September 15, 2022

Electronic Delivery

MAJ Investment, LLC
Matthew P. Maggiore, Contact
13 Wheeling Avenue
Woburn, MA 01801

Re: Impact Analysis of the Natural and Built Environment [LEC File #: TMCo\21-334.02]
1021 and 1025 Massachusetts Avenue
Parcel IDs: 55-2-19 and 55-2-20
Arlington, Massachusetts

Dear Mr. Maggiore:

LEC Environmental Consultants, Inc., (LEC) has prepared this *Impact Analysis of the Natural and Built Environment* (*Impact Analysis*) in support of a Comprehensive Permit Application being filed by your office with the Arlington Zoning Board of Appeals for an Affordable Housing project proposed under M.G.L. c. 40B. The Affordable Housing project includes construction of a 50-unit, 5-story affordable housing condominium building with ground-level parking garage and retail space. Portions of the proposed project are located within the outer portion of Riverfront Area associated with Mill Brook as jurisdictional under the *Massachusetts Wetlands Protection Act* (M.G.L. c. 131, s. 40, the *Act*) and its implementing *Regulations* (310 CMR 10.00, *the Act Regulations*). Site grading, a retaining wall, erosion controls, invasive species management and native revegetation, establishment of a meadow, and stormwater management are proposed. Below is a description of the items listed in Section 3.2.13 of the *Zoning Board of Appeals of the Town of Arlington Comprehensive Permit Regulations.*

Surface and Groundwater Quantity and Quality and Groundwater Recharge

Under existing conditions, the property contains two (2) 3-story, wood-framed structures situated along Massachusetts Avenue, both with paved driveways extending northerly from Massachusetts Avenue toward paved parking lots situated north of (behind) the site structures. Impervious walkways provide access to the front entrances, and lawn and landscaping generally surround the structures and pavement. Wooded uplands occur within the northern portions of the site. No stormwater management measures are in place to attenuate peak rates and volumes of stormwater runoff flowing from the roof areas and pavement. All stormwater run-off flows untreated toward the woodland comprising the northern portion of the property. The project engineer, Patriot Engineering, has designed a comprehensive stormwater

management system that meets the Town of Arlington and MassDEP standards. The project proponent proposes to install a single subsurface infiltration system to collect and infiltrate stormwater run-off from the proposed structure as depicted on the Site Plans. The accompanying Stormwater Report contains supporting calculations, and an Operation and Maintenance Plan, and demonstrates that peak rates and volumes of stormwater run-off will be maintained or reduced for the 2, 10, 50, and 100-year statistical storm events. The system has been designed using the Extreme Precipitation Tables for the Northeast Regional Climate Center (Cornell University), in an effort to promote climate resiliency associated with the project.

During construction, the project proponent proposes to implement an erosion control program to protect Mill Brook and adjacent properties from sedimentation and maintain surface water quality during construction activities. The plan for the control of potential impacts to the adjacent Wetland Resource Areas is based on DEP guidelines and will be comprised of staked compost filter tubes along the Limit-of-Work line. All erosion control measures will remain in place and maintained in good working order until disturbed areas are stabilized by vegetation. The location of the proposed erosion controls and a detail are shown on the Site Plan.

The above mitigating measures will protect surface water quality during construction, and improve groundwater recharge post construction by reducing peak rates and volumes of stormwater run-off by way of stormwater infiltration.

Open Space and Recreational Areas and Space

Under existing conditions, the 7,700± square foot wooded upland within the northern portion of the site to remain within the northern portion of the site contains almost entirely invasive/exotic plants and contains scattered trash and debris. The project proponent proposes to remove the invasive canopy and understory, remove piles of fill material and trash/debris, re-grade and replant the area to create a native woodland, as depicted on the *1021-1025 Massachusetts Avenue Draft Construction Document Set* dated September 8, 2022 prepared by Kyle Zick Landscape Architecture. The native woodland will contain a diversity of native deciduous and evergreen trees (58 total), shrubs (110 total), and tree seedlings (60 total). The proposed woody plants will be planted at various stages of growth, ranging from 4-foot-high seedlings to saplings measuring up to 12' tall and/or with calipers measuring 1 to 2 inches. The intent of this variability is to create a wooded landscape that mimics a natural woodland where trees, saplings, and shrubs of various sizes and age provide a diverse vegetated landscape. The groundcover will be seeded with *Partially Shaded Roadside Mix* available from Ernst Conservation Seeds (or native equivalent) to provide a native, stabilizing groundcover.

A native meadow measuring 6,000± square feet will be established by seeding the altered land off the rear of the structure (above the stormwater infiltration system) with a 50/50 mixture of the *Conservation Shade Mix* and *Partially Shaded Area Roadside Mix,* both available from Ernst Seeds. The project

proponent recognizes that sunlight penetration for the area adjacent to the proposed structure will be limited, which is why shade-tolerant seed mixtures are proposed. Once established, this meadow will be mowed once annually in the fall after October 15 to promote seed dispersal and inhibit establishment of woody invasive plants. Signage will be posted off the northeastern and northwestern building corners indicating the meadow is to be mowed once annually in the fall after October 15.

Recreational access to the meadow and native woodland for the residents will be provided by a looped walkway extending from the rear egress of the structure. The proposed efforts will significantly improve the aesthetics and recreational opportunity for enjoying the outdoor open space compared to existing conditions.

The revegetation area and meadow will be monitored for two (2) growing seasons by a qualified wetland scientist to document restoration success, identify any re-growth of invasive/exotic plants to be managed, and/or identify any re-planting efforts required due to mortality. The wetland scientist shall prepare annual monitoring reports describing the success of the restoration effort and any required management efforts, and representative site photographs, and will submit these reports to the Conservation Commission by October 31.

Wildlife Habitats and Corridors

The 47,085± square foot property contains two lots located along the north side of Massachusetts Avenue, between Arlington Heights and the Arlington High School, and directly across from the Massachusetts Avenue intersection with Orchard Place. Commercial and residential development generally surround the property on all sides, with apartment/condominium buildings located east and west of the site along Massachusetts Avenue and Brattle Street.

The property contains two (2) 3-story, wood-framed structures situated along Massachusetts Avenue, both with paved driveways extending northerly from Massachusetts Avenue toward paved parking lots situated north of the site structures. Impervious walkways provide access to the front entrances, and lawn and landscaping generally surround the structures and pavement. Roughly the northern half of the property is undeveloped, containing a wooded upland located within the Riverfront Area to Mill Brook. Site topography descends northerly, with gently sloping topography extending through the northern and southern portions of the site, and a comparatively steep topographic slope bifurcating the property in an east-west direction.

The wooded upland is separated from Mill Brook by a parking lot associated with an adjacent apartment complex, and dominated by invasive/exotic plants, including a canopy of Norway maple (*Acer platanoides*), and an understory of sapling Norway maple, burning bush (*Euonymus alatus*), and tartarian honeysuckle (*Lonicera tartarica*). The groundcover contains dense patches of ivy (*Vinca* sp.) and scattered patches of garlic mustard (*Alliaria petiolatta*). Scattered piles of landscape debris and trash occur throughout the woodland.

Given existing site conditions and the relatively urban landscape context of the site, wildlife habitat function is limited. To the extent a wildlife habitat corridor exists along Mill Brook, the site is separated from Mill Brook with a condominium parking lot. Further, the plant community within the northern portion of the site is dominated by invasive/exotic plant species and lacking the plant diversity and food resources associated with a native plant community. While the trees within the northern portion of the site will be removed, a robust and diverse planting effort is proposed, which, in the long-term, will provide substantially better wildlife habitat compared to existing conditions.

Wetlands and Bodies of Water

LEC conducted a site evaluation on October 15, 2021 to identify and characterize existing protectable Wetland Resource Areas located on or immediately adjacent to the site as jurisdictional under the *Act* and *Act Regulations,* and to accompany the project surveyor to locate the Bank-Mean Annual High Water (MAHW) Line associated with Mill Brook. The extent of Wetland Resource Areas was determined through observations of existing plant communities and hydrologic indicators in accordance with the *Act* and its implementing *Regulations*.

Based on these methods and review of pertinent maps, LEC determined that the Bank-MAHW Line to Mill Brook occurs north of the property, placing the 200-foot Riverfront Area on roughly the northern half of the property. No Bordering Vegetated Wetlands (BVW) were observed on or within 100 feet of the subject property.

The Bank-MAHW Line associated with Mill Brook was determined through observation of multiple corroborating Bankfull Indicators, including scouring, wrack deposition, stain, changes in vegetation, and a relatively distinct separation between predominantly aquatic and terrestrial land. LEC met with the project surveyor on October 15, 2021 to provide instruction regarding the location of the Bank-MAHW boundary, which occurs along the top of slope containing Mill Brook. An MWRA sewer line occurs adjacent to Mill Brook.

Riverfront Area includes land within 200 feet of the Bank-MAHW line associated with Mill Brook and encompasses roughly the northern half of the property. This 20,429± square foot area includes the wooded uplands, and 2,517± square feet of the paved parking lot associated with 1021 Massachusetts Avenue which is considered 'Degraded' in accordance with the *Act Regulations* at 310 CMR 10.58 (5).

Species of Special Concern in Massachusetts

According to the 15th Edition of the Massachusetts Natural Heritage Atlas (effective August 1, 2021) published by the Natural Heritage & Endangered Species Program (NHESP), no areas of Estimated Habitats of Rare Wildlife or Priority Habitat of Rare Species, or Potential or Certified Vernal Pools exist on or near the site.

Historic and Cultural Resources

LEC is unaware of any cultural or historic resources present on the subject property.

Thank you for your consideration of this *Impact Analysis*. Should you have any questions, please do not hesitate to contact me in our Wakefield office at 781-245-2500 or at rkirby@lecenvironmental.com.

Sincerely,

LEC Environmental Consultants, Inc.

Richard A. Kirby
Senior Wetland Scientist

PATRIOT ENGINEERING LLC

Michael J. Novak, P.E.

STORMWATER MANAGEMENT REPORT

FOR PROJECT LOCATED AT

1021 & 1025 MASSACHUSETTS AVENUE
ARLINGTON, MASSACHUSETTS

Prepared for:

MAJ Investment, LLC
13 Wheeling Avenue
Woburn, Massachusetts 01801

Prepared by:

Patriot Engineering
35 Bedford Street, Suite 4
Lexington, Massachusetts 02420
(978) 726-2654

DATE: SEPTEMBER 9, 2022

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.

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

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

09/19/2022

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 ANALYSIS & CALCULATIONS

for

1021 & 1025 MASSACHUSETTS AVENUE ARLINGTON, MASSACHUSETTS

Prepared for:

MAJ Investment, LLC
13 Wheeling Avenue
Woburn, Massachusetts 01801

Prepared by:

Patriot Engineering
35 Bedford Street, Suite 4
Lexington, Massachusetts 02420
(978) 726-2654

Date: September 9, 2022

TABLE OF CONTENTS

CALCULATION METHODS

- TR 20 SCS Unit Hydrograph Procedure
- Runoff Curve Numbers
- Time of Concentration by TR55 Methodology
- Reach and Pond Rating by the Storage-Indication Method
- Manning Equation

SOURCE OF DATA

- Technical Report No. 20
- Technical Report No. 55
- Extreme Precipitation Tables for the NOAA Atlas-14
- Field Survey and Soil Testing by RJ O'Connell and Associates.
- Massachusetts Stormwater Handbook February 2008
-

Stormwater Management Standards

Project Narrative:

The project site is comprised of two mixed-use lots located within the Neighborhood Office (B-1) District. The parcels are identified on the Town of Arlington Assessor's Map 55-2 as Lots 19 and 20. The subject properties have a total area of 47,085 s.f., and site features currently existing include two mixed-use dwellings, bituminous concrete driveways with parking lots, gravel areas, walkways, grassed/landscaped areas and wooded areas.

The applicant is proposing to construct a multi-story Chapter 40B development consisting of a multi-family dwellings (with an interior parking garage) and ground level retail space, along with a plaza, grassed and landscaped areas.

This proposal utilizes conventional stormwater management techniques including a subsurface infiltration system for the treatment and mitigation of stormwater.

The following is a summary of how the proposed project meets the DEP Stormwater Standards:

Standard 1: No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

There are no untreated stormwater conveyances proposed to discharge to wetlands or waters of the Commonwealth from the project.

Standard 2: Peak Rate Attenuation - Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

For the purpose of analyzing pre and post development stormwater peak rates of runoff, two (2) design points have been selected based on existing topographic conditions which were used for both the pre and the post peak rate calculations. The design points are Massachusetts Avenue to the southwest and the abutting property to the northeast.

The storm event rainfall frequencies used for this analysis have been selected based upon the Extreme Precipitation Tables for the Northeast Regional Climate Center. A full detail of peak rate attenuation along with supplemental stormwater calculations utilizing HydroCAD as well as pre and post drainage site plans have been submitted with the Definitive Subdivision Application. The details of this report will show that the peak rates of runoff for the 2-year, 10-year, 50-year and 100-year events have been either maintained or reduced from pre to post conditions through the use of a subsurface infiltration system.

The hydrologic calculations from the HydroCAD® have been included in this report and are located in section tab entitled "Hydrologic Calculations".

Proposed Design Points and Subcatchment Areas

Design Point #1 (DP#1) is Massachusetts Avenue to the southwest. The contributing area to the Design Point consists of Subcatchment 1 & 101.

Design Point #1:

Storm Event	Existing Conditions (Pre) Peak Flow (CFS)	Proposed Conditions (Post) Peak Flow (CFS)
2-Year (4.04 in./hr.)	0.2	0.1
10-Year (6.43 in./hr.)	0.5	0.3
50-Year (9.69 in./hr.)	1.0	0.6
100-Year (11.50 in./hr.)	1.2	0.7

Design Point #2 (DP#2) is the abutting bordering property to the northeast. The contributing area to the Design Point consists of Subcatchment 2 & 201.

Design Point #2:

Storm Event	Existing Conditions (Pre) Peak Flow (CFS)	Proposed Conditions (Post) Peak Flow (CFS)
2-Year (4.04 in./hr.)	1.3	0.8
10-Year (6.43 in./hr.)	3.2	1.7
50-Year (9.69 in./hr.)	6.2	3.3
100-Year (11.50 in./hr.)	7.9	5.5

Standard 3: Recharge - Loss of annual recharge to groundwater shall be eliminated or minimized…at a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume in accordance with the Mass Stormwater Handbook.

Loss of annual recharge to groundwater has been minimized through the use of stormwater Best Management Practices (BMP's), one (1) subsurface infiltration system, and a proposed operation and maintenance program are proposed for this project. One (1) subsurface infiltration system has been designed for recharging groundwater.

The classification is based upon the Natural Resource Conservation Service Maps dated May 1984 (map located in the Appendix to the narrative) the site consists of a mix of unclassified and Hydrological Group D soils. Onsite soil testing was conducted by Patriot Engineering on September 22, 2021 in the areas depicted on the attached plan. This

testing revealed a gravelly loamy sand parent material, which yields a Rawls Soil Group classification of A soils. Groundwater was not in either of the two test pit locations; therefore, the bottom of those test pits has been used as the estimated seasonal high groundwater elevation for design purposes.

Utilizing the current regulations, the proposed design will meet this standard as per the following calculation:

Rv = Fx
Rv = Required Recharge Volume
F = Target Depth Factor associated with hydrologic soil groups located in table 2.3.2 in Volume 3 of the Stormwater Management Handbook
x = Total impervious area proposed

Impervious area within project area (HSG A): 27,748 square feet (sf).
Required recharge volume depth factor for A type soils: 0.6 inches

Therefore Rv =

(27,748)(0.6inches/12 inches per foot)

Rv = 1,387 cubic feet (cf)

The proposed subsurface infiltration system provides a total recharge storage volume of 6,014 cf below the outlet.

In accordance with the Stormwater Handbook, a capture area adjustment calculation has been provided in the appendix of this report to ensure a minimum of 65% of the site impervious areas are directed into recharge facilities. The calculation demonstrates the proposed project directs 90% of the site's proposed impervious surface areas will be directed toward the recharge facility.

Standard 4: Water Quality – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The standard is met with pollution prevention plans, stormwater BMP's sized to capture required water quality volume, and pretreatment measures.

The stormwater management system has been designed to remove a minimum of 80% of the average annual post-construction load of Total Suspended Solids (TSS). These percentages have been achieved by the use of a subsurface infiltration system which is collecting the runoff from the proposed roof via roof drains and downspouts. As roof runoff is considered "clean" runoff, not pretreatment is needed prior to recharging.

The Stormwater Management Handbook assigns TSS removal percentages to each treatment BMP. Each treatment BMP is sized to capture the required water quality volume as calculated in accordance with the Handbook in order to achieve the assigned TSS removal rates.

<u>General Equation from Stormwater Management Handbook</u>

Vwq = (Dwq)(A)
Vwq = required water quality volume
Dwq = water quality depth (1" for critical areas, 0.5" for non-critical areas)
A = impervious area

The following are treatment sizing calculations for portions of the treatment trains based on the 0.5'' for non-critical areas:

Train 1 (Proposed Roof drains to PSIS)

Vwq = (25,016)(0.5"/12) = 1,042 cf

The proposed subsurface infiltration system provides a total recharge storage volume of 6,014 cf below the outlet.

A separate document entitled "Operation and Maintenance & Erosion and Sedimentation Control Program for a Proposed Stormwater Management System" is included as part of this report. Suitable practices for source control and long-term pollution prevention have been identified and shall be implemented as discussed.

The utilization of pretreatment and treatment BMP's combined with the operation and maintenance plan provides compliance with this standard.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs) – Source control and pollution prevention shall be implemented in accordance with the Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Stormwater Standard 5 is not applicable to this project. The proposed development will not subject the site to higher potential pollutant loads as defined in the Massachusetts Department of Environmental protection Wetlands and Water Quality Regulations.

LUHPPLs are identified in 310 CMR 22.20B(2) and C(2)(a)-(k) and (m) and CMR 22.21(2)(a)(1)-(8) and (b)(1)-(6), areas within a site that are the location of activities that are subject to an individual National Pollutant Discharge Elimination System (NPDES) permit or the NPDES Multi-sector General Permit; auto fueling facilities, exterior fleet storage areas, exterior vehicle service and equipment cleaning areas; marinas and boatyards; parking lots with high-intensity-use; confined disposal facilities and disposal sites.

Standard 6: Critical Areas – Stormwater discharges to critical areas require the use of specific source control and pollution prevention measures and specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas.

Stormwater Standard 6 is not applicable to this project given that proposed stormwater does not discharge near a critical area. Critical areas being Outstanding Resource Waters and Special Resource Waters as designated in 314 CMR 4.0, recharge areas for public water supplies as defined in 310 CMR 22.02, bathing beaches as defined in 105 CMR 445.000, cold-water fisheries and shellfish growing areas as defined in 314 CMR

9.02 and 310 CMR 10.04. The design points are not considered a critical area therefore Standard #6 does not applies to this project.

Standard 7: Redevelopments – A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met as well as the project shall improve the existing conditions.

Stormwater Standard 7 is not applicable to this project. Within the Stormwater Management Handbook (volume 1 chapter 1 page 20), the definition of a redevelopment project includes, "development, rehabilitation, expansion and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area".

This project will not result in a reduction of impervious area in the proposed conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan shall be implemented.

An *Operation and Maintenance & Erosion and Sediment Control Program for a Proposed Stormwater Management System* is included with this report. The program details the construction period operation and maintenance plan and sequencing for pollution prevention measures and erosion and sedimentation controls. Locations of erosion control measures for the project are depicted on the site plan set accompanying this report.

Standard 9: A long term Operation and Maintenance Plan shall be implemented.

An *Operation and Maintenance & Erosion and Sediment Control Program for a Proposed Stormwater Management System* is included with this report. The long term operation and maintenance section of the program provides details and the schedule for routine and non-routine maintenance tasks to be implemented at the completion of the project.

Standard 10: Prohibition of Illicit Discharges – Illicit discharges to the stormwater management system are prohibited.

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Discharges to the stormwater management system from the following activities or facilities are permissible: Firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents. All other illicit discharges are prohibited.

