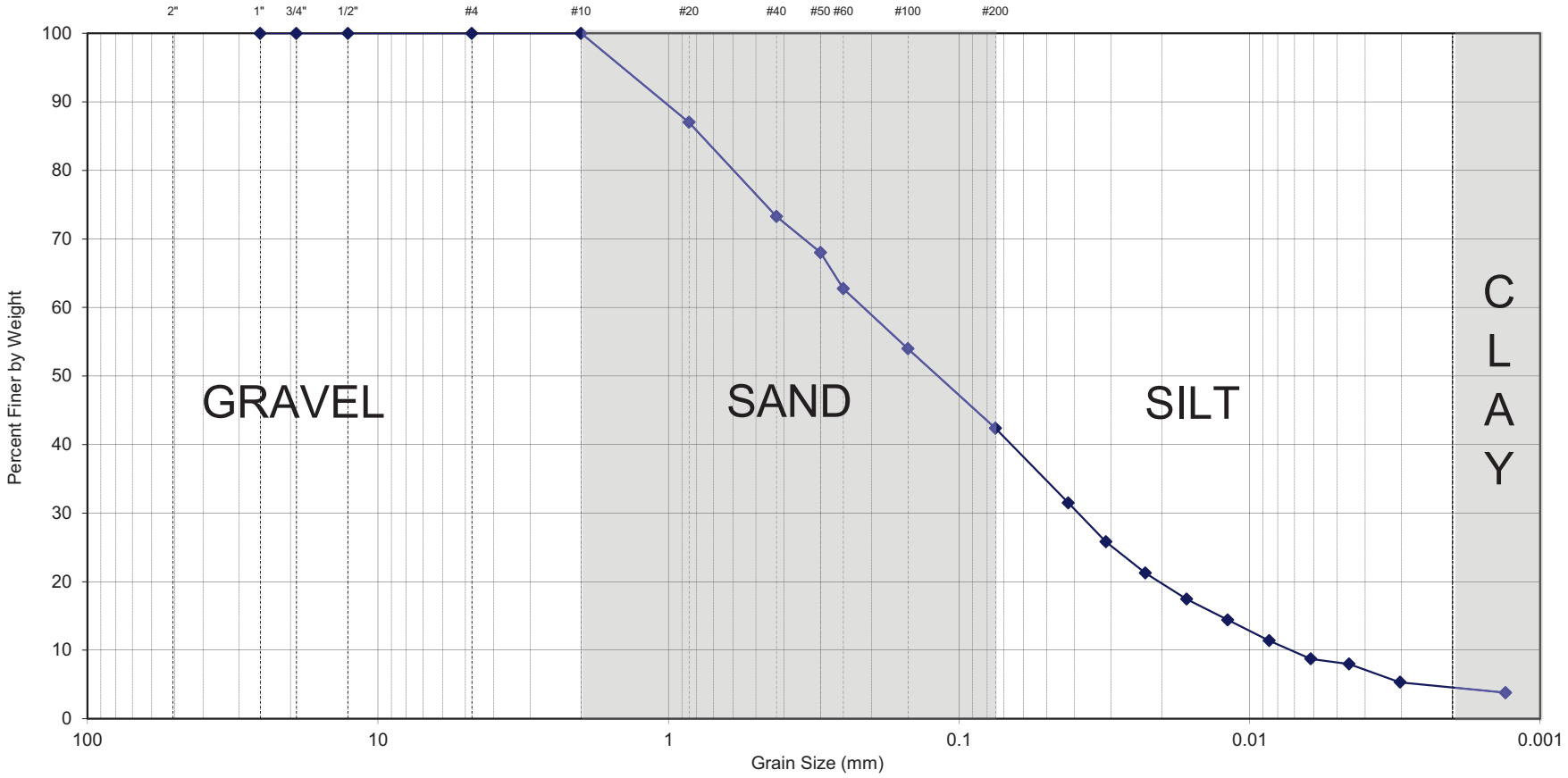
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 57.6% | 42.4% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 248 - USDA | VHB-20 | S-2 | 10-12' | USDA = Silt Loam | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 87.0 |
| #40 | 73.3 |
| #50 | 68.0 |
| #60 | 62.7 |
| #100 | 54.0 |
| #200 | 42.4 |

THIELSCH ENGINEERING

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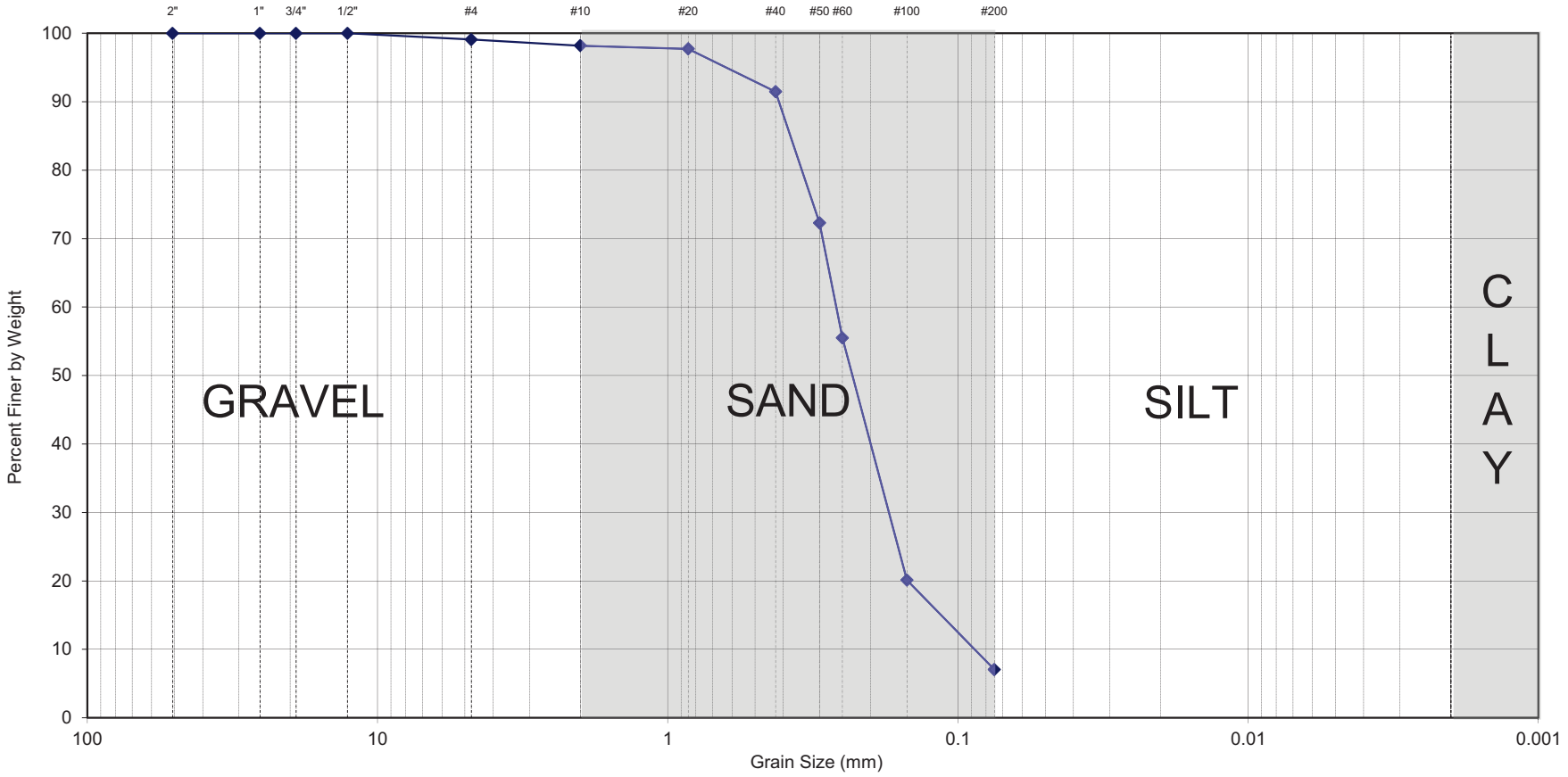


| Gravel | Sand | Fines |
|---|---|---|
| 1.8% | 91.2% | 7.0% |

S-3?

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 249 | VHB-22 | S-5 | 10-14' | Brown f-m SAND, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 99.1 |
| #10 | 98.2 |
| #20 | 97.7 |
| #40 | 91.5 |
| #50 | 72.3 |
| #60 | 55.5 |
| #100 | 20.1 |
| #200 | 7.0 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
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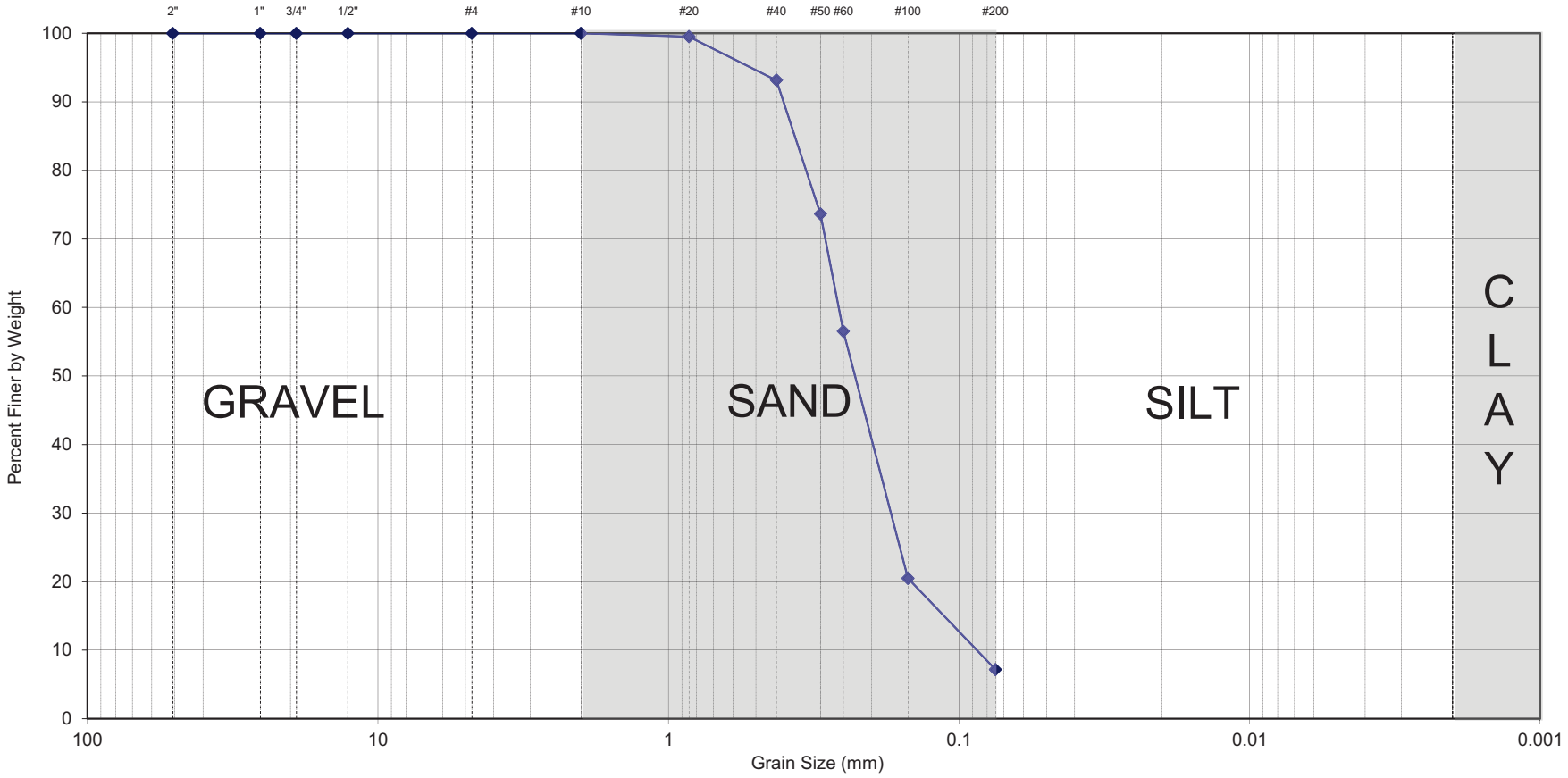


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 92.8% | 7.2% |

S-3?

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 249 - USDA | VHB-22 | S-5 | 10-14' | USDA = Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.5 |
| #40 | 93.2 |
| #50 | 73.6 |
| #60 | 56.5 |
| #100 | 20.5 |
| #200 | 7.2 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
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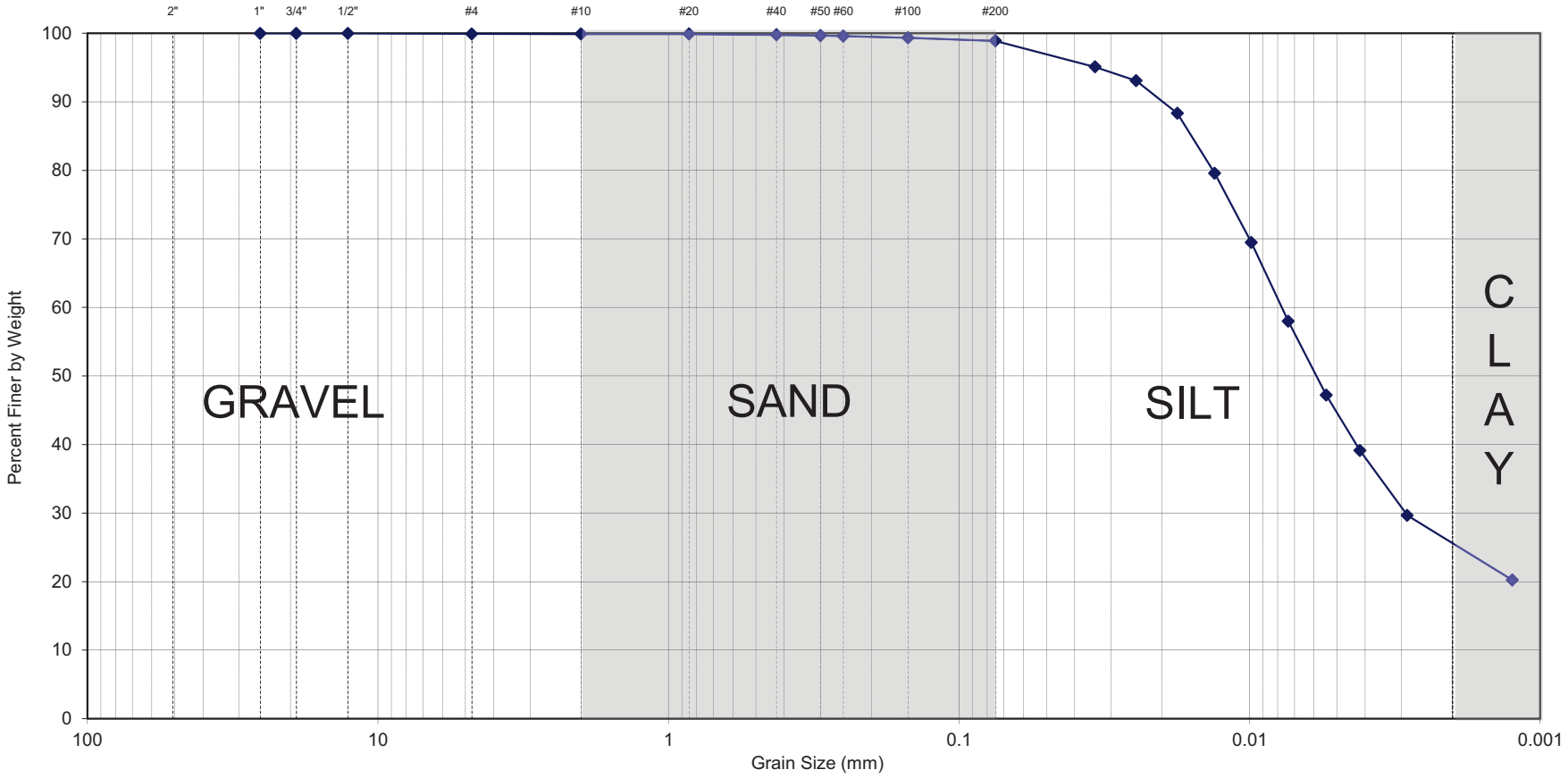
Tested by: PC Date: 10/18/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.1% | 1.0% | 98.9% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 250 | VHB-23 | S-1 | 0-13' | Brown CLAY & SILT, trace Sand | | | | |

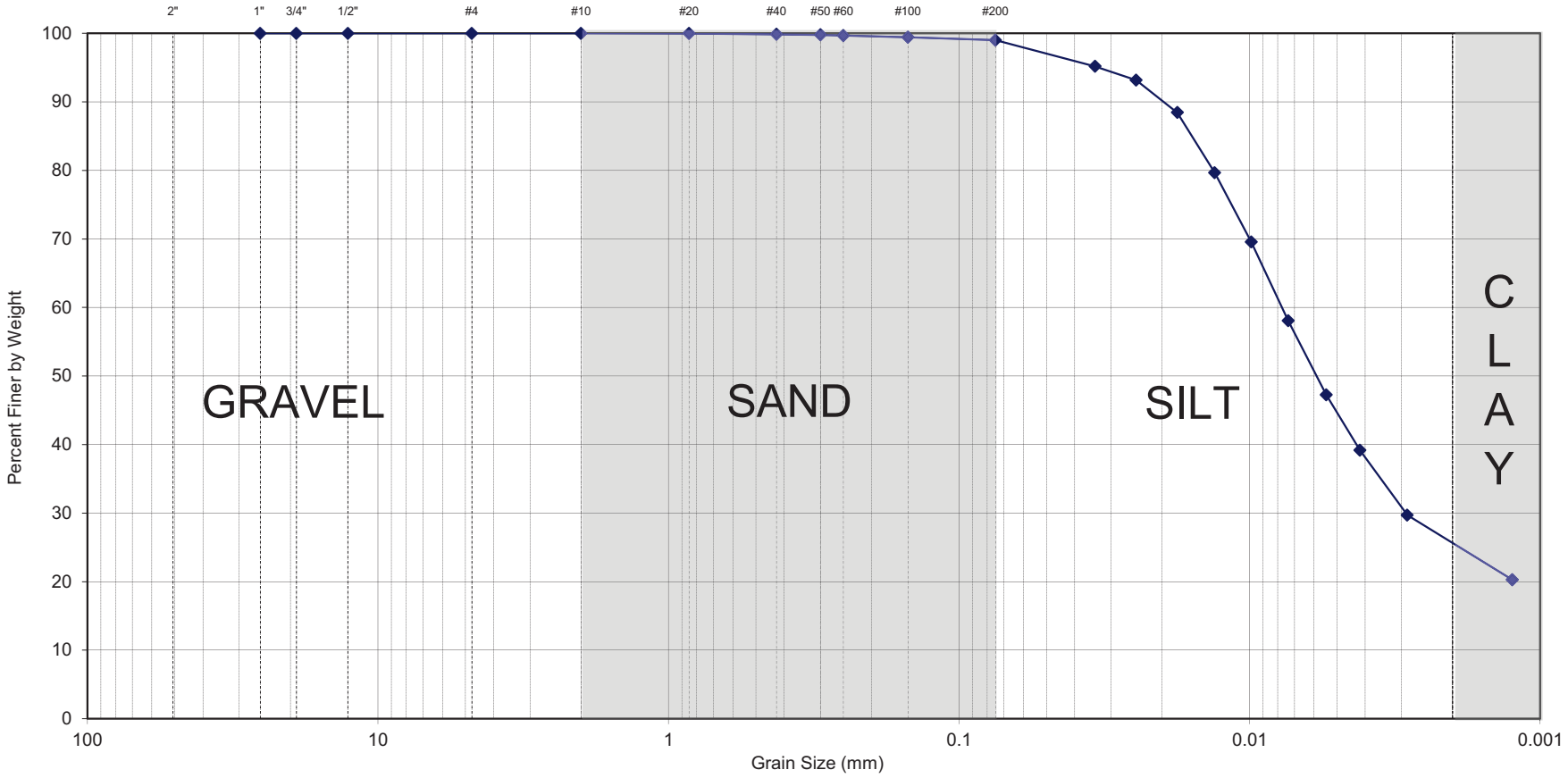
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 99.9 |
| #10 | 99.9 |
| #20 | 99.9 |
| #40 | 99.8 |
| #50 | 99.7 |
| #60 | 99.6 |
| #100 | 99.3 |
| #200 | 98.9 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 1.0% | 99.0% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 250 - USDA | VHB-23 | S-1 | 0-13' | USDA = Silt Loam | | | | |

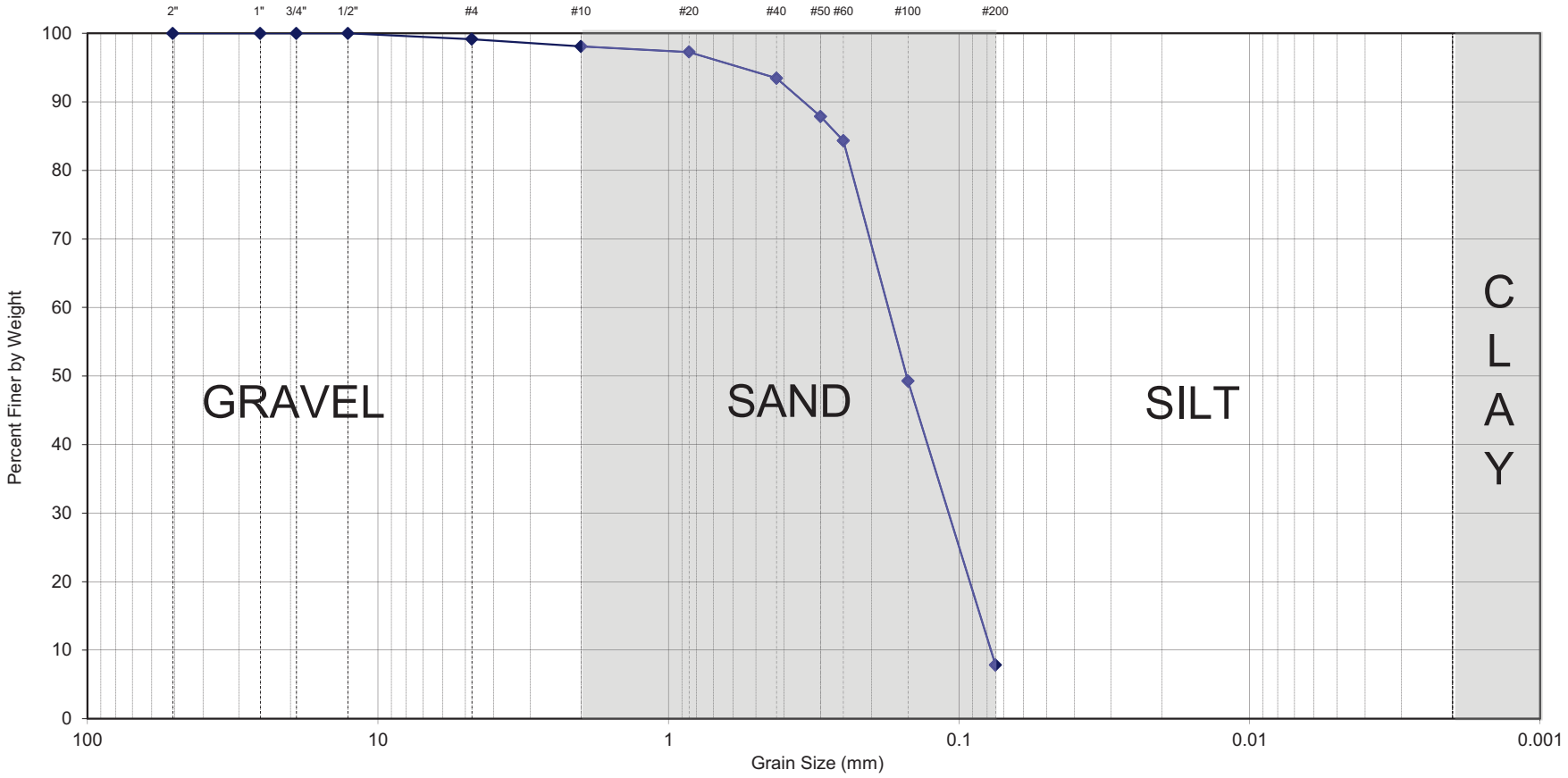
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 100.0 |
| #40 | 99.9 |
| #50 | 99.8 |
| #60 | 99.7 |
| #100 | 99.4 |
| #200 | 99.0 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 1.9% | 90.3% | 7.8% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 251 | VHB-24 | S-1 | 6-9.5' | Brown f-m SAND, trace Silt, trace Gravel | | | | |

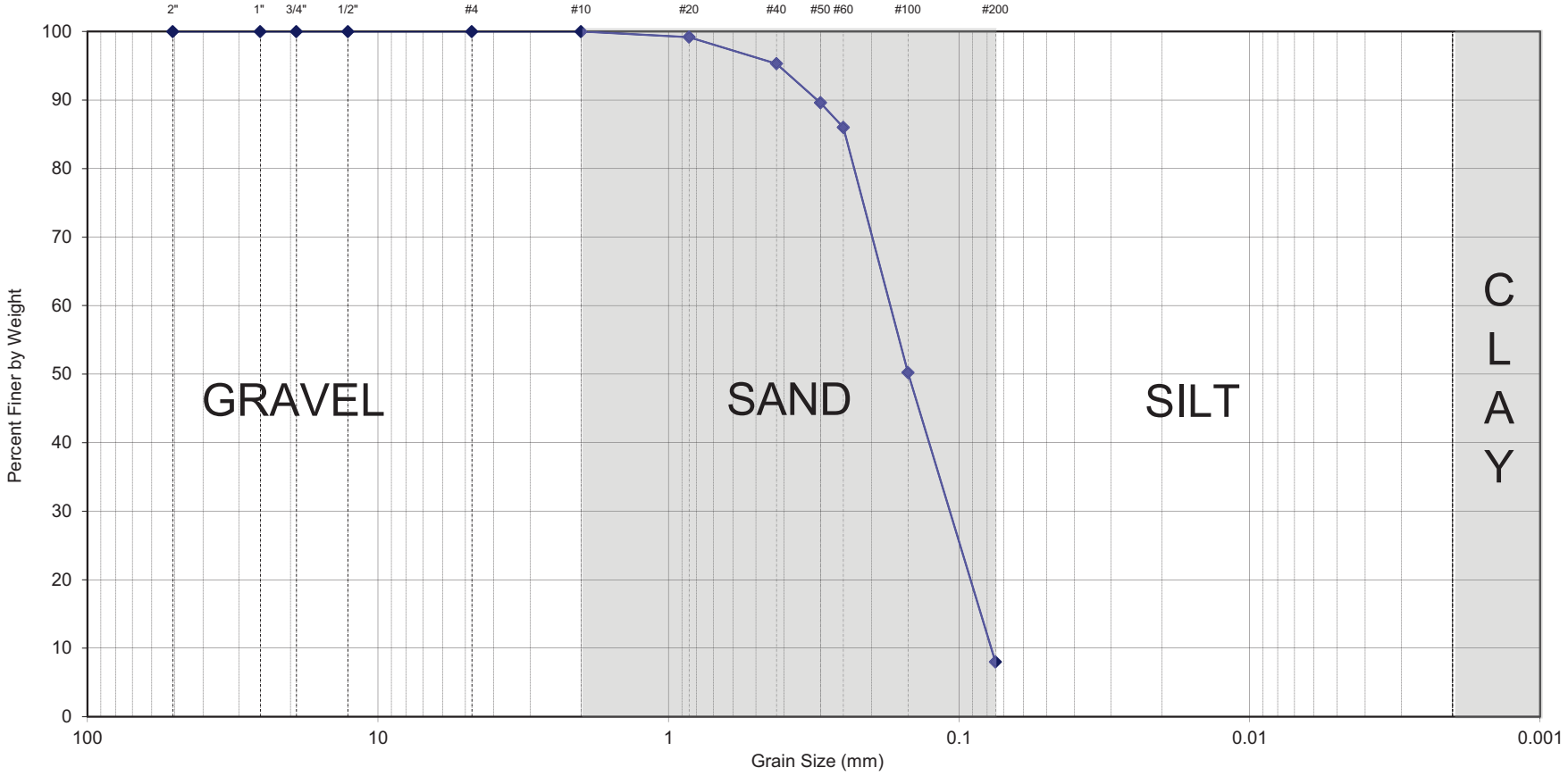
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 99.1 |
| #10 | 98.1 |
| #20 | 97.3 |
| #40 | 93.5 |
| #50 | 87.9 |
| #60 | 84.3 |
| #100 | 49.2 |
| #200 | 7.8 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC Date: 10/18/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 92.0% | 8.0% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 251 - USDA | VHB-24 | S-1 | 6-9.5' | USDA = Sand | | | | |

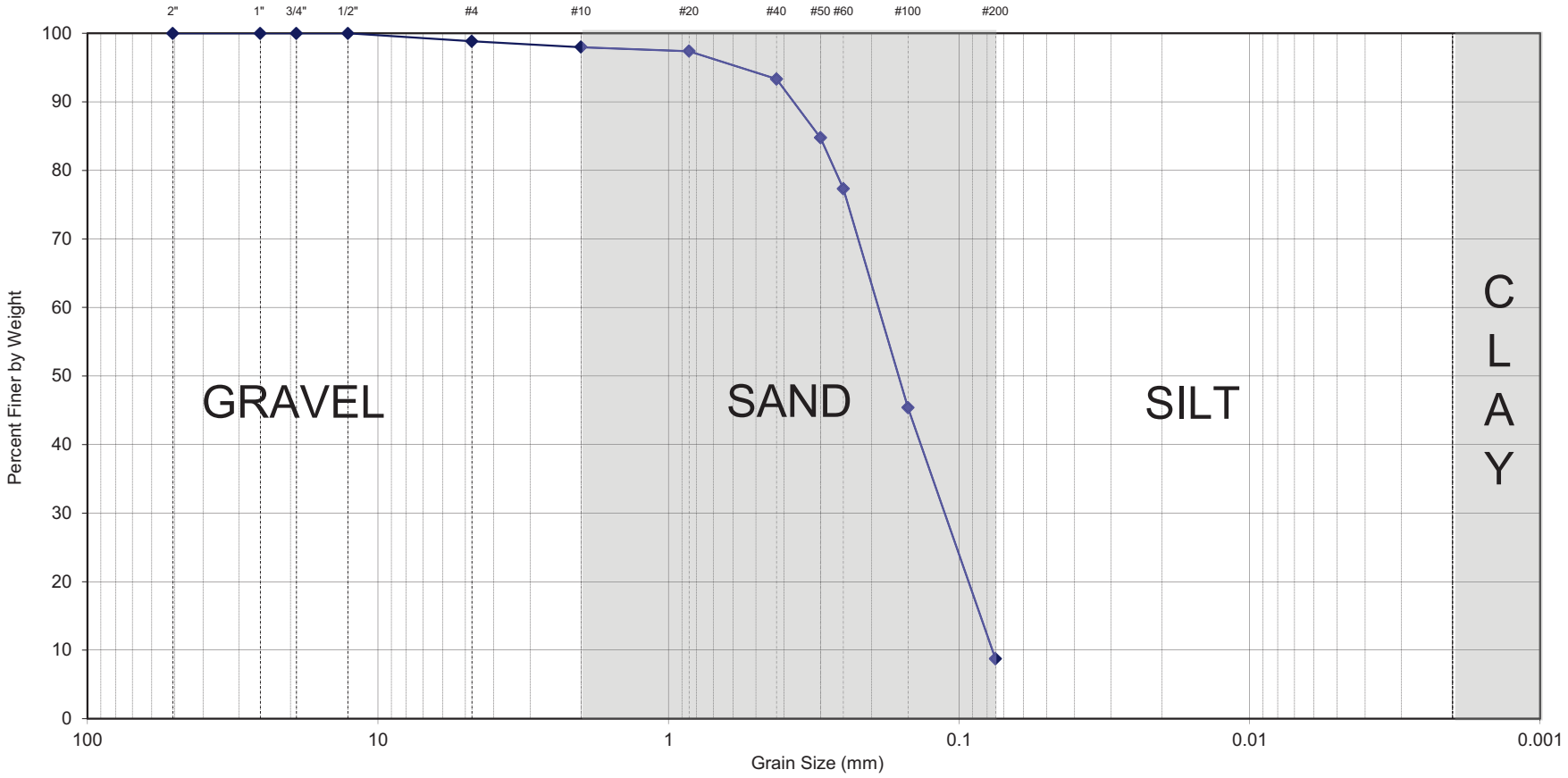
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.2 |
| #40 | 95.3 |
| #50 | 89.6 |
| #60 | 86.0 |
| #100 | 50.2 |
| #200 | 8.0 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC Date: 10/18/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 2.0% | 89.2% | 8.7% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 252 | VHB-25 | S-1 | 2.5-11' | Brown f-m SAND, trace Silt, trace Gravel | | | | |

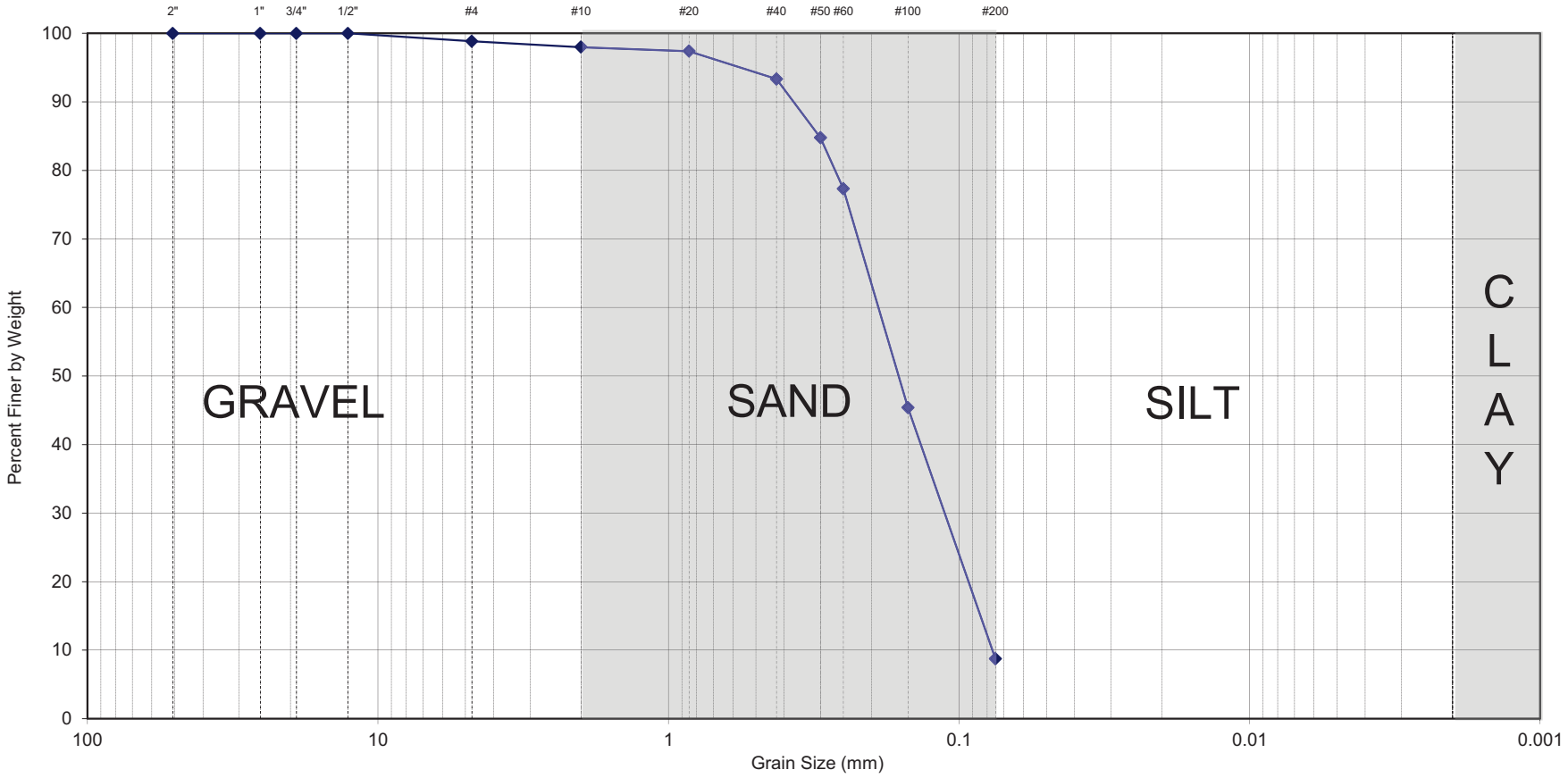
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 98.8 |
| #10 | 98.0 |
| #20 | 97.4 |
| #40 | 93.3 |
| #50 | 84.8 |
| #60 | 77.3 |
| #100 | 45.4 |
| #200 | 8.7 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC Date: 10/18/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 2.0% | 89.2% | 8.7% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 252 - USDA | VHB-25 | S-1 | 2.5-11' | USDA = Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 98.8 |
| #10 | 98.0 |
| #20 | 97.4 |
| #40 | 93.3 |
| #50 | 84.8 |
| #60 | 77.3 |
| #100 | 45.4 |
| #200 | 8.7 |

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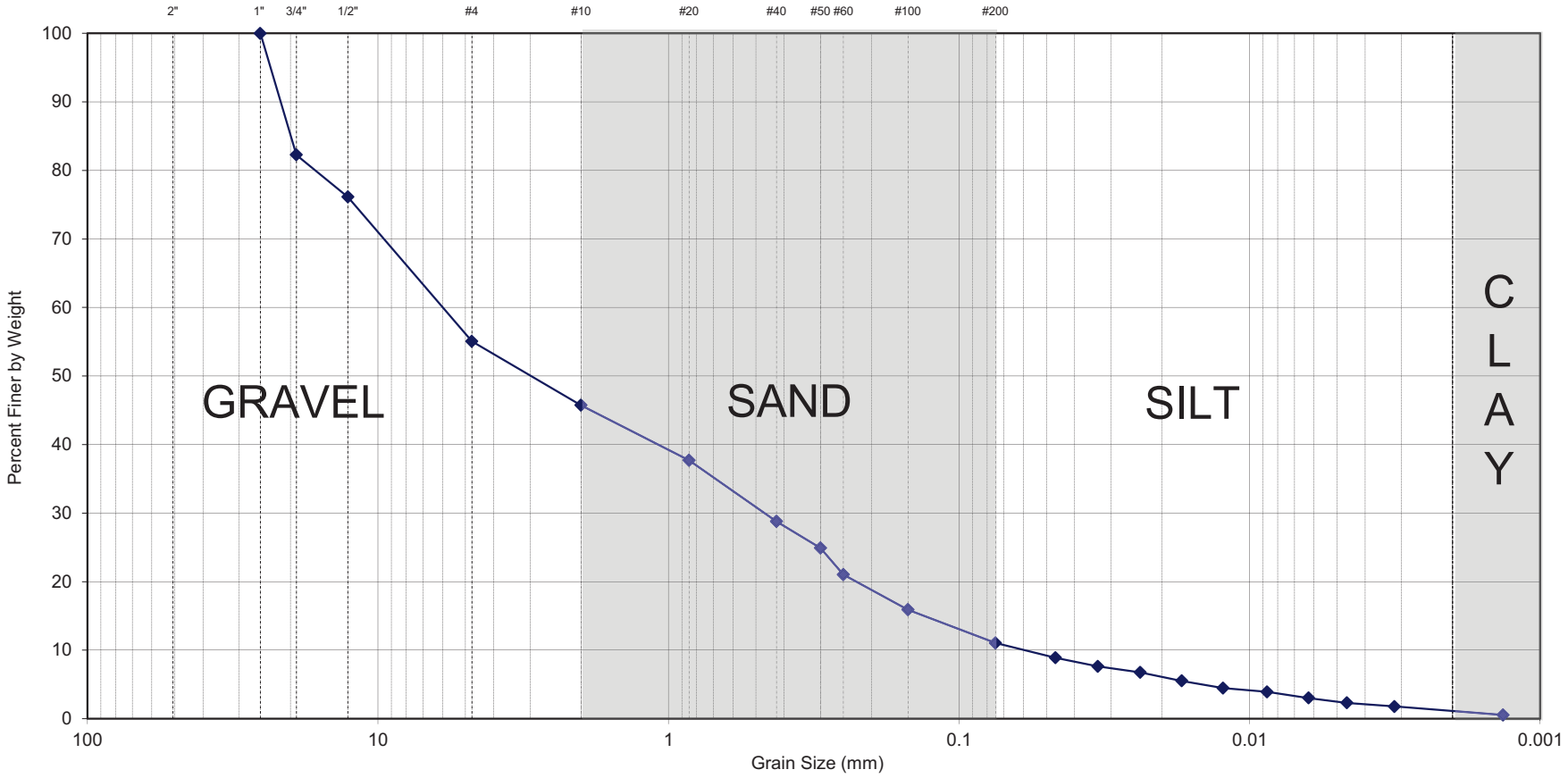
CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC Date: 10/18/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 54.3% | 34.7% | 11.0% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 253 | VHB-27 | S-1 | 5-7' | Gray f-c SAND and f-c GRAVEL, little Silt | | | | |

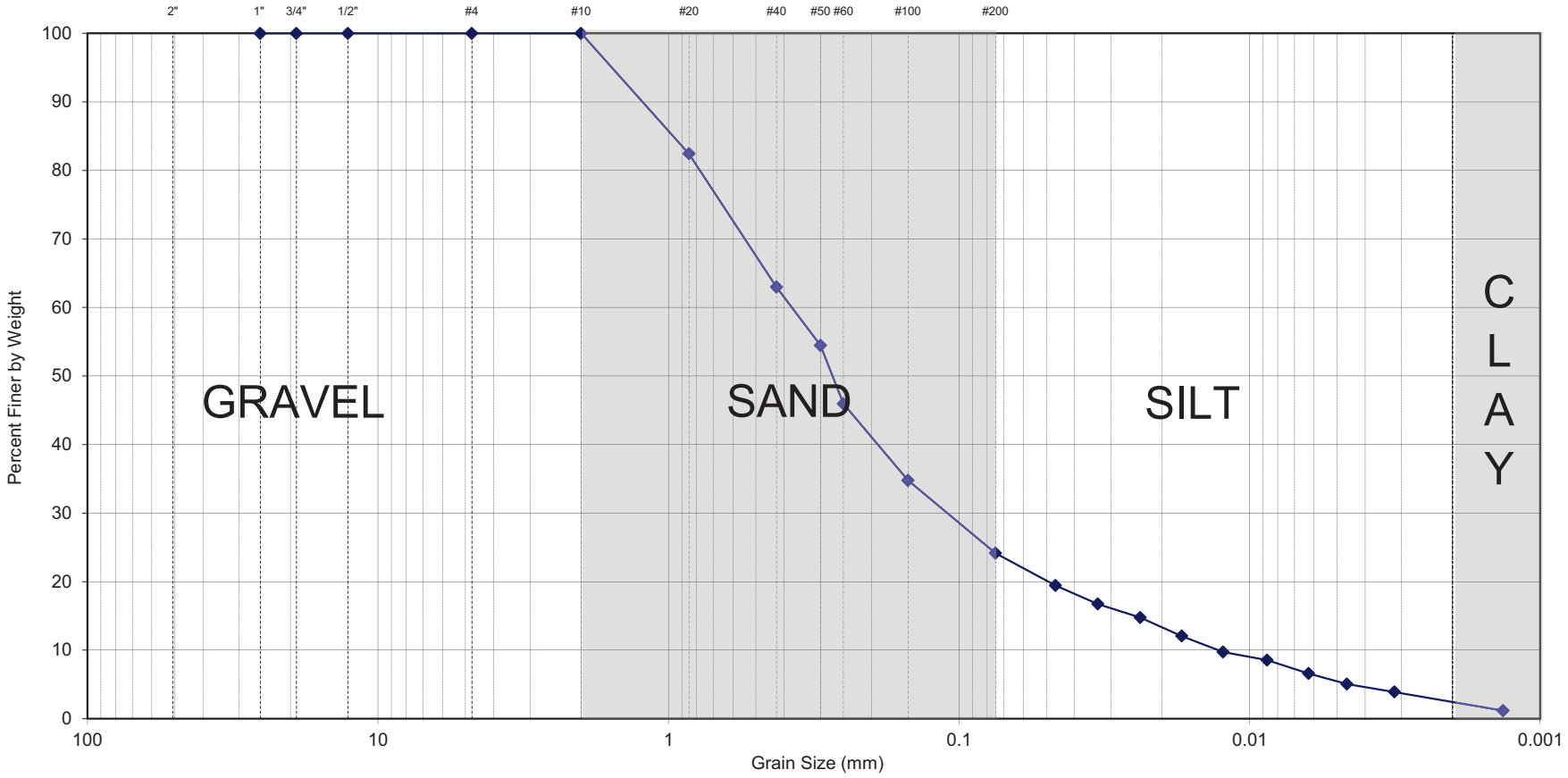
| Sieve Size | % Passing |
|---|---|
| ½" | 76.1 |
| #4 | 55.0 |
| #10 | 45.7 |
| #20 | 37.7 |
| #40 | 28.8 |
| #50 | 24.9 |
| #60 | 21.0 |
| #100 | 15.9 |
| #200 | 11.0 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 75.9% | 24.1% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 253-USDA | VHB-27 | S-1 | 5-7' | USDA = Sand | | | | |

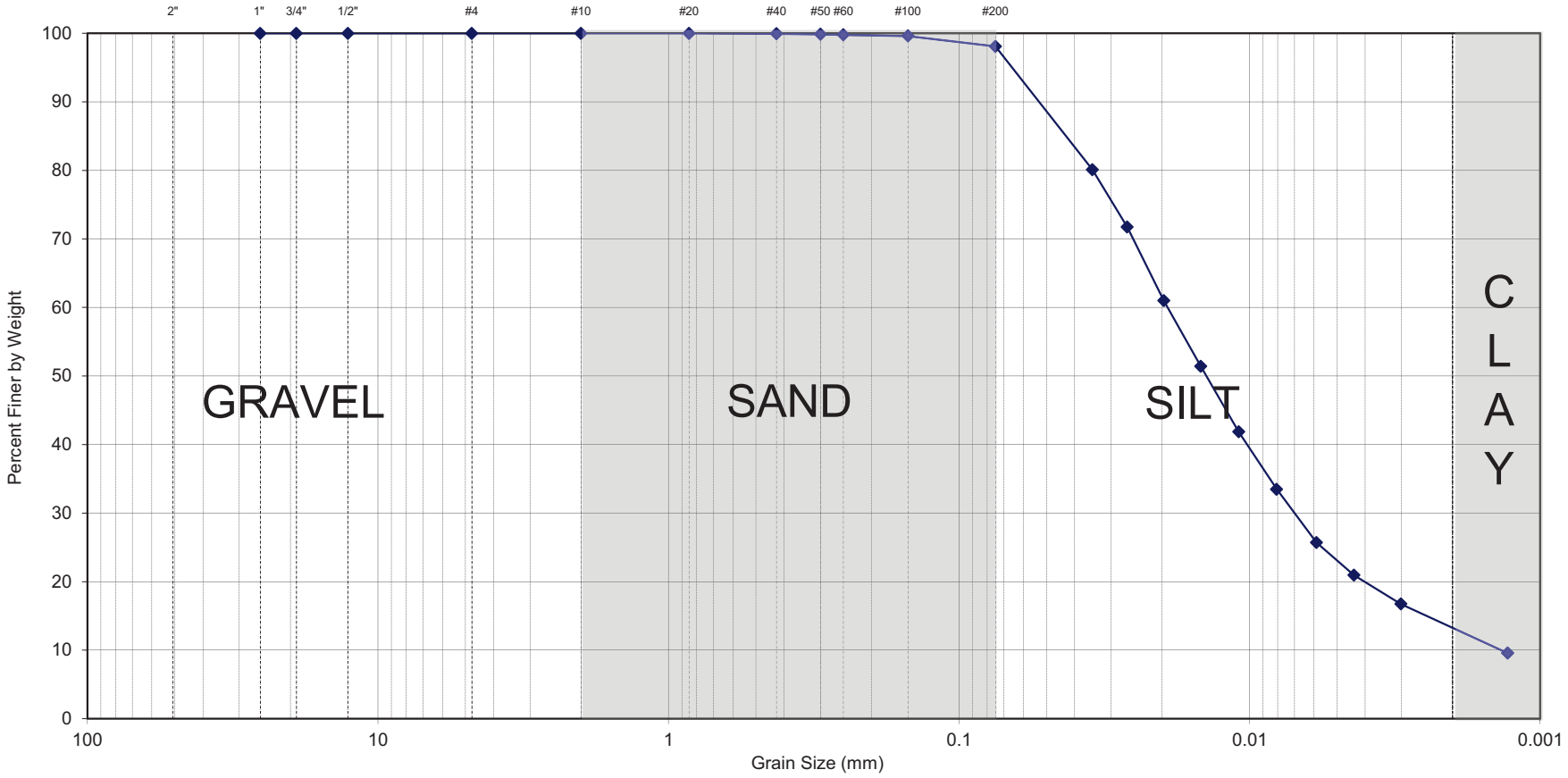
| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 82.4 |
| #40 | 63.0 |
| #50 | 54.5 |
| #60 | 46.0 |
| #100 | 34.8 |
| #200 | 24.1 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 1.9% | 98.1% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 254 | VHB-28 | S-1 | 5-7' | Brown Clayey SILT, trace Sand | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 100.0 |
| #40 | 99.9 |
| #50 | 99.9 |
| #60 | 99.8 |
| #100 | 99.6 |
| #200 | 98.1 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
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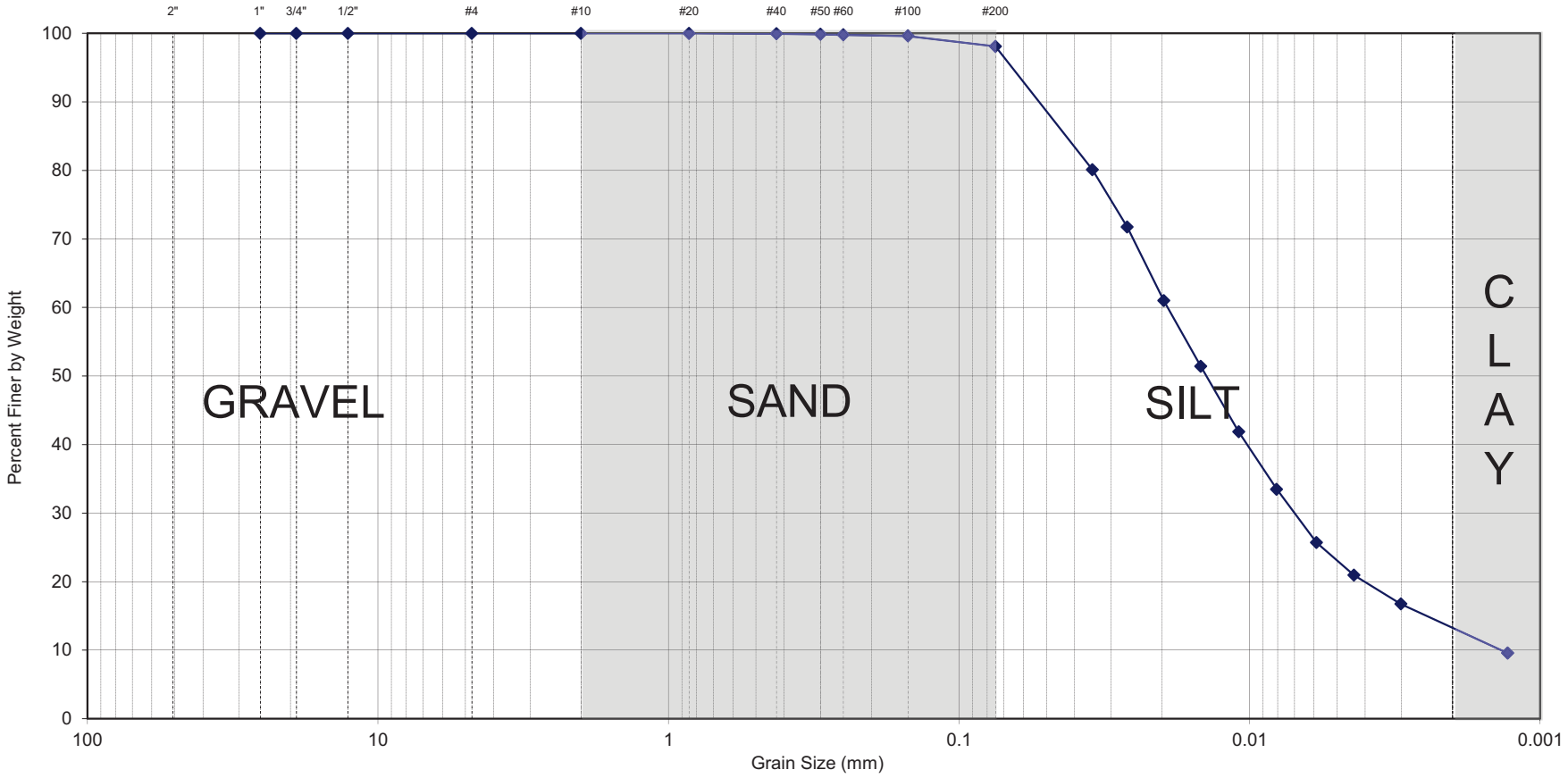


| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 1.9% | 98.1% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 254 - USDA | VHB-28 | S-1 | 5-7' | USDA = Silt Loam | | | | |

| Sieve Size | % Passing |
|---|---|
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 100.0 |
| #40 | 99.9 |
| #50 | 99.9 |
| #60 | 99.8 |
| #100 | 99.6 |
| #200 | 98.1 |

THIELSCH ENGINEERING

CTS-74-12-0003.07
Danforth Green - Hydrogeo
Framingham, Ma
GZA File # 74-12-0003.14

Tested by: PC/GG Date: 10/22/12
Reviewed by: MBP Date: 10/22/12

# GEOTECHNICAL ENGINEERING REPORT

**DANFORTH GREEN TOWNHOUSES**
**RIVERPATH DRIVE**
**FRAMINGHAM, MASSACHUSETTS**

**Prepared For:**

**Danforth Green, LLC**
**c/o Baystone Development**
**21 Center Street**
**Weston, Massachusetts 02493**

**Prepared By:**

McArdle Gannon Associates, Inc.
Engineers & Consultants

**Hanover, Massachusetts**

**MGA No. G0232.02**
**January 2013**

McArdle Gannon Associates, Inc.
Engineers & Consultants

January 16, 2013
MGA No. G0232.02

Danforth Green, LLC
c/o Todd S. MacDowell
Baystone Development
21 Center Street
Weston, MA 02493

RE: Geotechnical engineering report for the proposed Danforth Green Townhouses on Riverpath Drive in Framingham, Massachusetts.

Dear Todd:

The results of our geotechnical engineering studies at the referenced project site are summarized in the attached report. Our studies have been performed in accordance with our agreement with Danforth Green, LLC dated October 3, 2012.

The general subsurface profile encountered at the location of the borings consists of an intermittent surficial layer of fill (up to 34 feet deep) over intermittent buried topsoil/subsoil underlain by natural granular soils (sands / sands and silts / sands and gravels). The presence of deep uncontrolled fill within the proposed building areas and water sensitive silty natural soils in portions of the site are the primary subsurface condition impacting the proposed site development.

Building subgrades at the site prepared accordance with our recommendations would be considered suitable for support of shallow spread footing foundations and slabs on grade. We estimate that footings designed using the recommended allowable soil bearing pressure of up to one and one-half tons per square foot (1.5 tsf) would undergo settlements of less than 1 inch total and less than ½ inch differential that are typically tolerable for the types of structures proposed.

Our recommendations for parameters to use in the design and earthwork construction of shallow spread footing foundations, foundation retaining walls, slabs and pavements are discussed in this report. Our findings, conclusions and recommendations, subsurface exploration logs, laboratory test results, along with locus and exploration location plans, are included in the report.

We look forward to assisting you further as the design progresses and during the earthwork construction phase of the project. If you have any questions or require additional information, please do not hesitate to call.

Regards,

MCARDLE GANNON ASSOCIATES, INC.

Sherry L. Holmes, P.E.
Geotechnical Engineer

John J. Gannon
Principal

SLH/JJG/slh

cc. Craig Lizotte, Vanasse Hangen Brustlin, Inc.

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**FIGURES**

Figure 1 – Locus Plan
Figure 2 – Exploration Location Plan

**APPENDICES**

Appendix A – Statement of Limitations
Appendix B – MGA Soil Test Boring Logs – October 2012
Appendix C – MGA Soil Test Boring Logs – June 2010
Appendix D – MGA Test Pit Logs
Appendix E – Test Pit Pictures
Appendix F – UTS Test Boring and Test Pit Logs
Appendix G – Laboratory Test Results

# 1.00 INTRODUCTION

This report summarizes the results of our geotechnical engineering studies conducted at the site of the proposed townhouse portion of the Danforth Green residential development on Riverpath Drive in Framingham, Massachusetts. A site locus is attached as Figure No. 1 of this report. Our objective has been to assess the subsurface conditions at the site and provide geotechnical engineering recommendations for use in the design of foundations, slabs, and pavements and related earthwork construction considerations.

This report has been prepared in accordance with our proposal with Danforth Green, LLC dated October 3, 2012. The information contained in this report is subject to the Statement of Limitations attached as Appendix A.

## 1.10 Site and Project Description

Our understanding of the site and proposed project is based on our discussions with you and VHB, our recent visits to the site and our review of the following documents:

- A report entitled "Preliminary Geotechnical Investigation for Gloucester Village" dated June 2005 by UTS of Massachusetts, Inc. (UTS),
- Our "Hydrogeologic Report – Proposed Infiltration Basins" dated July 2010,
- A sketch entitled "Danforth Green" dated May 4, 2012 by Vanasse Hangen Brustlin, Inc. (VHB),
- A plan entitled "Schematic Design Layout and Materials Plan" dated August 8, 2012 by VHB, and
- An undated partial plan showing preliminary proposed grading by VHB.

The subject property consists of about 127 acres located in the northeasterly corner of Framingham. A residential development consisting of 360 units including 42 townhouse and 19 apartment buildings and a Clubhouse is planned at the site. Paved roadways and landscaped areas are also planned as part of the development. Reportedly, the easterly portion of the development will be an Avalon Bay community.

Existing grades vary significantly across the site, from about Elevation 153 to 203 feet, with numerous stockpiles across the site due to the former gravel pit operations. Based on referenced preliminary grading plan by VHB, proposed site grades vary from about Elevation 160 to 194 feet. Finished floor elevations for the proposed buildings were not available at the time of this report. We anticipate significant earthwork will be required for the development, with cuts and fills up to about 15 to 18 feet.

## 2.00 SUBSURFACE EXPLORATIONS

MGA observed seventeen (17) test borings and twelve (12) test pits performed at the site to assess the subsurface conditions for the proposed development for this geotechnical study. In addition, MGA observed ten (10) test borings and five (5) test pits for hydrogeological studies performed in 2010 and 2012. An MGA geotechnical engineer located, observed and logged the explorations and described the conditions encountered in general accordance with Burmister descriptions. MGA located the recent exploration locations by taping and/or pacing from existing features and survey stakes of proposed building corners provided by VHB at the site. VHB determined the 2010 test boring locations and elevations by survey.

The exploration locations shown on the attached Figure 2: Exploration Location Plan are approximate. We estimated ground surface elevations at the recent exploration locations based on ground surface contours and spot elevations shown on the referenced preliminary proposed grading plan by VHB and from ground surface elevations at survey stakes provided by VHB.

In addition, UTS of Massachusetts, Inc. observed four (4) test borings and thirty-five (35) test pits in the area of the proposed development for a previous study.

The explorations are summarized under the following subheadings:

### 2.10 MGA Soil Test Borings – October 2012

New Hampshire Boring, Inc. (NHB) of Brockton, Massachusetts performed seventeen (17) test borings (MGA-101 through MGA-117) at the site between October 8 and 11, 2012 for this study. In addition, NHB performed two (2) test borings (VHB-1 and VHB-4) in the area of the development on October 1 and 5, 2012 for our hydrogeological study. NHB advanced the borings using truck and all-terrain vehicle (ATV) mounted drill rigs.

NHB generally performed the borings by advancing 4.25-inch inside diameter hollow stem augers, with the exception of VHB-1 which was performed using 3 inch diameter flush jointed casing. NHB advanced the borings through existing fill, and terminated each in natural granular soils (sand, silty sand and gravel, or sand & silt) at depths between about 17 and 42± feet below ground surface (bgs).

NHB generally conducted standard penetration tests (SPT) at 5 foot intervals during advancement of the borings. NHB performed the SPT by driving a standard two-inch outside diameter split spoon sampler a distance of up to twenty-four inches (or to refusal) with a 140 pound safety hammer falling a distance of thirty inches at each sampling depth. The number of blows required to drive the sampler in six-inch increments is recorded on the boring logs attached in Appendix B. The sum of the blows required to drive the sampler from the 6 to 12 and 12 to 18 inch increments, defined as the Standard Penetration Resistance of the soil, is used as a measure of soil density and strength based upon empirically derived correlations.

MGA visually assessed and described the soil samples retrieved in the 2 inch outside diameter (1-3/8 inch inside diameter) split spoon sampler following each standard penetration test in the

field. The descriptions are shown on the boring logs attached in Appendix B. Note that these descriptions do not account for soil fractions larger than 1-3/8 inches in diameter that may be present within the strata sampled.

### 2.20 MGA Soil Test Borings – June 2010

Subsurface Drilling & Remediation (SDR) of Cranston, Rhode Island performed eight (8) soil test borings (MGA-1 through MGA-4, MGA-6, MGA-7, MGA-10, and MGA-11) at the site between June 9 and 15, 2010. SDR utilized a truck mounted drill rig equipped with 4 inch diameter flush jointed casing or 4.5 inch hollow stem augers to advance the borings.