There are no known illicit discharges anticipated through the completion of this project. During construction and post construction procedures are provided to dissipate the potential for illicit discharges to the drainage system. Post construction preventions of illicit discharges are described in the Operation and Maintenance Program under the Good Housekeeping Practices section of the report.

Calculation Objective

The purpose of this drainage analysis is to design a stormwater management system that maintains and/or reduces the peak rates and volumes of stormwater runoff from pre-development conditions in the post development conditions for the 2, 10, 50 and 100-year design storm events

The proposed stormwater management system designed for this project will consist of the installation of one (1) subsurface infiltration system to allow for the mitigation of the runoff from the proposed impervious areas within the project right of way.

There is one (1) proposed subsurface infiltration system to capture and mitigate stormwater runoff from the entire proposed roof. The installation of the subsurface infiltration system will allow the development to not have an increase in stormwater runoff (rate or volume) from the site during the 2, 10, 50 and 100-year design storms.

Classification of Soils

Existing soil conditions within the limits of the watershed analyzed for this study have been categorized as:

- Urban Land: Unclassified Hydrologic Group
- Udorthents, wet substratum: Hydrologic Group D

The classification is based upon the Natural Resource Conservation Service Maps dated May 1984 (map located in the Appendix to the narrative) the site consists of a mix of Urban Land (unclassified) and Hydrological Group D soils. Onsite soil testing was conducted by Patriot Engineering on September 22, 2021 in the areas depicted on the attached plan. This testing revealed a gravelly loamy sand parent material, which yields a Rawls Soil Group classification of A soils. Groundwater was not in either of the two test pit locations; therefore, the bottom of those test pits has been used as the estimated seasonal high groundwater elevation for design purposes.

Selection of Storm Events

The storm event rainfall frequencies used for this analysis have been selected based upon the Extreme Precipitation Tables for the NOAA Atlas 14. Rainfall frequency data has been provided as follows:

Frequency	Rainfall [24 hour event (inch)]
2 year	4.04
10 year	6.43
50 Year	9.69
100 year	11.50

Existing Site Overview

The project site is comprised of two mixed-use lots located within the Neighborhood Office (B-1) District. The parcels are identified on the Town of Arlington Assessor's Map 55-2 as Lots 19 and 20. The subject properties have a total area of 47,085 s.f., and site features currently existing include two mixed-use dwellings, bituminous concrete driveways with parking lots, gravel areas, walkways, grassed/landscaped areas and wooded areas.

The slope of the existing site promotes overland runoff in two (2) main directions: southwesterly toward Massachusetts Avenue and northeasterly toward an existing parking lot on the abutting property. This result in two (2) subcatchments (SC) and two (2) design points (DP):

- **Subcatchment SC-1 –** This subcatchment area consists of portions of existing mixed-use buildings, driveway/walkways and grassed areas. Stormwater runoff generated in this subcatchment flows southwest to Massachusetts Avenue to design point 1 **(DP1)**.

- **Subcatchment SC-2 –** This subcatchment area consists portions of existing mixed-use buildings, driveway/walkways, gravel areas, shed remnants and grassed/wooded areas. Stormwater runoff generated in this subcatchment flows northeast to the existing parking lot on the abutting property to design point 2 **(DP2)**.

Proposed Site Overview

The proposed project is comprised of the development of the existing properties into a 40B mixed-use development. The applicant is proposing a multi-story mixed-used building with residential and ground level commercial components. The building will be constructed with an interior parking garage, driveway, walkways, a stormwater management system, new utilities and associated grassed/landscaped areas.

A comprehensive stormwater management system that meets the Town of Arlington and MassDEP standards. The project proponent proposes to install a single subsurface infiltration system to collect and infiltrate stormwater run-off from the proposed structure as depicted on the Site Plans. The accompanying Stormwater Report contains supporting calculations, and an Operation and Maintenance Plan, and demonstrates that peak rates and volumes of stormwater run-off will be maintained or reduced for the 2, 10, 50, and 100-year statistical storm events. The proposed project has been developed with the intent of maintaining the existing drainage patterns of the site to the maximum extent practicable.

The three (3) subcatchments in the post construction scenario are as follows:

- **Subcatchment SC101 –** This subcatchment area consists of portions of the proposed driveway/walkway and grassed areas. Stormwater runoff generated in this subcatchment flows southwest to Massachusetts Avenue to design point 1 **(DP1)**.

- **Subcatchment SC201 –** This subcatchment area consists of proposed walkways (bit. conc. or stone dust) and grassed areas. Stormwater runoff generated in this subcatchment flows northeast to the existing parking lot on the abutting property to design point 2 **(DP2)**.

- **Subcatchment SC301 –** This subcatchment area consists of proposed roof area. Stormwater runoff generated in this subcatchment will be directed to proposed subsurface infiltration system **(PSIS-1)**, via gutters and downspouts. PSIS-1 has been designed with an overflow system that allows a portion of the stormwater runoff directed to the system to overflow northeast to the existing parking lot on the abutting property to design point 2 **(DP2)**.

Summary of Flows at the Design Point

Design Point 1 (DP1):

Peak Rates (CFS)

DP1	2-Year Storm	10-Year Storm	50-Year Storm	100-Year Storm
Existing	0.2	0.5	1.0	1.2
Proposed	0.1	0.3	0.6	0.7

Peak Volumes (AF)

DP1	2-Year Storm	10-Year Storm	50-Year Storm	100-Year Storm
Existing	0.01	0.04	0.07	0.09
Proposed	0.01	0.02	0.04	0.05

Design Point 2 (DP2):

Peak Rates (CFS)

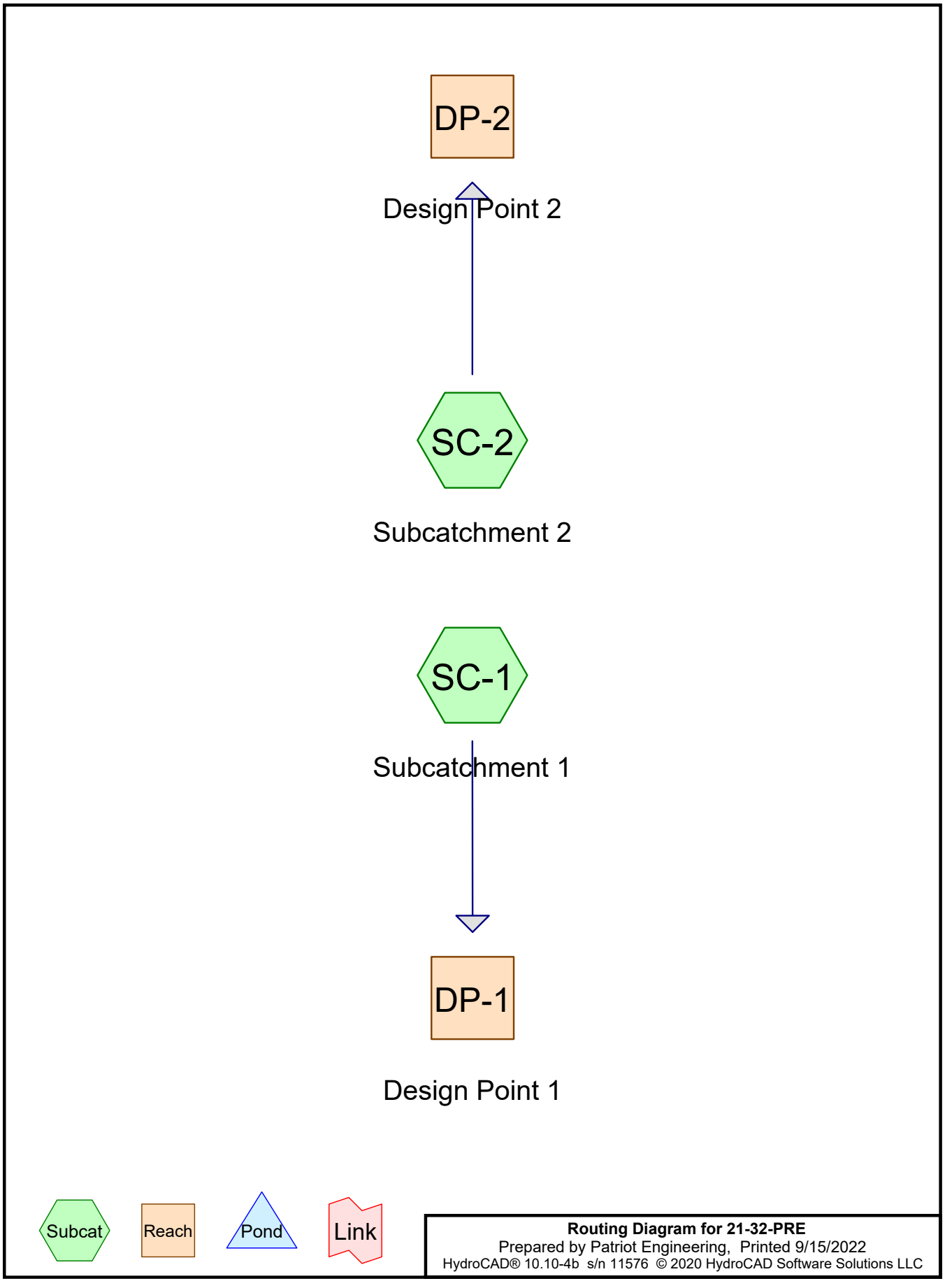
DP2	2-Year Storm	10-Year Storm	50-Year Storm	100-Year Storm
Existing	1.3	3.2	6.2	7.9
Proposed	0.8	1.7	3.3	5.5

Peak Volumes (AF)

DP2	2-Year Storm	10-Year Storm	50-Year Storm	100-Year Storm
Existing	0.10	0.24	0.45	0.57
Proposed	0.06	0.13	0.35	0.48

Conclusion

The calculations for each of the selected Design Points demonstrate that proposed site improvements will not result in an increase in the peak rate or volume of stormwater runoff for the 2-year, 10-year, 50-year or 100-year 24-hour storm events at the design points with the proposed stormwater mitigation system improvements.



Routing Diagram for 21-32-PRE
Prepared by Patriot Engineering, Printed 9/15/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Yr 24 Hr	Type III 24-hr		Default	24.00	1	4.04	2
2	10-Yr 24 Hr	Type III 24-hr		Default	24.00	1	6.43	2
3	50-Yr 24 Hr	Type III 24-hr		Default	24.00	1	9.69	2
4	100-Yr 24 Hr	Type III 24-hr		Default	24.00	1	11.50	2

Summary for Subcatchment SC-1: Subcatchment 1

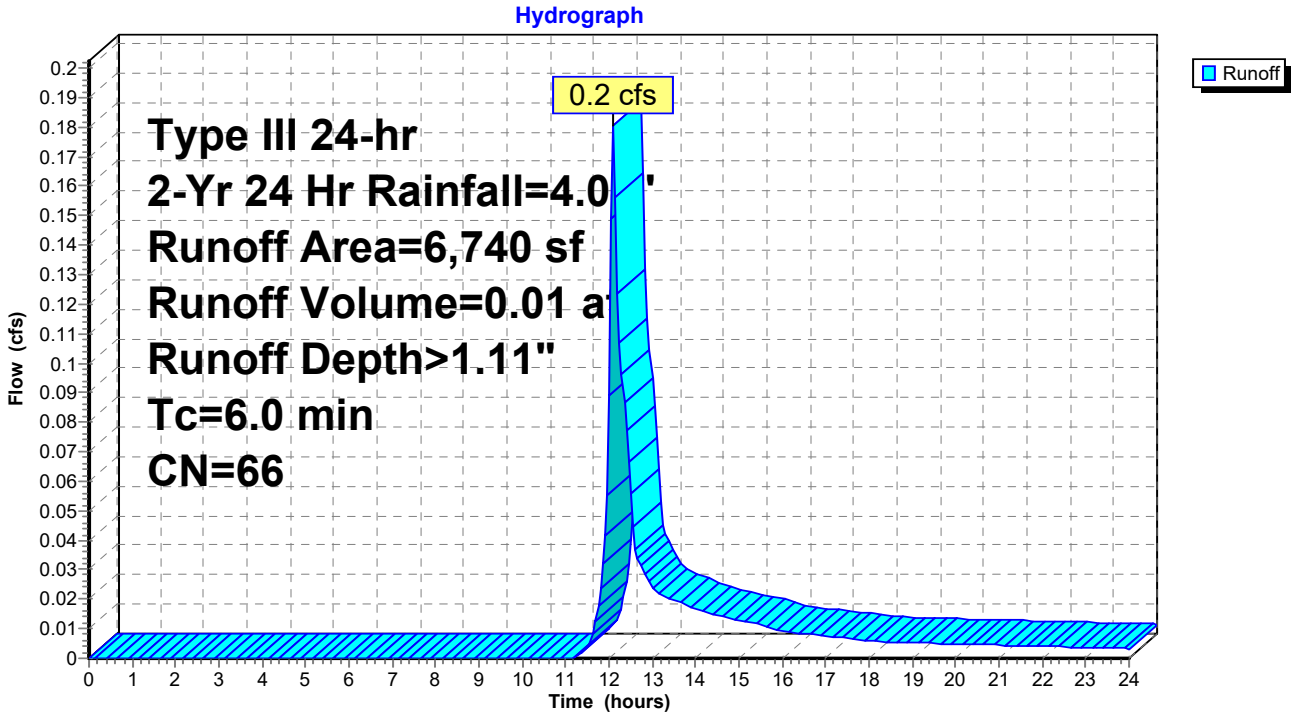
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.01 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=4.04"

	Area (sf)	CN	Description
	3,644	39	>75% Grass cover, Good, HSG A
*	1,684	98	Driveway/Walkways/Patios
*	1,412	98	Roof
	6,740	66	Weighted Average
	3,644		54.07% Pervious Area
	3,096		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-1: Subcatchment 1



Summary for Subcatchment SC-2: Subcatchment 2

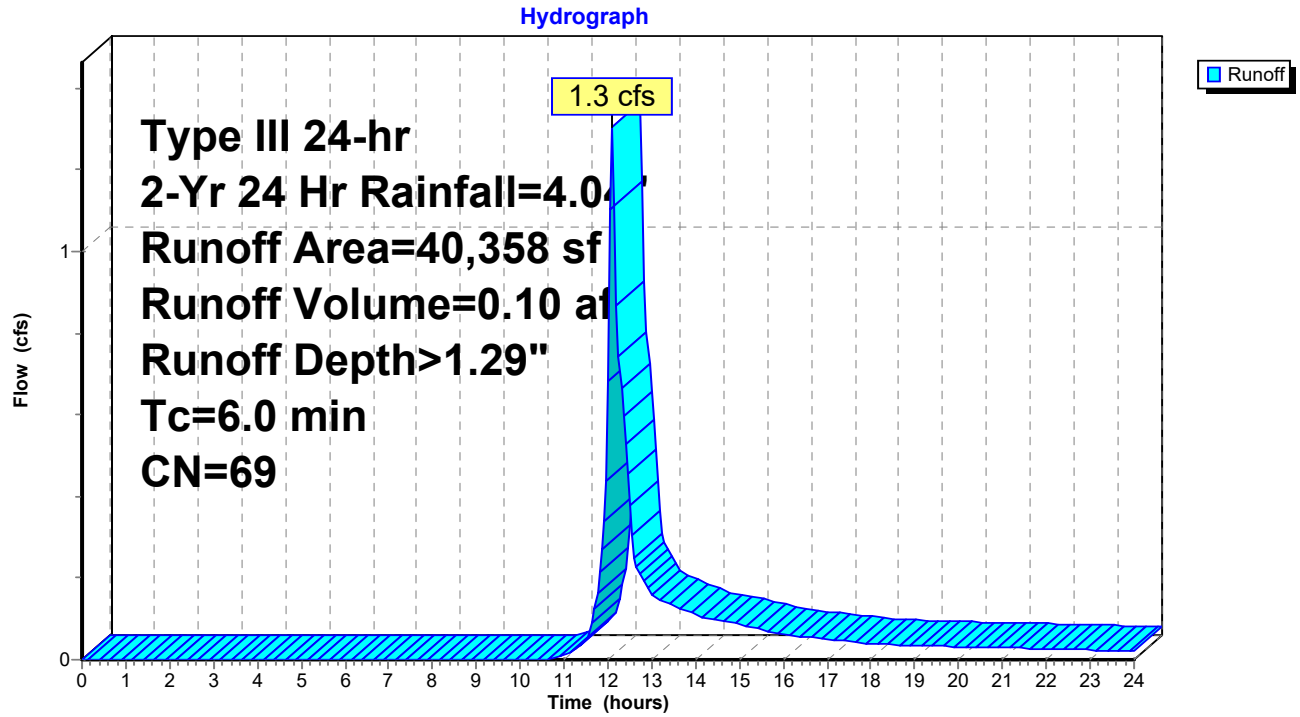
Runoff = 1.3 cfs @ 12.10 hrs, Volume= 0.10 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=4.04"

	Area (sf)	CN	Description
	6,103	39	>75% Grass cover, Good, HSG A
	12,656	77	Woods, Good, HSG D
*	10,068	98	Driveway/Walkways/Patios
*	2,942	98	Roof
	7,708	30	Woods, Good, HSG A
*	42	98	Bulkheads
*	192	98	Shed
	647	96	Gravel surface, HSG A
	40,358	69	Weighted Average
	27,114		67.18% Pervious Area
	13,244		32.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-2: Subcatchment 2

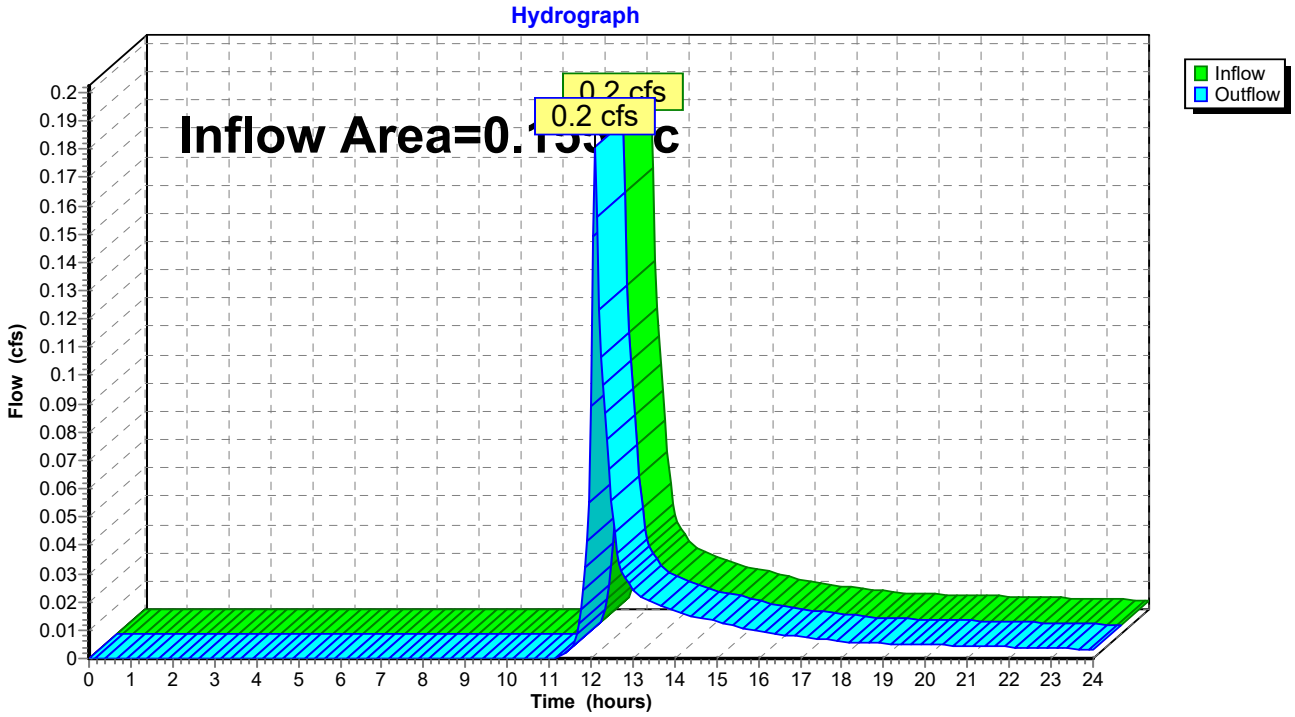


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.155 ac, 45.93% Impervious, Inflow Depth > 1.11" for 2-Yr 24 Hr event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 0.01 af
Outflow = 0.2 cfs @ 12.10 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

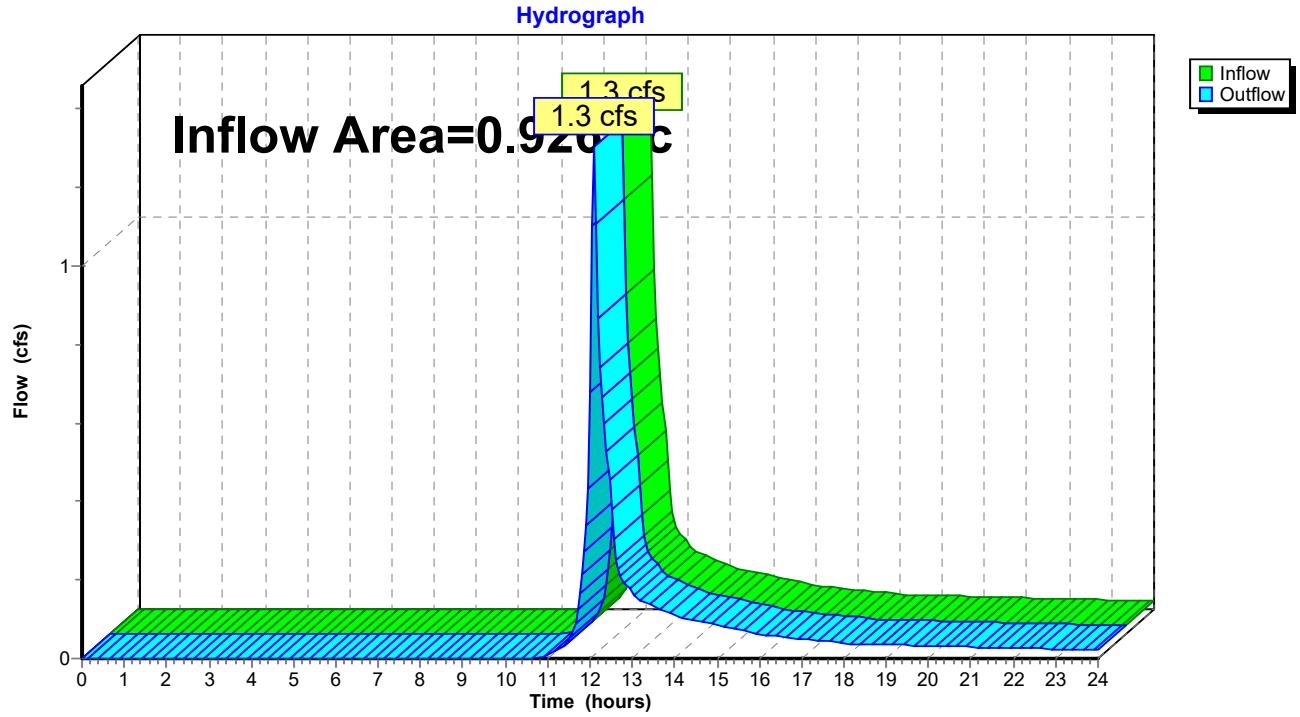


Summary for Reach DP-2: Design Point 2

Inflow Area = 0.926 ac, 32.82% Impervious, Inflow Depth > 1.29" for 2-Yr 24 Hr event
Inflow = 1.3 cfs @ 12.10 hrs, Volume= 0.10 af
Outflow = 1.3 cfs @ 12.10 hrs, Volume= 0.10 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2



Summary for Subcatchment SC-1: Subcatchment 1

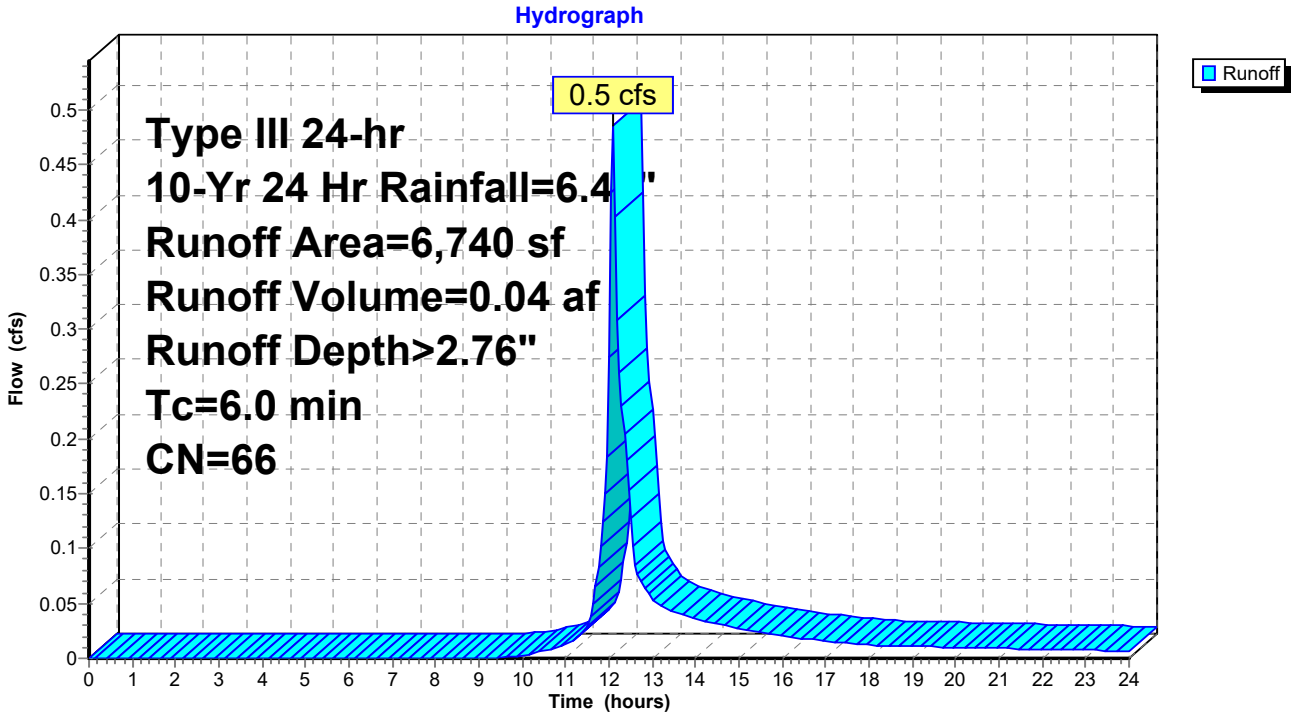
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=6.43"

	Area (sf)	CN	Description
	3,644	39	>75% Grass cover, Good, HSG A
*	1,684	98	Driveway/Walkways/Patios
*	1,412	98	Roof
	6,740	66	Weighted Average
	3,644		54.07% Pervious Area
	3,096		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-1: Subcatchment 1



Summary for Subcatchment SC-2: Subcatchment 2

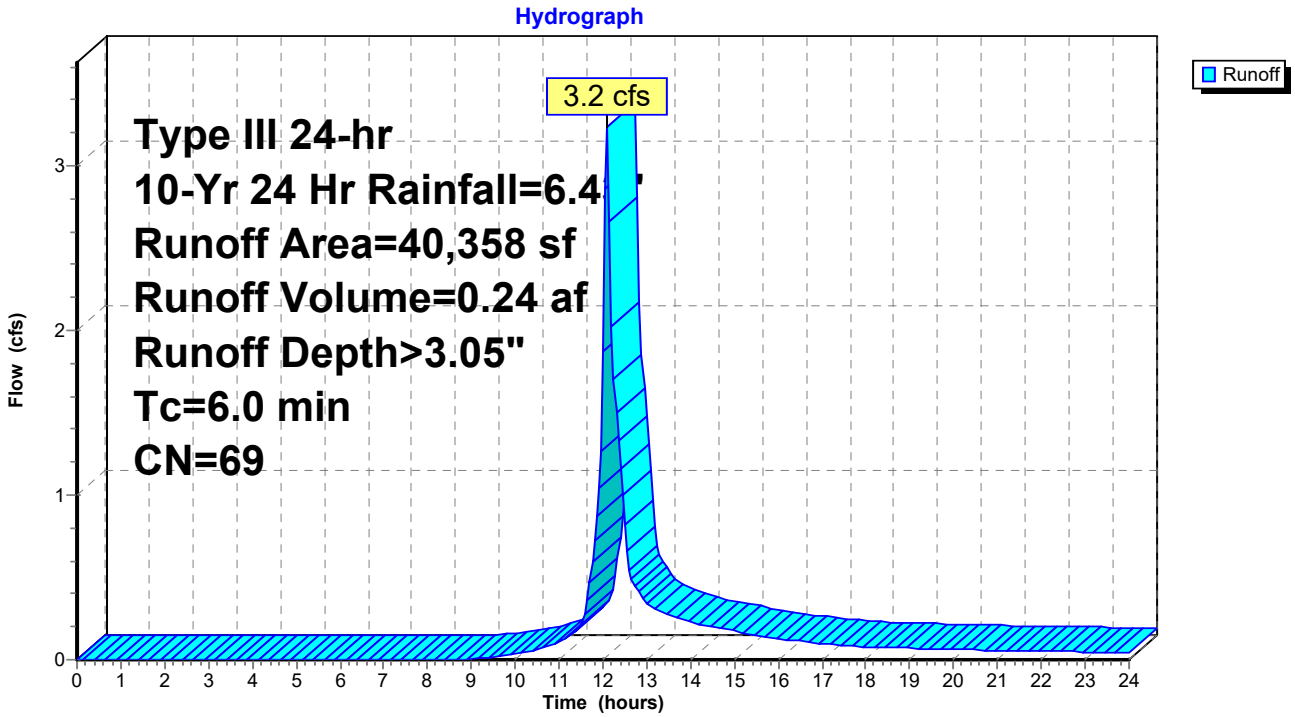
Runoff = 3.2 cfs @ 12.09 hrs, Volume= 0.24 af, Depth> 3.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=6.43"

	Area (sf)	CN	Description
	6,103	39	>75% Grass cover, Good, HSG A
	12,656	77	Woods, Good, HSG D
*	10,068	98	Driveway/Walkways/Patios
*	2,942	98	Roof
	7,708	30	Woods, Good, HSG A
*	42	98	Bulkheads
*	192	98	Shed
	647	96	Gravel surface, HSG A
	40,358	69	Weighted Average
	27,114		67.18% Pervious Area
	13,244		32.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-2: Subcatchment 2

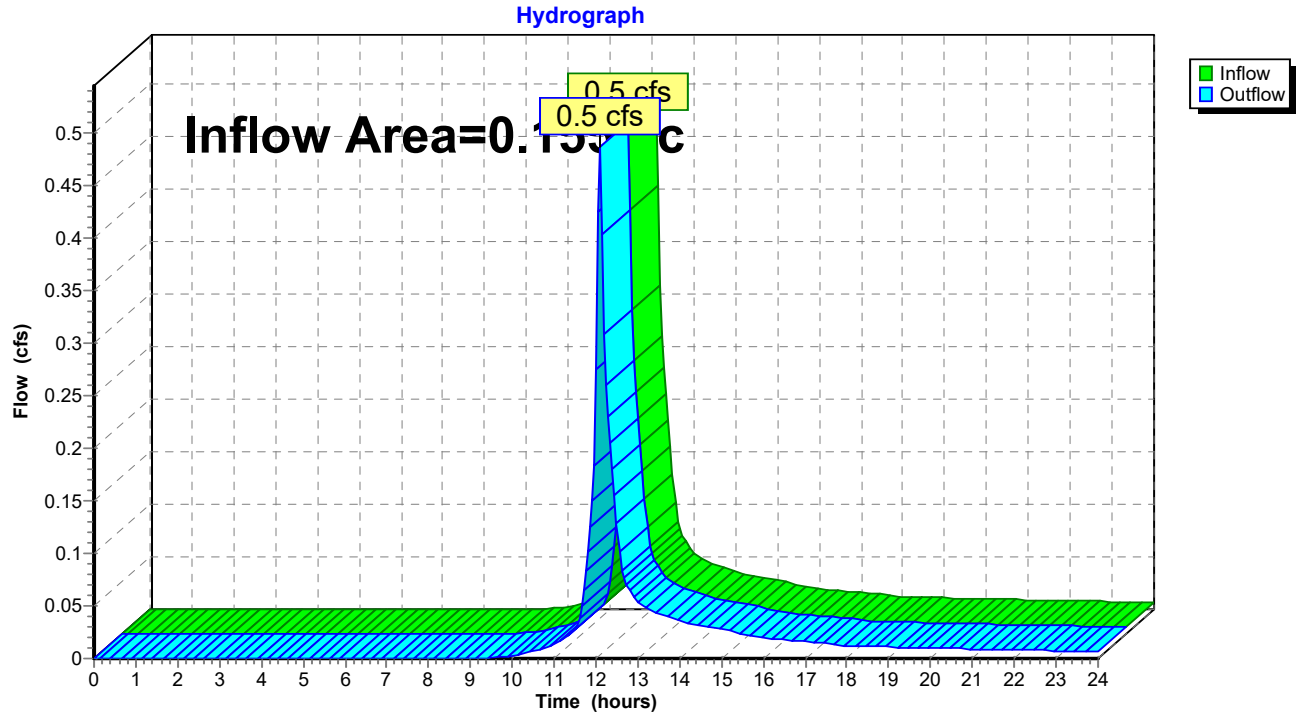


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.155 ac, 45.93% Impervious, Inflow Depth > 2.76" for 10-Yr 24 Hr event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

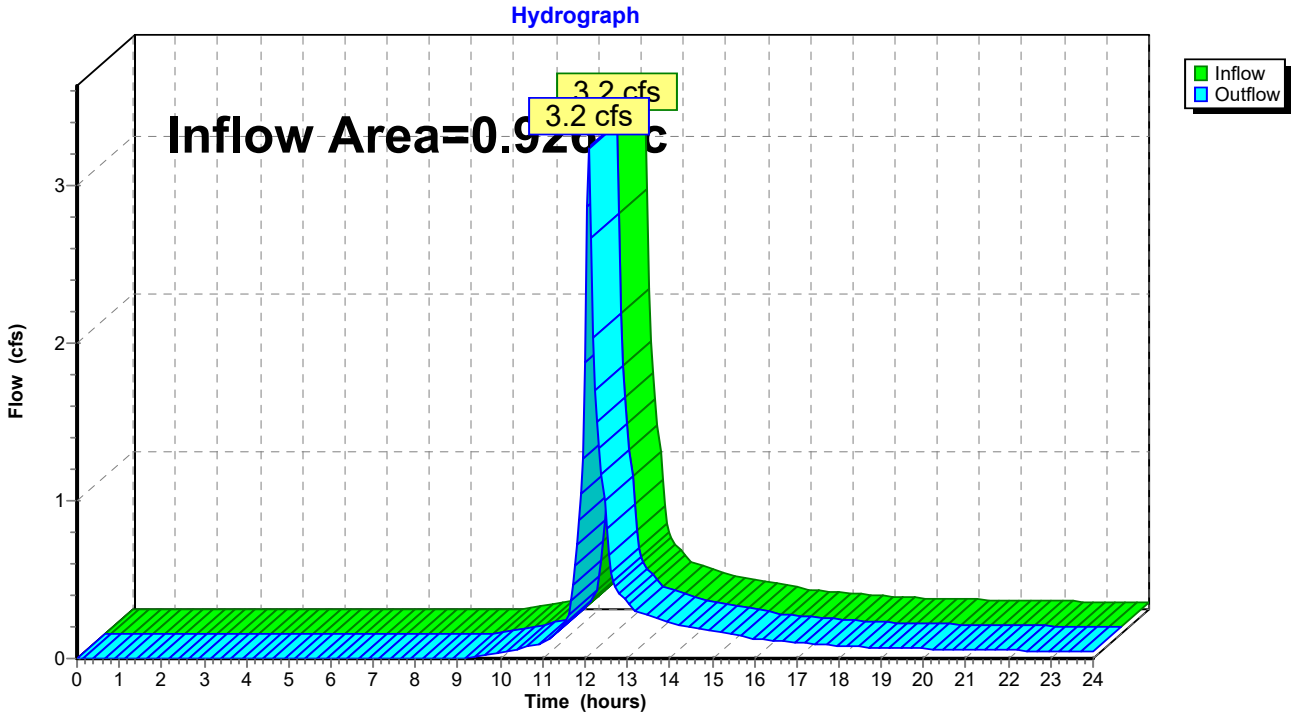


Summary for Reach DP-2: Design Point 2

Inflow Area = 0.926 ac, 32.82% Impervious, Inflow Depth > 3.05" for 10-Yr 24 Hr event
Inflow = 3.2 cfs @ 12.09 hrs, Volume= 0.24 af
Outflow = 3.2 cfs @ 12.09 hrs, Volume= 0.24 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2



Summary for Subcatchment SC-1: Subcatchment 1

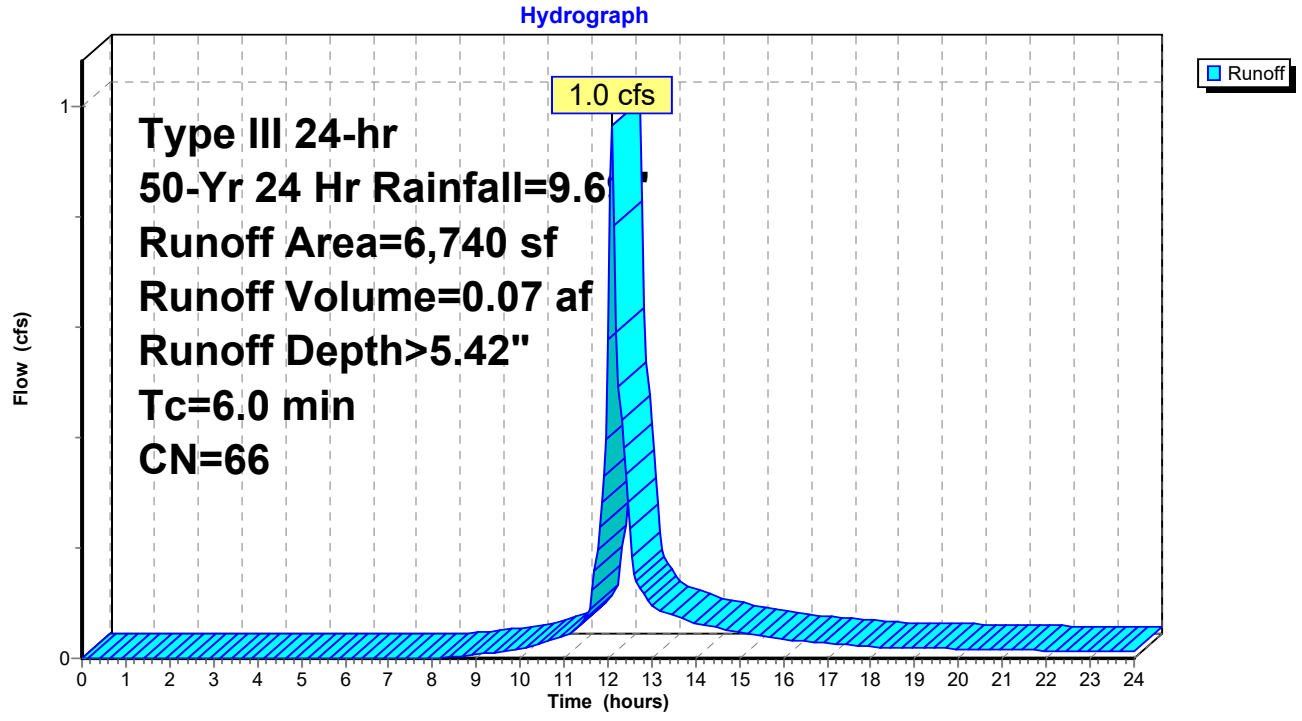
Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.07 af, Depth> 5.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Yr 24 Hr Rainfall=9.69"