SDR advanced the borings through existing fill, natural granular soils (sand and silt / sand / sand and gravel), and terminated the borings in natural granular soils at depths between about 21 to 41± feet below ground surface (bgs).

SDR generally conducted standard penetration tests (SPTs) at approximate 5 foot intervals below the depth of the proposed storm-water basins at that time during advancement of the borings. SDR performed the SPTs by driving a standard two-inch outside diameter split spoon sampler a distance of up to twenty-four inches (or to refusal) with a 140 pound automatic hammer falling a distance of thirty inches at each sampling depth. The number of blows required to drive the sampler in six-inch increments is recorded on the boring logs attached in Appendix B. The sum of the blows required to drive the sampler from the 6 to 12 and 12 to 18 inch increments, defined as the Standard Penetration Resistance of the soil, is used as a measure of soil density and strength based upon empirically derived correlations.

SDR installed two inch diameter PVC observation wells in borings MGA-6 and MGA-10 upon completion for use in assessing stabilized groundwater levels.

MGA visually assessed and described the soil samples retrieved in the 2 inch outside diameter (1-3/8 inch inside diameter) split spoon sampler following each standard penetration test in the field. The descriptions are shown on the boring logs attached in Appendix C. Note that these descriptions do not account for soil fractions larger than 1-3/8 inches in diameter that may be present within the strata sampled.

### 2.30 MGA Test Pits

Silversmith Excavating Co., Inc. (Silversmith) of Wilmington, Massachusetts excavated twelve (12) test pits (TP-1 through TP-12) at the site on October 3 through 5, 2012. Silversmith excavated the pits with a Caterpillar 315D tracked excavator. Silversmith generally excavated the test pits through existing fill and into natural granular soils (sand, sand and gravel, or silt and sand) to depths between about 7 and 16 feet bgs. Silversmith terminated test pits TP-7 through TP-10 at about 10 to 12 feet bgs at bucket refusal within the existing fill.

The subsurface conditions encountered are summarized on the test pit logs attached as Appendix D. Pictures that we took during excavation of the pits are attached as Appendix E.

### 2.40 UTS Test Borings and Test Pits

UTS of Massachusetts, Inc. (UTS) observed four (4) test borings (UTB-7, -14, -15, and -16) and thirty-five (35) test pits (UTP-1 through -14, -22, -23, -44 through -59, -73, -74, and -89 through -91) in the area of the proposed development for a previous study. The borings were performed by Soil Exploration Corp. (SEC) on June 10, 2005. SEC generally performed the borings by advancing 4.25-inch inside diameter hollow stem augers to depths between about 21 and 37± feet below ground surface (bgs).

National Development (ND) excavated the test pits at the site with a Caterpillar 325 tracked excavator in May 2005. ND generally excavated the test pits through existing fill and into natural granular soils (sand, sand and gravel, or silt and sand) to depths between about 5 and 21 feet bgs. ND terminated test pits UTP-10, UTP-13, and UTP-14 at about 21 feet bgs at the excavator's maximum reach within the existing fill.

Test boring and test pit logs and an exploration location plan prepared by UTS are attached as Appendix F.

## 3.00 LABORATORY TESTS

A geotechnical laboratory performed ten (10) gradation tests and moisture content tests on soil samples that we selected during the borings and test pits for use in our studies. The lab performed the tests on samples of the existing fill, natural sand, silty sand, and silty sand and gravel soils obtained from test pits TP-1, TP-3, TP-5, TP-7 and TP-10 and borings MGA-101, MGA-105, to verify our field descriptions and for us to gain a preliminary understanding of the engineering behavior of the soils tested. In addition, UTS performed two (2) gradation tests on two soil samples from test pit UTP-54. The test results are attached as Appendix G.

## 4.00 SUBSURFACE CONDITIONS

Subsurface conditions in the areas of the proposed building areas were assessed based on the results of the test borings, test pits, and laboratory test results. The general subsurface conditions encountered at the recent exploration locations consist of an intermittent surficial layer of fill (up to 34 feet deep) over intermittent buried topsoil/subsoil underlain by natural granular soils (sands / sands and silts / sands and gravels). Subsurface conditions were typically variable between each exploration location. Below is a general description of each stratum encountered in the recent explorations. More information can be found on the boring and test pit logs attached as Appendices B, C, D, and F.

Existing fill was encountered at the majority of exploration locations with the exception of borings MGA-101 through MGA-107 and MGA-113 through MGA-117 and test pits TP-3 and UTP-12. The density, consistency, and thickness of the fills encountered at the exploration locations are variable. Where encountered, the fill ranged in thickness from about 2 to 34 feet. The fill layer was not fully penetrated in test pits TP-7 through TP-12, UTP-10, UTP-13, and

UTP-14 where the fill depth exceeded the reach of the excavator (about 10 to 21 feet). The fill varied from a granular fill to dense grade fill to silty fill (possible wash pond sediment) to fill mixed with construction debris. The granular and dense grade fill generally consisted of very loose to very dense, gray-brown/brown/gray/tan, fine to coarse sand with about 20 to 60 percent fine to coarse gravel and about 5 to 30 percent silt. About 5 to 20 percent debris (concrete fragments, boulders, brick, wood, plastic, wire, steel, rubber, cloth, asphalt, and roots) was encountered within the fill layer at several exploration locations.

Topsoil and subsoil was encountered at ground surface at test pits TP-3, UTP-12, UTP-49, UTP-52, UTP-53, UTP-57, UTP-58, UTP-59, UTP-90, and UTP-91. The combined thickness was about 1 to 5 feet thick. An approximately 0.5 to 5 feet thick layer of buried topsoil/subsoil was encountered below the fill in test pits UTP-5, UTP-6, UTP-22, UTP-47, UTP-51, UTP-53, UTP-56, and UTP-90.

The natural sand and gravel/silty sand and gravel generally consists of a dense to very dense, brown, fine to coarse sand with about 20 to 50+ percent fine to coarse gravel and about 5 to 20 percent silt.

The natural sand/gravelly sand generally consists of loose to very dense, tan/brown/gray, fine / fine to medium sand with about 5 to 20 percent silt and 0 to 20 percent fine gravel.

The sand and silt/silty sand/silt generally consists of loose to very dense, brown/tan/gray, fine sand with 25 to 90 percent silt.

Groundwater levels for our study were measured in the completed test borings and test pits at the times and under the conditions noted on the logs. Groundwater was not encountered at the majority of the boring locations during drilling, with the exception of borings MGA-103, MGA-104, MGA-106, MGA-1, MGA-2, MGA-3, MGA-4, MGA-6, UTB-7, and UTB-15 where groundwater was encountered at about 10 to 33.5 feet below the existing ground surface at that time. Based on ground surface elevations provided by VHB, these depths for the MGA borings correspond to about Elevation 146.5 to 159 feet. Groundwater was generally not encountered at the test pit locations during excavation, however, UTS reports that water was encountered at a depth of about 8.5 to 12 feet in test pits UTP-7, UTP-8, UTP-53, UTP-54, UTP-55, UTP-89, and UTP-90.

It should be expected that groundwater levels will fluctuate due to variations in temperature, rainfall and other factors. Therefore, groundwater levels at any given time may be different than those reported herein.

## 5.00 CONCLUSIONS AND RECOMMENDATIONS

Our conclusions and recommendations for the project are based on the results of the borings and laboratory tests discussed above and are addressed under the following subheadings:

## 5.10 Earthwork

Existing foundations, utilities, asphalt, concrete slabs, topsoil, subsoil, vegetation and fill should be removed within the proposed building stress zones or to a minimum of 10 feet outside of the proposed buildings, whichever is greater. These materials should be removed down to firm natural granular soils. The stress zone is defined as the building footprint plus the volume defined by a line drawn from the bottom outside edge of the exterior foundation on a 45 degree angle down to firm, natural granular soils. Excavations between about 0 to 34 feet in depth are anticipated to remove these materials. Local excavations may also be required to remove these materials at existing utilities or structures.

Natural soils that are disturbed on the bottom of these excavations that are dry, should be re-compacted prior to the placement of the initial lift of Granular Fill. The placement of an initial lift of "free-draining" Granular Fill or Crushed Stone (see Table I below and Table II on page 7 for recommended gradations) may be required over silt and sand subgrades or in wet conditions prior to compaction. Compacted lifts of Granular Fill placed within the proposed building areas should be placed in 12 inch maximum thick lifts up to proposed slab subgrade elevations. Each lift should be compacted to at least 95 percent of the materials maximum dry density as determined by ASTM D1557 Method C.

Granular Fill shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic matter. Granular Fill shall conform to the following gradation requirements shown in Table I:

| **TABLE I.** | |
|---|---|
| **GRANULAR FILL** | |
| *Sieve Size* | *Percent Passing by Weight* |
| * | 100 |
| No. 10 | 30 – 95 |
| No. 40 | 10 – 70 |
| No. 200 | 0 – 15** |
| *Two thirds (2/3) of the loose lift thickness.<br>**0 – 8 for free-draining fill behind retaining walls. | |

Granular Fill will be required to achieve the proposed finish floor elevation for the proposed buildings after removal of the unsuitable soils discussed above. Due to the high silt content of some of the soils at the site, these deposits can be become soft and unstable when wet and are considered highly frost susceptible. Therefore, to the extent possible, we recommend that the silty soils generated during excavations be utilized in proposed landscaped of the site and not be reused in the proposed building or pavement areas. Refer to the "Reuse of On-site Soils" section below for additional details.

## 5.20 Foundations and Allowable Bearing Capacities

Spread footing foundations are considered suitable to support the proposed buildings. We anticipate that the foundation subgrade will primarily consist of natural granular soils or

compacted Granular Fill. We recommend that foundation subgrade soils loosened during excavation be re-compacted provided the soil is dry enough to be adequately re-compacted. An alternative would be to remove loosened soil by hand or with an excavator equipped with a smooth edged bucket.

We recommend that the foundation subgrades in natural silt and sand soils be over-excavated a minimum of six inches and be replaced with a ¾ inch crushed stone (working mat) to bottom of footing elevation. This working mat is recommended to protect the moisture sensitive silty soils and facilitate concrete construction in inclement weather conditions. Three-quarter inch Crushed Stone shall be composed of durable crushed rock consisting of angular fragments, free from a detrimental quantity of thin, flat, elongated pieces or shall be durable crushed gravel stone obtained by artificial crushing of gravel boulders or fieldstone. The Crushed Stone shall be free from cay, loam or deleterious material and should meet the gradation requirements shown below in Table II.

| **TABLE II.** | |
|---|---|
| **¾ INCH CRUSHED STONE FILL** | |
| *Sieve Size* | *Percent Passing by Weight* |
| 1 inch | 100 |
| ¾ inch | 90-100 |
| ½ inch | 10-50 |
| 3/8 inch | 0 – 20 |
| No. 4 | 0 – 5 |

Provided that the foundation areas are prepared as described above, the foundations may be designed utilizing a maximum allowable soil bearing capacity of up to one and one-half tons per square foot (1.5 TSF).

To protect the integrity of the foundation bearing conditions, no utility lines should be allowed to pass beneath or within the stress zone of the footings. Rather, efforts should be made to move utilities or lower footing elevations to satisfy this recommendation.

Regardless of the recommended allowable bearing capacity, continuous wall footings should be at least 24 inches wide and column footings should be no less than 36 inches wide in the least lateral dimension. Exterior footings and interior footings in unheated buildings should be founded at least four feet (4’) below the finish exterior and slab grade for frost protection. Foundations should not be installed on frozen soil and should be backfilled as soon as possible during freezing temperatures. Footing subgrades should be protected by temporary heated enclosures if left open prior to backfilling during freezing temperatures.

Foundations and sub-slab utilities should be backfilled with Granular Fill placed in compacted lifts for slab support. Each lift should be compacted to at least 95 percent of the materials maximum dry density as determined by ASTM D1557 Method C.

Following the above criteria, total building foundation settlements are not expected to exceed 1 inch with differential settlements expected to be about ½ inch or less. These estimated settlements are typical and generally acceptable for the structure proposed.

## 5.30 Ground Floor Slab Support

Provided that the proposed building areas are prepared as described in the preceding sections, slab-on-grade construction is recommended. The slab should bear directly on a 12-inch minimum thick Sand and Gravel Fill base course layer compacted to at least 95 percent of the material's maximum dry density (ASTM D-1557).

The base course material should consist of hard, durable sand and gravel meeting the gradation requirements shown below in Table III.

| **TABLE III.** | |
|---|---|
| **SAND AND GRAVEL FILL** | |
| *Sieve Size* | *Percent Passing by Weight* |
| 4 inches | 100 |
| ½ inch | 50 – 85 |
| No. 4 | 40 – 75 |
| No. 10 | 30 – 60 |
| No. 40 | 10 – 35 |
| No. 100 | 5 – 20 |
| No. 200 | 2 – 8 |

Alternatively, the slab could be constructed on a 6-inch thick layer of compacted ¾ inch crushed stone meeting the gradation in Table II.

Slabs constructed on compacted base course layers over subgrades prepared as recommended herein can be designed using a Modulus of Sugrade Reaction (k) up to 200 pounds per cubic inch (k = 200 pci).

## 5.40 Site Seismic Coefficient

Provided that foundations are designed and constructed as recommended herein, the proposed building site should be considered Site Class D in accordance with Section 1613 of the Eighth Edition of The Massachusetts State Building Code (MSBC). In accordance with table 1604.11 in the MSBC, maximum considered earthquake response accelerations factors of $S_S$=0.26 and $S_1$=0.067 should be utilized for the town of Framingham in the structural design.

## 5.50 Concrete Retaining Walls and Buried Foundation Walls

Retaining walls and foundation walls with unbalanced loading should be designed to resist lateral earth pressures. For unrestrained retaining walls (active condition) that are allowed to rotate after construction we recommend an equivalent fluid pressure of 45 pcf times the height of the walls be considered in the structural design. For foundation walls (rigid walls, at-rest pressures) we recommend an equivalent fluid pressure of 65 pcf times the height of the walls be considered in the structural design.

These values are for horizontal backfilled and assume that the walls (where backfill behind the walls is exposed to rainfall) are backfilled with "clean" free draining Granular Fill (less than 8 percent passing the No.200 sieve) or Sand and Gravel within at least 3 feet of the walls and are drained so that no water pressure develops behind the wall.

Where the calculated earth pressure behind walls is less than 250 pounds per square foot (psf), it should be increased to 250 psf to account for stresses created by compaction within 5 feet of the wall. Walls should also be designed for appropriate sloping backfill, surcharge (e.g., floor loads), and seismic loads per Section 1610.2 of the Massachusetts State Building Code.

For retaining walls and foundation walls where backfill behind the wall is exposed to rainfall, a 4-inch diameter perforated PVC pipe surrounded by Crushed Stone and wrapped in a non-woven geotextile should be provided at the heel of each retaining wall (above the bottom of footing) to provide discharge of penetrating surface and rain water. As previously indicated, backfill placed within a 3-foot lateral distance behind these walls should be free draining and have less than 8 percent fines passing the No. 200 sieve.

The following coefficients of friction to resist sliding between mass concrete and various bearing materials are recommended:

| Bearing Material | Recommended Sliding Coefficient |
|---|---|
| Crushed Stone | 0.6 |
| Controlled, Compacted Sand and Gravel | 0.5 |
| Controlled, Compacted Granular Fill | 0.4 |
| Natural Undisturbed Silt and Sand | 0.3 |
| Natural Undisturbed Sand | 0.4 |
| Natural Undisturbed Sand and Gravel/Silty Sand And Gravel | 0.5 |

The minimum factors of safety for sliding and overturning under static loads should be 1.5 and 2 respectively. Passive pressure at the toe of the walls should not be included as a resisting force when analyzing for overturning and sliding.

## 5.60 Pavement Area Earthwork and Recommended Pavement Sections

Topsoil, subsoil and vegetation are not considered suitable to remain in place below the proposed pavements in their current state. Therefore, we recommend that these materials and any existing structures and utilities that are to be abandoned be removed from the proposed pavement areas.

We anticipate that the existing fill will be suitable for the support of the proposed pavement provided that the surface of the existing fill is systematically densified. Densifying existing fills in-place beneath proposed pavement areas to provide a uniformly densified zone of soil on which additional fill can be properly placed and compacted and/or pavement sections can be constructed is recommended.

To accomplish the densification operation, the pavement area should be cut to subgrade elevation. Where encountered, the fill surface should then be compacted in the presence of a geotechnical engineer by making at least 10 passes with a vibratory drum compactor having a minimum drum weight of 20,000 pounds. Areas of the fill surface that are observed to be weak and unstable under the action of the compactor should be explored with shallow test pits.

The unstable materials should be excavated and replaced with compacted material meeting the recommended gradation specification for Granular Fill. The fill should be placed in controlled lifts and each lift should be compacted to at least 95 percent of the materials' maximum dry density as determined by ASTM D1557 in accordance with the project specifications.

Once the topsoil, subsoil, and buried structures and utilities are removed from the proposed pavement fill areas and the existing fill subgrade is densified as described above, Granular Fill should be placed in compacted lifts up to the proposed pavement subgrade elevations. The Granular Fill should be placed in 12-inch maximum thick lifts and each lift should be compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D-1557 Method C.

Provided that the pavement subgrades are prepared as described above, we recommend the pavement sections shown in Table IV:

**TABLE IV.**
**RECOMMENDED ASPHALT PAVEMENT SECTIONS**

| | Passenger Car (Standard Duty) Parking Areas | Truck (Heavy Duty) Traffic Areas |
|---|---|---|
| Bituminous Finish Course | 1.5" | 1.5" |
| Bituminous Binder Course | 1.5" | 2" |
| Base Course Sand and Gravel | 10" | 12" |

The Sand and Gravel Fill layer should meet the recommended gradation specifications shown in Table III on page 8 of this report and should be compacted to at least 95 percent of the materials maximum dry density as determined by ASTM D 1557 Method C.

## 5.70 Reuse of On-site Soils

On-site materials that are potentially reusable as Granular Fill in building and pavement areas include the natural granular soils and other natural nonorganic granular soil deposits provided these soils are maintained at suitable moisture contents for proper compaction and that oversize particles, defined as those greater than 2/3 the loose lift thickness, are removed prior to reuse. We anticipate that the majority of the on-site soils will be reusable as Granular Fill for the development.

On-site soils that contain a higher percentage (>15) of particles passing the no. 200 sieve will be considered suitable for re-use as Granular Fill provided that these soils can be densified to the required compaction percentages in a firm and stable condition. However, as noted above, we recommend that the excavated silty soils (silt and sand) be used as fill/backfill within proposed landscaped areas of the site to the extent possible.

The excavated on-site soils will be considered suitable for reuse provided boulders larger than 8 inches are removed and the soils are maintained at moisture contents at which the recommended compaction percentages can be achieved with the soils being in a firm and stable state. On-site silty soils generated from cuts that are at suitable moisture content should be placed and compacted to its required density the same day that it is cut. Stockpiling increases exposure to rain and may reduce the amount of soil that may be suitable for reuse as Granular Fill.

Topsoil and subsoil are not considered suitable for reuse as Granular Fill. The topsoil and subsoil may be reused in landscaped areas or removed from the site.

## 5.80 Groundwater Control & Dewatering

Ground surfaces immediately around the building should be covered with loam, asphalt or concrete and should be sloping downward away from the structure and surface runoff should be diverted away from the building toward storm drains.

We anticipate that the majority of the excavations at the site will be above the groundwater table. However, dewatering may be required after precipitation events and in cases of perched groundwater in the natural silty soils.

We anticipate that dewatering by the use of sumps and submersible pumps should be adequate. Discharge of pumped water is subject to local, state and federal regulations. The contractor should conduct dewatering and discharge water in accordance with all applicable regulations.

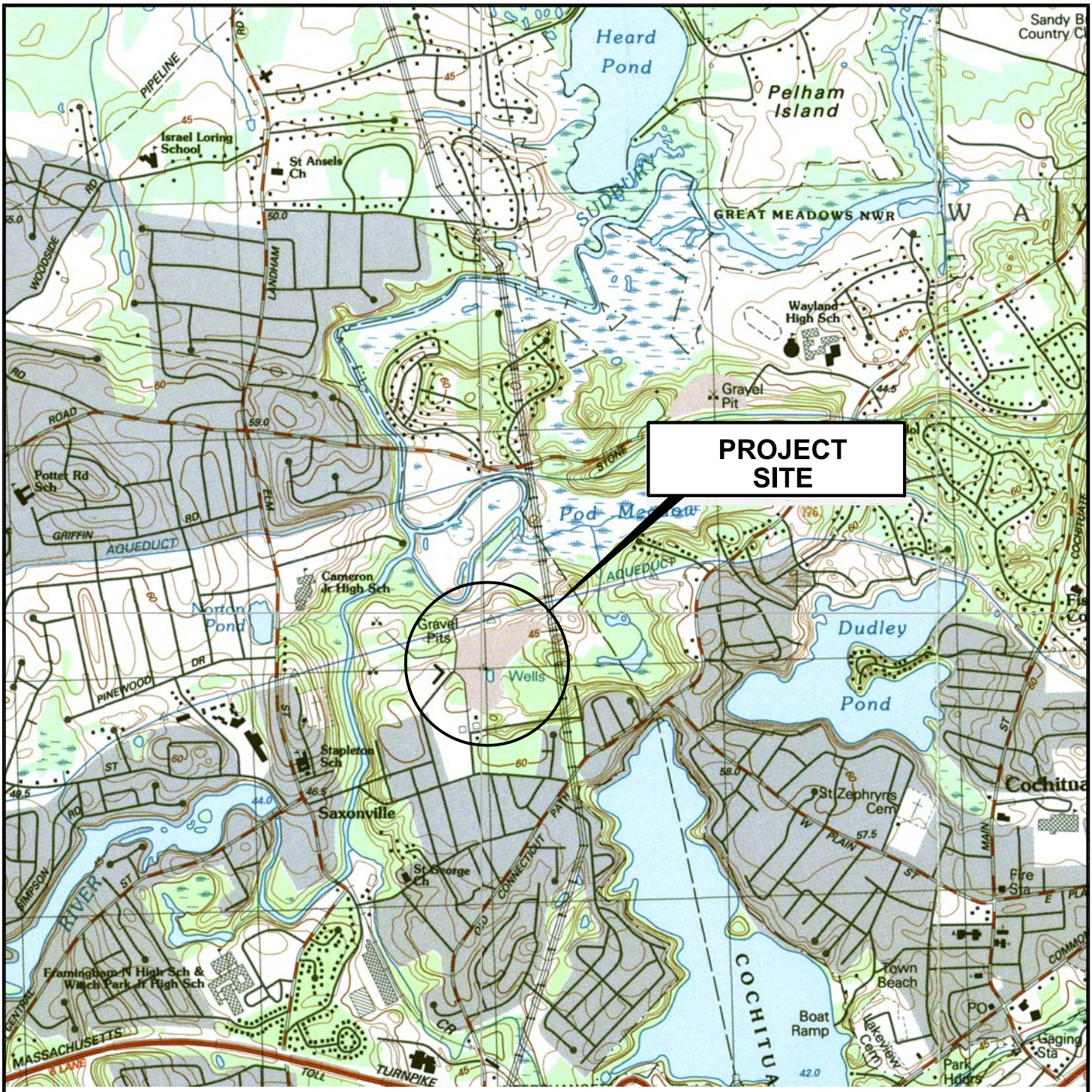
The contractor should implement temporary surface water runoff control measures during construction. Temporary measures should include, but are not necessarily limited to, the use of small earth berms or construction of a drainage ditch adjacent to the top of proposed excavations to divert and/or reduce the amount of surface water flowing over exposed slopes and into excavations during construction.

## 6.00 DOCUMENT REVIEW AND CONSTRUCTION OBSERVATION

Please forward the design documents to us for review prior to finalizing the construction documents and bidding the project. Our objective is to assess that our findings and recommendations have been properly incorporated and make recommendations to the design team for revising the documents as needed.

To assist the project team in meeting the requirements of Chapter 17 of the Eight Edition of the Massachusetts State Building Code (MSBC) and the design intent, we recommend that MGA be retained to provide geotechnical observation and testing services during earthwork construction. This will allow us to assess that this phase of the work is accomplished in accordance with the plans, specifications and the design intent. Our involvement will allow us to provide timely engineering input during construction should questions arise or conditions change.

# FIGURES




SCALE: 1"=1500'

0 750 1500 3000 FEET

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Hanover, MA 02339
781.982.2881 phone
781.735.0418 fax

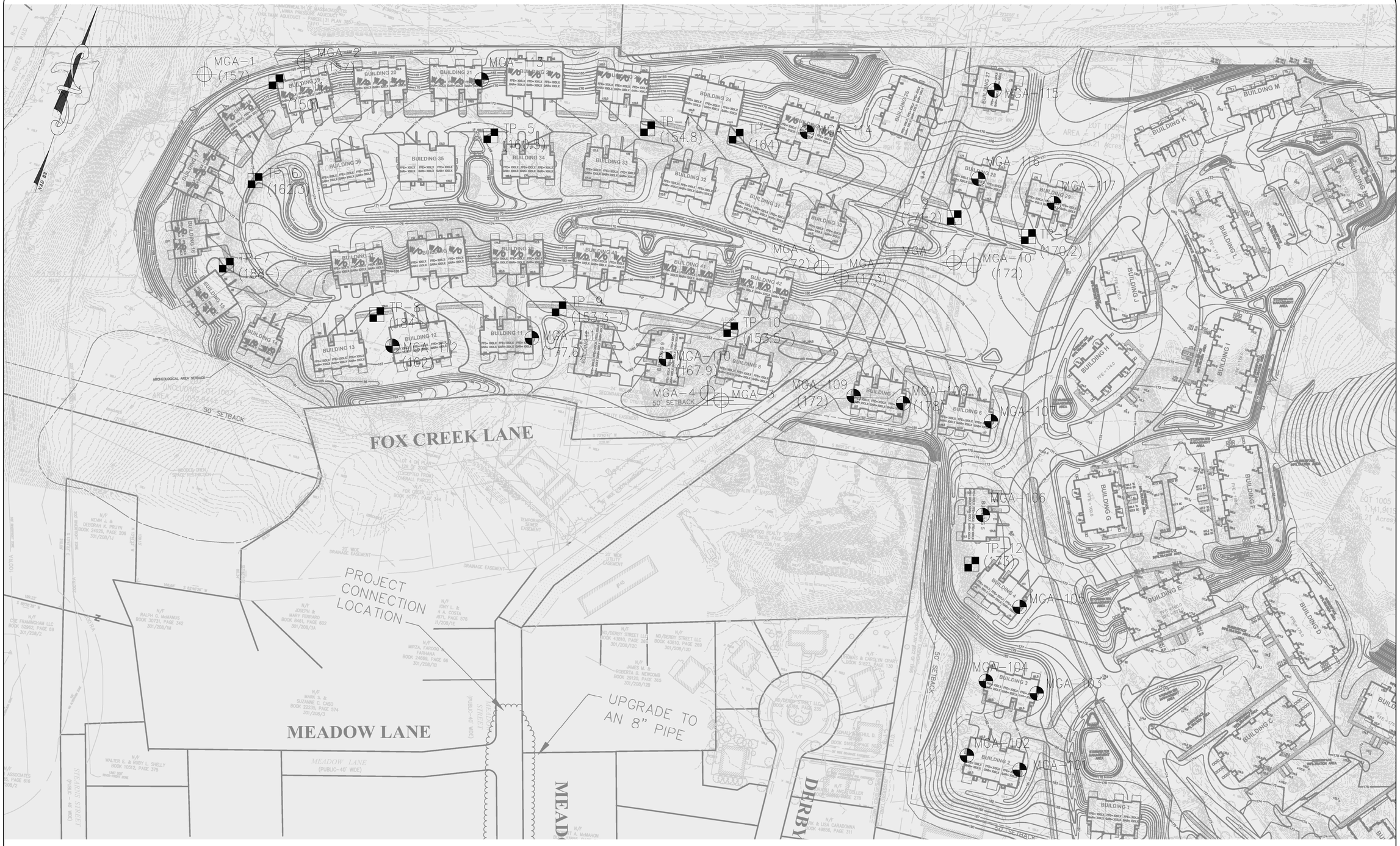
LOCUS PLAN
DANFORTH GREEN

RIVER PATH DRIVE
FRAMINGHAM, MA

PROJECT: G0232.02 | DATE: 11/2012 | SCALE: AS NOTED

SKETCH NO.:
FIG. No. 1

DRAWN: SLH
CHECKED: JJG




NOTES:

1. BASE PLAN DEVELOPED FROM AUTOCAD FILE 12004 00_Grading–PRELIMINARY PROVIDED BY VANASSE HANGEN BRUSTLIN, INC. (VHB).
2. MGA LOCATED THE RECENT EXPLORATIONS SHOWN BY TAPING AND/OR PACING FROM EXISTING SITE FEATURES AND SURVEY STAKES PROVIDED BY VHB.
3. VHB SURVEY LOCATED THE 2010 BORING LOCATIONS SHOWN.
3. MGA PERSONNEL OBSERVED AND LOGGED THE EXPLORATIONS.

LEGEND:

- TEST BORING PERFORMED BY NEW HAMPSHIRE BORING OF DERRY, NH BETWEEN 10/8/2012 AND 10/11/2012.
- TEST BORING PERFORMED BY SUBSURFACE DRILLING & REMEDIATION OF CRANSTON, RI BETWEEN 6/5/2010 AND 6/10/2010.
- TEST PIT EXCAVATED BY SILVERSMITH EXCAVATING CO., INC. OF WILMINGTON, MA BETWEEN 10/3/2012 AND 10/5/2012.

(150) INDICATES APPROXIMATE BOTTOM OF FILL/ORGANIC SOILS WHERE ENCOUNTERED AT EXPLORATION LOCATION, (–) AFTER NUMBER INDICATES THAT EXPLORATON ENDED IN FILL.

GRAPHIC SCALE

70 0 35 70 140 210

( IN FEET )
1 inch = 70 ft.

REVISIONS

DRAWN BY: SLH

DESIGNED BY: JJG

CHECKED BY: JJG

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# EXPLORATION LOCATION PLAN

## DANFORTH GREEN TOWNHOUSES

RIVER PATH DRIVE FRAMINGHAM, MA

JANUARY 2013

AS SHOWN

JOB No. G0232.02

FIG No.2

SHEET 1 OF 1

# APPENDIX A: STATEMENT OF LIMITATIONS

# STATEMENT OF LIMITATIONS

## Explorations

The analysis and recommendations submitted in this report are based in part upon the data obtained from subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

The stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

Water level readings have been made in the explorations at the time and under the conditions stated on the logs. This data has been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors that are different from the time the measurements were made.

## Review

In the event that any change in the nature, design or location of the proposed structure are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this preliminary report modified or verified in writing.

It is recommended that this firm be provided the opportunity for a general review of final design and specifications in order that earthwork recommendations may be properly interpreted and implemented in the design and specifications.

## Construction

It is recommended that this firm be retained to provide soil engineering services during the construction phase of the work. This is to observe compliance with design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

## Use of Report

This report has been prepared for the exclusive use of Danforth Green, LLC for specific application to the Danforth Green Townhouses on Riverpath Drive in Framingham, Massachusetts, in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

# APPENDIX B: MGA SOIL TEST BORING LOGS
# OCTOBER 2012

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-101

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 189.0'±
**DATE START :** 10/10/12
**END :** 10/10/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Spilt Spoon | --- |
| 10/10/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 4<br>4<br>4<br>100/1" | S-1 | | 5.0<br>7.0 | 12 | | Loose, brown, fine to coarse SAND, some Silt, trace fine Gravel.<br><br>[Augers grinding from 6.5 to 15 feet] |
| 8 | | | 36<br>90<br>53<br>33 | S-2 | | 10.0<br>12.0 | 18 | | Very dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt.<br><br>-SILTY SAND & GRAVEL- |
| 12 | | | 11<br>21<br>27<br>22 | S-3 | | 15.0<br>17.0 | 12 | | Dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. |
| 16 | | | 19<br>17<br>20<br>14 | S-4 | | 20.0<br>22.0 | 12 | | Dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. |
| 20 | | | | | | | | 167.0<br>22.0 | BOTTOM OF BORING AT 22 FEET.<br><br>(1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-101**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-102

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 189.0'±
**DATE START :** 10/9/12
**END :** 10/9/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/9/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | [Augers grinding from 0 to 20 feet] |
| 4 | | | 9<br>12<br>24<br>22 | S-1 | | 5.0<br>7.0 | 6 | | Dense, brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| 8 | | | 18<br>26<br>30<br>25 | S-2 | | 10.0<br>12.0 | 18 | | Dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. |
| 12 | | | | | | | | | -SILTY SAND & GRAVEL- |
| 16 | | | 16<br>20<br>26<br>29 | S-3 | | 15.0<br>17.0 | 12 | | Dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. |
| 20 | | | 10<br>11<br>18<br>17 | S-4 | | 20.0<br>22.0 | 12 | 167.0<br>22.0 | Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, little Silt.<br>BOTTOM OF BORING AT 22 FEET. |

(1) NE = Not Encountered

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-102**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-103

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 170.2'±
**DATE START :** 10/11/12
**END :** 10/11/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/11/12 | 11:30 | 17' | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 6<br>5<br>7<br>24 | S-1 | | 5.0<br>7.0 | 12 | | Medium dense, brown, fine GRAVEL, little fine to coarse Sand, little Silt.<br><br>-SAND & GRAVEL- |
| 8 | | | | | | | | 160.2 | |
| 12 | | | 10<br>15<br>15<br>19 | S-2 | | 10.0<br>12.0 | 18 | 10.0<br><br>155.2 | Medium dense to dense, brown, fine to coarse SAND, little Silt.<br><br>-SAND- |
| 16 | | | 9<br>12<br>13<br>16 | S-3 | | 15.0<br>17.0 | 18 | 15.0 | Medium dense, wet, brown, fine SAND and SILT.<br><br>-SAND & SILT- |
| 20 | | | 4<br>9<br>12<br>18 | S-4 | | 20.0<br>22.0 | 24 | 148.2<br>22.0 | Medium dense, brown, wet, fine SAND and SILT.<br><br>BOTTOM OF BORING AT 22 FEET. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-103**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-104

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 170.2'±
**DATE START :** 10/11/12
**END :** 10/11/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/11/12 | 10:00 | 17.1 | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 15<br>27<br>28<br>25 | S-1 | | 5.0<br>7.0 | 16 | | Very dense, brown fine to coarse SAND, little Silt, little fine to coarse Gravel.<br><br>-SILTY SAND & GRAVEL- |
| 8 | | | | | | | | 160.2 | |
| 12 | | | 8<br>10<br>10<br>17 | S-2 | | 10.0<br>12.0 | 12 | 10.0 | Medium dense, brown, fine to coarse SAND, trace Silt.<br><br>-SAND- |
| | | | | | | | | 155.2 | |
| 16 | | | 4<br>9<br>11<br>11 | S-3 | | 15.0<br>17.0 | 12 | 15.0 | Medium dense, brown, wet, fine SAND and SILT.<br><br>-SAND & SILT- |
| 20 | | | | | | | | 150.2 | |
| | | | 2<br>9<br>19<br>19 | S-4 | | 20.0<br>22.0 | 12 | 20.0<br>148.2 | Medium dense, wet, fine to coarse SAND, trace fine to coarse Gravel, trace Silt.<br>-SAND- |
| | | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-104**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-105

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 170.5'±
**DATE START :** 10/9/12
**END :** 10/9/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | |
| 10/9/12 | | NE (1) | out | 17' | Size I.D. | 4-1/4" | 1-3/8" | |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 4<br>4<br>5<br>9 | S-1 | 5.0<br>7.0 | 12 | | Loose, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |
| 8 | | | | | | | | -SAND- |
| 12 | | | 11<br>15<br>18<br>17 | S-2 | 10.0<br>12.0 | 18 | | Dense, tan, fine to coarse SAND, little Silt, trace fine to coarse Gravel. |
| 16 | | | 10<br>15<br>17<br>16 | S-3 | 15.0<br>17.0 | 21 | 153.5<br>17.0 | Dense, tan, fine to medium SAND, little Silt.<br>BOTTOM OF BORING AT 17 FEET.<br>(1) NE = Not Encountered |
| 20 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-105**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-106

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 170.0'±
**DATE START :** 10/9/12
**END :** 10/9/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/9/12 | 11:00 | 17.5' | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 7<br>9<br>9<br>10 | S-1 | | 5.0<br>7.0 | 20 | | Medium dense, tan, fine to coarse SAND, trace Silt. |
| 8 | | | | | | | | 160.0 | -SAND- |
| 12 | | | 16<br>16<br>23<br>24 | S-2 | | 10.0<br>12.0 | 6 | 10.0 | Dense, tan, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |
| 16 | | | 12<br>15<br>22<br>16 | S-3 | | 15.0<br>17.0 | 18 | | -SAND & GRAVEL-<br>Dense, tan, fine to coarse SAND, little fine to coarse Gravel, trace Silt. |
| 20 | | | 13<br>20<br>32<br>36 | S-4 | | 20.0<br>22.0 | 21 | 148.0 | Very dense, wet, tan, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| | | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-106**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-107

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174'±
**DATE START :** 10/8/12
**END :** 10/8/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/8/12 | | NE (1) | 20' | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 14<br>21<br>26<br>22 | S-1 | | 5.0<br>7.0 | 18 | | Dense, brown, fine to medium SAND, little Silt. |
| 8 | | | | | | | | | -SILTY SAND- |
| | | | | | | | | 164.0 | |
| 12 | | | 12<br>12<br>9<br>11 | S-2 | | 10.0<br>12.0 | 17 | 10.0 | Medium dense, tan, SILT, little fine Sand. |
| | | | | | | | | | -SILT- |
| 16 | | | 5<br>8<br>7<br>6 | S-3 | | 15.0<br>17.0 | 21 | | Medium dense, tan, SILT, little fine Sand. |
| 20 | | | 9<br>7<br>7<br>11 | S-4 | | 20.0<br>22.0 | 16 | | Medium dense, tan, SILT, little fine Sand. |
| | | | | | | | | 152.0 | |
| | | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-107**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-108

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 186'±
**DATE START :** 10/11/12
**END :** 10/11/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/11/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | [Augers grinding from 0-8 feet] |
| | | | | | | | | | -FILL- |
| 4 | | | | | | | | | |
| | | | 30<br>69<br>100/3" | S-1 | | 5.0<br>6.3 | 12 | | Black, ASPHALT. |
| | | | | | | | | 178.0 | |
| 8 | | | | | | | | 8.0 | |
| | | | 6<br>10<br>27<br>27 | S-2 | | 10.0<br>12.0 | 12 | | Dense, tan, fine to coarse SAND, some Silt, little fine to coarse Gravel. |
| 12 | | | | | | | | | -SILTY SAND & GRAVEL- |
| | | | 12<br>20<br>19<br>21 | S-3 | | 15.0<br>17.0 | 12 | | Dense, tan, fine to coarse SAND, some Silt, little fine to coarse Gravel. |
| 16 | | | | | | | | | |
| 20 | | | 84<br>20<br>20<br>16 | S-4 | | 20.0<br>22.0 | 12 | | Dense, tan, fine to coarse SAND, some Silt, little fine to coarse Gravel. |
| | | | | | | | | 164.0 | |
| | | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |
| | | | | | | | | | (1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-108**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-109

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 185'±
**DATE START :** 10/10/12
**END :** 10/10/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/10/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | -FILL- |
| 4 | | | 24<br>28<br>19<br>30 | S-1 | | 5.0<br>7.0 | 20 | | Dense, black, fine to coarse SAND, some fine to coarse Gravel, some Silt, trace Asphalt, trace Concrete. |
| 8 | | | | | | | | | [Augers grinding from 5 to 13 feet] |
| 12 | | | 36<br>27<br>35<br>27 | S-2 | | 10.0<br>12.0 | 12 | | Very dense, black, fine to coarse SAND, some fine to coarse Gravel, some Silt, trace Concrete. |
| | | | | | | | | 172.0<br>13.0 | |
| 16 | | | 15<br>16<br>18<br>19 | S-3 | | 15.0<br>17.0 | 18 | | Dense, tan, fine to medium SAND and SILT. |
| | | | | | | | | | -SAND & SILT- |
| 20 | | | 27<br>92<br>73<br>70 | S-4 | | 20.0<br>22.0 | 12 | | Dense, tan, fine to medium SAND, some Silt, trace fine Gravel. |
| | | | | | | | | 163.0<br>22.0 | BOTTOM OF BORING AT 22 FEET. |

(1) NE = Not Encountered

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-109**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-110

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 182.9'±
**DATE START :** 10/8/12
**END :** 10/8/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/8/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | -FILL- |
| 4 | | | 11<br>32<br>40<br>34 | S-1 | | 5.0<br>7.0 | 18 | | Very dense, brown, fine to coarse SAND, some fine to coarse Gravel, some Silt. |
| | | | | | | | | | [Augers grinding from 5 to 15 feet] |
| 8 | | | | | | | | | |
| | | | 40<br>34<br>41<br>17 | S-2 | | 10.0<br>12.0 | 12 | | Very dense, tan, fine to medium SAND, some Silt, some fine to coarse Gravel. |
| 12 | | | | | | | | 167.9 | |
| | | | 6<br>6<br>8<br>9 | S-3 | | 15.0<br>17.0 | 18 | 15.0 | Medium dense, tan, fine to medium SAND, trace fine to coarse Gravel, trace Silt. |
| 16 | | | | | | | | | -SAND- |
| | | | | | | | | 162.9 | |
| 20 | | | 11<br>13<br>18<br>23 | S-4 | | 20.0<br>22.0 | 20 | 20.0 | Dense, tan, fine SAND and SILT. |
| | | | | | | | | 160.9 | -SAND & SILT- |
| | | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |
| | | | | | | | | | (1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-110**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-111

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 183.6'±
**DATE START :** 10/8/12
**END :** 10/8/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/8/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | -FILL- |
| 4 | | | 8<br>12 | S-1 | 5.0<br>6.0 | 6 | 177.6 | Gray, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| | | | 16<br>40 | S-1A | 6.0<br>7.0 | 6 | 6.0 | Tan, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| 8 | | | | | | | | -SILTY SAND & GRAVEL- |
| | | | 6<br>7<br>10<br>12 | S-2 | 10.0<br>12.0 | 12 | 173.6<br>10.0 | Medium dense, tan, SILT and fine SAND. |
| 12 | | | | | | | | -SAND & SILT- |
| | | | 7<br>24<br>18<br>16 | S-3 | 15.0<br>17.0 | 12 | 168.6<br>15.0 | Dense, tan, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| 16 | | | | | | | | -SILTY SAND AND GRAVEL- |
| 20 | | | 7<br>12<br>16<br>33 | S-4 | 20.0<br>22.0 | 18 | 163.6<br>20.0 | Medium dense, tan, fine to medium SAND, little Silt. |
| | | | | | | | 161.6 | -SILTY SAND- |
| | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |
| | | | | | | | | (1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-111**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-112

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 196.0'±
**DATE START :** 10/8/12
**END :** 10/8/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/8/12 | | NE (1) | out | 42' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | [Augers grinding from 0 to 23 feet] |
| 4 | | | 22<br>30<br>62<br>60 | S-1 | | 5.0<br>7.0 | 18 | | Very dense, gray, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| 8 | | | 30<br>28<br>32<br>39 | S-2 | | 10.0<br>12.0 | 18 | | Very dense, gray, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| 12 | | | | | | | | | -FILL- |
| 16 | | | 15<br>34<br>28<br>21 | S-3 | | 15.0<br>17.0 | 12 | | Very dense, gray, fine to coarse SAND, little fine to coarse Gravel, little Silt. |
| 20 | | | 21<br>37<br>35<br>60/2" | S-4 | | 20.0<br>22.0 | 12 | | Very dense, gray, fine to coarse SAND, little fine to coarse Gravel, little Silt. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-112**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-112

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC

**MGA NO. :** G0232.02
**SHEET NO. :** 2 of 2

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | | | | | | |
| | | | 3<br>7<br>9<br>14 | S-5 | 25.0<br>27.0 | 12 | | Medium dense, tan, fine SAND and SILT. |
| 28 | | | | | | | | -FILL- |
| | | | 5<br>15 | S-6 | 30.0<br>31.0 | 6 | | Tan, fine SAND and SILT. |
| 32 | | | 11<br>14 | S-6A | 31.0<br>32.0 | 6 | | Gray, fine to coarse SAND, little fine to coarse Gravel, little Silt, trace Wood. |
| | | | | | | | 162.0<br>34.0 | [Augers grinding from 33 to 40 feet] |
| 36 | | | 25<br>58<br>78<br>100/1" | S-7 | 35.0<br>37.0 | 12 | | Very dense, tan, fine to coarse SAND, some fine to coarse Gravel, little Silt. |
| | | | | | | | | -SILTY SAND & GRAVEL- |
| 40 | | | 8<br>12<br>16<br>20 | S-8 | 40.0<br>42.0 | 24 | 156.0<br>40.0<br>154.0<br>42.0 | Medium dense, tan, fine SAND & SILT.<br>-SAND & SILT-<br>BOTTOM OF BORING AT 42 FEET. |
| 44 | | | | | | | | (1) NE = Not Encountered |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-112**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-113

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 175.0'±
**DATE START :** 10/8/12
**END :** 10/8/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/8/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 25<br>31<br>26<br>24 | S-1 | 5.0<br>7.0 | 18 | | Very dense, brown, fine to coarse SAND, some Silt. |
| 8 | | | 4<br>5<br>8<br>12 | S-2 | 10.0<br>12.0 | 18 | | Medium dense, brown, SILT, trace fine to medium Sand.<br><br>-SAND & SILT- |
| 12 | | | 8<br>11 | S-3 | 15.0<br>16.0 | 9 | | Brown, fine to medium SAND, some Silt. |
| 16 | | | 10<br>12 | S-3A | 16.0<br>17.0 | 9 | | Brown, SILT, little fine Sand. |
| 20 | | | 7<br>15<br>25<br>37 | S-4 | 20.0<br>22.0 | 12 | 153.0<br>22.0 | Dense, brown, fine SAND, some Silt, trace fine Gravel.<br><br>BOTTOM OF BORING AT 22 FEET.<br><br>(1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-113**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-114

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 165.0'±
**DATE START :** 10/9/12
**END :** 10/9/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/9/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 8<br>10<br>10<br>10 | S-1 | 5.0<br>7.0 | 24 | | Medium dense, tan, fine to medium SAND, trace Silt. |
| 8 | | | | | | | | -SAND- |
| 12 | | | 3<br>5<br>4<br>6 | S-2 | 10.0<br>12.0 | 18 | | Loose, tan, fine to coarse SAND, little Silt. |
| | | | | | | | 150.0 | |
| 16 | | | 10<br>13<br>15<br>16 | S-3 | 15.0<br>17.0 | 20 | 15.0 | Medium dense, tan, SILT, little fine Sand. |
| | | | | | | | | -SILT- |
| 20 | | | | | | | 145.0 | |
| | | | 10<br>10<br>10<br>11 | S-4 | 20.0<br>22.0 | 20 | 20.0<br>143.0 | Medium dense, tan, fine to medium SAND, little Silt.<br>-SAND- |
| | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |

(1) NE = Not Encountered

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-114**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-115

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174.2'±
**DATE START :** 10/10/12
**END :** 10/10/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/10/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 4 | | | 7<br>8<br>13<br>13 | S-1 | 5.0<br>7.0 | 19 | | Medium dense, fine to medium SAND, some Silt. |
| 8 | | | | | | | | -SILTY SAND- |
| | | | | | | | 164.2<br>10.0 | Medium dense, tan, fine to medium SAND, trace Silt. |
| 12 | | | 5<br>9<br>12<br>13 | S-2 | 10.0<br>12.0 | 16 | | -SAND- |
| | | | | | | | 159.2<br>15.0 | Medium dense, light brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. |
| 16 | | | 7<br>7<br>11<br>27 | S-3 | 15.0<br>17.0 | 18 | | [Augers grinding from 15 to 20 feet] |
| | | | | | | | | -SILTY SAND & GRAVEL- |
| 20 | | | 80<br>64<br>120<br>51 | S-4 | 20.0<br>22.0 | 18 | | Very dense, light brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. |
| | | | | | | | 152.2<br>22.0 | BOTTOM OF BORING AT 22 FEET. |
| | | | | | | | | (1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-115**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-116

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174.6'±
**DATE START :** 10/10/12
**END :** 10/10/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/10/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 20<br>25<br>36<br>45 | S-1 | | 5.0<br>7.0 | 21 | | Very dense, tan, fine to coarse SAND, some fine to coarse Gravel, trace Silt. |
| | | | | | | | | | [Augers grinding from 5 to 20 feet] |
| 8 | | | | | | | | | -SAND & GRAVEL- |
| | | | 50<br>63<br>40<br>48 | S-2 | | 10.0<br>12.0 | 12 | | Very dense, tan, fine to coarse SAND, some fine to coarse Gravel, some Silt. |
| 12 | | | | | | | | 159.6 | |
| | | | 12<br>21<br>30<br>34 | S-3 | | 15.0<br>17.0 | 12 | 15.0 | Very dense, tan, fine to coarse SAND, some fine to coarse Gravel, some Silt. |
| 16 | | | | | | | | | -SILTY SAND & GRAVEL- |
| | | | | | | | | 154.6 | |
| 20 | | | 16<br>23<br>26<br>28 | S-4 | | 20.0<br>22.0 | | 20.0 | Dense, tan, fine to coarse SAND, some Silt. |
| | | | | | | | | 152.6 | -SILTY SAND- |
| | | | | | | | | 22.0 | BOTTOM OF BORING AT 22 FEET. |
| | | | | | | | | | (1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-116**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-117

**PROJECT:** Danforth Green - Townhouses Riverpath Drive Framingham, MA
**CLIENT:** Danforth Green LLC
**CONTRACTOR:** New Hampshire Boring

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174.0'±
**DATE START :** 10/10/12
**END :** 10/10/12
**DRILLER :** Greg Leavitt
**ENGINEER :** Steve Marcassoli

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 10/10/12 | | NE (1) | out | 22' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | 9<br>9<br>8<br>8 | S-1 | | 5.0<br>7.0 | 18 | | Medium dense, tan, fine to medium SAND, trace fine Gravel, trace Silt. |
| 8 | | | 6<br>9<br>10<br>12 | S-2 | | 10.0<br>12.0 | 21 | | Medium dense, tan, fine to coarse SAND, little Silt.<br><br>-SAND- |
| 12 | | | 5<br>8<br>11<br>11 | S-3 | | 15.0<br>17.0 | 20 | | Medium dense, tan, fine to coarse SAND, trace Silt. |
| 16 | | | | | | | | | |
| 20 | | | 6<br>8<br>10<br>11 | S-4 | | 20.0<br>22.0 | 18 | | Medium dense, tan, fine to coarse SAND, trace Silt, trace fine to coarse Gravel. |
| | | | | | | | | 152.0<br>22.0 | BOTTOM OF BORING AT 22 FEET.<br><br>(1) NE = Not Encountered |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-117**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

# KEY TO SYMBOLS

**Symbol Description**

**Strata symbols**

**Silty Sand & Gravel**

**Sand and Gravel**

**Sand**

**Silty sand**

**Silt**

**Fill**

**Soil Samplers**

**Split Spoon**

**Notes:**

1. **New Hampshire Boring, Inc. of Derry, NH performed the test borings between October 8 and 11, 2012 with truck and all-terrain vehicle (ATV) mounted drill rigs equipped with a 140# safety hammer.**

2. **MGA estimated the test boring elevations from spot grades provided by VHB and ground surface contours shown plans prepared by VHB. Elevations are approximate.**

3. **MGA personnel observed and logged the test borings.**

**APPENDIX C: MGA SOIL TEST BORING LOGS**
**JUNE 2010**

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-1

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 160'±
**DATE START :** 6/15/10
**END :** 6/15/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** Sherry Holmes

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HW | Split Spoon | --- |
| 6/15/10 | 1315 | 12' | 11' | 14' | Size I.D. | 4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 3<br>10<br>7<br>17 | S-1 | 0.0<br>2.0 | 6 | | Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt, trace Roots. |
| | | | | | | | | -FILL- |
| | | | | | | | 157.0 | |
| | | | | | | | 3.0 | Very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. |
| 4 | | | 14<br>35<br>59<br>65 | S-2 | 4.0<br>6.0 | 6 | | -SAND & GRAVEL- |
| | | | | | | | | |
| 8 | | | | | | | 152.0 | |
| | | | | | | | 8.0 | Medium dense, beige, SILT, trace Sand. |
| | | | 11<br>11<br>15<br>14 | S-3 | 9.0<br>11.0 | 10 | | [Borehole advanced using open hole drilling techniques from 11' to bottom of boring] |
| 12 | | | | | | | | |
| | | | 12<br>14<br>13<br>15 | S-4 | 14.0<br>16.0 | 10 | | Medium dense, beige, fine SAND, some Silt. |
| 16 | | | | | | | | -SAND & SILT- |
| | | | 13<br>16<br>24<br>33 | S-5 | 19.0<br>21.0 | 14 | | Dense, beige, fine SAND, little Silt. |
| 20 | | | | | | | 139.0 | |
| | | | | | | | 21.0 | BOTTOM OF BORING AT 21 FEET. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-1**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-2

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 160'±
**DATE START :** 6/15/10
**END :** 6/15/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** Sherry Holmes

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HSA | Split Spoon | --- |
| 6/15/10 | 1400 | 10' | 10' | 12' | Size I.D. | 4-1/4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | --- | 140# | - - - - |
| | | | | | Hammer Fall | --- | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 1<br>2<br>4<br>5 | S-1 | 0.0<br>2.0 | 16 | | Loose, brown, fine to medium SAND, trace Silt.<br><br>-FILL- |
| | | | | | | | 157.0<br>3.0 | |
| 4 | | | 10<br>12<br>10<br>12 | S-2 | 5.0<br>7.0 | 15 | | Medium dense, brown, fine to coarse SAND, trace fine Gravel, trace Silt.<br><br>-SAND- |
| 8 | | | | | | | 151.0<br>9.0 | |
| | | | 6<br>11<br>14<br>10 | S-3 | 10.0<br>12.0 | 14 | | Medium dense, wet, beige, fine SAND, some Silt. |
| 12 | | | | | | | | -SAND & SILT- |
| | | | 11<br>16<br>17<br>18 | S-4 | 15.0<br>17.0 | 15 | | Dense, wet, beige, fine SAND and SILT. |
| 16 | | | | | | | | |
| 20 | | | 10<br>11<br>13<br>15 | S-5 | 20.0<br>22.0 | 20 | | Medium dense, wet, beige, SILT and fine SAND. |
| | | | | | | | 138.0<br>22.0 | BOTTOM OF BORING AT 22 FEET. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-2**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-3

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 183'±
**DATE START :** 6/10/10
**END :** 6/10/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** Sherry Holmes

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HW | Split Spoon | --- |
| 6/10/10 | 1500 | 25.5' | 24' | 26' | Size I.D. | 4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | 174.0 | |
| | | | 7<br>10<br>16<br>18 | S-1 | | 9.0<br>11.0 | 12 | 9.0 | Medium dense, beige, fine to medium SAND, trace Silt, trace fine Gravel. |
| 4 | | | | | | | | | |
| 8 | | | | | | | | | |
| 12 | | | | | | | | | -SAND- |
| | | | 14<br>21<br>33<br>48 | S-2 | | 14.0<br>16.0 | 10 | | Very dense, beige, fine to medium SAND and SILT, trace fine Gravel. |
| 16 | | | | | | | | 164.0 | |
| | | | 21<br>78<br>60 | S-3 | | 19.0<br>20.5 | 5 | 19.0 | Very dense, beige/gray, fine to coarse GRAVEL, some fine to coarse Sand, trace Silt.<br>-SAND & GRAVEL-<br>[Increased drilling resistance at 19'±] |
| 20 | | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-3**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-3

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.

**MGA NO. : G0232**
**SHEET NO. : 2 of 2**

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 50<br>58<br>37<br>26 | S-4 | 24.0<br>26.0 | 6 | | Very dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little Silt. |
| | | | | | | | | -SAND & GRAVEL- |
| 28 | | | 11<br>11<br>9<br>12 | S-5 | 29.0<br>31.0 | 5 | | Medium dense, gray-brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. |
| | | | | | | | 152.0<br>31.0 | BOTTOM OF BORING AT 31 FEET. |
| 32 | | | | | | | | |
| 36 | | | | | | | | |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-3**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-4

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 184'±
**DATE START :** 6/11/10
**END :** 6/11/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** Sherry Holmes

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HW | Split Spoon | --- |
| 6/11/10 | 0920 | 25' | 19' | 26' | Size I.D. | 4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | 175.0 | |
| 4 | | | | | | | | |
| 8 | | | | | | | | |
| | | | 11<br>11<br>13<br>14 | S-1 | 9.0<br>11.0 | 8 | 9.0 | Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt.<br><br>-SAND & GRAVEL- |
| 12 | | | | | | | 170.0 | |
| | | | 7<br>8<br>13<br>14 | S-2 | 14.0<br>16.0 | 8 | 14.0 | Medium dense, brown, fine to medium SAND, trace Silt, trace fine Gravel.<br><br>-SAND- |
| 16 | | | | | | | | |
| | | | 7<br>10<br>12<br>14 | S-3 | 19.0<br>21.0 | 6 | | Medium dense, beige, fine to medium SAND, trace Silt.<br><br>[Borehole advanced using open hole drilling techniques from 19' to bottom of boring] |
| 20 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-4**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING MGA-4 |
|---|---|---|

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.

**MGA NO. : G0232**
**SHEET NO. : 2 of 2**

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 16<br>24<br>25<br>33 | S-4 | 24.0<br>26.0 | 12 | | Dense, beige, fine SAND, little Silt. |
| 28 | | | | | | | | -SAND- |
| | | | 22<br>34<br>30<br>33 | S-5 | 29.0<br>31.0 | 14 | 153.0<br>31.0 | Very dense, beige, fine SAND, little Silt.<br>BOTTOM OF BORING AT 31 FEET. |
| 32 | | | | | | | | |
| 36 | | | | | | | | |
| 40 | | | | | | | | |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-4**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-6 (MW)

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 180'±
**DATE START :** 6/11/10
**END :** 6/11/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** Sherry Holmes

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HW | Split Spoon | --- |
| 6/15/10 | 0745 | 33.5' | MW | | Size I.D. | 4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | | | | | | | -FILL- |
| 8 | | | | | | | | 172.0<br>8.0 | [Sand & Gravel based on cuttings from about 8 to 19 feet] |
| 12 | | | | | | | | | -SAND & GRAVEL- |
| 16 | | | | | | | | | |
| 20 | | | 19<br>18<br>29<br>29 | S-1 | | 19.0<br>21.0 | 7 | | Dense, brown, fine to coarse SAND and fine to coarse GRAVEL, little Silt. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-6 (MW)**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING MGA-6 (MW) |
|---|---|---|

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.

**MGA NO. : G0232**
**SHEET NO. : 2 of 2**

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 23<br>28<br>34<br>53 | S-2 | 24.0<br>26.0 | 12 | 156.0<br>24.0 | Very dense, beige, SILT & CLAY, trace (- ) fine Sand.<br><br>[Borehole advanced using open hole drilling techniques from 26' to bottom of boring] |
| 28 | | | 32<br>44<br>50<br>55 | S-3 | 29.0<br>31.0 | 10 | | Very dense, beige, fine SAND, little Silt.<br><br>-SAND & SILT- |
| 32 | | | 17<br>31<br>26<br>29 | S-4 | 34.0<br>36.0 | 18 | | Very dense, beige, fine SAND and SILT. |
| 36 | | | 19<br>31<br>38<br>38 | S-5 | 39.0<br>41.0 | 16 | | Very dense, beige, fine SAND, some Silt. |
| 40 | | | | | | | 139.0<br>41.0 | BOTTOM OF BORING AT 41 FEET. |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-6 (MW)**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-7

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 181'±
**DATE START :** 6/15/10
**END :** 6/15/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** Sherry Holmes

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HW | Split Spoon | --- |
| | | | | | Size I.D. | 4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | [Several concrete obstructions from 0-4'. Used solid stem augers to advance borehole to 5', then switched to HW casing] |
| 4 | | | | | | | | -FILL- |
| 8 | | | | | | | 173.0<br>8.0 | |
| 12 | | | | | | | | -SAND & GRAVEL- |
| 16 | | | | | | | | |
| 20 | | | 16<br>31 | S-1 | 19.0<br>20.0 | 3 | 161.0 | Gray-brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. |
| | | | 26<br>21 | S-1A | 20.0<br>21.0 | 6 | 20.0 | Beige, CLAYEY SILT, little fine Sand.<br>[Borehole advanced using open hole drilling techniques from 21' to bottom of boring] |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-7**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-7

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.