	Area (sf)	CN	Description
	3,644	39	>75% Grass cover, Good, HSG A
*	1,684	98	Driveway/Walkways/Patios
*	1,412	98	Roof
	6,740	66	Weighted Average
	3,644		54.07% Pervious Area
	3,096		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-1: Subcatchment 1



Summary for Subcatchment SC-2: Subcatchment 2

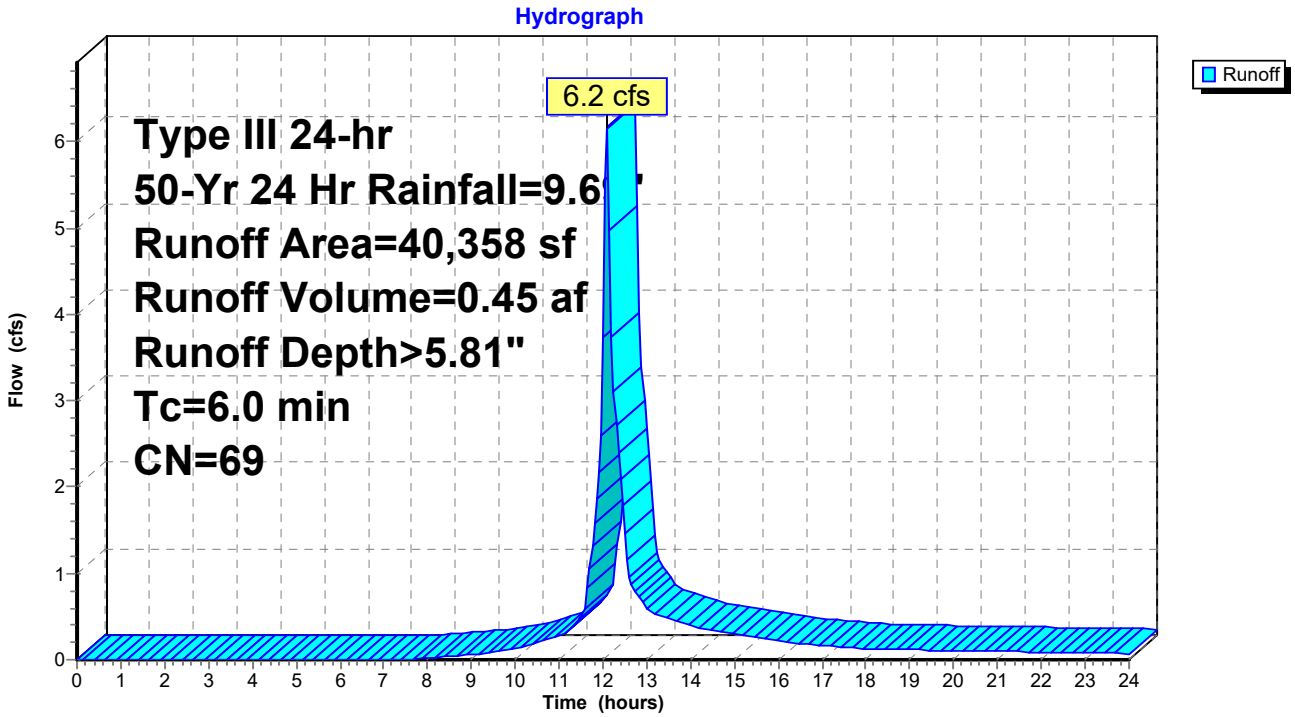
Runoff = 6.2 cfs @ 12.09 hrs, Volume= 0.45 af, Depth> 5.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Yr 24 Hr Rainfall=9.69"

	Area (sf)	CN	Description
	6,103	39	>75% Grass cover, Good, HSG A
	12,656	77	Woods, Good, HSG D
*	10,068	98	Driveway/Walkways/Patios
*	2,942	98	Roof
	7,708	30	Woods, Good, HSG A
*	42	98	Bulkheads
*	192	98	Shed
	647	96	Gravel surface, HSG A
	40,358	69	Weighted Average
	27,114		67.18% Pervious Area
	13,244		32.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-2: Subcatchment 2

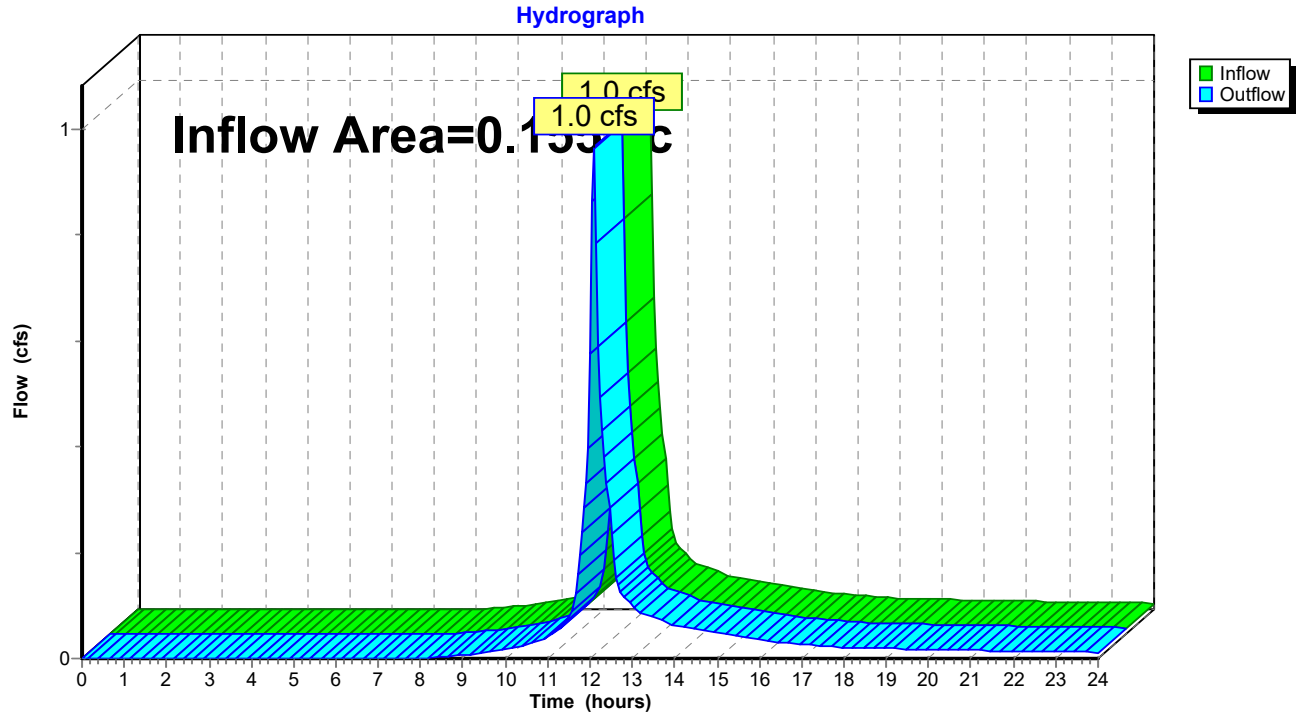


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.155 ac, 45.93% Impervious, Inflow Depth > 5.42" for 50-Yr 24 Hr event
Inflow = 1.0 cfs @ 12.09 hrs, Volume= 0.07 af
Outflow = 1.0 cfs @ 12.09 hrs, Volume= 0.07 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

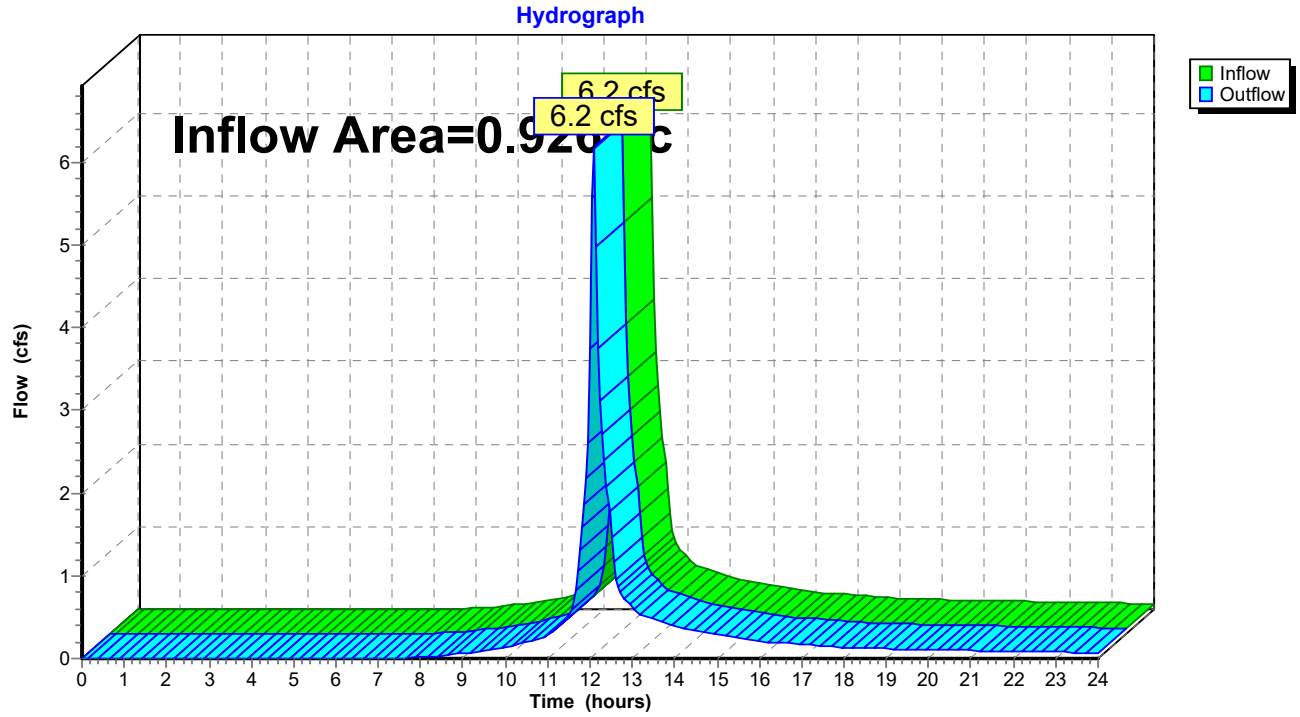


Summary for Reach DP-2: Design Point 2

Inflow Area = 0.926 ac, 32.82% Impervious, Inflow Depth > 5.81" for 50-Yr 24 Hr event
Inflow = 6.2 cfs @ 12.09 hrs, Volume= 0.45 af
Outflow = 6.2 cfs @ 12.09 hrs, Volume= 0.45 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2



Summary for Subcatchment SC-1: Subcatchment 1

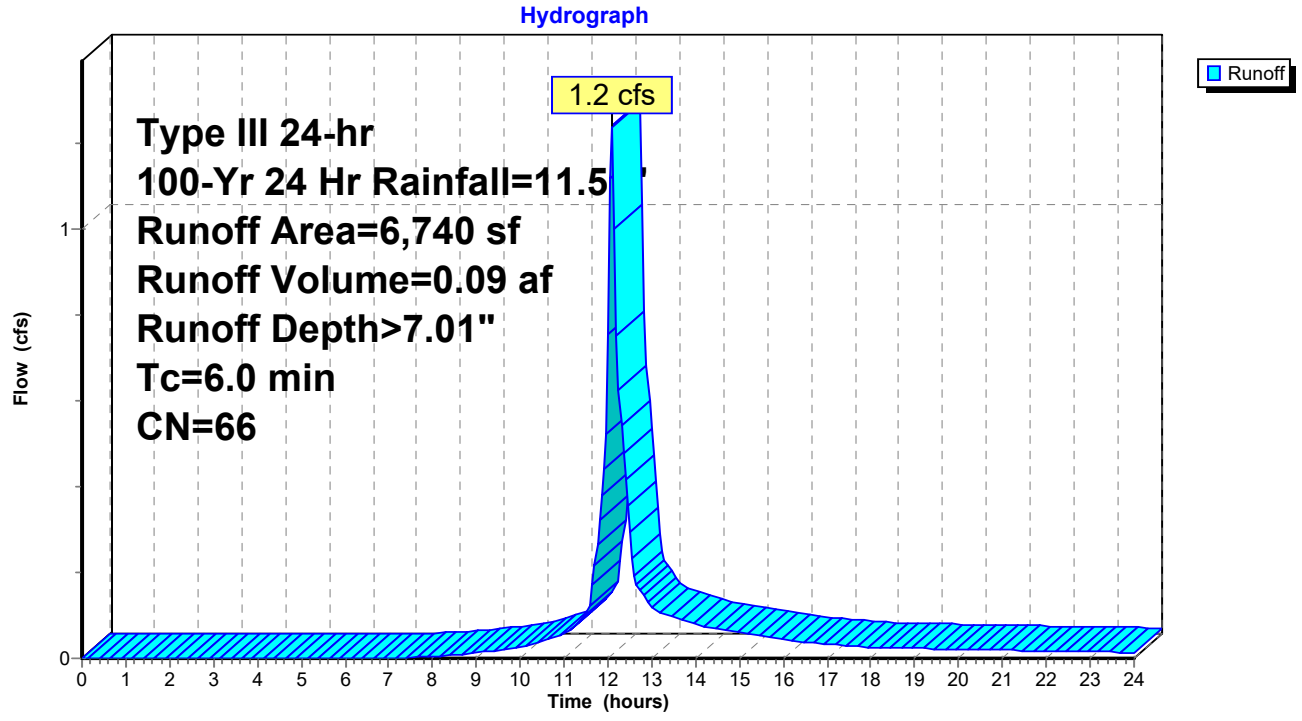
Runoff = 1.2 cfs @ 12.09 hrs, Volume= 0.09 af, Depth> 7.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=11.50"

	Area (sf)	CN	Description
	3,644	39	>75% Grass cover, Good, HSG A
*	1,684	98	Driveway/Walkways/Patios
*	1,412	98	Roof
	6,740	66	Weighted Average
	3,644		54.07% Pervious Area
	3,096		45.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-1: Subcatchment 1



Summary for Subcatchment SC-2: Subcatchment 2

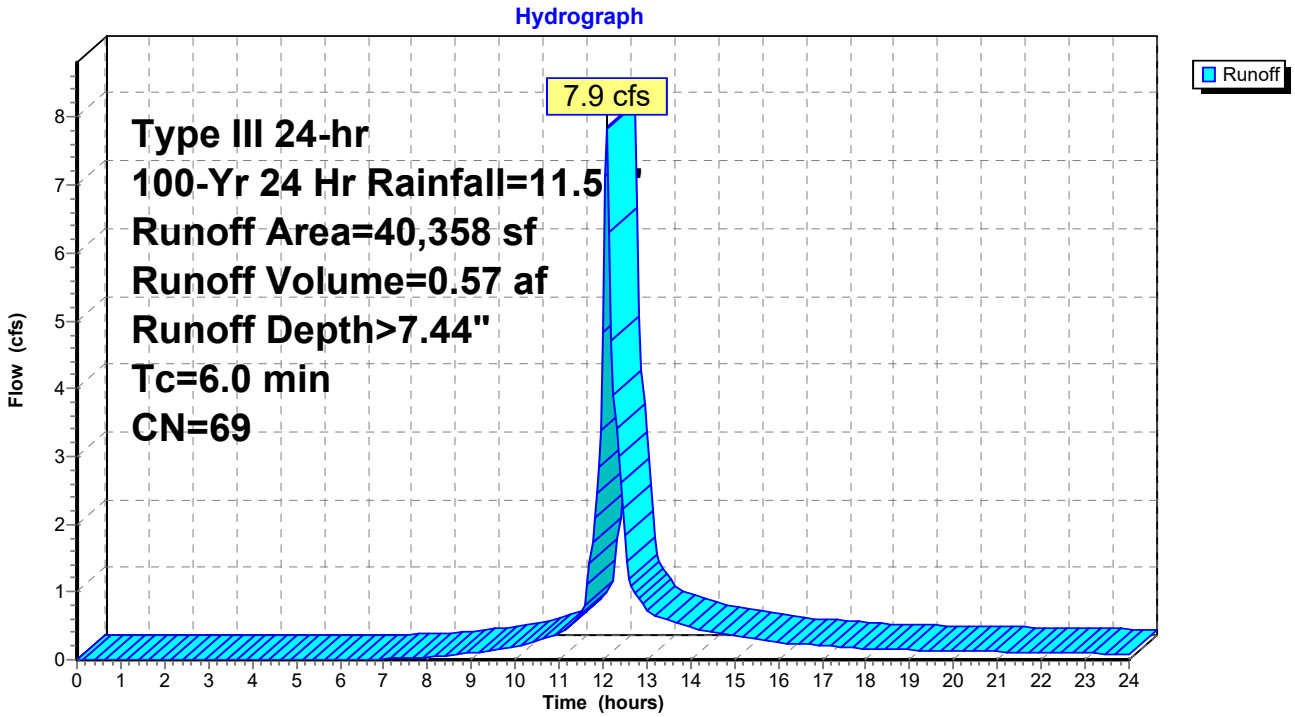
Runoff = 7.9 cfs @ 12.09 hrs, Volume= 0.57 af, Depth> 7.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=11.50"

	Area (sf)	CN	Description
	6,103	39	>75% Grass cover, Good, HSG A
	12,656	77	Woods, Good, HSG D
*	10,068	98	Driveway/Walkways/Patios
*	2,942	98	Roof
	7,708	30	Woods, Good, HSG A
*	42	98	Bulkheads
*	192	98	Shed
	647	96	Gravel surface, HSG A
	40,358	69	Weighted Average
	27,114		67.18% Pervious Area
	13,244		32.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-2: Subcatchment 2

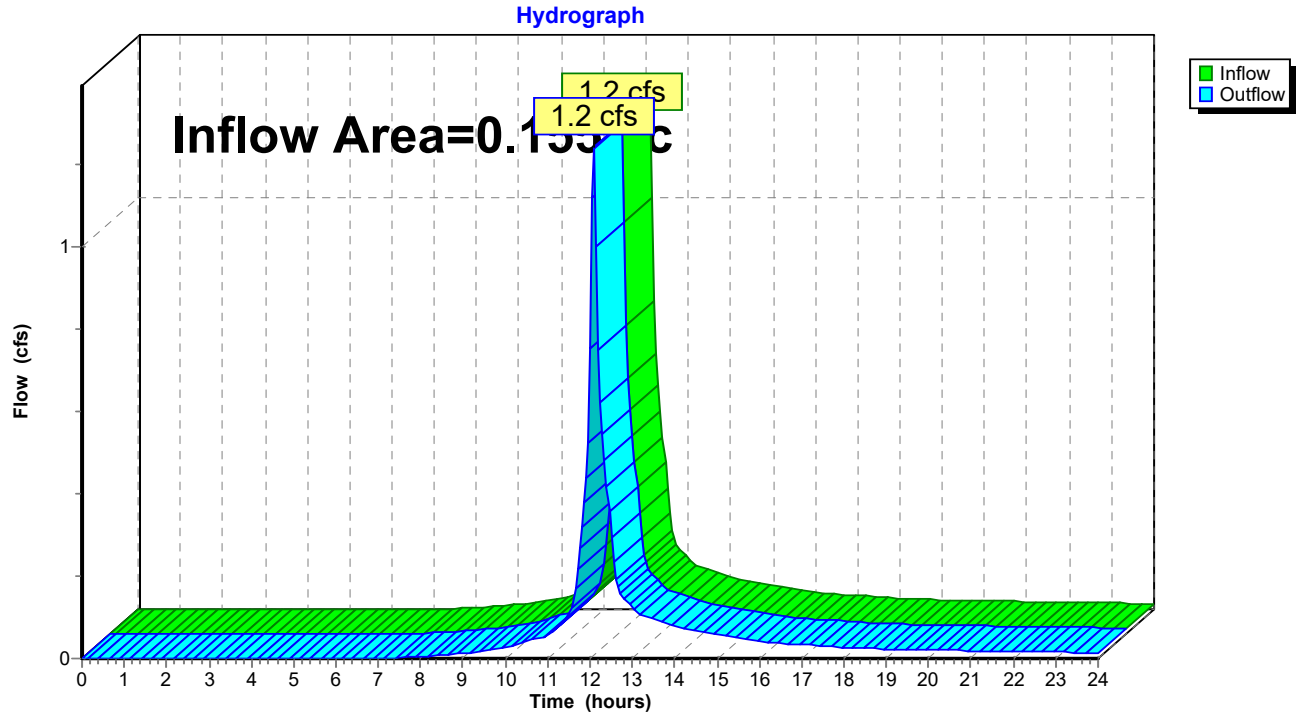


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.155 ac, 45.93% Impervious, Inflow Depth > 7.01" for 100-Yr 24 Hr event
Inflow = 1.2 cfs @ 12.09 hrs, Volume= 0.09 af
Outflow = 1.2 cfs @ 12.09 hrs, Volume= 0.09 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

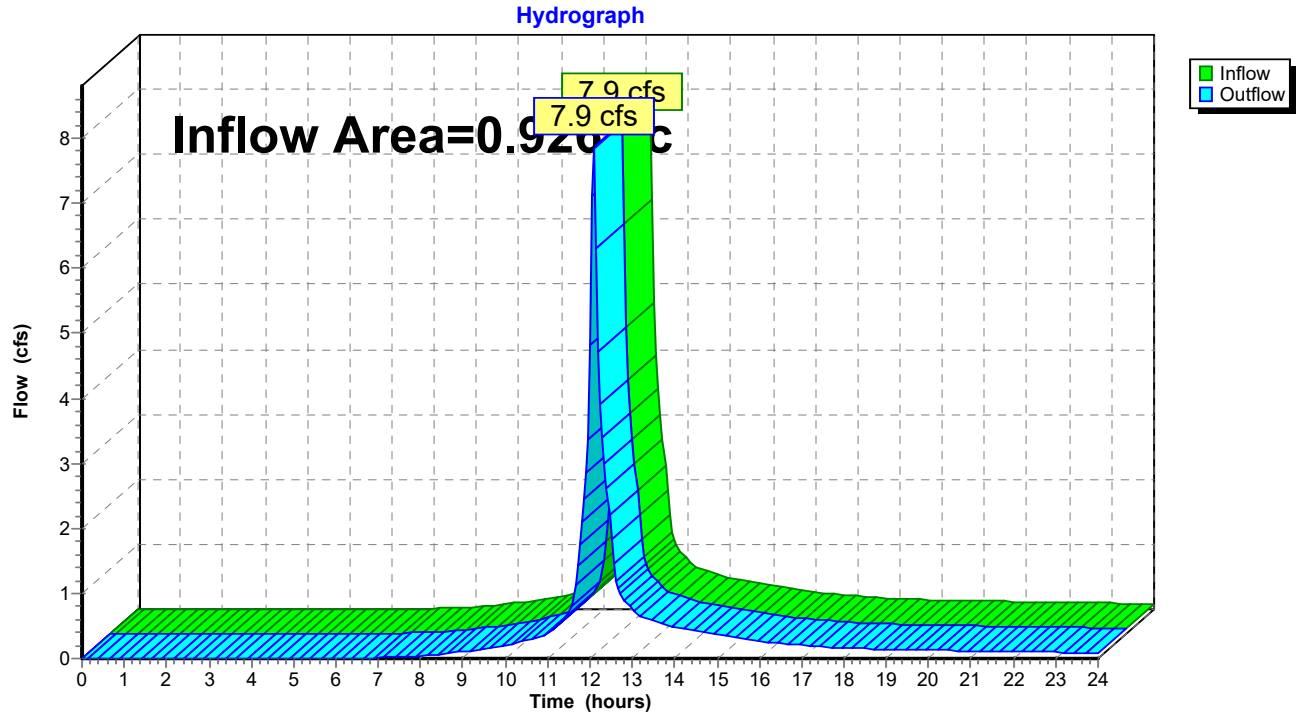


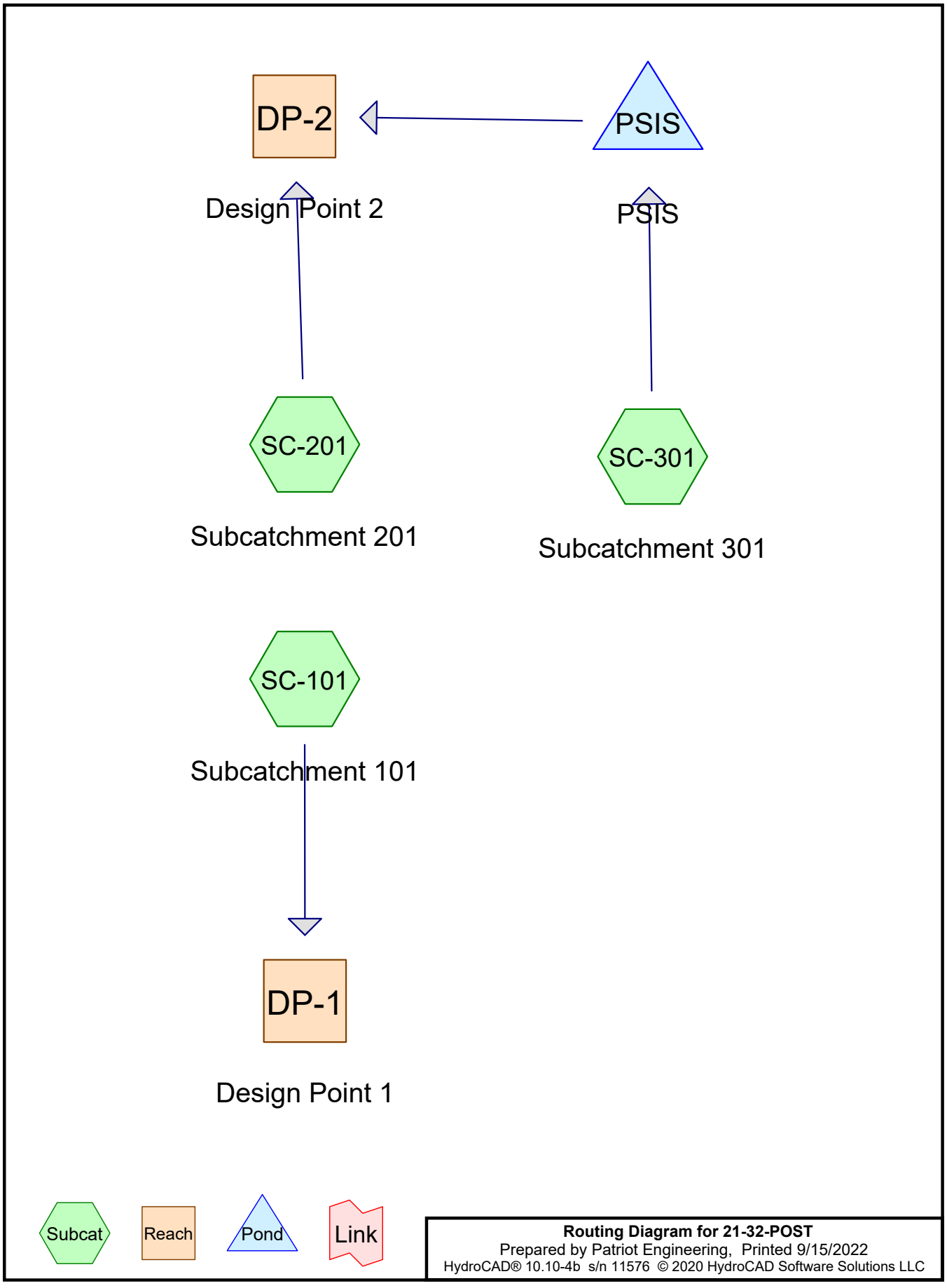
Summary for Reach DP-2: Design Point 2

Inflow Area = 0.926 ac, 32.82% Impervious, Inflow Depth > 7.44" for 100-Yr 24 Hr event
Inflow = 7.9 cfs @ 12.09 hrs, Volume= 0.57 af
Outflow = 7.9 cfs @ 12.09 hrs, Volume= 0.57 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2





Routing Diagram for 21-32-POST
Prepared by Patriot Engineering, Printed 9/15/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Yr 24 Hr	Type III 24-hr		Default	24.00	1	4.04	2
2	10-Yr 24 Hr	Type III 24-hr		Default	24.00	1	6.43	2
3	50-Yr 24 Hr	Type III 24-hr		Default	24.00	1	9.69	2
4	100-Yr 24 Hr	Type III 24-hr		Default	24.00	1	11.50	2

Summary for Subcatchment SC-101: Subcatchment 101

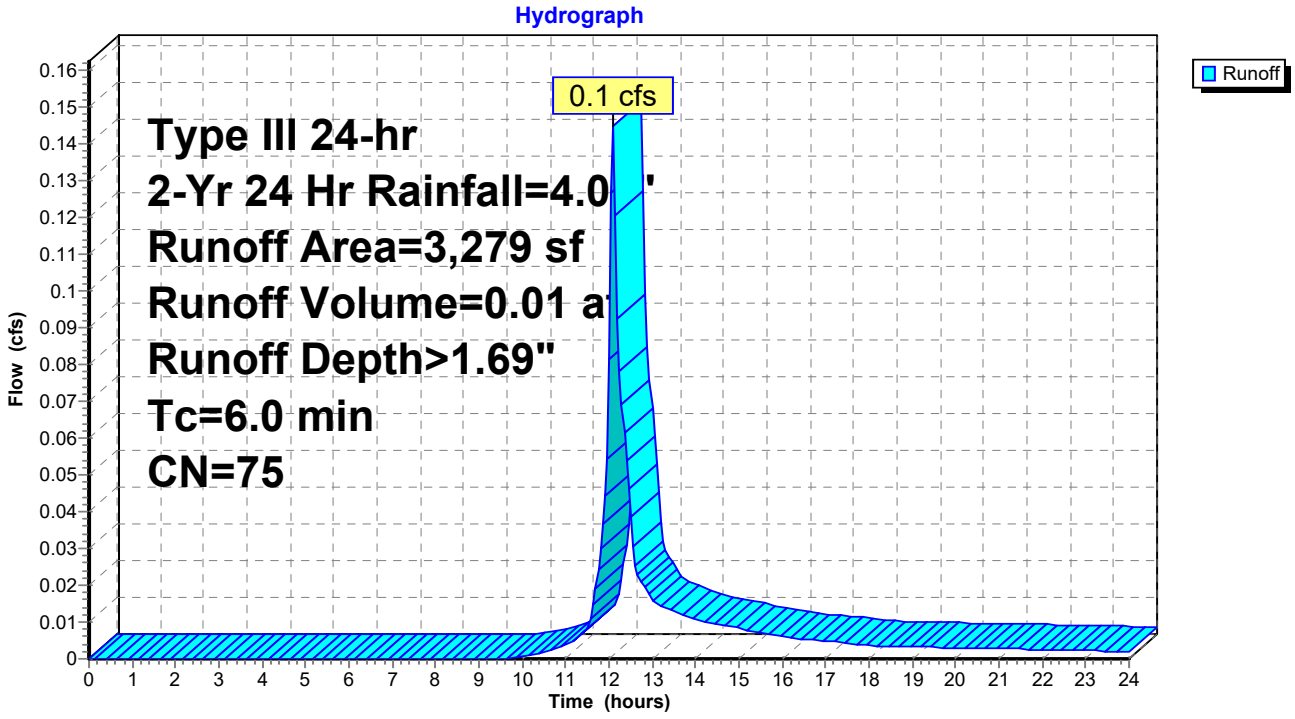
Runoff = 0.1 cfs @ 12.10 hrs, Volume= 0.01 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=4.04"

	Area (sf)	CN	Description
	1,266	39	>75% Grass cover, Good, HSG A
*	2,013	98	Proposed Driveway
	3,279	75	Weighted Average
	1,266		38.61% Pervious Area
	2,013		61.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-101: Subcatchment 101



Summary for Subcatchment SC-201: Subcatchment 201

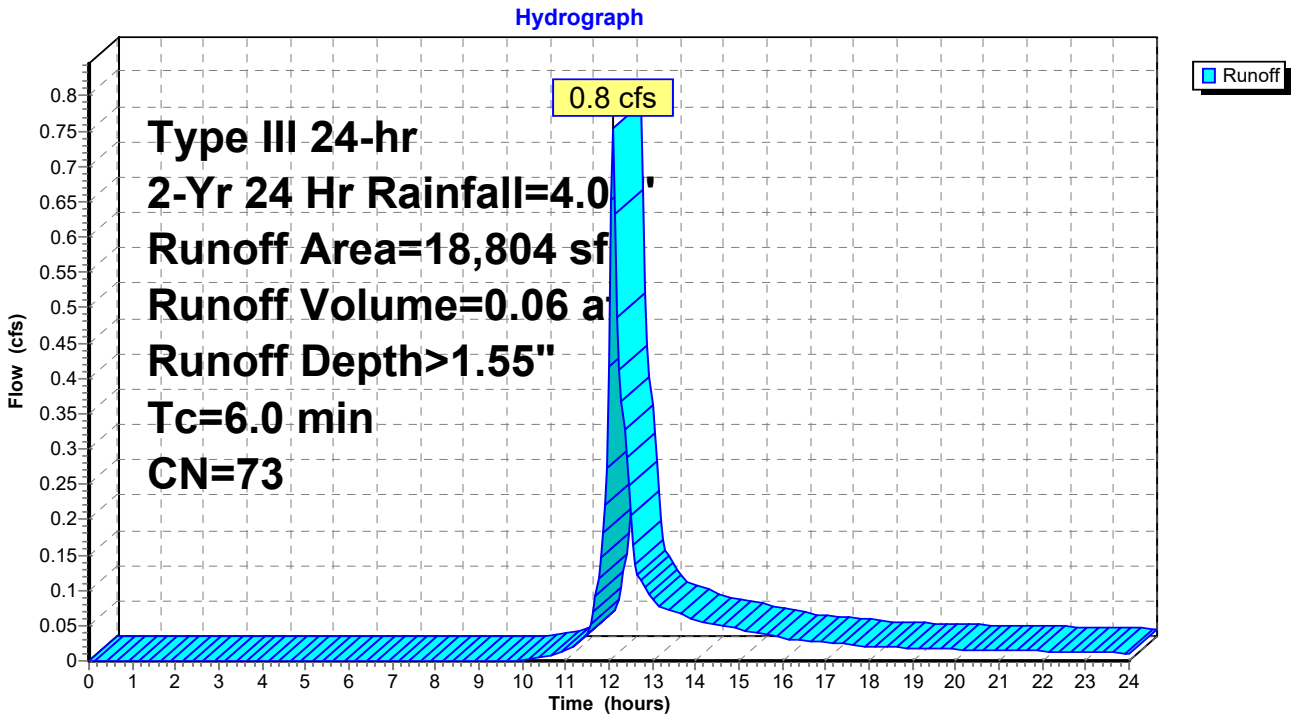
Runoff = 0.8 cfs @ 12.10 hrs, Volume= 0.06 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=4.04"

	Area (sf)	CN	Description
	4,332	39	>75% Grass cover, Good, HSG A
	12,186	80	>75% Grass cover, Good, HSG D
*	1,558	96	Stone Dust Walkway
*	728	98	Bit. Conc. Walkway
	18,804	73	Weighted Average
	18,076		96.13% Pervious Area
	728		3.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-201: Subcatchment 201



Summary for Subcatchment SC-301: Subcatchment 301

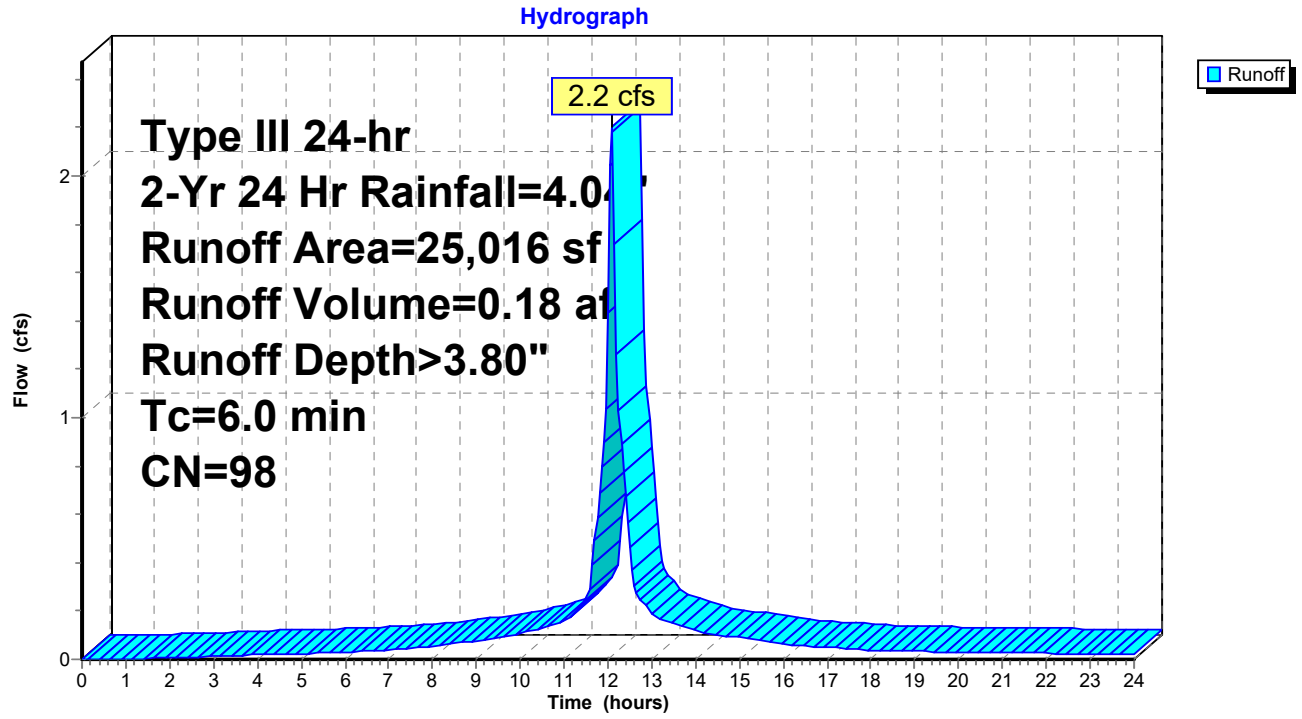
Runoff = 2.2 cfs @ 12.09 hrs, Volume= 0.18 af, Depth> 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Yr 24 Hr Rainfall=4.04"

	Area (sf)	CN	Description
*	25,016	98	Proposed Roof Area
	25,016		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-301: Subcatchment 301

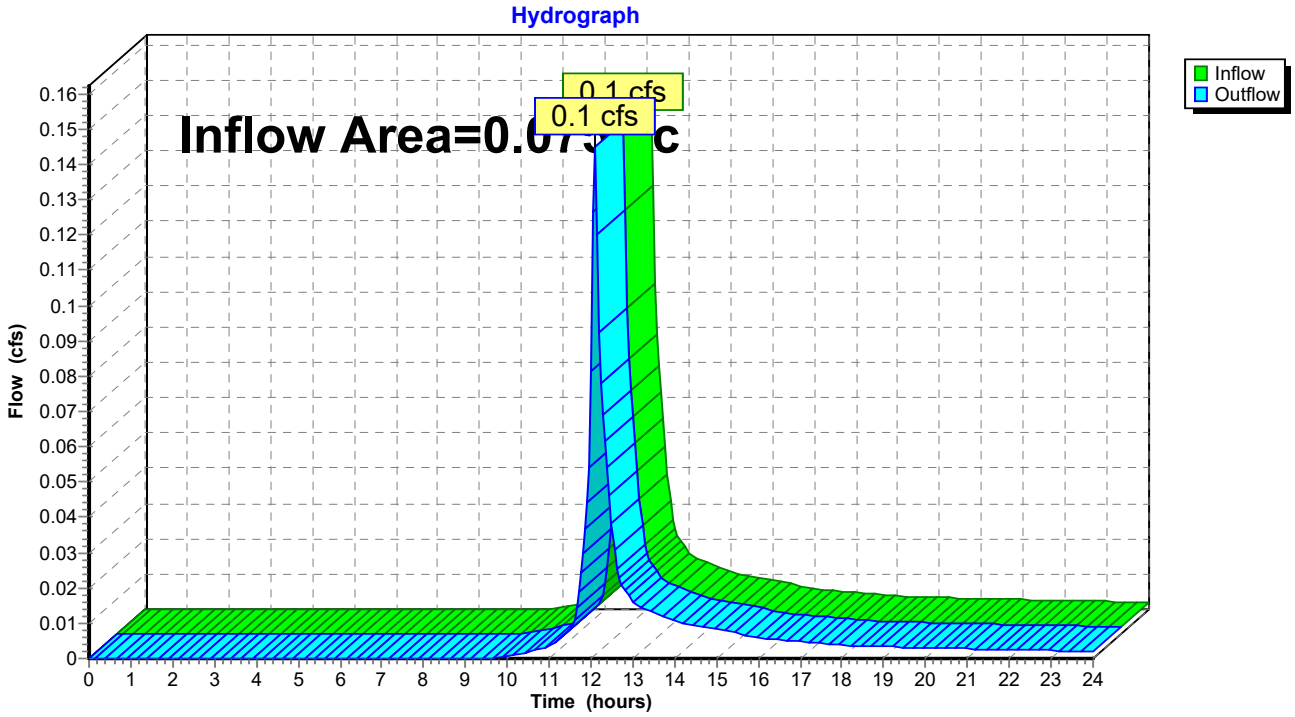


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.075 ac, 61.39% Impervious, Inflow Depth > 1.69" for 2-Yr 24 Hr event
Inflow = 0.1 cfs @ 12.10 hrs, Volume= 0.01 af
Outflow = 0.1 cfs @ 12.10 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