**MGA NO. : G0232**
**SHEET NO. : 2 of 2**

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 21<br>35<br>56<br>63 | S-2 | 24.0<br>26.0 | 8 | | Very dense, beige, fine SAND, some Silt. |
| 28 | | | 26<br>35<br>31<br>39 | S-3 | 29.0<br>31.0 | 12 | | Very dense, beige, fine SAND, some Silt. |
| 32 | | | | | | | | -SAND & SILT- |
| 36 | | | 14<br>21<br>33<br>37 | S-4 | 34.0<br>36.0 | 16 | | Very dense, beige, fine SAND, some Silt. |
| 40 | | | 35<br>43<br>52<br>60 | S-5 | 39.0<br>41.0 | 10 | | Very dense, beige, fine SAND, little Silt. |
| | | | | | | | 140.0<br>41.0 | BOTTOM OF BORING AT 41 FEET. |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-7**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-10 (MW)

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 177'±
**DATE START :** 6/09/10
**END :** 6/10/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** WAM/SLH

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HW | Split Spoon | --- |
| 6/15/10 | 0755 | Dry | MW | | Size I.D. | 4" | 1-3/8" | --- |
| 6/16/10 | 1015 | Dry | MW | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recovery (in) | Elevation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 9<br>17<br>19<br>15 | S-1 | 0.0<br>2.0 | 14 | | Dense, beige, fine to coarse SAND, some (+) fine to coarse Gravel, trace (-) Silt.<br><br>-FILL- |
| 4 | | | 18<br>13 | S-2 | 4.0<br>5.0 | 10 | 172.0 | Tan, fine to coarse SAND, some (-) fine to coarse Gravel, little (+) Silt. |
| | | | 8<br>8 | S-2A | 5.0<br>6.0 | 7 | 5.0 | Beige, fine SAND, trace Silt. |
| 8 | | | | | | | | |
| 12 | | | | | | | | -SAND- |
| 16 | | | | | | | | |
| 20 | | | 11<br>12<br>13<br>16 | S-3 | 19.0<br>21.0 | 10 | | Medium dense, dray, beige, fine SAND, little Silt. |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**
- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**
**Station:**
**Rock:**
**Samples:**

**BORING MGA-10 (MW)**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST BORING LOG

# BORING MGA-10 (MW)

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 2 of 2

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 9<br>11<br>12<br>14 | S-4 | 24.0<br>26.0 | 10 | | Medium dense, beige, fine SAND, little Silt.<br><br>[Borehole advanced using open hole drilling techniques from 24' to bottom of boring] |
| 28 | | | 9<br>12<br>16<br>19 | S-5 | 29.0<br>31.0 | 10 | | Medium dense, beige, fine SAND, little Silt.<br><br>-SAND- |
| 32 | | | 7<br>12<br>17<br>17 | S-6 | 34.0<br>36.0 | 11 | | Medium dense, beige, fine to medium SAND, little Silt. |
| 36 | | | 12<br>16<br>19<br>21 | S-7 | 39.0<br>41.0 | 12 | | Dense, beige, fine to medium SAND, trace Silt. |
| 40 | | | | | | | 136.0<br>41.0 | BOTTOM OF BORING AT 41 FEET. |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-10 (MW)**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING MGA-11 |
|---|---|---|

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.
**CONTRACTOR:** Subsurface Drilling & Remediation, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 1 of 2
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 175'±
**DATE START :** 6/10/10
**END :** 6/10/10
**DRILLER :** Phil Thornsbury
**ENGINEER :** Sherry Holmes

| GROUNDWATER | | DEPTH (ft) OF: | | | EQUIPMENT | CASING | SAMPLER | CORE |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Water | Casing | Hole | Type | HW | Split Spoon | --- |
| | | | | | Size I.D. | 4" | 1-3/8" | --- |
| | | | | | Hammer Wt. | 300# | 140# | - - - - |
| | | | | | Hammer Fall | 24" | 30" | - - - - |

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | |
| 4 | | | | | | | | | |
| 8 | | | | | | | | | |
| 12 | | | | | | | | | |
| 16 | | | | | | | | | |
| | | | | | | | | 156.0 | |
| 20 | | | 9<br>14<br>21<br>18 | S-1 | | 19.0<br>21.0 | 14 | 19.0 | Dense, beige, fine SAND, little Silt.<br><br>-SAND- |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-11**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST BORING LOG | BORING MGA-11 |
|---|---|---|

**PROJECT:** Danforth Green Basins, River Path Drive, Framingham, MA
**CLIENT:** Vanasse Hangen Brustlin, Inc.

**MGA NO. :** G0232
**SHEET NO. :** 2 of 2

| Depth in Feet | Strata Change | Case BPF (Drill) (min/ft) | Sampler Blows Per 6" (RQD%) | Sample Number/ Type | Sample Depth Range (ft) | Sample Recov-ery (in) | Elev-ation/ Depth (ft) | FIELD CLASSIFICATION AND REMARKS |
|---|---|---|---|---|---|---|---|---|
| 24 | | | 13<br>16<br>12<br>11 | S-2 | 24.0<br>26.0 | 9 | | Medium dense, beige, fine SAND and SILT.<br><br>[Borehole advanced using open hole drilling techniques from 26' to bottom of boring] |
| 28 | | | 12<br>19<br>21<br>21 | S-3 | 29.0<br>29.9 | | | Dense, beige, fine SAND, little Silt.<br><br>-SAND- |
| 32 | | | 21<br>23<br>30<br>30 | S-4 | 34.0<br>36.0 | 10 | | Very dense, beige, fine SAND, trace Silt. |
| 36 | | | 19<br>21<br>25<br>29 | S-5 | 39.0<br>41.0 | 9 | | Dense, beige, fine SAND, trace Silt. |
| 40 | | | | | | | 134.0<br>41.0 | BOTTOM OF BORING AT 41 FEET. |
| 44 | | | | | | | | |
| 48 | | | | | | | | |
| 52 | | | | | | | | |

| BLOWS/FT. | DENSITY |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| 50 + | Very Dense |

| BLOWS/FT. | CONSISTENCY |
|---|---|
| 0 - 2 | Very Soft |
| 2 - 4 | Soft |
| 4 - 8 | Medium Stiff |
| 8 - 15 | Stiff |
| 15 - 30 | Very Stiff |
| 30+ | Hard |

**SAMPLE IDENTIFICATION**

- S - Split Spoon
- T - Thin Wall Tube
- U - Undisturbed Piston
- C - Diamond Core
- B - Bulk/Grab Sample

**SUMMARY**

**Station:**
**Rock:**
**Samples:**

**BORING MGA-11**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|
| **Strata symbols** | |
| | Fill |
| | Sand and Gravel |
| | Sand & Silt |
| | Sand |
| | Topsoil |
| | Glacial Till |
| **Soil Samplers** | |
| | Split Spoon |

**Notes:**

1. Test borings performed by Subsurface Drilling & Remediation, Inc. between June 9 and 22, 2010 using a truck-mounted or track-mounted drilling rig equipped with a 140# safety hammer.

2. Test boring elevations estimated from surveyed elevations provided by Vanasse Hangen Brustlin, Inc. and should be considered approximate.

3. Test borings observed and logged by MGA.

# APPENDIX D: MGA TEST PIT LOGS

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-1

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

| GROUNDWATER | | | |
|---|---|---|---|
| Date | Time | Depth (ft.) | Notes |
| 10/5/12 | 0830 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174.2'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>2.0 | | Brown, fine to coarse SAND, trace fine Gravel, trace Silt.<br><br>-FILL-<br>Dark brown, fine SAND and SILT, little fine to coarse Gravel. | |
| | | S-2 | 2.0<br>4.0 | | | |
| 4 | | S-3 | 4.0<br>8.0 | 170.2<br>4.0 | Light brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt.<br><br>-SAND- | |
| 8 | | | | 166.2<br>8.0 | BOTTOM OF TEST PIT AT 8 FEET. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 14' Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. TP-1**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-2

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/5/12 | 0845 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 174.2'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>3.0 | 171.2 | Dark brown, fine to coarse SAND, trace fine Gravel, trace Silt, trace Cobbles.<br>-FILL- | |
| 4 | | S-2 | 3.0<br>10.0 | 3.0 | Light brown, fine SAND, little fine to coarse Gravel, little Silt.<br>-SAND & SILT- | |
| 8 | | | | 164.2 | | |
| 12 | | | | 10.0 | BOTTOM OF TEST PIT AT 10 FEET. | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 12' Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. TP-2**

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-3

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/5/12 | 1045 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 165'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | 164.0 | Dark brown, fine SAND and SILT. | |
| | | | | 1.0 | -TOPSOIL- | |
| | | S-1 | 1.0 | | | |
| | | | 8.0 | | Tan, fine to medium SAND, some Silt, trace fine to coarse Gravel. | |
| 4 | | | | | -SILTY SAND- | |
| | | | | | | |
| | | | | | | |
| 8 | | | | 157.0 | | |
| | | | | 8.0 | BOTTOM OF TEST PIT AT 8 FEET. | |
| | | | | | | |
| | | | | | | |
| 12 | | | | | | |
| | | | | | | |
| | | | | | | |
| 16 | | | | | | |
| | | | | | | |
| | | | | | | |
| 20 | | | | | | |
| | | | | | | |
| | | | | | | |
| 24 | | | | | | |

**TEST PIT DIMENSIONS**

Width: 3' Feet

Length: 8' Feet

**BOULDERS**

6" to 18" Diameter= 0
18" to 36" Diameter= 0
Over 36" Diameter= 0
(number)

**SAMPLE IDENTIFICATION**

- B - Bag
- J - Jar
- P - Percolation Test

**SUMMARY**

**Overburden:**
**Rock:**
**Samples:**

**TEST PIT NO. TP-3**

1125 Main Street, Hanover, MA 02339 | Telephone 781.982.2881 | Fax 781.735.0418 | mcardlegannon.com

McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-4

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/5/12 | 1110 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 160.8'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>6.0 | | Tan, fine to coarse SAND, little fine to coarse Gravel, trace Silt. | |
| | | | | | -FILL- | |
| 4 | | | | 154.8 | | |
| | | S-2 | 6.0<br>8.0 | 6.0 | Tan, SILT, trace fine Sand. | |
| 8 | | | | 152.8<br>8.0 | -SILT-<br>BOTTOM OF TEST PIT AT 8 FEET. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 10' Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. TP-4**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-5

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

| GROUNDWATER | | | |
|---|---|---|---|
| Date | Time | Depth (ft.) | Notes |
| 10/5/12 | 1220 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 165.5'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>2.0 | | Gray, fine to coarse GRAVEL and fine to coarse SAND, little Silt. | |
| | | S-2 | 2.0<br>5.0 | | Brown, fine to coarse SAND, some fine to coarse Gravel, little (+) Silt. | |
| 4 | | | | 160.5 | -FILL- | |
| | | S-3 | 5.0<br>8.0 | 5.0 | Brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. | |
| | | | | | -SAND- | |
| 8 | | S-4 | 8.0<br>10.0 | 157.5<br>8.0 | Brown, fine SAND and SILT. | |
| | | | | 155.5 | -SAND & SILT- | |
| | | | | 10.0 | BOTTOM OF TEST PIT AT 10 FEET. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 10' Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. TP-5**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-6

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

GROUNDWATER

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/5/12 | | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 165.3'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>3.0 | 162.3 | Gray, fine to coarse SAND, some Silt, some fine to coarse Gravel.<br>-FILL- | |
| 4 | | S-2 | 3.0<br>10.0 | 3.0 | Brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt.<br>-SAND & GRAVEL- | |
| 8 | | | | 155.3 | | |
| | | | | 10.0 | BOTTOM OF TEST PIT AT 10 FEET. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 8' Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. TP-6**

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Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-7

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/5/12 | 1400 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 198'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>10.0 | | Gray, fine to coarse GRAVEL, some fine to coarse Sand, little Silt.<br><br>-FILL- | |
| 4 | | | | | | |
| 8 | | | | 188.0 | | |
| | | | | 10.0 | BUCKET REFUSAL AT 10 FEET IN FILL. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

**TEST PIT DIMENSIONS**

Width: 3' Feet
Length: 8' Feet

**BOULDERS**

6" to 18" Diameter= 0
18" to 36" Diameter= 0
Over 36" Diameter= 0
(number)

**SAMPLE IDENTIFICATION**

- B - Bag
- J - Jar
- P - Percolation Test

**SUMMARY**

**Overburden:**
**Rock:**
**Samples:**

**TEST PIT NO. TP-7**

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Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-8

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

| GROUNDWATER | | | |
|---|---|---|---|
| Date | Time | Depth (ft.) | Notes |
| 10/5/12 | 1420 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 196'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>12.0 | | Gray,fine to coarse SAND, some fine to coarse Gravel, little Silt.<br><br>-FILL- | |
| 12 | | | | 184.0<br>12.0 | BUCKET REFUSAL AT 12 FEET IN FILL. | |

0
4
8
12
16
20
24

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 10' Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. TP-8**

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Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-9

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

**GROUNDWATER**

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/5/12 | 1500 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 165.3'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>12.0 | | Gray/brown, fine to coarse SAND, some Silt, some fine to coarse Gravel, trace Cobbles, trace Wood.<br><br>-FILL-<br><br>[Wood obstructions at 12 feet] | |
| 12 | | | | 153.3<br>12.0 | BUCKET REFUSAL AT 12 FEET IN FILL. | |

4 8 16 20 24

**TEST PIT DIMENSIONS**

Width: 3' Feet
Length: 10' Feet

**BOULDERS**

6" to 18" Diameter= 0
18" to 36" Diameter= 0
Over 36" Diameter= 0
(number)

**SAMPLE IDENTIFICATION**

- B - Bag
- J - Jar
- P - Percolation Test

**SUMMARY**

**Overburden:**
**Rock:**
**Samples:**

**TEST PIT NO. TP-9**

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McArdle Gannon Associates, Inc.
Engineers & Consultants

# TEST PIT LOG

# TEST PIT NO. TP-10

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

| GROUNDWATER | | | |
|---|---|---|---|
| Date | Time | Depth (ft.) | Notes |
| 10/5/12 | 1515 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 165.5'±
**DATE START :** 10/5/12
**END :** 10/5/12
**ENGINEER :** Steve Marcassoli

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | S-1 | 0.0<br>12.0 | | Gray, fine to coarse GRAVEL, some fine to coarse Sand, little Silt, trace Cobbles.<br><br>-FILL- | |
| 12 | | | | 153.5<br>12.0 | BUCKET REFUSAL AT 12 FEET IN FILL. | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 3' Feet<br>Length: 10' Feet | 6" to 18" Diameter= 0<br>18" to 36" Diameter= 0<br>Over 36" Diameter= 0<br>(number) | - B - Bag<br>- J - Jar<br>- P - Percolation Test | **Overburden:**<br>**Rock:**<br>**Samples:** |

**TEST PIT NO. TP-10**

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# TEST PIT LOG

# TEST PIT NO. TP-11

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

GROUNDWATER

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/3/12 | 1520 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 160'±
**DATE START :** 10/3/12
**END :** 10/3/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | Brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. | See Pictures 1 & 2 |
| | | | | | -FILL- | |
| | | | | 158.0 | | |
| | | | | 2.0 | [South Side] Gray CLAYEY SILT, little Wood, Roots (Sediment from Soil Wash Operation) -FILL- | |
| 4 | | | | | Brown fine to coarse SAND & fine to coarse GRAVEL, trace Silt 10% Cobbles -SAND & GRAVEL- | |
| 8 | | | | | | |
| | | | | 150.0 | | |
| | | | | 10.0 | Tan SILT, little fine Sand. | |
| 12 | | | | | -SILT- | |
| | | | | 144.0 | | |
| 16 | | | | 16.0 | Bottom of Test Pit at 16 feet. | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 6' Feet | 6" to 18" Diameter= 0 | - B - Bag | **Overburden:** |
| Length: 15' Feet | 18" to 36" Diameter= 0 | - J - Jar | **Rock:** |
| | Over 36" Diameter= 0 (number) | - P - Percolation Test | **Samples:** |

**TEST PIT NO. TP-11**

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| McArdle Gannon Associates, Inc. Engineers & Consultants | TEST PIT LOG | TEST PIT NO. TP-12 |
|---|---|---|

**PROJECT:** Danforth Green, Riverpath Drive, Framingham, MA
**CLIENT:** Danthforth Green LLC
**CONTRACTOR:**

**EQUIPMENT:** Caterpillar 315D Excavator

**OPERATOR:** Todd Wells

GROUNDWATER

| Date | Time | Depth (ft.) | Notes |
|---|---|---|---|
| 10/4/12 | 1333 | --- | Not Encountered |
| | | | |

**MGA NO. :** G0232.02
**SHEET NO. :** 1 of 1
**LOCATION N :** See Plan
**E :**
**ELEVATION :** 175'±
**DATE START :** 10/4/12
**END :** 10/4/12
**ENGINEER :** John Gannon

| Depth in Feet | Strata Change | Sample Number/ Type | Sample Depth Range (ft) | Elev-ation/ Depth (ft) | SOIL DESCRIPTION (BURMISTER IDENTIFICATION) | NOTES |
|---|---|---|---|---|---|---|
| 0 | | | | | [2 inches of 1.5" Crushed stone at surface] Brown, fine to coarse SAND, little Silt, trace fine to coarse Gravel, trace Roots. -FILL- | |
| | | | | 173.0 2.0 | Tan, fine to coarse GRAVEL and fine to coarse SAND, little (+) Cobbles, trace Silt. -SAND & GRAVEL- | |
| 4 | | | | 171.0 4.0 | Tan, fine to coarse SAND, little fine Gravel, trace (-) Silt. -SAND- | |
| | | | | 169.0 6.0 | Tan/yellow, fine SAND, little (+) Silt. -SILTY SAND- | |
| 8 | | | | 168.0 7.0 | BOTTOM OF TEST PIT AT 7 FEET. | |
| 12 | | | | | | |
| 16 | | | | | | |
| 20 | | | | | | |
| 24 | | | | | | |

| TEST PIT DIMENSIONS | BOULDERS | SAMPLE IDENTIFICATION | SUMMARY |
|---|---|---|---|
| Width: 5' Feet | 6" to 18" Diameter= 0 | - B - Bag | **Overburden:** |
| Length: 8' Feet | 18" to 36" Diameter= 0 | - J - Jar | **Rock:** |
| | Over 36" Diameter= 0 (number) | - P - Percolation Test | **Samples:** |
| | | | **TEST PIT NO. TP-12** |

# KEY TO SYMBOLS

| Symbol | Description |
|---|---|
| **Strata symbols** | |
| | Fill |
| | Sand |
| | Silty sand |
| | Topsoil |
| | Silt |
| | Sand and Gravel |
| **Soil Samplers** | |
| | Bulk/Grab sample |

**Notes:**

1. Silversmith Excavating Co., Inc. of Wilmington, MA excavated the test pits between October 3 and 5, 2012 with a Caterpillar 315D excavator.

2. MGA estimated the test pit elevations from spot grades provided by VHB and ground surface contours shown plans prepared by VHB. Elevations are approximate.

3. MGA personnel observed and logged the test pits.

# APPENDIX E: TEST PIT PICTURES

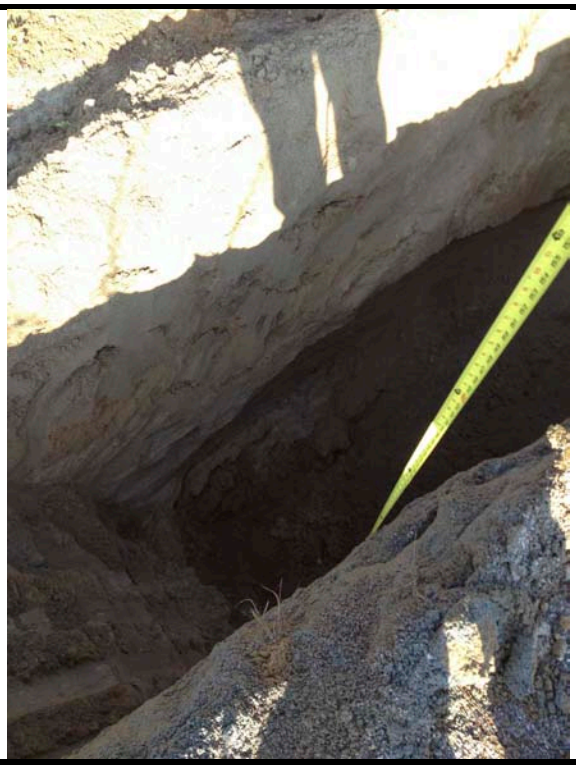

**Photo #1** Looking north at test pit TP-1.

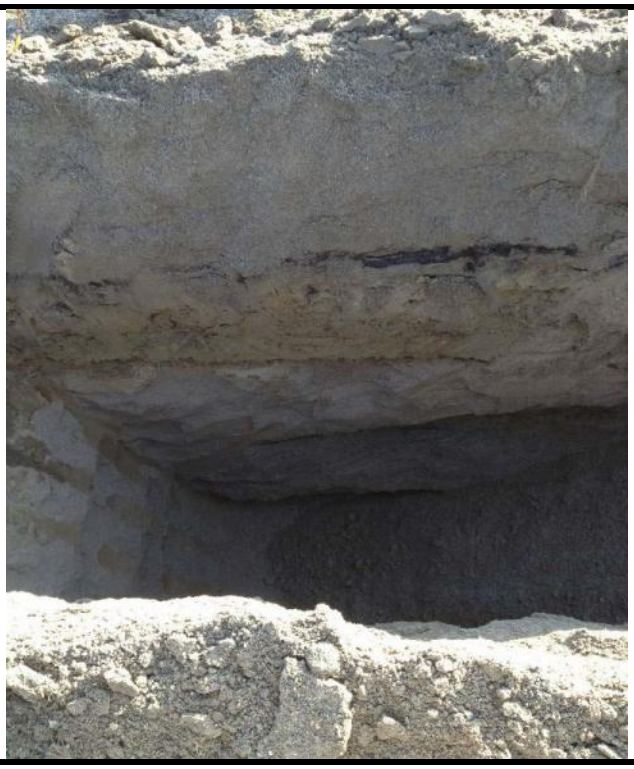

**Photo #2** Looking north at test pit TP-1.

**Photo #3** Looking west at test pit TP-1.

**Photo #4** Looking north at test pit TP-2.

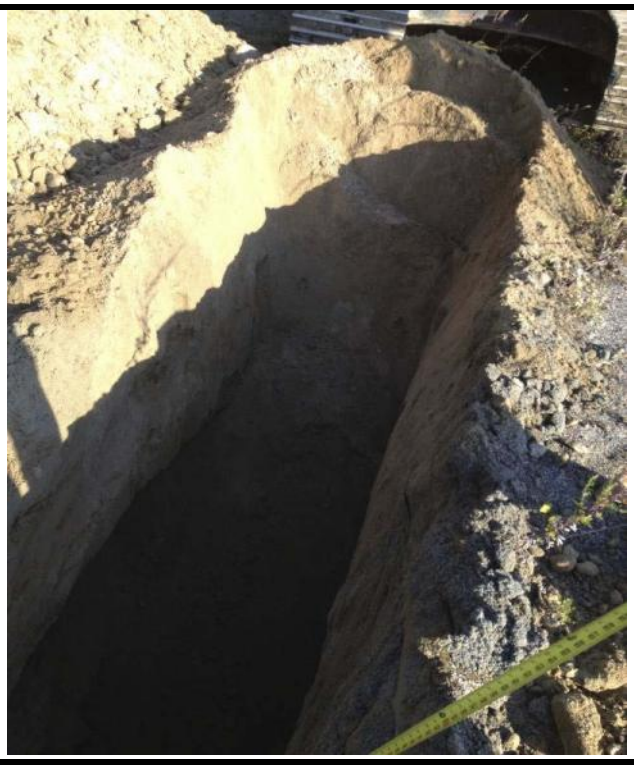

**Photo #5** Looking east at test pit TP-2.

**Photo #6** Looking at soil excavated from test pit TP-2.

**Photo #7** Looking west at test pit TP-3.

**Photo #8** Looking west at test pit TP-4.

**Photo #9** Looking west at test pit TP-5.

**Photo #10** Looking west at test pit TP-5.

**Photo #11** Looking west at test pit TP-6.

**Photo #12** Looking west at test pit TP-7.

**Photo #13** Looking east at test pit TP-8.

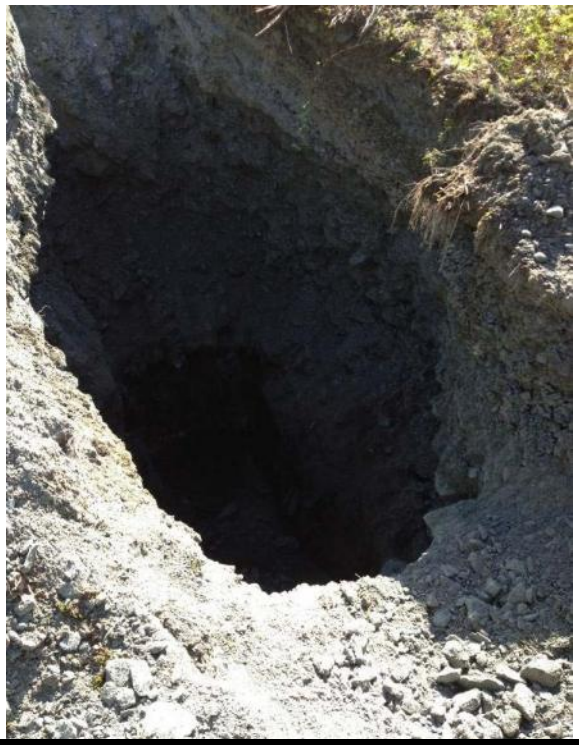

**Photo #14** Looking north at test pit TP-8.

| | |
|---|---|
| | **Photo #15** Looking at test pit TP-12. |

# APPENDIX F: UTS TEST BORING AND TEST PIT LOGS

# GLOUCESTER VILLAGE

FRAMINGHAM, MA

## LEGEND

- UTP# — TEST PIT LOCATION 1–94 (JUNE 2005)
- UTB# — SOIL BORING LOCATION 1–16 (JUNE 2005)

FILL DEPTHS

- < 4'
- 4' – 10'
- 10' – 18'
- > 18'

**GROUP I** (near NWRA shaft along NW section of site)
Tunnel Rock Fill (5-14 ft)
Dark Grey, compact, f-m SAND & GRAVEL, little Silt;
The fill was spread, graded then seeded.
Northern perimeter limits of fill visibly apparent.
Remnant and discontinuous subsoil horizon (1-12 inches)
Parent, stratified, silty sand and/or sandy silt (Fluvial Deposits)
Groundwater >12-15 ft below grade

**GROUP II** (located along NE section of site near the Sudbury River)
Uncontrolled Fill (7-14 ft)
Fill varies in composition but generally consists of dark brown, loamy, silty SAND with cobbles, wood, organics, trash, auto parts, stumps, boulders, trash, landscape debris, rubble, metal, etc.
Northern and eastern perimeter limits of fill visibly apparent.
Fill is underlain by fine silty sand (Fluvial Deposits) with lesser amounts of gravelly sand;
Groundwater is about 13-18 ft below grade.

**GROUP III** (along eastern portion of site near the abandoned Birch Road Well Field)
Uncontrolled Fill ( 25-30 ft)
Fill varies from (1) clean, silty SAND, little Gravel, (2) dark brown, loamy, silty SAND, trace wood, metal, organics, plastic, tires, etc. (3) clayey silt (suspect dredge materials from the siltation ponds) and (4) extensive concrete debris: Fill varies from loose to compact.
Perimeter limits of fill visibly apparent.
Fill is underlain by limited fluvial deposits which include silty sand, gravelly sands and/or sandy silt. Presumed bedrock refusal at depths of 30-40 ft.
Groundwater typically greater than 30 -40 ft.

**GROUP IV** (near former precast plant being razed from property)
Uncontrolled Fill ( 10-20 ft)
An uncontrolled, localized fill which includes silty SAND mixed with organics, concrete, tires, concrete, rubble, metal, etc.
Fill is underlain by fluvial deposit which include silty sand, gravelly sand and/or sandy silt.
Groundwater greater than 20 ft below grade

**GROUP V** (along western site perimeter near Sudbury River)
Uncontrolled Fill ( 12-28 ft)
Uncontrolled fill which includes a dark brown, loose, loamy , silty SAND with varying gravel, organics, concrete, wood, stumps, plastic, rubble, car parts, metal, boulders, etc.
The unsuitable fill is expected to be localized and extend below the western portions of the Group VI stockpile (summarized below) based o n other explorations in the area.
Parent soils generally include a fine sand and silt (fluvial deposits) with lesser amounts of gravelly sand or sandy gravel.
Groundwater greater than 20 -30 ft below grade.

**GROUP VI** (stockpiled or embanked fill along southwestern portion of the site)
There is an expansive stockpile or embankment about 35 -40 ft in height in this area based on topographic survey. No explorations were completed atop this pile but several test pits were excavated into the sides of the embankment. As such, only limited exploration was completed in this area. The test pits generally indicate clean soils which include the tunnel rock fill (Group I) and/or fine to medium SAND, some Gravel, little Silt, Cobbles. The fill is underlain by the former subsoil horizon and, in some cases, by both the organic topsoil and subsoil. The parent soils include silty sand, gravelly sands and/or sandy silt. Groundwater greater than 20 -30 ft below the toe of the embankment.

**GROUP VII** (located along eastern perimeter of site)
Shallow Bedrock ( 0-6 ft)
A limited quarry excavation with exposed bedrock cuts. Some of the exposed bedrock is about 15 -20 ft in height.

**GROUP VIII** (Elsewhere)
Variable Fill ( 0-8 ft)
The remainder of the site include areas of limited fill or undeveloped areas which are overlain with the parent organic soils.
These areas may include localized, uncontrolled fills associated with the gravel pit operation, roadways, site buildings, USTs, underground utilities, etc.
Many areas are covered with localized stockpiles which precluded review of the subgrade conditions. There was one area located on the southern portion the site which is covered by a huge pile of crushed stone fill. There are also large piles and/or embankments around the existing crushing operation which are suspected to be removed and fed into the crusher. Some of these piles or embankments contain a preponderance of boulders varying from about 2-6 ft in size (test pits UTP -40 ft 41). These test pits were excavated to depths of 18 -20 ft and did not penetrate the embanked fill in this area.