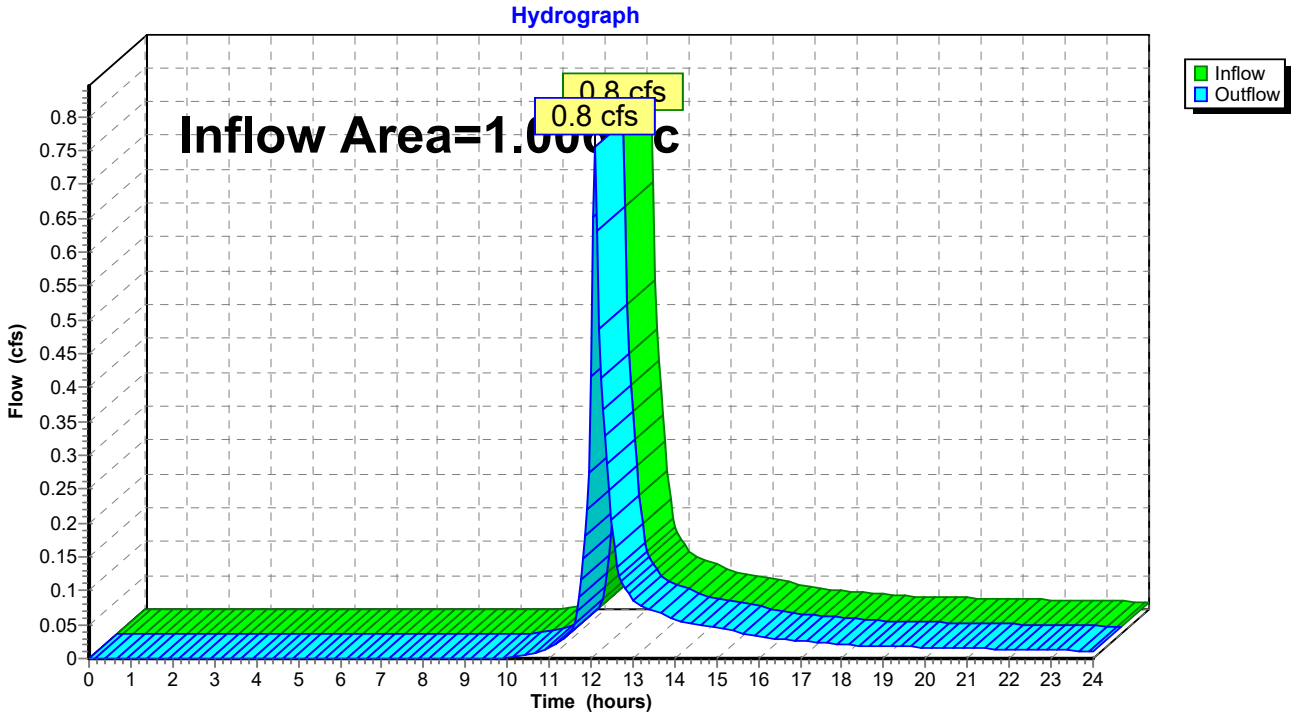


Summary for Reach DP-2: Design Point 2

Inflow Area = 1.006 ac, 58.75% Impervious, Inflow Depth > 0.67" for 2-Yr 24 Hr event
Inflow = 0.8 cfs @ 12.10 hrs, Volume= 0.06 af
Outflow = 0.8 cfs @ 12.10 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2



Summary for Pond PSIS: PSIS

Inflow Area = 0.574 ac,100.00% Impervious, Inflow Depth > 3.80" for 2-Yr 24 Hr event
Inflow = 2.2 cfs @ 12.09 hrs, Volume= 0.18 af
Outflow = 0.1 cfs @ 10.80 hrs, Volume= 0.18 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.1 cfs @ 10.80 hrs, Volume= 0.18 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 87.44' @ 13.61 hrs Surf.Area= 2,530 sf Storage= 3,248 cf

Plug-Flow detention time= 181.1 min calculated for 0.18 af (100% of inflow)
Center-of-Mass det. time= 180.1 min (931.4 - 751.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	85.50'	3,583 cf	**29.92'W x 84.57'L x 5.50'H Field A** 13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 40.0% Voids
#2A	86.25'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 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 44 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		8,540 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	85.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	88.90'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 10.80 hrs HW=85.56' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=85.50' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.0 cfs)

Pond PSIS: PSIS - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 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= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

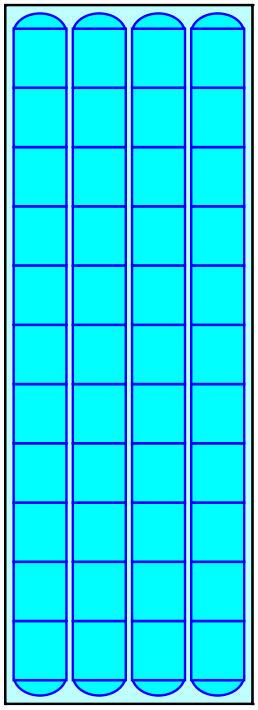
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

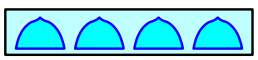
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 40.0% Voids = 3,583.3 cf Stone Storage

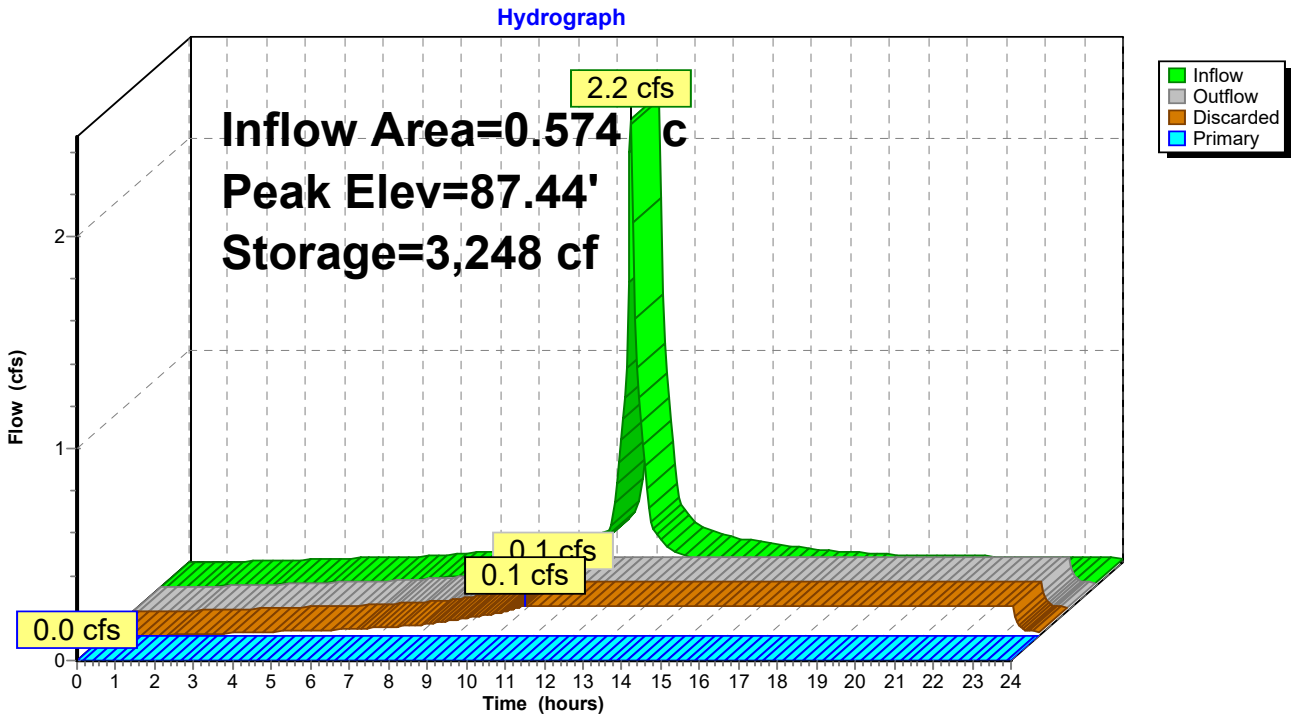
Chamber Storage + Stone Storage = 8,540.4 cf = 0.20 af
Overall Storage Efficiency = 61.4%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Pond PSIS: PSIS



Summary for Subcatchment SC-101: Subcatchment 101

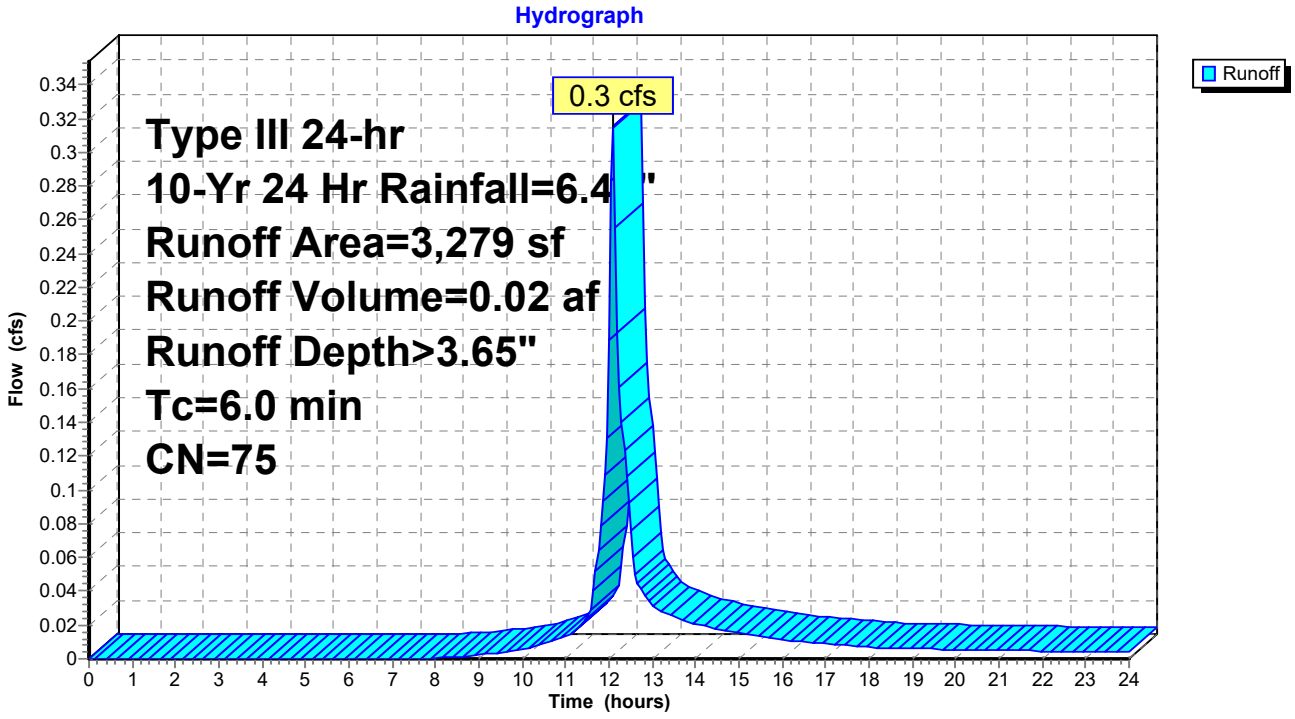
Runoff = 0.3 cfs @ 12.09 hrs, Volume= 0.02 af, Depth> 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=6.43"

	Area (sf)	CN	Description
	1,266	39	>75% Grass cover, Good, HSG A
*	2,013	98	Proposed Driveway
	3,279	75	Weighted Average
	1,266		38.61% Pervious Area
	2,013		61.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-101: Subcatchment 101



Summary for Subcatchment SC-201: Subcatchment 201

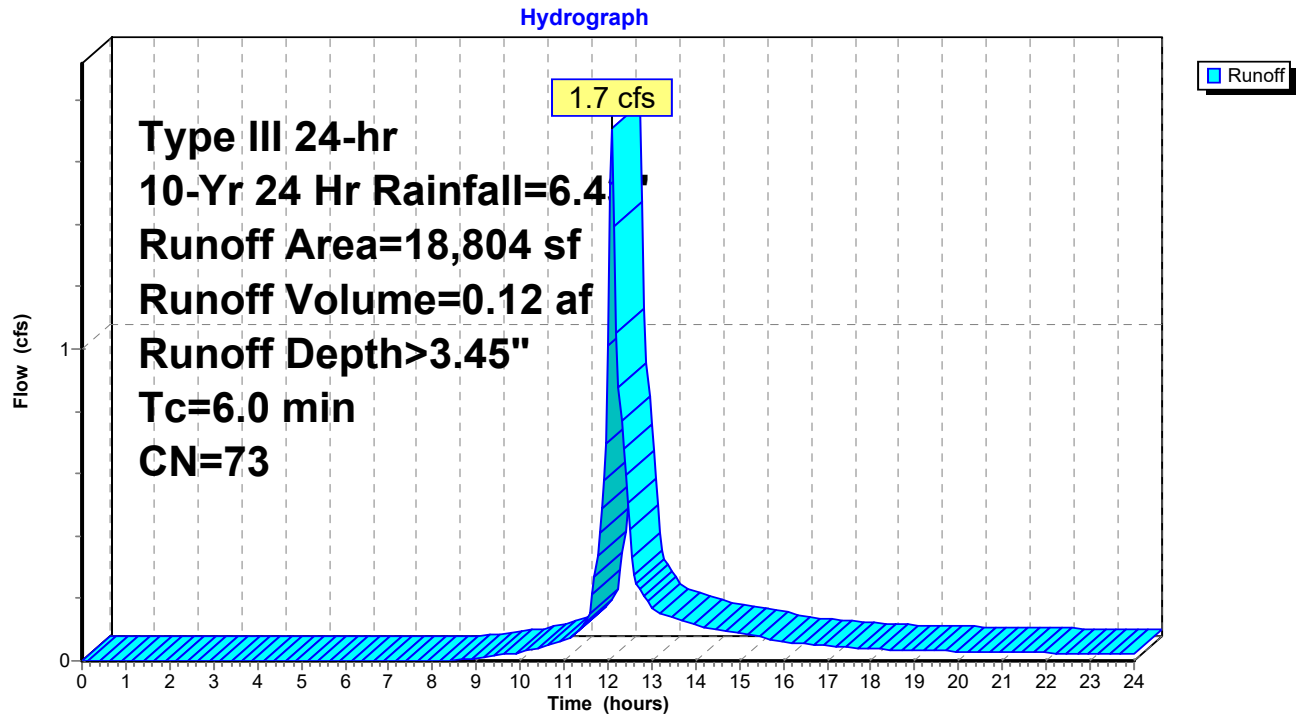
Runoff = 1.7 cfs @ 12.09 hrs, Volume= 0.12 af, Depth> 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=6.43"

	Area (sf)	CN	Description
	4,332	39	>75% Grass cover, Good, HSG A
	12,186	80	>75% Grass cover, Good, HSG D
*	1,558	96	Stone Dust Walkway
*	728	98	Bit. Conc. Walkway
	18,804	73	Weighted Average
	18,076		96.13% Pervious Area
	728		3.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-201: Subcatchment 201



Summary for Subcatchment SC-301: Subcatchment 301

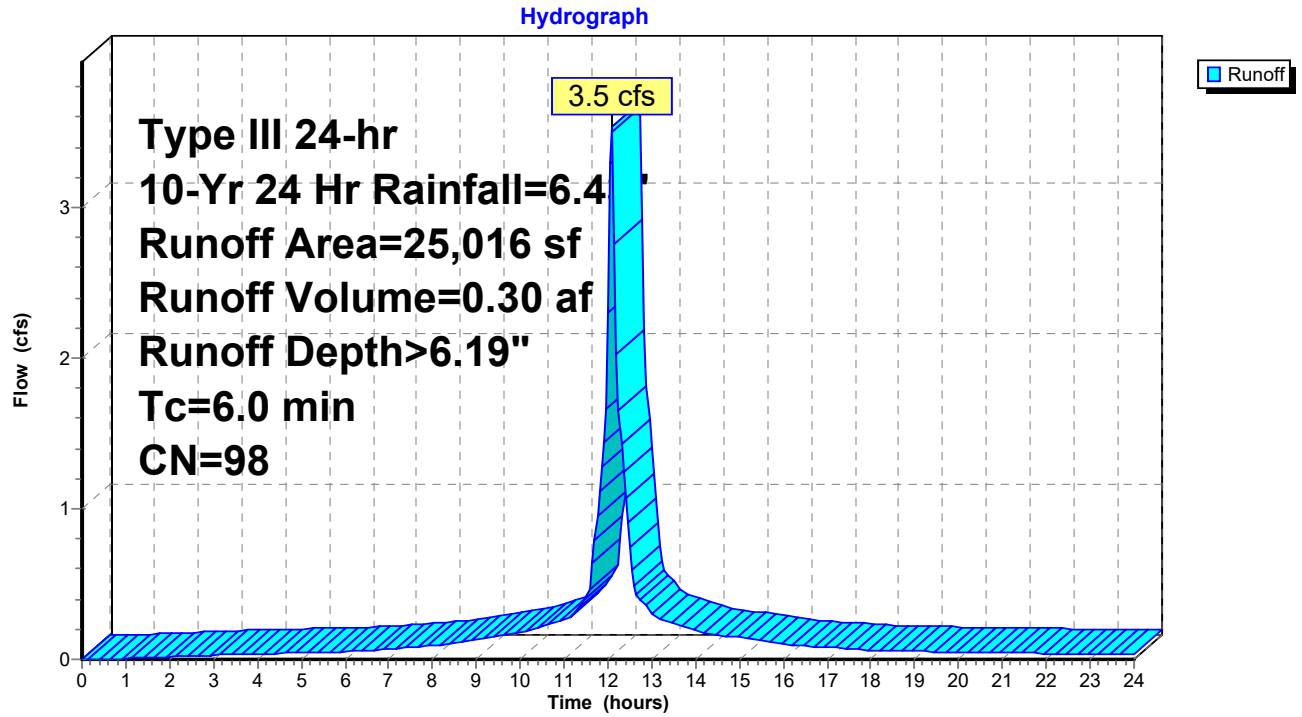
Runoff = 3.5 cfs @ 12.09 hrs, Volume= 0.30 af, Depth> 6.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr 24 Hr Rainfall=6.43"

	Area (sf)	CN	Description
*	25,016	98	Proposed Roof Area
	25,016		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-301: Subcatchment 301

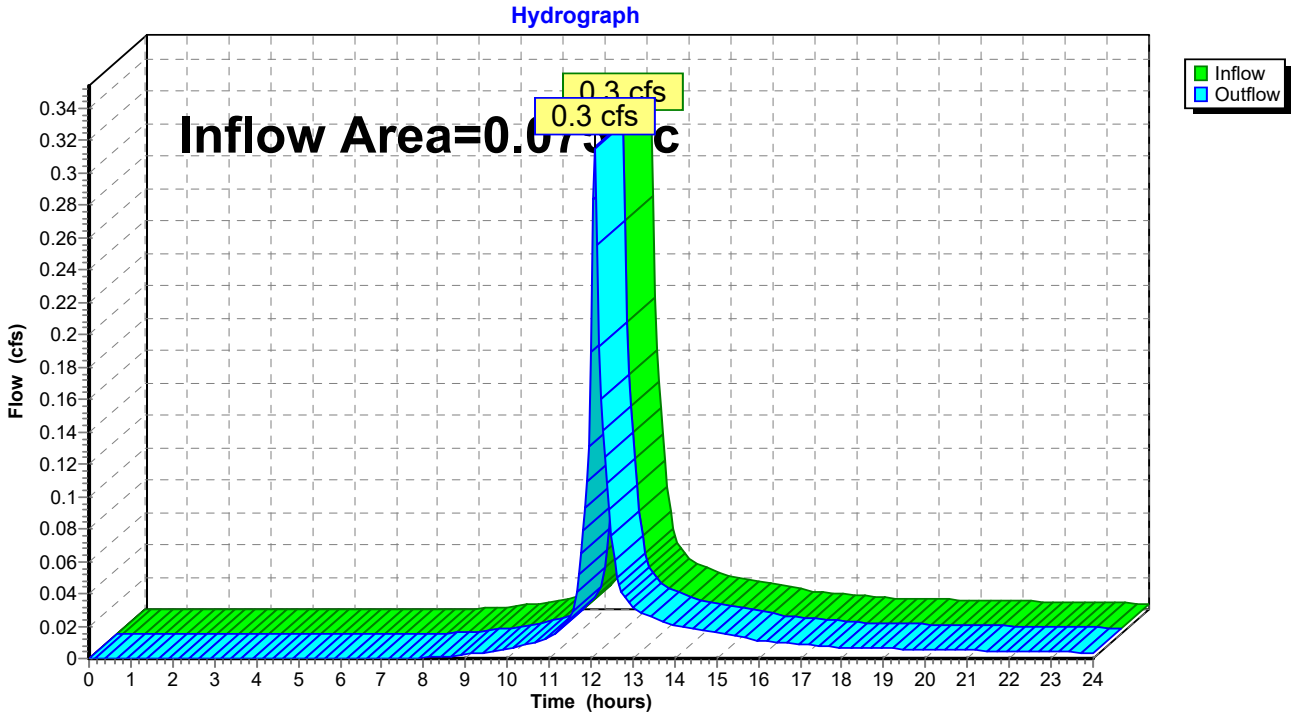


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.075 ac, 61.39% Impervious, Inflow Depth > 3.65" for 10-Yr 24 Hr event
Inflow = 0.3 cfs @ 12.09 hrs, Volume= 0.02 af
Outflow = 0.3 cfs @ 12.09 hrs, Volume= 0.02 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

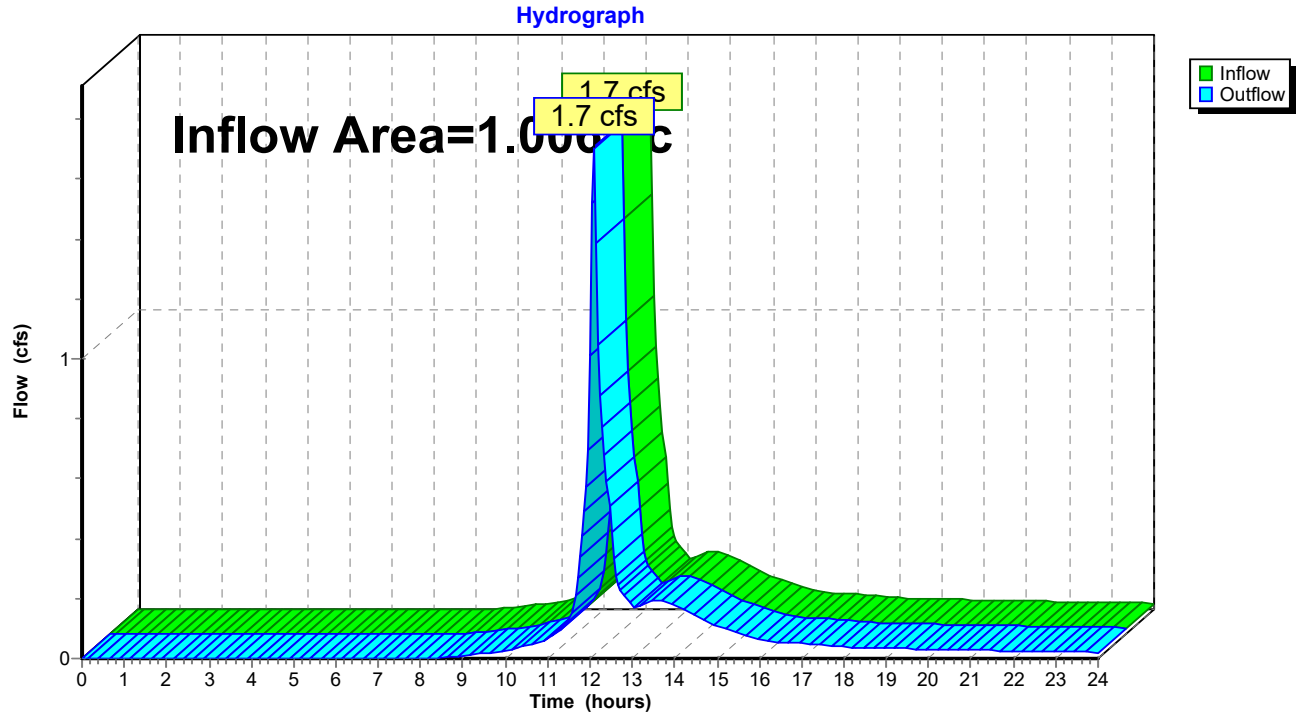


Summary for Reach DP-2: Design Point 2

Inflow Area = 1.006 ac, 58.75% Impervious, Inflow Depth > 1.58" for 10-Yr 24 Hr event
Inflow = 1.7 cfs @ 12.09 hrs, Volume= 0.13 af
Outflow = 1.7 cfs @ 12.09 hrs, Volume= 0.13 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2



Summary for Pond PSIS: PSIS

Inflow Area = 0.574 ac,100.00% Impervious, Inflow Depth > 6.19" for 10-Yr 24 Hr event
Inflow = 3.5 cfs @ 12.09 hrs, Volume= 0.30 af
Outflow = 0.2 cfs @ 13.78 hrs, Volume= 0.22 af, Atten= 94%, Lag= 101.7 min
Discarded = 0.1 cfs @ 9.35 hrs, Volume= 0.21 af
Primary = 0.1 cfs @ 13.78 hrs, Volume= 0.01 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 89.01' @ 13.78 hrs Surf.Area= 2,530 sf Storage= 6,193 cf

Plug-Flow detention time= 240.0 min calculated for 0.22 af (73% of inflow)
Center-of-Mass det. time= 149.2 min (892.9 - 743.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	85.50'	3,583 cf	**29.92'W x 84.57'L x 5.50'H Field A** 13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 40.0% Voids
#2A	86.25'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 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 44 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		8,540 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	85.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	88.90'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 9.35 hrs HW=85.56' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.1 cfs @ 13.78 hrs HW=89.01' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 1.1 fps)

Pond PSIS: PSIS - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 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= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

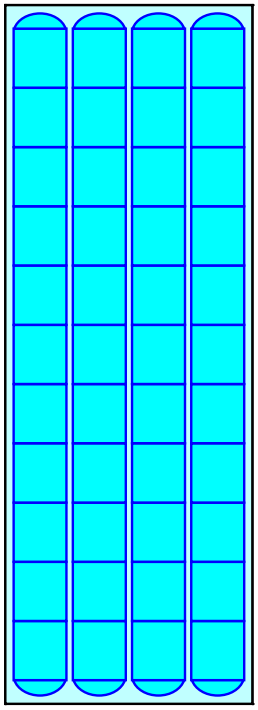
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

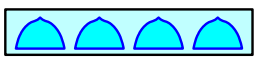
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 40.0% Voids = 3,583.3 cf Stone Storage

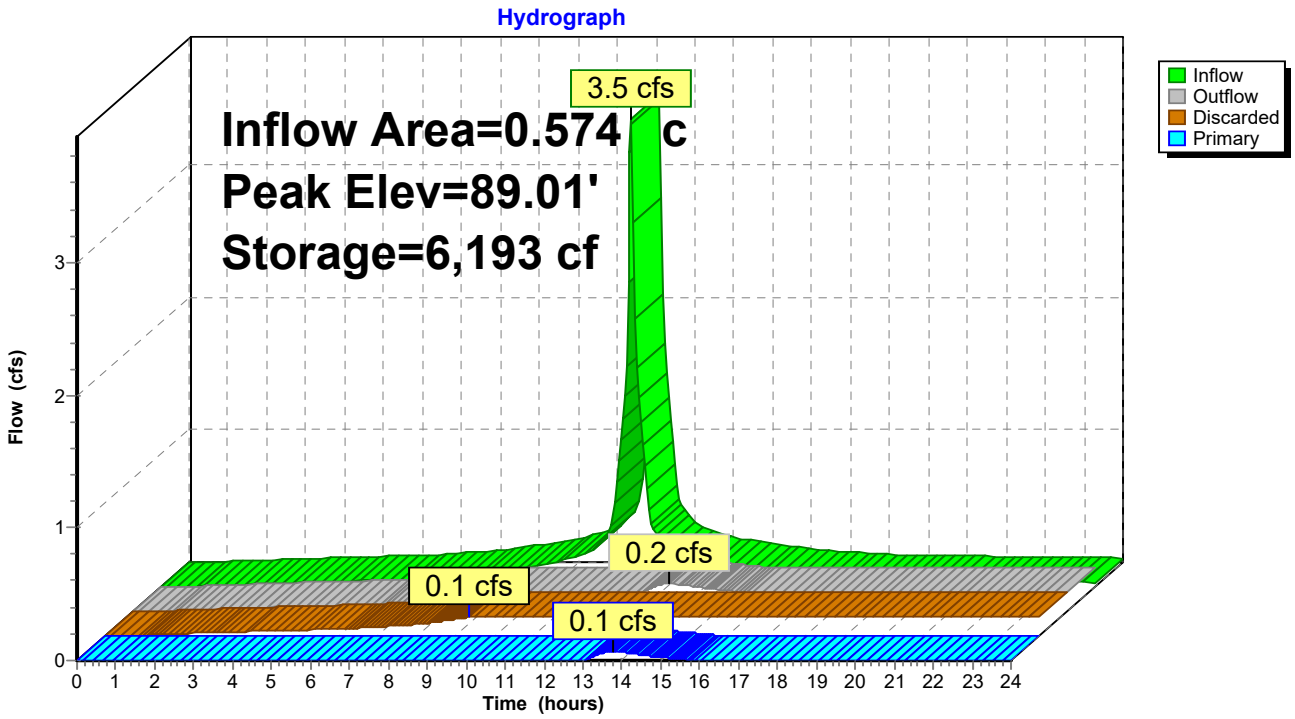
Chamber Storage + Stone Storage = 8,540.4 cf = 0.20 af
Overall Storage Efficiency = 61.4%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Pond PSIS: PSIS



Summary for Subcatchment SC-101: Subcatchment 101

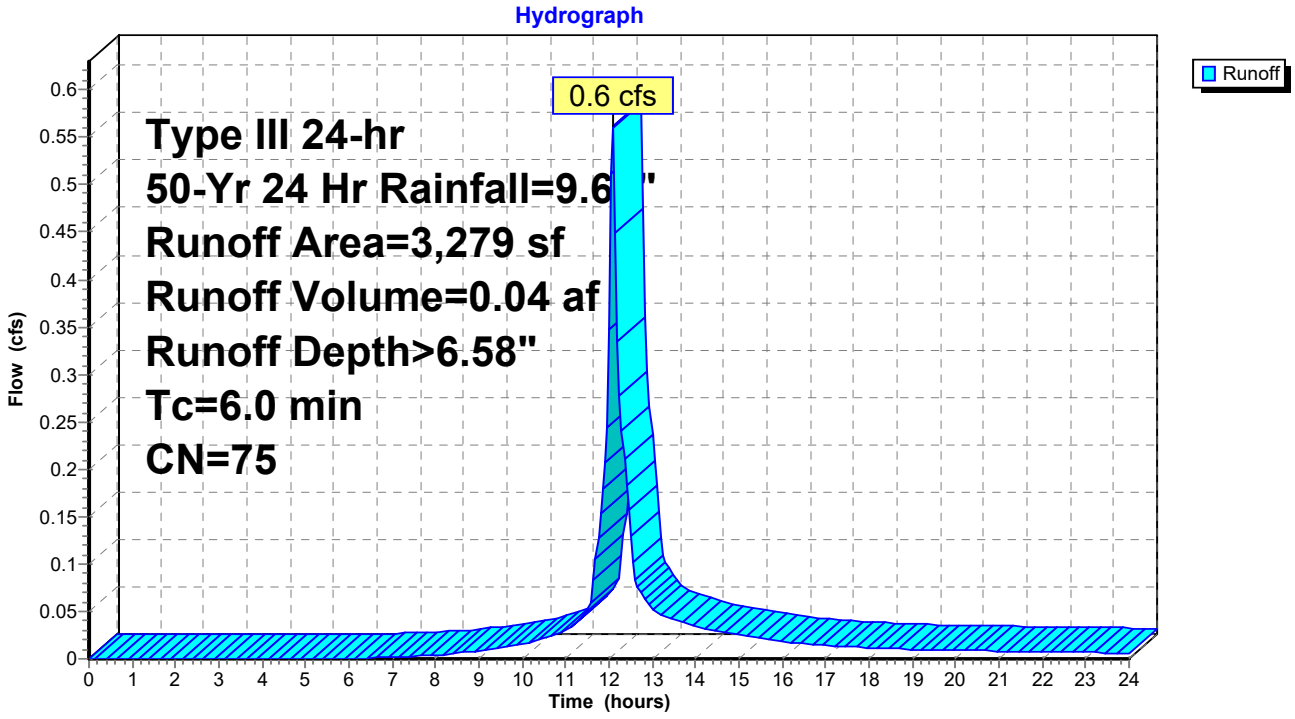
Runoff = 0.6 cfs @ 12.09 hrs, Volume= 0.04 af, Depth> 6.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Yr 24 Hr Rainfall=9.69"

	Area (sf)	CN	Description
	1,266	39	>75% Grass cover, Good, HSG A
*	2,013	98	Proposed Driveway
	3,279	75	Weighted Average
	1,266		38.61% Pervious Area
	2,013		61.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-101: Subcatchment 101



Summary for Subcatchment SC-201: Subcatchment 201

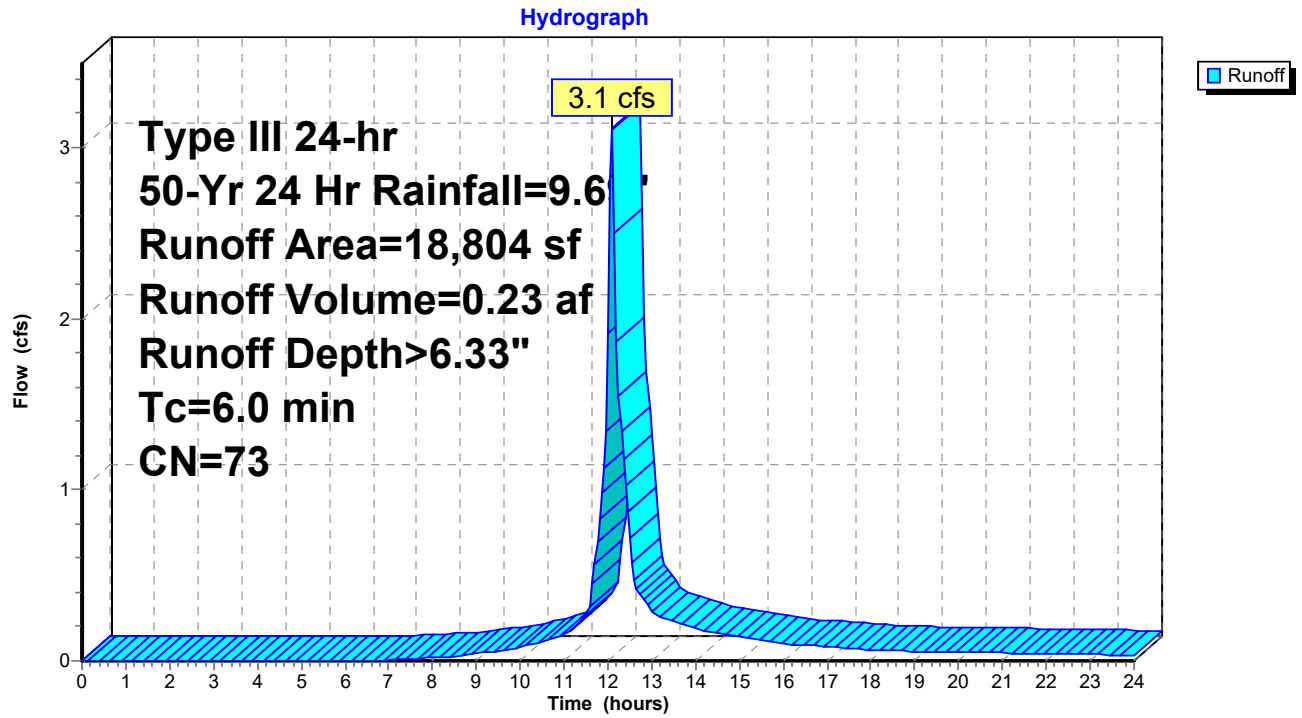
Runoff = 3.1 cfs @ 12.09 hrs, Volume= 0.23 af, Depth> 6.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Yr 24 Hr Rainfall=9.69"

	Area (sf)	CN	Description
	4,332	39	>75% Grass cover, Good, HSG A
	12,186	80	>75% Grass cover, Good, HSG D
*	1,558	96	Stone Dust Walkway
*	728	98	Bit. Conc. Walkway
	18,804	73	Weighted Average
	18,076		96.13% Pervious Area
	728		3.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-201: Subcatchment 201



Summary for Subcatchment SC-301: Subcatchment 301

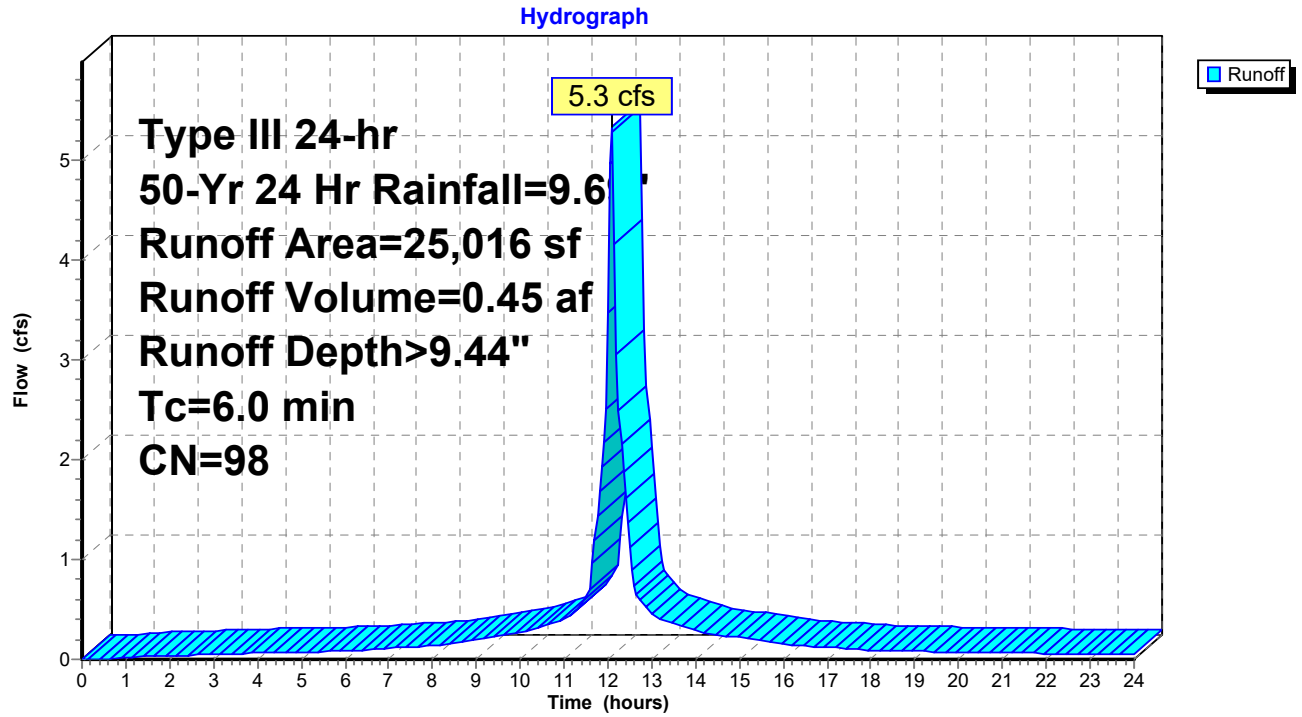
Runoff = 5.3 cfs @ 12.09 hrs, Volume= 0.45 af, Depth> 9.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Yr 24 Hr Rainfall=9.69"