NOTE: SOIL TESTING PERFORMED BY U.T.S. OF MASSACHUSETTS, INC.
5 RICHARDSON LANE, STONEHAM, MA 02180


**Marchionda** & Associates, L.P.
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Email: engineering@marchionda.com
Website: www.marchionda.com


REVISIONS

# FIGURE 2
# SUBSURFACE EXPLORATION LOCATION PLAN

| | |
|---|---|
| SCALE: | 1"=100'-0" |
| JOB: | |
| FILE: UTS SOIL TESTING | |
| DRAWN: | RA |
| CHECKED: | JB |
| DATE: | 6.15.05 |

# TEST BORING LOG

SHEET 1

| | | |
|---|---|---|
| Soil Exploration Corp.<br>Geotechnical Drilling<br>Groundwater Monitor Well<br>148 Pioneer Drive<br>Leominster, MA 01453<br>978 840-0391 | **Universal Testing Services, Inc.**<br>**Site: Glouster Village**<br>**Framingham, MA** | BORING UTB-7<br>PROJECT NO.<br>DATE: June 10, 2005 |

Ground Elevation:
Date Started: June 1, 2005
Date Finished: June 1, 2005
Driller: T. Flores
Soil Engineer/Geologist: J. McCarthy

GROUNDWATER OBSERVATIONS

| DATE | DEPTH | CASING | STABILIZATION |
|---|---|---|---|
| | 10' | | UPON |
| | | | COMPLETION |
| | | | |

| Depth Ft. | Casing bl/ft | Sample No. | Pen/Rec | Sample Depth | Blows/6" | Strata | Visual Identification of Soil and / or Rock Sample |
|---|---|---|---|---|---|---|---|
| 1 | | 1 | 12" | 0'0"-2'0" | 11-17-29-18 | | Dense to Medium dense to very dense F to C sand, F gravel, some inorganic silt. (FILL) |
| | | 2 | 14" | 2'0"-4'0" | 6-5-6-9 | | |
| 5 | | 3 | 12" | 4'0"-5'2" | 14-20-100/2" | 5'-2" | Concrete. (FILL) |
| | | 4 | 12" | 7'0"-9'0" | 16-24-36-30 | 6'-6" | Very dense F to C sand, F to C gravel, cobbles, brick fragments, some inorganic silt. (FILL) |
| 10 | | 5 | | 9'0"-10'6" | 8-8-11-10 | 9'0" | Medium dense F to C sand, trace F gravel, trace inorganic silt. |
| | | 5A | 6" | 10'6"-11'0" | 14 | 10'-6" | Medium dense F sand and inorganic silt. Wet |
| 15 | | 6 | 12" | 14'0"-16'0" | 8-10-10-12 | | |
| 20 | | 7 | 16" | 19'0"-21'0" | 9-16-22-18 | 21'0" | End of boring at 21'0" with hollow stem auger.<br>Water level at 10'0" upon completion. |
| 25 | | | | | | | |
| 30 | | | | | | | |
| 35 | | | | | | | |
| 39 | | | | | | | |

Notes: Hollow Stem Auger Size - 4-1/4"

Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V Dense.
Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M Stiff 8 -15 Stiff, 15 -30 V. Stiff, 30 + Hard.

| | |
|---|---|
| Trace | 0 to 10% |
| Little | 10 to 20% |
| Some | 20 to 35% |
| And | 50% or More |

| | CASING | SAMPLE | CORE TYPE |
|---|---|---|---|
| ID SIZE (IN) | | S/S | |
| HAMMER WGT (LB) | | 140 Lb | |
| HAMMER FALL (IN) | | 30" | |

# TEST BORING LOG

SHEET 1

| | | |
|---|---|---|
| Soil Exploration Corp.<br>Geotechnical Drilling<br>Groundwater Monitor Well<br>148 Pioneer Drive<br>Leominster, MA 01453<br>978 840-0391 | **Universal Testing Services, Inc.**<br>**Site: Glouster Village**<br>**Framingham, MA** | BORING UTB-14<br>PROJECT NO.<br>DATE: June 10, 2005 |

Ground Elevation:
Date Started: June 2, 2005
Date Finished: June 2, 2005
Driller: G. Guinto
Soil Engineer/Geologist: J. McCarthy

GROUNDWATER OBSERVATIONS

| DATE | DEPTH | CASING | STABILIZATION |
|---|---|---|---|
| | N/A | | |
| | | | |
| | | | |

| Depth Ft. | Casing bl/ft | Sample No. | Sample Pen/Rec | Sample Depth | Sample Blows/6" | Strata | Visual Identification of Soil and / or Rock Sample |
|---|---|---|---|---|---|---|---|
| 1 | | 1 | | 0'0"-2'0" | 5-4-5-5 | | Medium dense to loose dry to moist F/C sand, loam, topsoil, trace plastic. |
| 5 | | 2 | | 5'0"-7'0" | 10-12-17-12 | | |
| 10 | | 3 | | 10'-12'0" | 2-2-2-2 | | (UNCONTROLLED FILL) |
| 15 | | 4 | | 15'0"-17'0" | 2-3-3-6 | | |
| 20 | | 5 | | 20'0"-22'0" | 9-15-17-10 | | |
| | | | | | | 23'0" | |
| 25 | | 6 | | 25'0"-27'0" | 4-4-5-6 | | Medium dense dry F/M sand |
| | | | | | | 28'0" | |
| 30 | | 7 | | 30'0"-32'0" | 17-30-31-46 | | Medium dense dry F/C sand, F/C gravel, trace inorganic silt |
| | | | | | | 34'0" | End of boring at 34'0" auger refusal. |
| 35 | | | | | | | No Water upon completion. |
| 42 | | | | | | | PRESUMED BEDROCK |

Notes: Hollow Stem Auger Size - 4-1/4"

| | | | | | |
|---|---|---|---|---|---|
| Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, | Trace | 0 to 10% | | CASING | SAMPLE | CORE TYPE |
| 10 -30 M Dense, 30 -50 Dense, 50+ V Dense. | Little | 10 to 20% | ID SIZE (IN) | | S/S | |
| Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M Stiff | Some | 20 to 35% | HAMMER WGT (LB) | | 140 Lb | |
| 8 -15 Stiff. 15 -30 V. Stiff. 30 + Hard. | And | 50% or More | HAMMER FALL (IN) | | 30" | |

# TEST BORING LOG

SHEET 1

| | | |
|---|---|---|
| Soil Exploration Corp.<br>Geotechnical Drilling<br>Groundwater Monitor Well<br>148 Pioneer Drive<br>Leominster, MA 01453<br>978 840-0391 | **Universal Testing Services, Inc.**<br>**Site: Glouster Village**<br>**Framingham, MA** | BORING UTB-15<br>PROJECT NO.<br>DATE: June 10, 2005 |

Ground Elevation:
Date Started: June 3, 2005
Date Finished: June 3, 2005
Driller: G. Guinto
Soil Engineer/Geologist: J. McCarthy

GROUNDWATER OBSERVATIONS

| DATE | DEPTH | CASING | STABILIZATION |
|---|---|---|---|
| | 31 ± | | UPON |
| | | | COMPLETION |
| | | | |

| Depth Ft. | Casing bl/ft | Sample No. | Sample Pen/Rec | Sample Depth | Sample Blows/6" | Strata | Visual Identification of Soil and / or Rock Sample |
|---|---|---|---|---|---|---|---|
| 1 | | 1 | | 0'0"-2'0" | 5-4-4-5 | | Loose to medium dense dry to wet F/M sand, inorganic silt, loam, wood. |
| 5 | | 2 | | 5'0"-7'0" | 4-4-5-5 | | |
| 10 | | 3 | | 10'-12'0" | 2-2-2-2 | | (UNCONTROLLED FILL) |
| 15 | | 4 | | 15'0"-17'0" | 10-12-17-11 | | |
| 20 | | 5 | | 20'0"-22'0" | 15-8-5-6 | | |
| 25 | | 6 | | 25'0"-27'0" | 4-5-5-5 | | |
| | | | | | | 28'0" | Medium dense wet F/C sand, some F/C gravel |
| 30 | | 7 | | 30'0"-31'6" | 7-11-11 | 31'6" | |
| | | 7A | | 31'6"-32'0" | 12 | | Medium dense to dense wet very Fine sand, some inorganic silt |
| 35 | | 8 | | 35'0"-37'0" | 18-18-23-27 | | |
| | | | | | | 37'0" | End of boring at 37'0"<br>Water at 31'0" upon completion. |
| 42 | | | | | | | |

Notes: Hollow Stem Auger Size - 4-1/4"

| | | | | | |
|---|---|---|---|---|---|
| Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V Dense. | Trace | 0 to 10% | | CASING | SAMPLE | CORE TYPE |
| Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M Stiff 8 -15 Stiff. 15 -30 V. Stiff. 30 + Hard. | Little | 10 to 20% | ID SIZE (IN) | | S/S | |
| | Some | 20 to 35% | HAMMER WGT (LB) | | 140 Lb | |
| | And | 50% or More | HAMMER FALL (IN) | | 30" | |

# TEST BORING LOG

SHEET 1

| | | |
|---|---|---|
| Soil Exploration Corp.<br>Geotechnical Drilling<br>Groundwater Monitor Well<br>148 Pioneer Drive<br>Leominster, MA 01453<br>978 840-0391 | **Universal Testing Services, Inc.**<br>**Site: Glouster Village**<br>**Framingham, MA** | BORING UTB-16<br>PROJECT NO.<br>DATE: June 10, 2005 |

Ground Elevation:
Date Started: June 3, 2005
Date Finished: June 3, 2005
Driller: G. Guinto
Soil Engineer/Geologist: J. McCarthy

GROUNDWATER OBSERVATIONS

| DATE | DEPTH | CASING | STABILIZATION |
|---|---|---|---|
| | N/A | | |
| | | | |
| | | | |

| Depth Ft. | Casing bl/ft | Sample No. | Sample Pen/Rec | Sample Depth | Sample Blows/6" | Strata | Visual Identification of Soil and / or Rock Sample |
|---|---|---|---|---|---|---|---|
| 1 | | 1 | | 0'0"-2'0" | 5-6-6-6 | | Medium dense dry F/C sand, some loam, trace wood, trace silt. |
| 5 | | 2 | | 5'0"-7'0" | 3-4-4-5 | | (UNCONTROLLED FILL) |
| 10 | | 3 | | 10'-12'0" | 7-7-8-7 | | |
| 15 | | 4 | | 15'0"-17'0" | 7-7-8-8 | 14'0" | Medium dense to dense dry F/C sand |
| 20 | | 5 | | 20'0"-22'0" | 11-15-18-19 | | |
| 25 | | 6 | | 25'0"-27'0" | 13-19-23-24 | | |
| 30 | | | | | | 27'0" | End of boring at 27'0"<br>No Water upon completion. |
| 35 | | | | | | | |
| 42 | | | | | | | |

Notes: Hollow Stem Auger Size - 4-1/4"

| | | | | | |
|---|---|---|---|---|---|
| Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, | Trace | 0 to 10% | | CASING | SAMPLE | CORE TYPE |
| 10 -30 M Dense, 30 -50 Dense, 50+ V Dense. | Little | 10 to 20% | ID SIZE (IN) | | S/S | |
| Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M Stiff | Some | 20 to 35% | HAMMER WGT (LB) | | 140 Lb | |
| 8 -15 Stiff. 15 -30 V. Stiff. 30 + Hard. | And | 50% or More | HAMMER FALL (IN) | | 30" | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 1<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYERED GRAVELLY SAND WITH COBBLES, MINOR ORGANICS, LITTLE SILT | D | | |
| 2 | 2' | (FILL) | D | | |
| 3 | | CLEAN SANDY GRAVEL, TRACE SILT | D | | |
| 4 | | | D | | |
| 5 | 5' | (NATURAL) | D | | |
| 6 | | CEMENTED SILTY SAND TRACE CLAY | STIFF | | |
| 7 | | | " | | |
| 8 | | | " | | |
| 9 | | | " | | |
| 10 | | END @ 10' NO REFUSAL | " | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 2<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | F/M SAND, SOME GRAVEL, LITTLE SILT, BRICK, STRUCT ST'L MEMBER | D | | |
| 2 | | | D | | |
| 3 | 3' | (FILL) | D | | |
| 4 | | SANDY GRAVEL W/ COBBLE, TRACE SILT (NATURAL) | D | | |
| 5 | | | D | | |
| 6 | | | D | | |
| 7 | | | D | | |
| 8 | 8' | | D | | |
| 9 | | CREMBLITED SILTY SAND, TRACE CLAY | STIFF | | |
| 10 | | END @ 12' NO REFUSAL | " | | |

**REMARKS:**

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|---|
| | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | | | F - Fine | E - Easy |
| L (FT) ____ | 6" - 18" | A | TRACE | 0-10% | M - Medium | M - Moderate |
| | | | | | C - Coarse | D - Difficult |
| W (FT) ____ | | | LITTLE | 10-20% | F/M - Fine to Medium | |
| | 18" - 36" | B | SOME | 20-35% | F/C - Fine to Coarse | |
| | 36" AND LARGER | C | AND | 35-50% | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 3<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAMINATED F/M SAND, SOME GRAVEL/COBBLE, CLEAN | D | | |
| 2 | | | D | | |
| 3 | 3' | (FILL) | D | | |
| 4 | | CLEAN SAND | E | | |
| 5 | 5' | (NATURAL) | E | | |
| 6 | | SANDY GRAVEL, TRACE SILT | D | | |
| 7 | | | D | | |
| 8 | | | D | | |
| 9 | | END @ 9' NO REFUSAL | D | | |
| | | | | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

| PROPORTIONS USED | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 4<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAMINATED F/M SAND, SOME GRAVEL, LITTLE SILT, CLEAN | D | | |
| 2 | | | D | | |
| 3 | | | D | | |
| 4 | | | D | | |
| 5 | 5' | (FILL) | D | | |
| 6 | | CLEAN SAND | E | | |
| 7 | 7' | (NATURAL) | E | | |
| 8 | | SANDY GRAVEL, TRACE SILT | D | | |
| 9 | | | D | | |
| 10 | | END @ 11' NO REFUSAL | D | | |

**REMARKS:**

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND:
BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 5<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYERED F/M SAND, SOME GRAVEL, LITTLE SILT, CLEARS (FILL) | D | | |
| 2 | | | D | | |
| 3 | | | D | | |
| 4 | | | D | | |
| 5 | | | D | | |
| 6 | | | D | | |
| 7 | 7' | | D | | |
| 8 | | BURIED FOREST MAT & SUBSOIL W/ EMBEDDED BOULDERS | M | | |
| 9 | | | M | | |
| 10 | | | M | | |

**REMARKS:** Cont'd Pg. 2

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP-5
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | Cont'd. | M | | |
| 12 | 12 | (Buried Organics) | M | | |
| 13 | | FINE SAND & SILT | STIFF | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | END @ 19' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 6<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYERED F/M SAND, | D | | |
| 2 | | SOME GRAVEL, | | | |
| 3 | | LITTLE SILT, CLEAN | | | |
| 4 | | (FILL) | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | 8' | | | | |
| 9 | 9' | BURIED SUBSOIL | M | | |
| 10 | | MINOR ROOTS<br>FINE SAND & SILT (NATURAL) | STIFF | | |

**REMARKS:** END @ 12' NO REFUSAL

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | PROPORTIONS USED | | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|---|
| L (FT) ____ | 6" - 18" | A | TRACE | 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 18" - 36" | B | LITTLE | 10-20% | M - Medium | M - Moderate |
| | 36" AND LARGER | C | SOME | 20-35% | C - Coarse | D - Difficult |
| | | | AND | 35-50% | F/M - Fine to Medium | |
| | | | | | F/C - Fine to Coarse | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 7<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>WET @ 12' |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 3' | LAYERED F/M SAND, SOME GRAVEL, LITTLE SILT (FILL) | D | | |
| 2 | | | D | | |
| 3 | | | D | | |
| 4 | | AS ABOVE W/ INTERMIXED BOULDERS, CONCRETE, METAL, CAR FRAME, TIMBER, WOOD, BRICK | VOIDED | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | L | | |

**REMARKS:** CONT'D PG. 2

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND: BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP- 7
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D | " | | |
| 12 | 12' TO 15' | | " | | |
| 13 | | | " | | |
| 14 | | (FILL) | " | | |
| 15 | | LT. BROWN FINE SAND & SILT (NATURAL) | " | | |
| | | END @ 15' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 8<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE / DEPTH (FT) / TIME<br>WET @ 12' |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 3' | LAYERED F/M SAND, SOME GRAVEL, LITTLE SILT (FILL) | D | | |
| 2 | | | D | | |
| 3 | | | D | | |
| 4 | | AS ABOVE W/ NESTED BOULDERS, CONCRETE, METAL, CAR FRAME, REBAR, WOOD, BRICK | VOIDED | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | L | | |

**REMARKS:** CONT'D PG. 2

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND:
BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP-8
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D | " | | |
| 12 | 12' TO 15' | | " | | |
| 13 | | | " | | |
| 14 | | (FILL) | " | | |
| 15 | | LT. BROWN FINE SAND & SILT (NATURAL) | " | | |
| | | END @ 15' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 9<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYERED TUNNEL ROCK FILL | D | | |
| 2 | | 3" MINUS F-C GRAVEL & SAND, LITTLE SILT | D | | |
| 3 | 3' | (FILL) | D | | |
| 4 | 4'-6" | F/M SAND, LITTLE SILT, TRACE GRAVEL, LT. BRN (FILL) | D | | |
| 5 | | | M | | |
| 6 | | LOOSE/MED. DENSE F/M/C SAND TRACE GRAVEL, TRACE SILT, CLEAN | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | ~ | | |

**REMARKS:** CONT'D PG. 2

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

| PROPORTIONS USED | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP-9
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D | M | | |
| 12 | | | " | | |
| 13 | 13' | (POSSIBLE FILL) | " | | |
| 14 | | LT. GRAY F-SAND, | STIFF | | |
| 15 | | SOME SILT, TRACE GRAVEL (NATURAL) | " | | |
| | | END @ 15' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 10<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LOOSE F/M SAND, SOME GRAVEL, ORGANICS, WOOD, PLASTIC, OCCASIONAL STUMPS, BRICK, LOAMY SILTY SAND | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

**REMARKS:** END @ 21' DID NOT PENETRATE FILL

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 11<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LOOSE F/M SAND, SOME GRAVEL, WOOD, PLASTIC, ORGANICS, LOAMY SILTY SAND | LOOSE VOIDED | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | 2 | | |

**REMARKS:** CONT'D. PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND 35-50% | F/M - Fine to Medium | |
| | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-11
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | " | | |
| 12 | 12' | (FILL) | " | | |
| 13 | | LT. BRN. F/M SAND, TRACE SILT, TRACE GRAVEL | M | | |
| 14 | | (NATIVE) | D | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 12<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | TOPSOIL / SUBSOIL | E | | |
| 2 | 2' | (ORGANICS) | E | | |
| 3 | | F/M/C SAND & | D | | |
| 4 | | GRAVEL, TRACE SILT | D | | |
| 5 | | (NATURAL) | D | | |
| 6 | | | D | | |
| | | END @ 6' NO REFUSAL | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND: BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS

- F - Fine
- M - Medium
- C - Coarse
- F/M - Fine to Medium
- F/C - Fine to Coarse

EXCAVATION EFFORT

- E - Easy
- M - Moderate
- D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 13<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LOOSE F/M SAND, SOME GRAVEL, ORGANICS, WOOD, PLASTIC, OCCASIONAL STUMPS, BRICK, LOAMY SILTY SAND | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

**REMARKS:** END @ 21' DID NOT PENETRATE FILL

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND: BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 14<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LOOSE F/M SAND, SOME GRAVEL, ORGANICS, WOOD, PLASTIC, OCCASIONAL STUMPS, BRICK, LOAMY SILTY SAND | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

**REMARKS:** END @ 21' DID NOT PENETRATE FILL

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND:
BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 22<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | BROWN F/M SAND, LITTLE SILT, ORGANICS, MINOR WOOD | LOOSE | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | 6' | (FILL) | | | |
| | | BURIED FOREST MAT SUBSOIL | E | | |
| | | | E | | |
| | 9' | (ORGANICS) | E | | |
| | | CLEAN SAND | E | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS

- F - Fine
- M - Medium
- C - Coarse
- F/M - Fine to Medium
- F/C - Fine to Coarse

EXCAVATION EFFORT

- E - Easy
- M - Moderate
- D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 23<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | BROWN F/M SAND, LITTLE SILT, ORGANICS, MINOR WOOD | LOOSE | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | 6' | (FILL) | | | |
| | | BURIED FOREST MAT SUBSOIL | E | | |
| | | | E | | |
| | 9' | (ORGANICS) | E | | |
| | | CLEAN SAND | E | | |

**REMARKS:** CAR FRAME @ SURFACE

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND:
BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP-23
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | ~ | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | 14' | (FILL) | | | |
| 15 | | FINE SAND AND SILT (NATURAL) | STIFF | | |
| | | END @ 15' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 44<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | CLEAN MATERIAL SAND TO 20' (COLLAPSE) | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-45<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYERED GRAVEL FILL 2" MINUS CHOKERS w/ SAND | D | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | 4' | (FILL) | | | |
| 5 | | BROWN F-SAND & SILT, TRACE GRAVEL, ORGANICS, ROOTS, VOIDED CONCRETE & METAL | LOOSE | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | ~ | | |

**REMARKS:** CONT'D PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND 35-50% | F/M - Fine to Medium | |
| | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-45
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D | T | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | 20' | (FILL) | ↓ | | |
| 21 | | CLEAN SAND & GRAVEL, TRACE SILT (NATURAL) | D | | |
| | | END AT 21' | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-46<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYER GRAVEL FILL 2" MINUS choked w/ SAND | D | | |
| 2 | | | \| | | |
| 3 | | | \| | | |
| 4 | 4' | (FILL) | ↓ | | |
| 5 | | BROWN F-SAND & SILT, TRACE GRAVEL, ORGANICS, ROOTS, VOIDED CONCRETE & METAL | LOOSE | | |
| 6 | | | \| | | |
| 7 | | | \| | | |
| 8 | | | \| | | |
| 9 | | | \| | | |
| 10 | | | 2 | | |

**REMARKS:** CONT'D Pg. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | | | |
| L (FT) ____ | 6" - 18" | A | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | | | LITTLE 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND 35-50% | F/M - Fine to Medium | |
| | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-46
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D | T | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | 20' | (FILL) | | | |
| 21 | | CLEAN SAND & GRAVEL, TRACE SILT (NATURAL) | D | | |
| | | END AT 21' | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 47<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | VOIDED FILL DEBRIS: 2 TIRES, CONCRETE, REBAR, METAL, F/M SAND, LITTLE GRAVEL, COBBLE, PLASTIC | M | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | 8'-6" | (FILL) | E | | |
| 10 | 10' | BURIED SUBSOIL (BURIED ORGANICS) | E | | |

**REMARKS:** CONT'D PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE | 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE | 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME | 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND | 35-50% | F/M - Fine to Medium | |
| | | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-47
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION CONT'D. | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | GRAY F-SAND & SILT, TRACE GRAVEL | STIFF | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | (NATURAL) | ↓ | | |
| | | END @ 20' NO REFUSAL | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 48<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | 3" MINUS GRAY/BLUE CRUSHED ROCK | D | | |
| 2 | | | D | | |
| 3 | | | D | | |
| 4 | | | D | | |
| 5 | 4'-6" | (FILL) | | | |
| 6 | | BROWN F/M/C SAND, SOME GRAVEL, TRACE SILT | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | 9' | (NATURAL) | | | |
| 10 | | LT. GRAY F-SAND, TRACE GRAVEL, SOME SILT, | MED. STIFF | | |

**REMARKS:** CONT'D PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE 10-20% | M - Medium<br>C - Coarse<br>F/M - Fine to Medium | M - Moderate<br>D - Difficult |
| | 18" - 36" | B | SOME 20-35% | F/C - Fine to Coarse | |
| | 36" AND LARGER | C | AND 35-50% | | |

TEST PIT No. UTP-48
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. OCCASIONAL COBBLE | ↓ | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | (NATURAL) | | | |
| | | END @ 19' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 49<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 2'-6" TO 5' | TOPSOIL & SUBSOIL (ORGANICS) | E | | |
| 2 | | | E | | |
| 3 | | | E | | |
| 4 | | | E | | |
| 5 | | F-SAND, SOME SILT, LITTLE GRAVEL (NATIVE) | E | | |
| | | | STIFF | | |
| | | END @ 5' NO REFUSAL | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND: BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-50<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAMPHIED TUNNEL ROCK FILL | D | | |
| 2 | | | D | | |
| 3 | 3' | (FILL) | D | | |
| 4 | | F/M SAND, LITTLE SILT, TRACE GRAVEL, LT. BRN (FILL) | D | | |
| 5 | 4'-6" | | M | | |
| 6 | | LOOSE/MED. DENSE F/M/C SAND, TRACE GRAVEL, TRACE SILT, CLEAN | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | L | | |

**REMARKS:** CONT'D PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND 35-50% | F/M - Fine to Medium | |
| | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-50
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D | M | | |
| 12 | | | " | | |
| 13 | 13' | (POSSIBLE FILL) | " | | |
| 14 | | LT. GRAY F-SAND, | STIFF | | |
| 15 | | SOME SILT, TRACE GRAVEL (NATURAL) | " | | |
| | | END @ 15' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 51<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | TUNNEL ROCK | M | | |
| 2 | | 3" minus F-C gravel & sand, little silt | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | 8' | (FILL) | | | |
| 9 | 8'-6" | REMNANT SUBSOIL | M | | |
| 10 | | GRAY F-SAND, SOME SILT, TRACE GRAVEL | STIFF | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND: BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS

- F - Fine
- M - Medium
- C - Coarse
- F/M - Fine to Medium
- F/C - Fine to Coarse

EXCAVATION EFFORT

- E - Easy
- M - Moderate
- D - Difficult

TEST PIT No. UTP- 51
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | STIFF | | |
| 12 | | | ↓ | | |
| 13 | | | | | |
| 14 | | (NATURAL) | | | |
| | | END @ 14' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 52<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 1'-6" | TOPSOIL / SUBSOIL | E | | |
| 2 | | | D | | |
| 3 | | F/M/C SAND & GRAVEL, TRACE SILT, FREQUENT COBBLES (CONTINUED) | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | L | | |

**REMARKS:** CONT'D. PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | | | |
| L (FT) ____ | 6" - 18" | A | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | | | LITTLE 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND 35-50% | F/M - Fine to Medium | |
| | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-52
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | D | | |
| 12 | | | D | | |
| 13 | | | D | | |
| 14 | | (CONTINUED) | D | | |
| | | END @ 14' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-53<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>8'-6" |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LOAMY TOPSOIL (ORGANICS) | E | | |
| 2 | 1'-6" | | E | | |
| 3 | 3' | LAYERED TUNNEL ROCK 3" MINUS (FILL) | D | | |
| 4 | | BURIED FOREST MAT / SUBSOIL (ORGANICS) | E | | |
| 5 | 4'-6" | | E | | |
| 6 | | F/M/C SAND, LITTLE F-GRAVEL, TRACE SILT | D | | |
| 7 | | | D | | |
| 8 | | | D | | |
| 9 | | (NATURAL) | D | | |
| | | END @ 8'-6" NO REFUSAL | | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS

- F - Fine
- M - Medium
- C - Coarse
- F/M - Fine to Medium
- F/C - Fine to Coarse

EXCAVATION EFFORT

- E - Easy
- M - Moderate
- D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 54<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>11'-6" |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYERED SAND/GRAVEL FILL | D | | |
| 2 | | | D | | |
| 3 | 3' | (FILL) | D | | |
| 4 | | F/M/C SAND, LITTLE F-GRAVEL, TRACE SILT | | | |
| 5 | | (NATURAL) | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | L | | |

**REMARKS:** CONT'D PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE | 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE | 10-20% | M - Medium<br>C - Coarse<br>F/M - Fine to Medium | M - Moderate |
| | 18" - 36" | B | SOME AND | 20-35%<br>35-50% | F/C - Fine to Coarse | D - Difficult |
| | 36" AND LARGER | C | | | | |

TEST PIT No. UTP-54
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | D | | |
| 12 | 11'-6" | (NATURAL) | D | | |
| 13 | | STIFF CLAYEY SILT | STIFF | | |
| 14 | | | ↓ | | |
| 15 | | | ↓ | | |
| 16 | | (NATURAL) | ↓ | | |
| | | END @ 16' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 55<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>11'-6" |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | LAYERED SAND/GRAVEL FILL | D | | |
| 2 | | | D | | |
| 3 | 3' | (FILL) | D | | |
| 4 | | F/M/C SAND, LITTLE F-GRAVEL, TRACE SILT | | | |
| 5 | | (NATURAL) | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | ↓ | | |

**REMARKS:** CONT'D PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE | 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE | 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME | 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND | 35-50% | F/M - Fine to Medium | |
| | | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-55
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | D | | |
| 12 | 11'-6" | (NATURAL) | D | | |
| 13 | | STIFF CLAYEY SILT | STIFF | | |
| 14 | | | ↓ | | |
| 15 | | | ↓ | | |
| 16 | | (NATURAL) | ↓ | | |
| | | END @ 16' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-56<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 4" | TOPPED ROCK 3" minus | D | | |
| 2 | 2' | BURIED FOREST MAT / SUBSOIL (ORGANICS) | E | | |
| 3 | | CLEAN SAND | F/M | | |
| 4 | | | F/M | | |
| 5 | 4'-6" | (MATURAL) | F/M | | |
| 6 | | CLAYEY SILT | STIFF | | |
| 7 | | (MATURAL) | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | L | | |

**REMARKS:** CONT'D. Pg. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND 35-50% | F/M - Fine to Medium | |
| | | | | F/C - Fine to Coarse | |

TEST PIT No. UTP-56
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | STIFF | | |
| 12 | | | ↓ | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | (CONTINUED) | | | |
| | | END @ 17' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 57<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 1' | TOPSOIL | E | | |
| 2 | 2'-6" | SUBSOIL | E | | |
| 3 | | F/M SAND, TRACE GRAVEL, TRACE SILT | D | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | 8' | (NATURAL) | | | |
| 9 | | CLAYEY SILT | STIFF | | |
| 10 | | (NATURAL) | " | | |

**REMARKS:** CONT'D. PG. 2

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | PROPORTIONS USED | | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|---|
| L (FT) ____ | 6" - 18" | A | TRACE | 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 18" - 36" | B | LITTLE | 10-20% | M - Medium | M - Moderate |
| | 36" AND LARGER | C | SOME AND | 20-35% 35-50% | C - Coarse<br>F/M - Fine to Medium<br>F/C - Fine to Coarse | D - Difficult |

TEST PIT No. UTP- 57
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | STIFF | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | (CONTINUED) | | | |
| | | END @ 17' NO REFUSAL | | | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 58<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 1' | TOPSOIL | E | | |
| 2 | | | E | | |
| 3 | 3' | SUBSOIL | E | | |
| 4 | | F/M/C SAND, TRACE | D | | |
| 5 | | F-GRAVEL, TRACE SILT | \| | | |
| 6 | | (NATURAL) | \| | | |
| 7 | | | \| | | |
| 8 | | | \| | | |
| 9 | | | \| | | |
| 10 | | | L | | |

**REMARKS:** cont'd. pg. 2

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

| PROPORTIONS USED | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP- 58
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | 11 | | |
| 12 | | (NATURAL) | 11 | | |
| | | END @ 12' NO REFUSAL | | | |
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# TEST PIT FIELD LOG

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|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 59<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 1' | TOPSOIL | E | | |
| 2 | | | E | | |
| 3 | 3' | SUBSOIL | E | | |
| 4 | | F/M/C SAND, TRACE | D | | |
| 5 | | F-GRAVEL, TRACE SILT | \| | | |
| 6 | | (NATURAL) | \| | | |
| 7 | | | \| | | |
| 8 | | | \| | | |
| 9 | | | \| | | |
| 10 | | | ⏚ | | |

**REMARKS:** CONT'D. PG. 2

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND:

| BOULDER COUNT SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

| PROPORTIONS USED | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP-59
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | " | | |
| 12 | | (NATURAL) | " | | |
| | | END @ 12' NO REFUSAL | | | |
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# TEST PIT FIELD LOG

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| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 73<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | TOPSOIL | E | | |
| 2 | 2'-6" | | E | | |
| 3 | | F/M SAND, LITTLE GRAVEL, LITTLE SILT | M | | |
| 4 | | | M | | |
| 5 | | | M | | |
| 6 | 6' TO 7' | (FILL) | M | | |
| 7 | | F/M SAND, TRACE SILT, TRACE GRAVEL, TAN | M | | |
| 8 | | | M | | |
| 9 | | (NATURAL) | M | | |
| 10 | | END @ 10' NO REFUSAL | M | | |

**REMARKS:**

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND:
BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-74<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | TOPSOIL | E | | |
| 2 | | | E | | |
| 3 | 2'-6" | | M | | |
| 4 | | F/M SAND, LITTLE GRAVEL, LITTLE SILT | M | | |
| 5 | | | M | | |
| 6 | 6' TO 7' | (FILL) | M | | |
| 7 | | F/M SAND, TRACE SILT, TRACE GRAVEL, TAN | M | | |
| 8 | | | M | | |
| 9 | | (NATURAL) | M | | |
| 10 | | END @ 10' NO REFUSAL | M | | |

**REMARKS:**

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND:
BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP- 89<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>9' |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | | SANDY GRAVEL F/M/C SAND, TRACE SILT (FILL) | D | | |
| 2 | 2'-6" | | D | | |
| 3 | | | D | | |
| 4 | | TUNNEL ROCK MIXED WITH GRAVEL & SAND (FILL) | D | | |
| 5 | | | D | | |
| 6 | | | D | | |
| 7 | | | D | | |
| 8 | 8'-9' | | D | | |
| 9 | | OLIVE BROWN MED. STIFF CLAYEY SILT | D | | |
| 10 | | | MED. STIFF | | |

**REMARKS:** END @ 15' NO REFUSAL

| TEST PIT DIMENSIONS | LEGEND: BOULDER COUNT | | PROPORTIONS USED | ABBREVIATIONS | EXCAVATION EFFORT |
|---|---|---|---|---|---|
| L (FT) ____ | SIZE RANGE CLASSIFICATION | LETTER DESIGNATION | TRACE 0-10% | F - Fine | E - Easy |
| W (FT) ____ | 6" - 18" | A | LITTLE 10-20% | M - Medium | M - Moderate |
| | 18" - 36" | B | SOME 20-35% | C - Coarse | D - Difficult |
| | 36" AND LARGER | C | AND 35-50% | F/M - Fine to Medium | |
| | | | | F/C - Fine to Coarse | |

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-90<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>8'-6" |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 1'-6" | LOAMY TOPSOIL (ORGANICS) | E | | |
| 2 | | | E | | |
| 3 | 3' | LAYERED TUNNEL ROCK (FILL) | D | | |
| 4 | 4'-6" | BURIED FOREST MAT / SUBSOIL (ORGANICS) | E | | |
| 5 | | | E | | |
| 6 | | F/M/C SAND, LITTLE F. GRAVEL, TRACE SILT | D | | |
| 7 | | | D | | |
| 8 | | (NATURAL) | D | | |
| 9 | | END @ 8'-6" NO REFUSAL | D | | |
| | | | | | |

**REMARKS:**

TEST PIT DIMENSIONS

L (FT) ____

W (FT) ____

LEGEND: BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME | 20-35% |
| AND | 35-50% |

ABBREVIATIONS

F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

# TEST PIT FIELD LOG

| | | |
|---|---|---|
| **UNIVERSAL TESTING SERVICES, INC** | **PROJECT:** GLOUCESTER VILLAGE<br>**LOCATION:** FRAMINGHAM, MA<br>**PROJECT No.** | **TEST PIT NO:** UTP-91<br>**LOCATION:** See Sketch<br>**SURFACE ELEV:** |
| **ENGINEER:** J. McCarthy<br>M. Chase<br>**WEATHER:** Clear<br>**DATE:** May 2005 | ***EXCAVATION EQUIPMENT***<br>**Contractor:** NATIONAL DEVELOPMENT<br>**Operator:** Scott<br>**Make:** CAT **Model:** 325<br>**Capacity:** **Reach:** 21 ft | ***GROUNDWATER OBSERVATION***<br>DATE DEPTH (FT) TIME<br>N/A |

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 1 | 1' | TOPSOIL | E | | |
| 2 | | | E | | |
| 3 | 3' | SUBSOIL | E | | |
| 4 | | F/M/C SAND, TRACE | D | | |
| 5 | | F-GRAVEL, TRACE SILT | | | |
| 6 | | (NATURAL) | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | L | | |

**REMARKS:** cont'd. pg. 2

TEST PIT DIMENSIONS
L (FT) ____
W (FT) ____

LEGEND: BOULDER COUNT

| SIZE RANGE CLASSIFICATION | LETTER DESIGNATION |
|---|---|
| 6" - 18" | A |
| 18" - 36" | B |
| 36" AND LARGER | C |

PROPORTIONS USED

| | |
|---|---|
| TRACE | 0-10% |
| LITTLE | 10-20% |
| SOME AND | 20-35% 35-50% |

ABBREVIATIONS
F - Fine
M - Medium
C - Coarse
F/M - Fine to Medium
F/C - Fine to Coarse

EXCAVATION EFFORT
E - Easy
M - Moderate
D - Difficult

TEST PIT No. UTP-91
Page 2 of 2

| DEPTH (FT) | STRATUM CHANGE (FT) | SOIL DESCRIPTION | EXCAV. EFFORT | BOULDER COUNT QTY/CLASS | NOTES |
|---|---|---|---|---|---|
| 11 | | CONT'D. | " | | |
| 12 | | (NATURAL) | " | | |
| | | END @ 12' NO REFUSAL | | | |

# APPENDIX G: LABORATORY TEST RESULTS

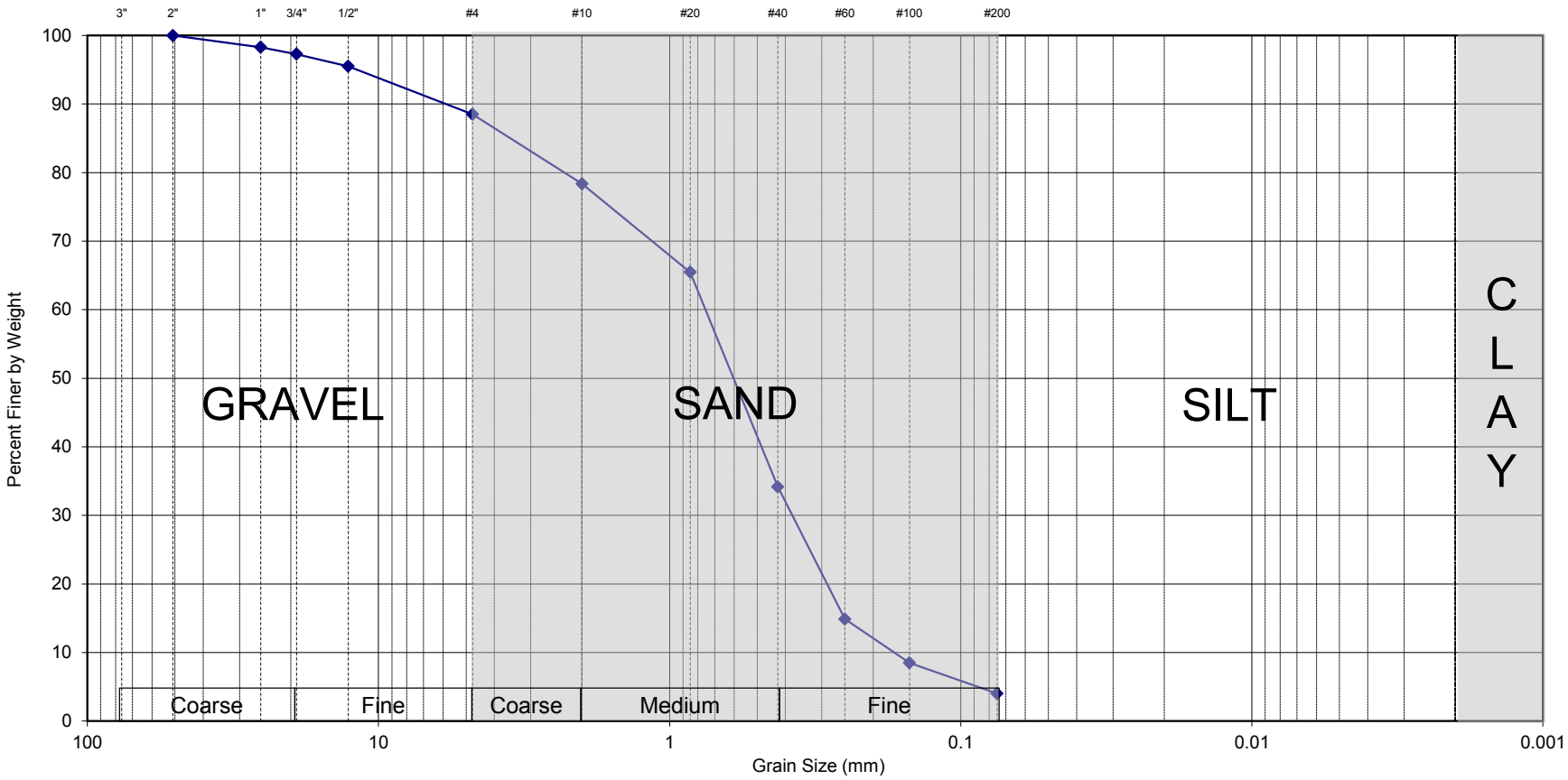
# LABORATORY TESTING DATA SHEET

Project Name Danforth Green - Geotechnical
Project Location Framingham, MA
Reviewed By [signature]
Project No. CTS-74-12-0003.14 MGA # G0232.02
Assigned By S. Holmes
Project Engineer J. Gannon
Date 12/2/2012
Date Reviewed 12/2/2012

| Boring/ Test Pit No. | Sample No. | Depth ft. | Lab No. | Identification Tests | | | | | | | | Strength Tests | | | | | Laboratory Log and Soil Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Water Content % | LL % | PL % | Sieve -200 % | Hyd -2µ % | ORG % | $G_s$ | Dry unit wt. pcf | Torvane or Type Test | $\bar{\sigma}_c$ psf | Failure Criteria | $\sigma_1 - \sigma_3$ or $\tau$ psf | Strain % | |
| TP-1 | S-3 | 4-8 | 298 | | | | 4 | | | | | | | | | | Lt. brown f-c SAND, little f-c Gravel, trace Silt |
| TP-3 | S-1 | 1-8 | 299 | | | | 32 | | | | | | | | | | Lt. brown f-m SAND, some Silt, trace f-c Gravel |
| TP-5 | S-1 | 0-2 | 300 | | | | 16 | | | | | | | | | | Gray f-c GRAVEL and f-c SAND, little Silt |
| TP-7 | S-1 | 0-10 | 301 | | | | 12 | | | | | | | | | | Gray f-c GRAVEL, some f-c Sand, little Silt |
| TP-10 | S-1 | 0-12 | 302 | | | | 11 | | | | | | | | | | Gray f-c GRAVEL, some f-c Sand, little Silt |
| MGA-101 | S-1 | 5-7 | 303 | | | | 27 | | | | | | | | | | Brown f-c SAND, some Silt, trace fine Gravel |
| MGA-105 | S-1 | 5-7 | 304 | | | | 7 | | | | | | | | | | Brown f-c SAND, some f-c Gravel, trace Silt |
| MGA-111 | S-2 | 10-12 | 305 | | | | 55 | | | | | | | | | | Lt. Brown SILT and fine SAND |
| MGA-114 | S-1 | 5-7 | 306 | | | | 3 | | | | | | | | | | Lt. Brown f-m SAND, trace Silt |
| MGA-117 | S-1 | 5-7 | 307 | | | | 3 | | | | | | | | | | Lt. Brown f-m SAND, trace fine Gravel, trace Silt |

THIELSCH ENGINEERING

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 11.5% | 84.4% | 4.0% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 298 | TP-1 | S-3 | 4-8' | Lt. brown f-c SAND, little f-c Gravel, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 97.3 |
| ½" | 95.5 |
| #4 | 88.5 |
| #10 | 78.4 |
| #20 | 65.5 |
| #40 | 34.2 |
| #60 | 14.9 |
| #100 | 8.5 |
| #200 | 4.0 |

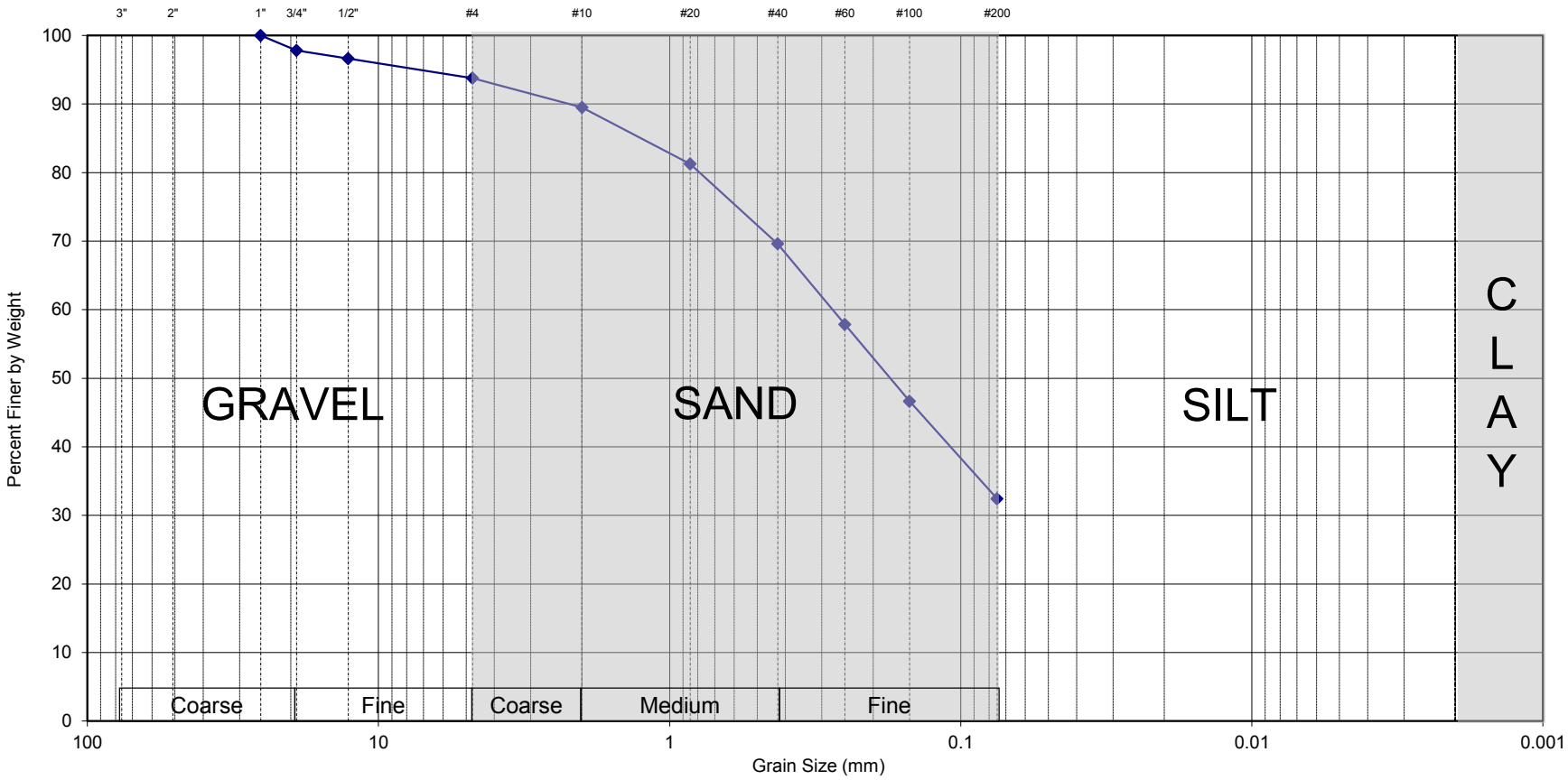
THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
Thielsch CTS File # 74-12-0003.14 (G0232.02)

Tested by: GG/MS Date: 11/30/12

Reviewed by: MBP Date: 11/30/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 6.2% | 61.4% | 32.4% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 299 | TP-3 | S-1 | 1-8' | Lt. brown f-m SAND, some Silt, trace f-c Gravel | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 97.8 |
| ½" | 96.6 |
| #4 | 93.8 |
| #10 | 89.5 |
| #20 | 81.2 |
| #40 | 69.6 |
| #60 | 57.9 |
| #100 | 46.6 |
| #200 | 32.4 |

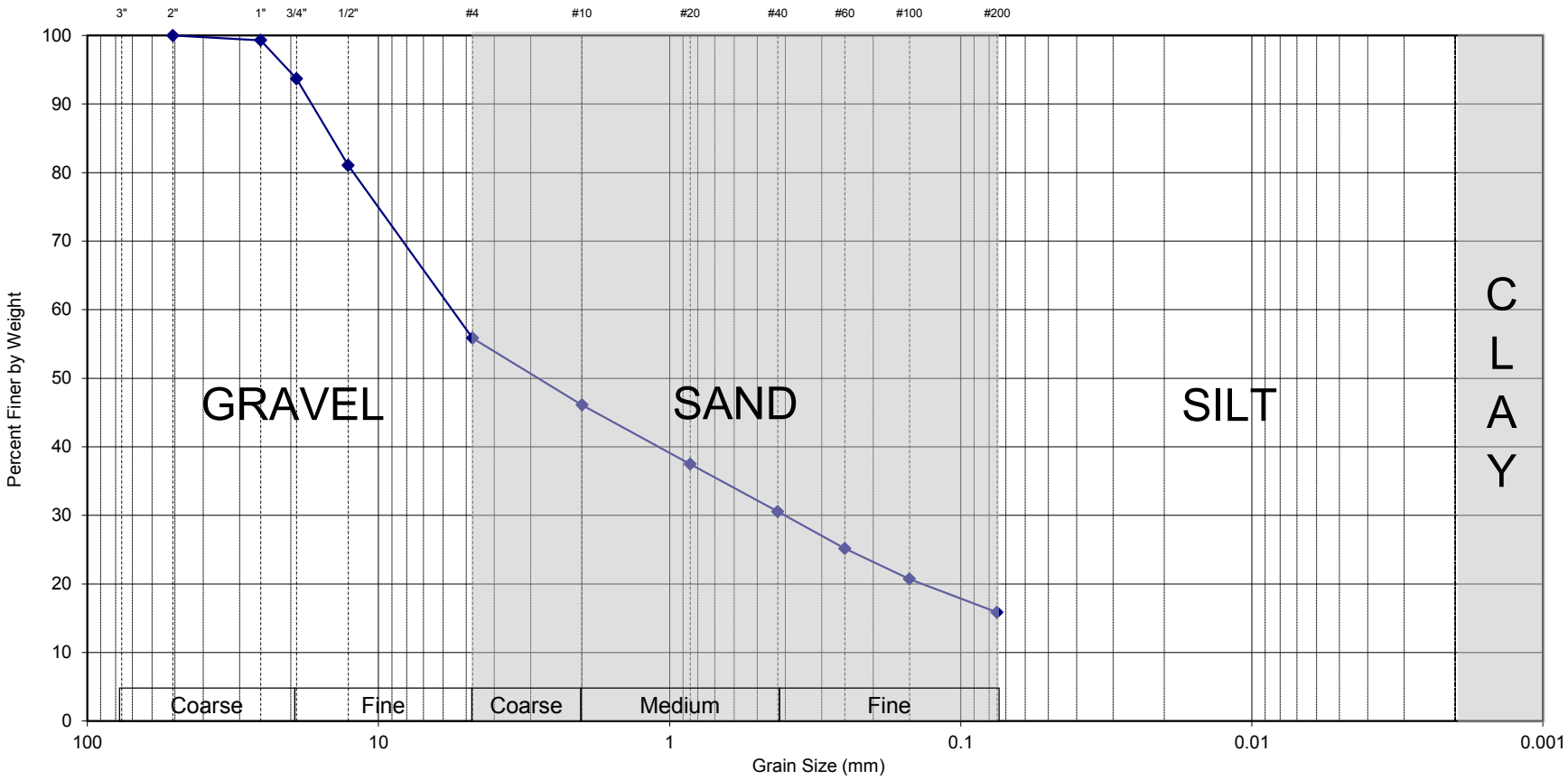
THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
Thielsch CTS File # 74-12-0003.14 (G0232.02)

Tested by: GG/MS Date: 11/30/12

Reviewed by: MBP Date: 12/2/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 44.1% | 40.0% | 15.9% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 300 | TP-5 | S-1 | 0-2' | Gray f-c GRAVEL and f-c SAND, little Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 93.7 |
| ½" | 81.1 |
| #4 | 55.9 |
| #10 | 46.1 |
| #20 | 37.5 |
| #40 | 30.5 |
| #60 | 25.2 |
| #100 | 20.7 |
| #200 | 15.9 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
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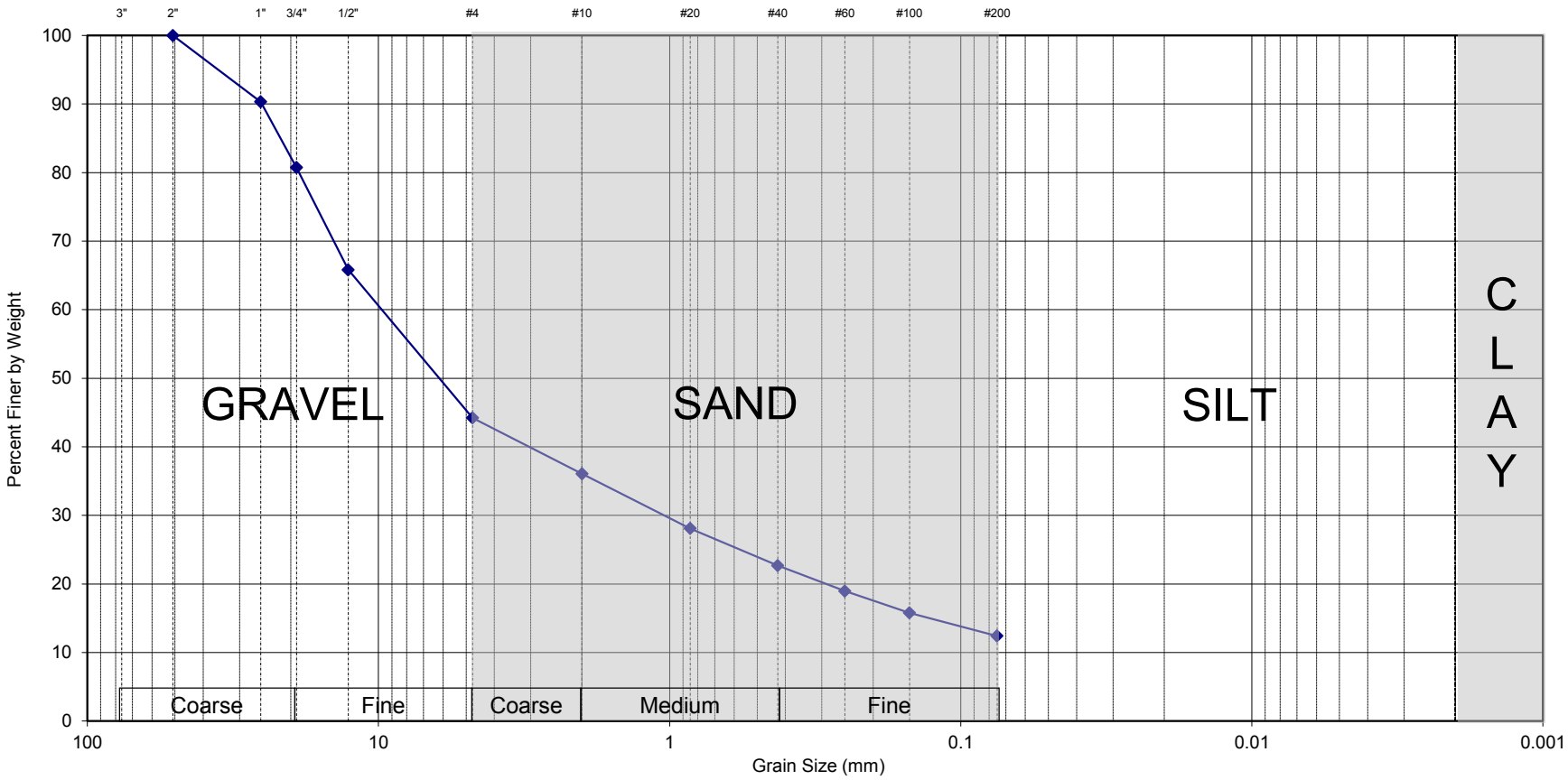
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 55.8% | 31.8% | 12.4% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 301 | TP-7 | S-1 | 0-10' | Gray f-c GRAVEL, some f-c Sand, little Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 80.7 |
| ½" | 65.8 |
| #4 | 44.2 |
| #10 | 36.1 |
| #20 | 28.1 |
| #40 | 22.7 |
| #60 | 19.0 |
| #100 | 15.8 |
| #200 | 12.4 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
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Thielsch CTS File # 74-12-0003.14 (G0232.02)

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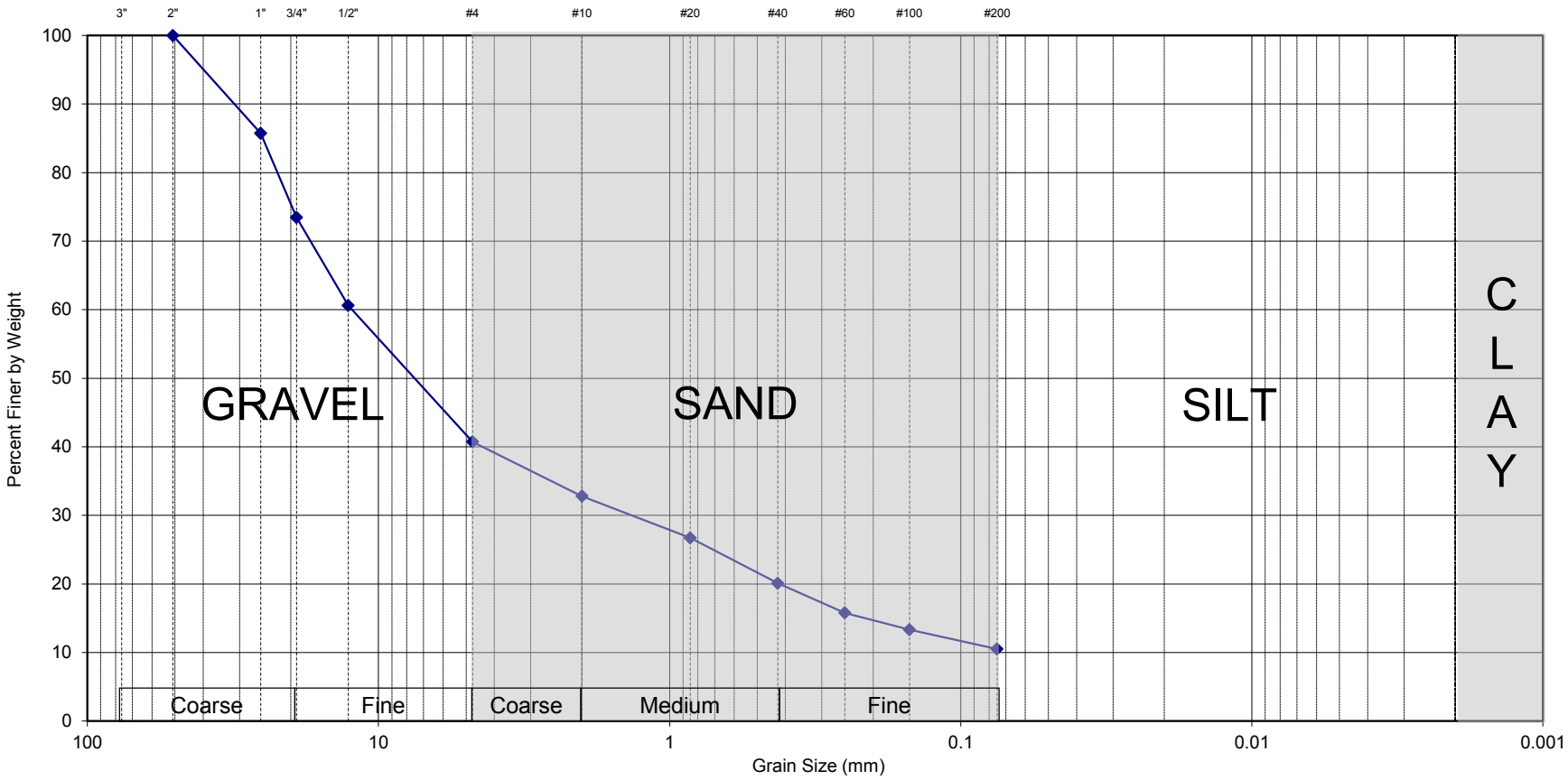
## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 59.3% | 30.2% | 10.5% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 302 | TP-10 | S-1 | 0-12' | Gray f-c GRAVEL, some f-c Sand, little Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 73.5 |
| ½" | 60.6 |
| #4 | 40.7 |
| #10 | 32.8 |
| #20 | 26.7 |
| #40 | 20.1 |
| #60 | 15.8 |
| #100 | 13.3 |
| #200 | 10.5 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
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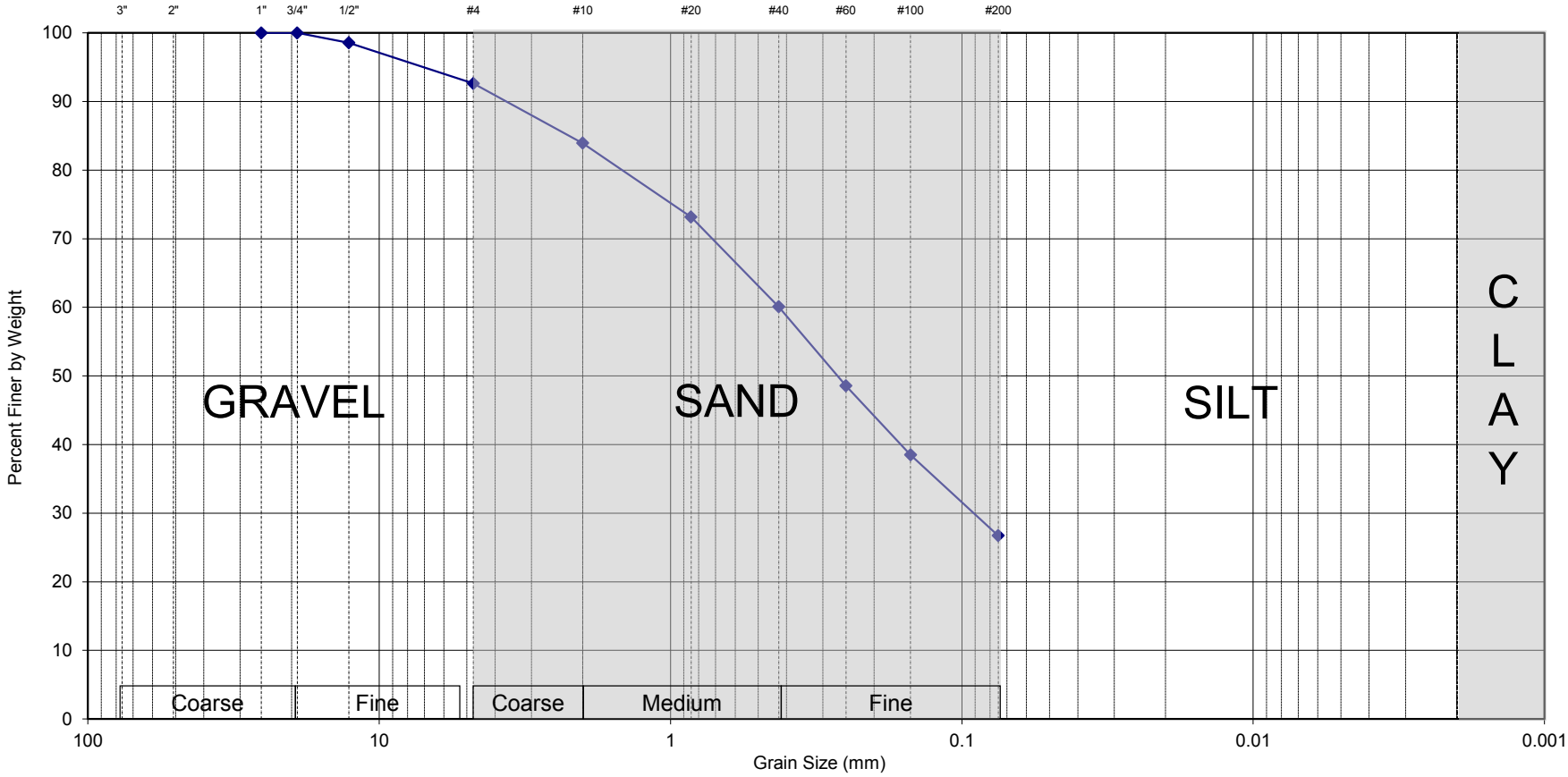
Tested by: GG/MS Date: 11/30/12

Reviewed by: MBP Date: 12/2/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 7.4% | 65.9% | 26.7% |

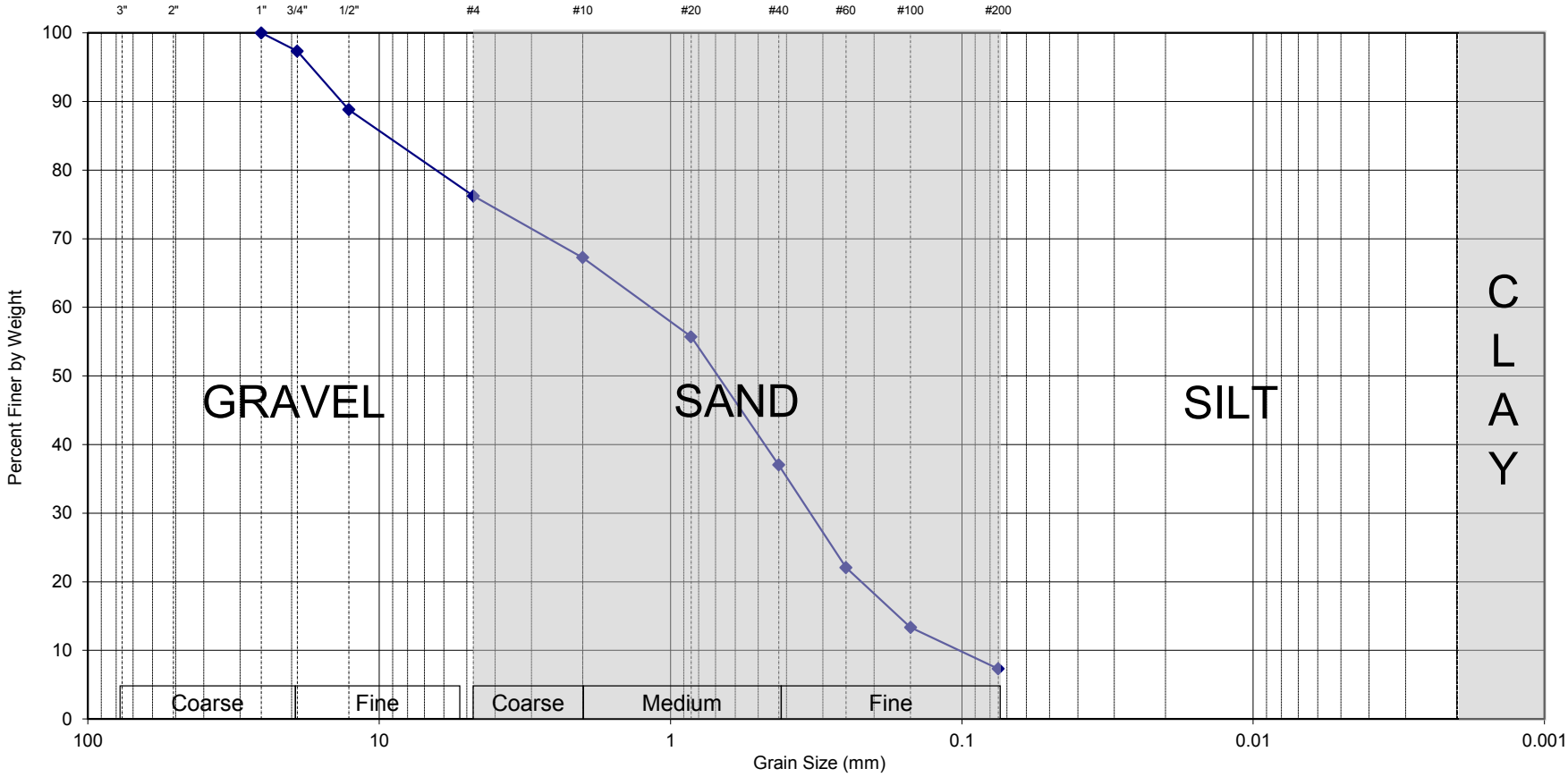
| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 303 | MGA-101 | S-1 | 5-7' | Brown f-c SAND, some Silt, trace fine Gravel | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 100.0 |
| ½" | 98.6 |
| #4 | 92.6 |
| #10 | 83.9 |
| #20 | 73.2 |
| #40 | 60.1 |
| #60 | 48.5 |
| #100 | 38.5 |
| #200 | 26.7 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
Thielsch CTS File # 74-12-0003.14 (G0232.02)
Tested by: GG/MA Date: 11/30/12
Reviewed by: MBP Date: 12/2/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 23.8% | 68.9% | 7.3% |

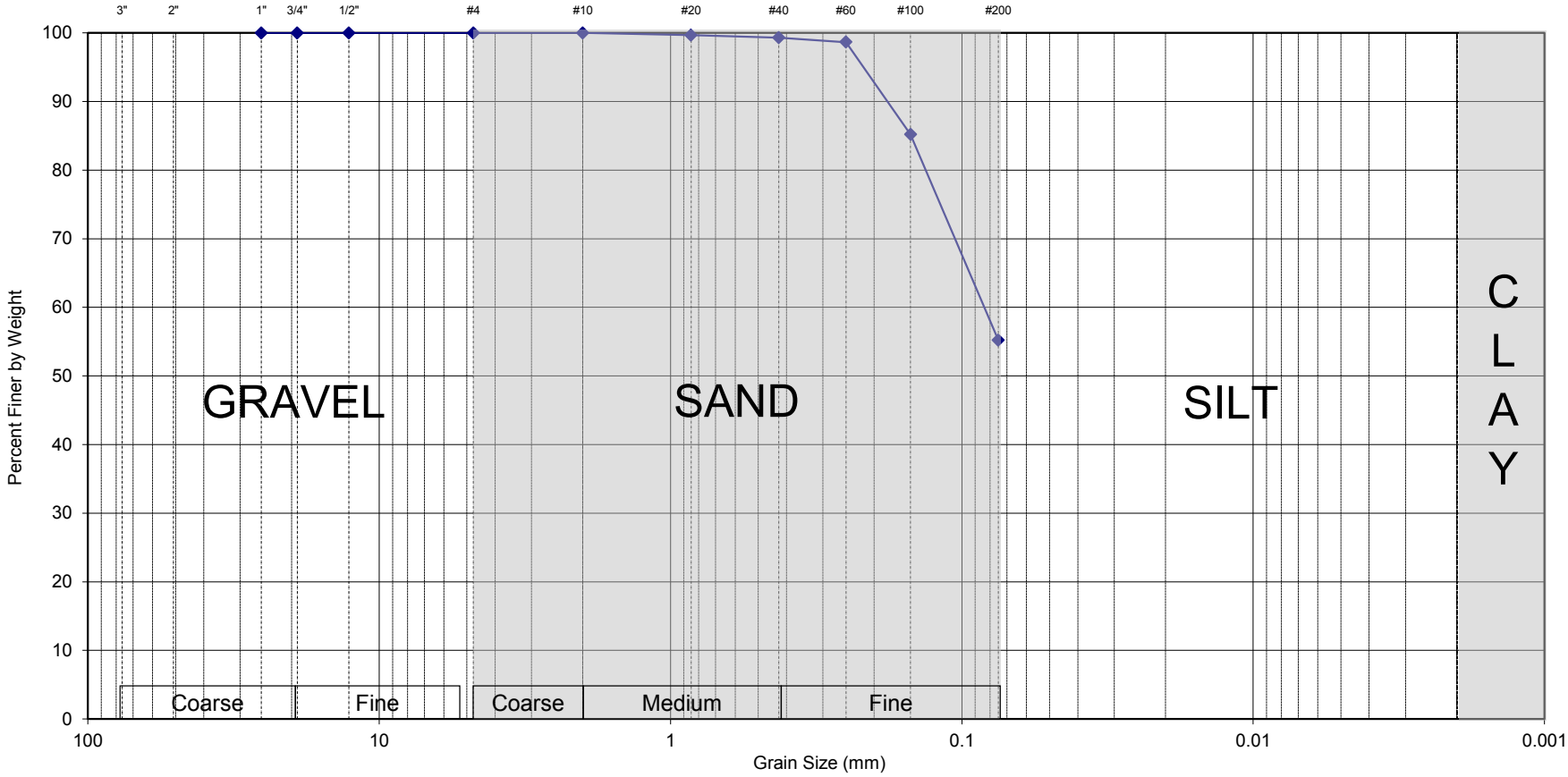
| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 304 | MGA-105 | S-1 | 5-7' | Brown f-c SAND, some f-c Gravel, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 97.3 |
| ½" | 88.8 |
| #4 | 76.2 |
| #10 | 67.3 |
| #20 | 55.7 |
| #40 | 37.0 |
| #60 | 22.1 |
| #100 | 13.3 |
| #200 | 7.3 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
Thielsch CTS File # 74-12-0003.14 (G0232.02)
Tested by: GG/MA Date: 11/30/12
Reviewed by: MBP Date: 12/2/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 44.8% | 55.2% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 305 | MGA-111 | S-2 | 10-12' | Lt. Brown SILT and fine SAND | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 100.0 |
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 100.0 |
| #20 | 99.7 |
| #40 | 99.3 |
| #60 | 98.7 |
| #100 | 85.2 |
| #200 | 55.2 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
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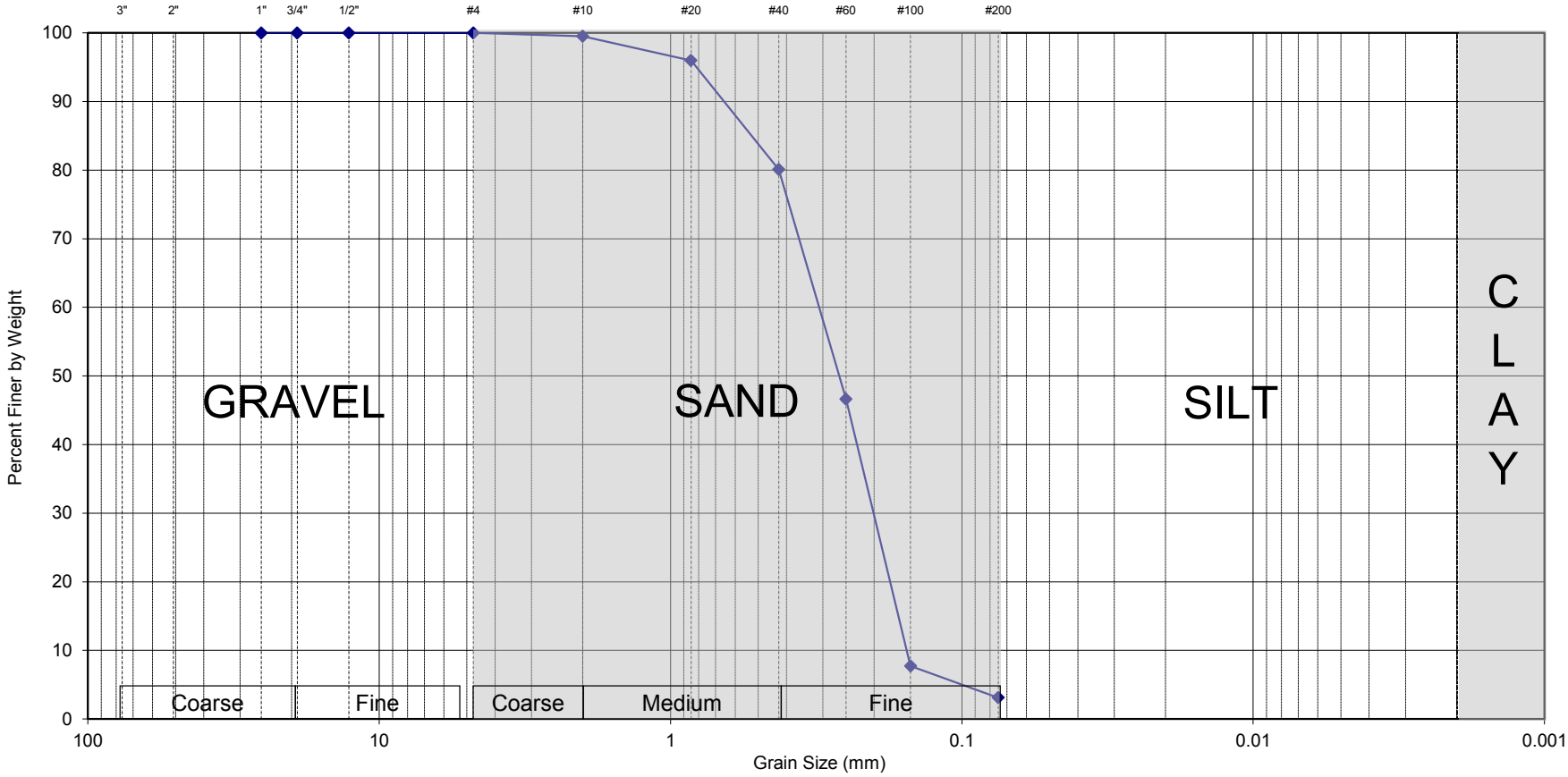
Tested by: GG/MA Date: 11/30/12
Reviewed by: MBP Date: 12/2/12

## U.S. STANDARD SIEVE AND HYDROMETER




| Gravel | Sand | Fines |
|---|---|---|
| 0.0% | 96.9% | 3.1% |

| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 306 | MGA-114 | S-1 | 5-7' | Lt. Brown f-m SAND, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 100.0 |
| ½" | 100.0 |
| #4 | 100.0 |
| #10 | 99.5 |
| #20 | 96.0 |
| #40 | 80.1 |
| #60 | 46.6 |
| #100 | 7.7 |
| #200 | 3.1 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
Thielsch CTS File # 74-12-0003.14 (G0232.02)
Tested by: GG/MA Date: 11/30/12
Reviewed by: MBP Date: 12/2/12

## U.S. STANDARD SIEVE AND HYDROMETER

| Gravel | Sand | Fines |
|---|---|---|
| 3.7% | 93.3% | 3.0% |

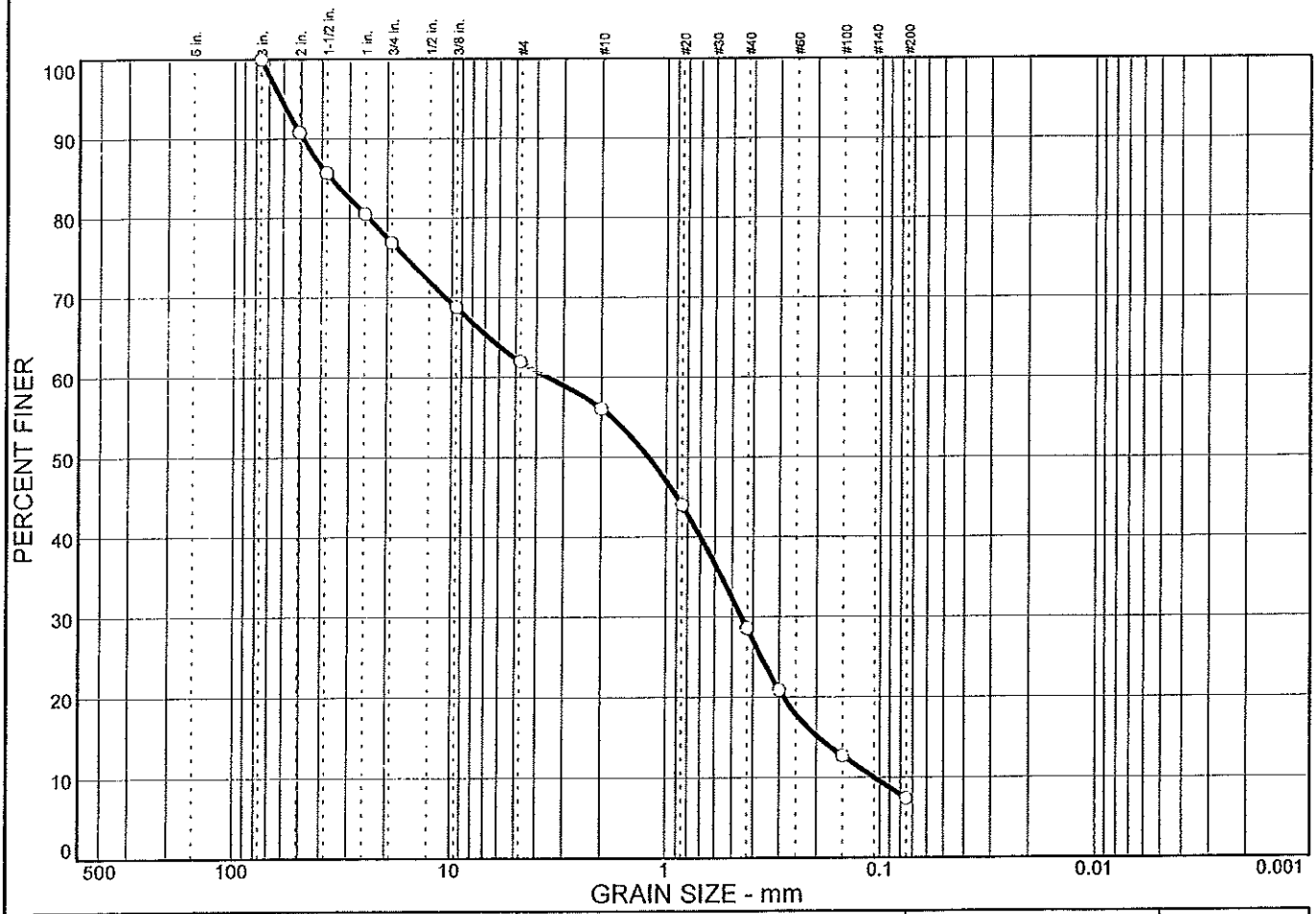
| Lab # | Exploration | Sample | Depth | Description | WC | LL | PL | PI |
|---|---|---|---|---|---|---|---|---|
| 307 | MGA-117 | S-1 | 5-7' | Lt. Brown f-m SAND, trace fine Gravel, trace Silt | | | | |

| Sieve Size | % Passing |
|---|---|
| ¾" | 100.0 |
| ½" | 98.5 |
| #4 | 96.3 |
| #10 | 93.7 |
| #20 | 86.4 |
| #40 | 53.1 |
| #60 | 19.3 |
| #100 | 7.6 |
| #200 | 3.0 |

THIELSCH ENGINEERING

Danforth Green - Geotechnical
Framingham, MA
Thielsch CTS File # 74-12-0003.14 (G0232.02)
Tested by: GG/MA Date: 11/30/12
Reviewed by: MBP Date: 12/2/12

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 38.0 | 54.6 | 7.4 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| 3 in. | 100.0 | | |
| 2 in. | 90.8 | | |
| 1-1/2 in. | 85.7 | | |
| 1 in. | 80.5 | | |
| 3/4 in. | 76.9 | | |
| 3/8 in. | 68.8 | | |
| #4 | 62.0 | | |
| #10 | 56.1 | | |
| #20 | 44.0 | | |
| #40 | 28.6 | | |
| #50 | 20.9 | | |
| #100 | 12.7 | | |
| #200 | 7.4 | | |

* (no specification provided)

**Material Description**

F-M SAND, AND GRAVEL, TRACE SILT

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{85}$= 36.3 $D_{60}$= 3.52 $D_{50}$= 1.20
$D_{30}$= 0.451 $D_{15}$= 0.195 $D_{10}$= 0.106
$C_u$= 33.16 $C_c$= 0.54

**Classification**

USCS= SP-SM AASHTO=

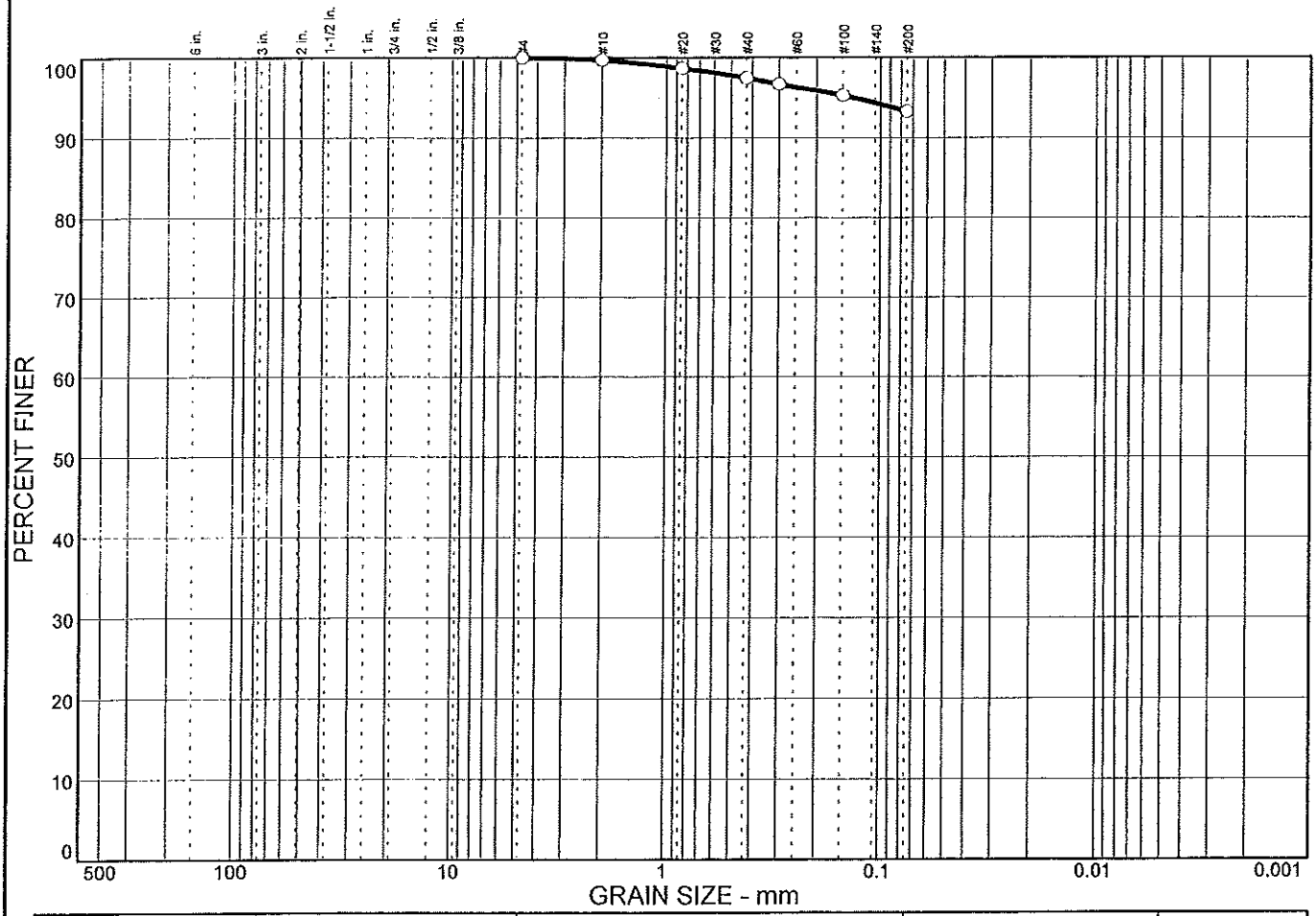
**Remarks**

**Sample No.:** 262 **Source of Sample:** TP #54 UPPER **Date:** 5/30/2005
**Location:** **Elev./Depth:**

UTS OF MASSACHUSETTS, INC.

**Client:** PULTE
**Project:** GLOUCESTER VILLAGE, FRAMINGHAM, MA
**Project No:** **Figure** 262

# Particle Size Distribution Report




| % COBBLES | % GRAVEL | % SAND | % SILT | % CLAY |
|---|---|---|---|---|
| 0.0 | 0.0 | 6.7 | 93.3 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|---|---|---|---|
| #4 | 100.0 | | |
| #10 | 99.7 | | |
| #20 | 98.7 | | |
| #40 | 97.5 | | |
| #50 | 96.7 | | |
| #100 | 95.3 | | |
| #200 | 93.3 | | |

* (no specification provided)

**Material Description**

SILT, TRACE SAND

**Atterberg Limits**

PL= LL= PI=

**Coefficients**

$D_{85}$= $D_{60}$= $D_{50}$=
$D_{30}$= $D_{15}$= $D_{10}$=
$C_u$= $C_c$=

**Classification**

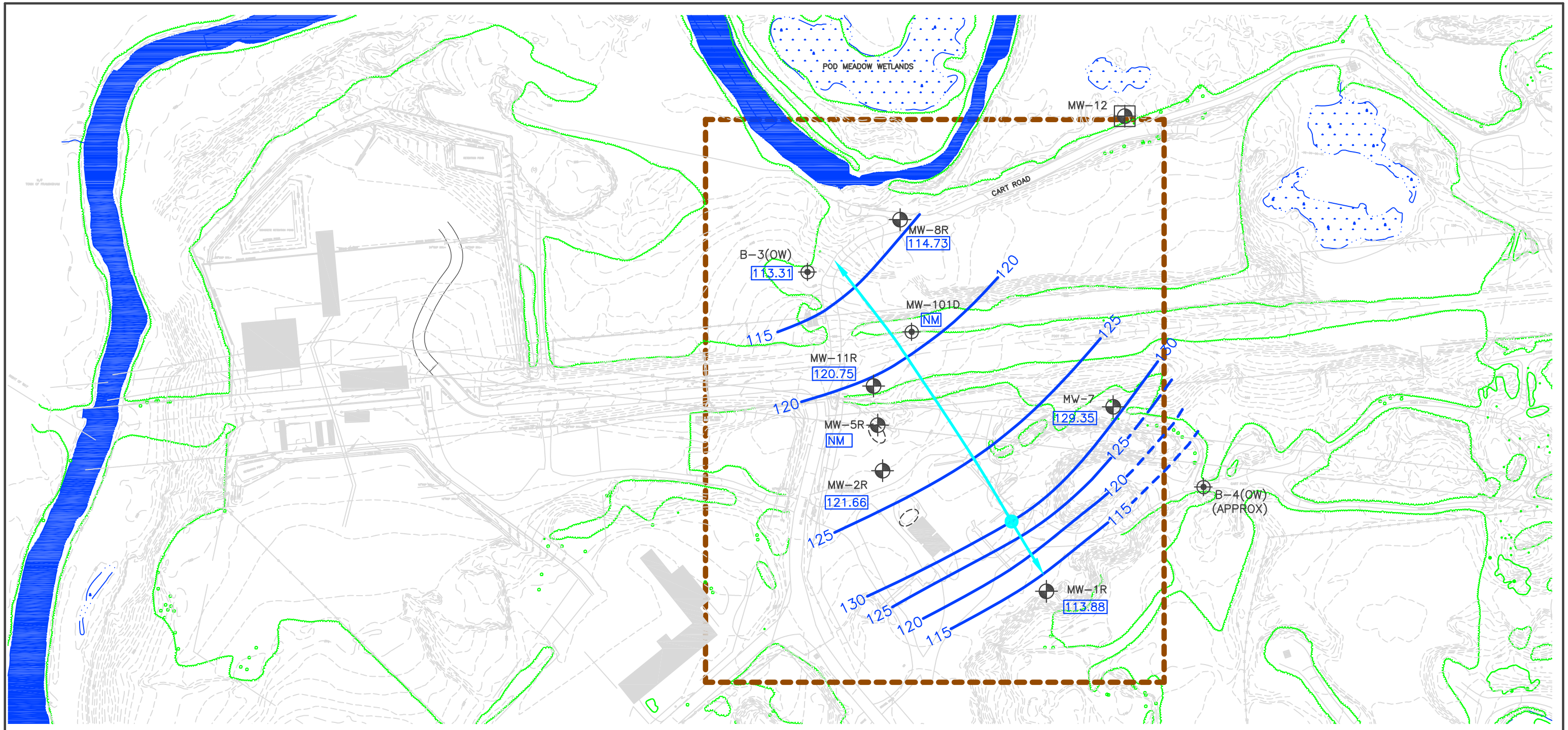
USCS= ML AASHTO=

**Remarks**

**Sample No.:** 263 **Source of Sample:** TP #54 LOWER **Date:** 5/30/2005
**Location:** **Elev./Depth:**

UTS OF MASSACHUSETTS, INC.

**Client:** PULTE
**Project:** GLOUCESTER VILLAGE, FRAMINGHAM, MA
**Project No:** **Figure** 263




LEGEND:

- MW-16 — EXISTING GROUNDWATER MONITORING WELL
- MONITORING WELL DESTROYED
- B-4(OW) — MONITORING WELLS INSTALLED BY OTHERS
- APPROXIMATE VEGETATED BOUNDARY
- LIMITS OF DISPOSAL SITE
- 120 — POTENTIOMETRIC CONTOUR (DASHED WHERE INFERRED)
- 114.73 — GROUNDWATER ELEVATION IN FEET
- INFERRED GROUNDWATER FLOW DIRECTION

DRAFT

N

SOURCE:
SITE PLAN PREPARED BY HALEY & ALDRICH, INC. DATED SEPTEMBER 2001, DAMES & MOORE PHASE III DATED JULY 31, 1995.

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Portland, ME 04101-3453
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Fax: 207.879.7685
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0 200 400
SCALE IN FEET

| | | | |
|---|---|---|---|
| PROJECT NO: | 39460911 | | |
| DESIGN: | JAC | SCALE: | 1" = 200' |
| APPROVED: | WPH | DATE: | AUG 2012 |
| DRAWN: | MM | FILE NO: | MonitoringReport_2012 |

CLIENT: AIR FORCE CENTER FOR ENGINEERING & THE ENVIRONMENT

PROJECT: NEW ENGLAND SAND & GRAVEL PROPERTY SAXONVILLE, MASSACHUSETTS

TITLE: GROUNDWATER POTENTIOMETRIC CONTOUR MAP JULY 2012

FIGURE NO.: 3