	Area (sf)	CN	Description
*	25,016	98	Proposed Roof Area
	25,016		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-301: Subcatchment 301

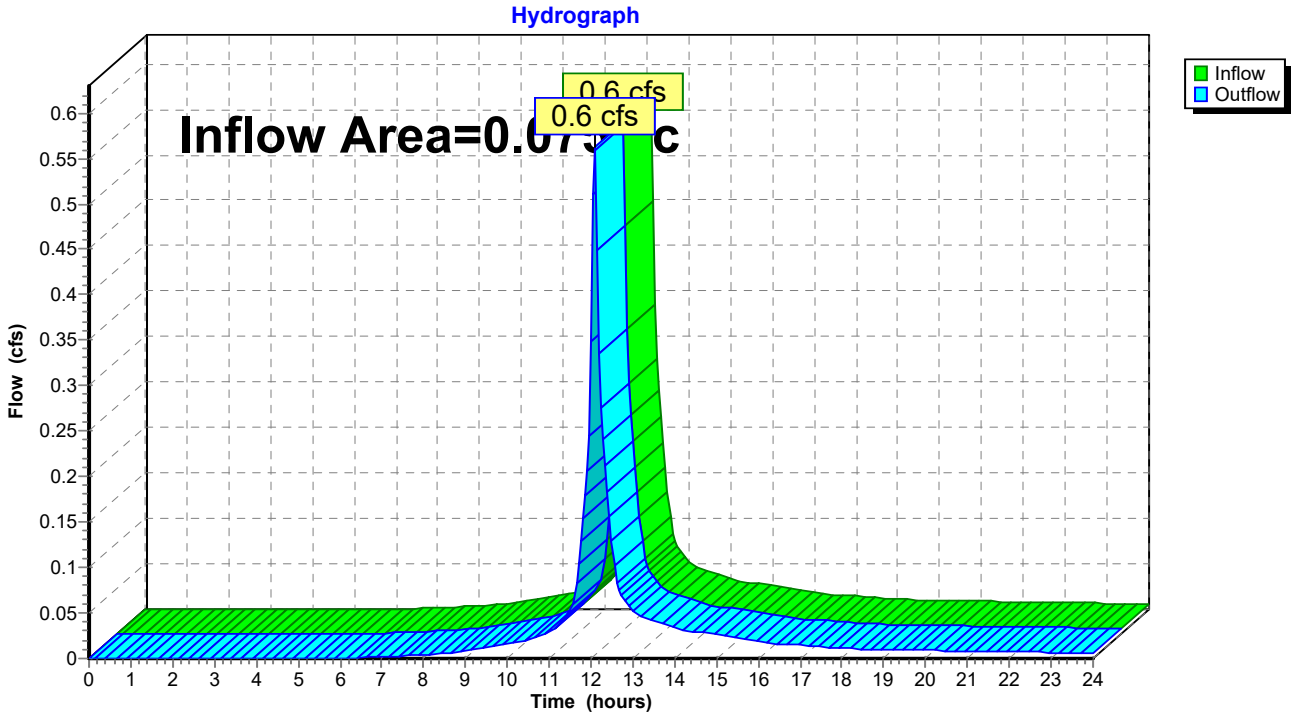


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.075 ac, 61.39% Impervious, Inflow Depth > 6.58" for 50-Yr 24 Hr event
Inflow = 0.6 cfs @ 12.09 hrs, Volume= 0.04 af
Outflow = 0.6 cfs @ 12.09 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

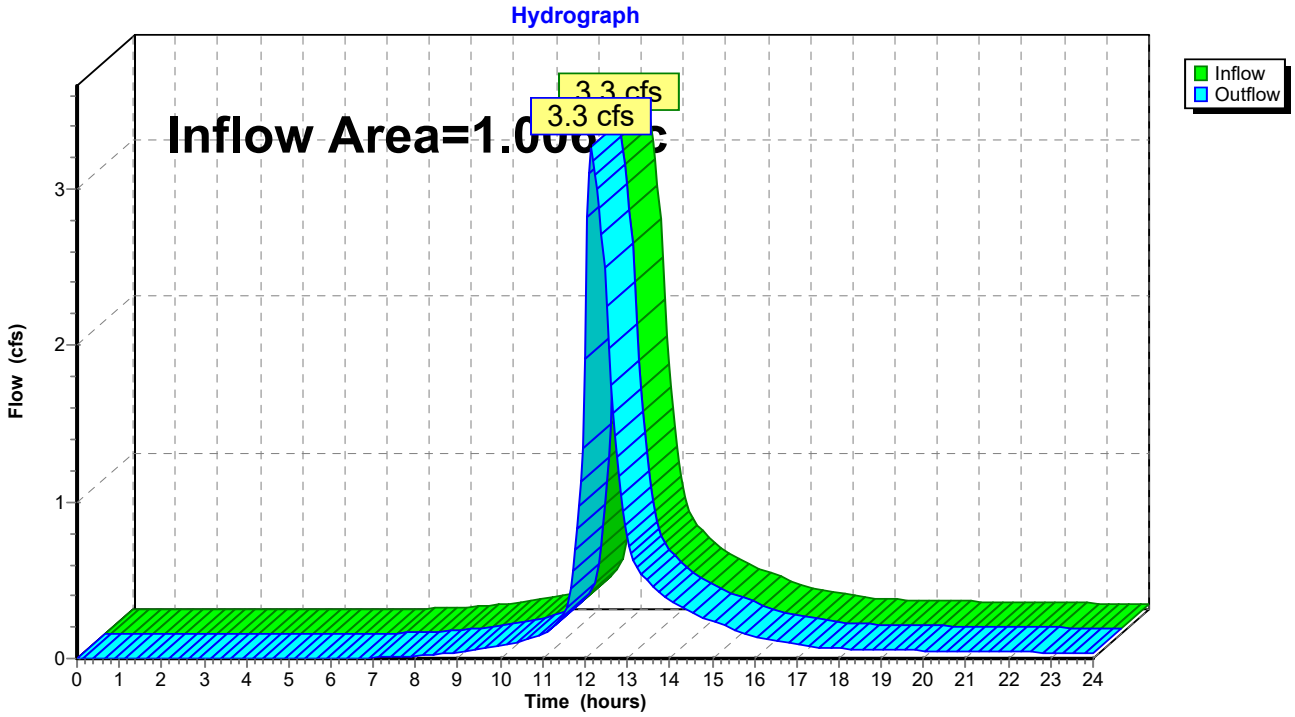


Summary for Reach DP-2: Design Point 2

Inflow Area = 1.006 ac, 58.75% Impervious, Inflow Depth > 4.21" for 50-Yr 24 Hr event
Inflow = 3.3 cfs @ 12.16 hrs, Volume= 0.35 af
Outflow = 3.3 cfs @ 12.16 hrs, Volume= 0.35 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2



Summary for Pond PSIS: PSIS

Inflow Area = 0.574 ac,100.00% Impervious, Inflow Depth > 9.44" for 50-Yr 24 Hr event
Inflow = 5.3 cfs @ 12.09 hrs, Volume= 0.45 af
Outflow = 1.8 cfs @ 12.36 hrs, Volume= 0.35 af, Atten= 66%, Lag= 16.4 min
Discarded = 0.1 cfs @ 8.15 hrs, Volume= 0.23 af
Primary = 1.7 cfs @ 12.36 hrs, Volume= 0.13 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 89.95' @ 12.36 hrs Surf.Area= 2,530 sf Storage= 7,479 cf

Plug-Flow detention time= 166.2 min calculated for 0.35 af (78% of inflow)
Center-of-Mass det. time= 84.8 min (823.4 - 738.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	85.50'	3,583 cf	**29.92'W x 84.57'L x 5.50'H Field A** 13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 40.0% Voids
#2A	86.25'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 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 44 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		8,540 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	85.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	88.90'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 8.15 hrs HW=85.56' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.7 cfs @ 12.36 hrs HW=89.95' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 1.7 cfs @ 4.3 fps)

Pond PSIS: PSIS - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 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= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

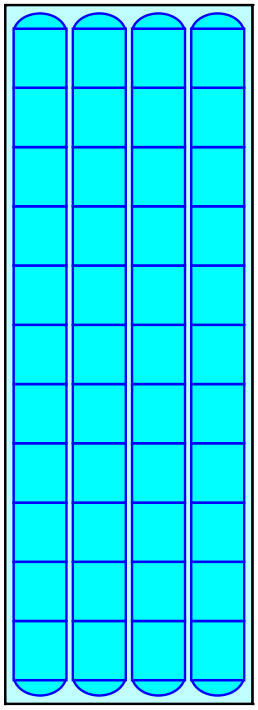
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

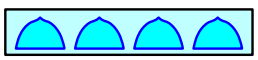
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 40.0% Voids = 3,583.3 cf Stone Storage

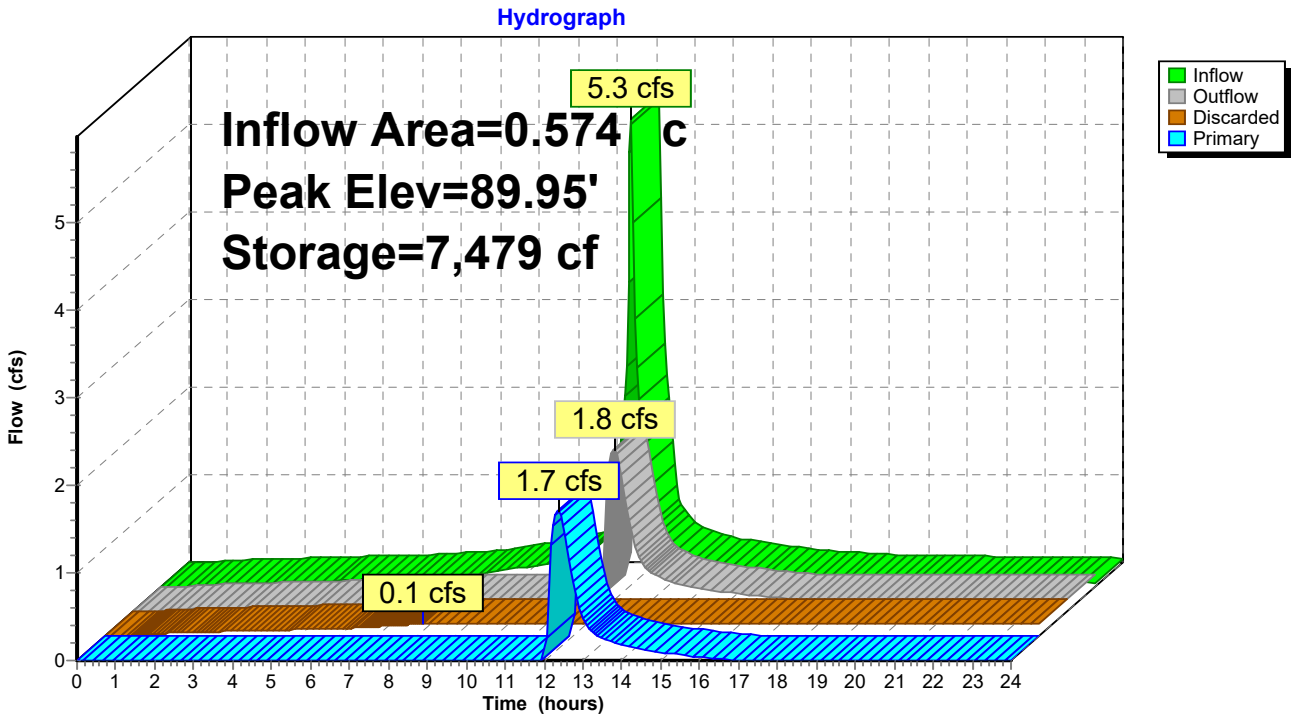
Chamber Storage + Stone Storage = 8,540.4 cf = 0.20 af
Overall Storage Efficiency = 61.4%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Pond PSIS: PSIS



Summary for Subcatchment SC-101: Subcatchment 101

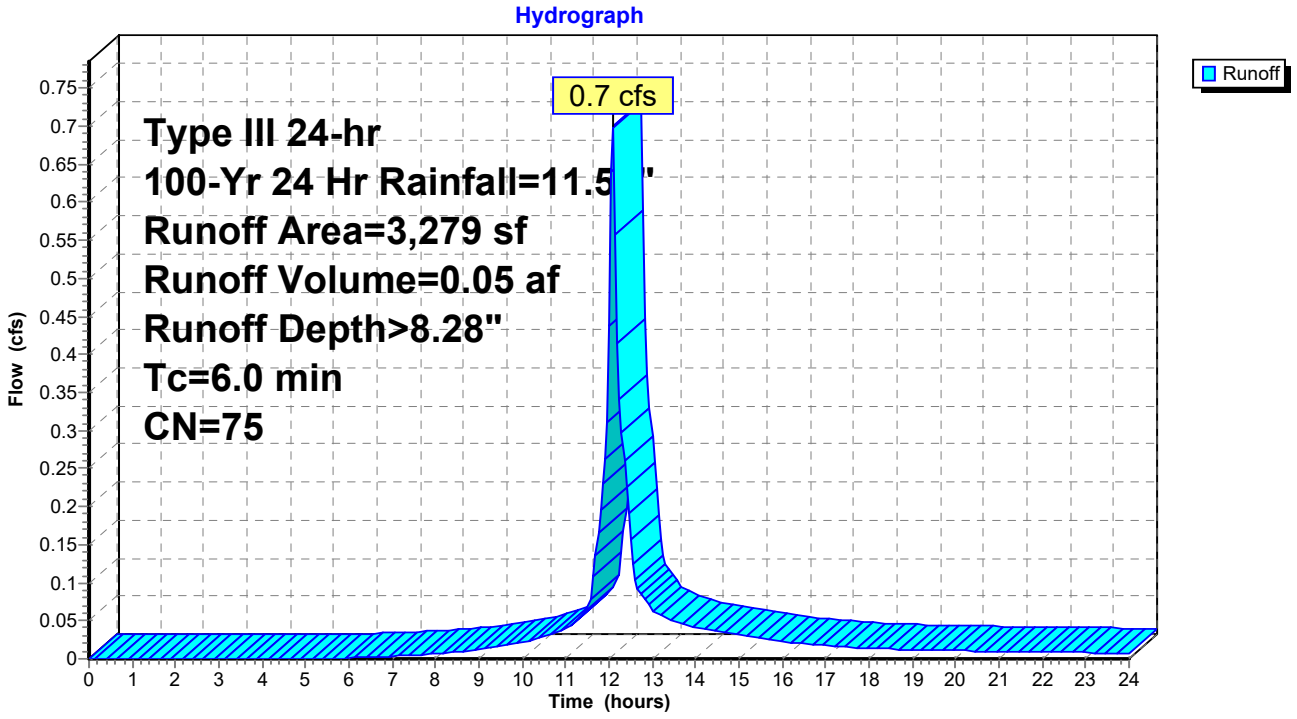
Runoff = 0.7 cfs @ 12.09 hrs, Volume= 0.05 af, Depth> 8.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=11.50"

	Area (sf)	CN	Description
	1,266	39	>75% Grass cover, Good, HSG A
*	2,013	98	Proposed Driveway
	3,279	75	Weighted Average
	1,266		38.61% Pervious Area
	2,013		61.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-101: Subcatchment 101



Summary for Subcatchment SC-201: Subcatchment 201

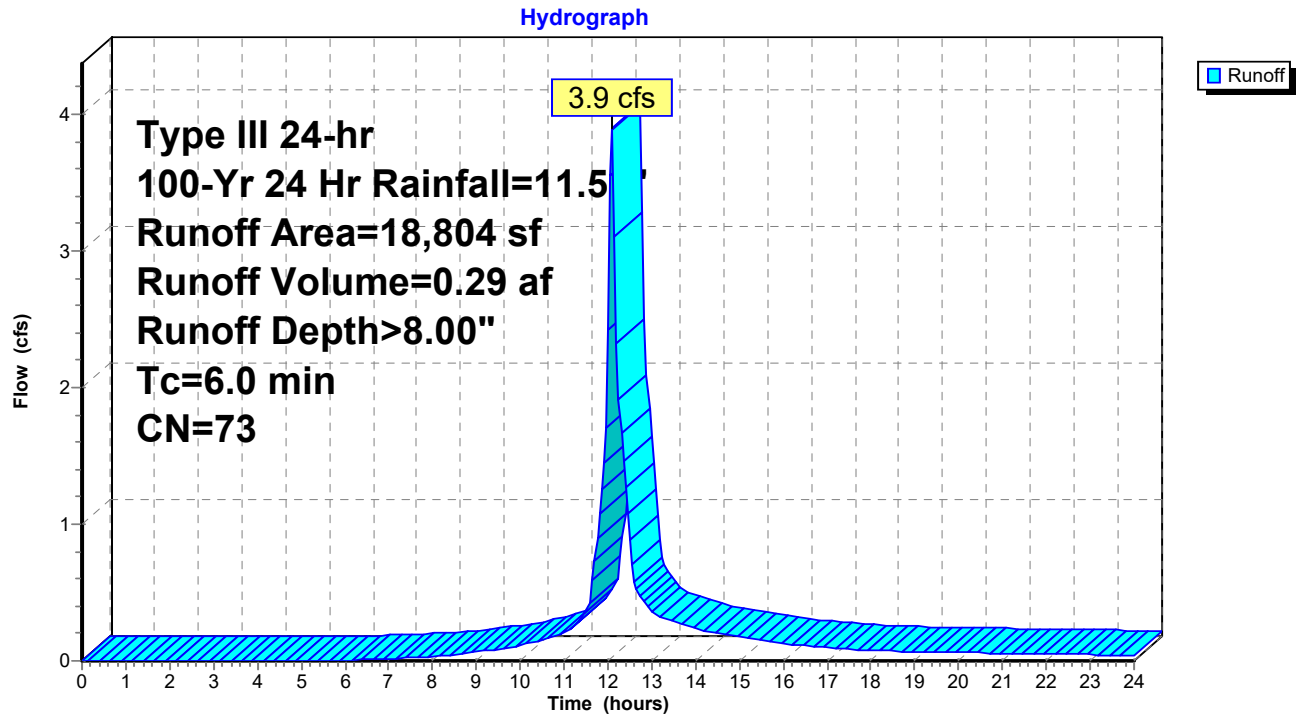
Runoff = 3.9 cfs @ 12.09 hrs, Volume= 0.29 af, Depth> 8.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=11.50"

	Area (sf)	CN	Description
	4,332	39	>75% Grass cover, Good, HSG A
	12,186	80	>75% Grass cover, Good, HSG D
*	1,558	96	Stone Dust Walkway
*	728	98	Bit. Conc. Walkway
	18,804	73	Weighted Average
	18,076		96.13% Pervious Area
	728		3.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-201: Subcatchment 201



Summary for Subcatchment SC-301: Subcatchment 301

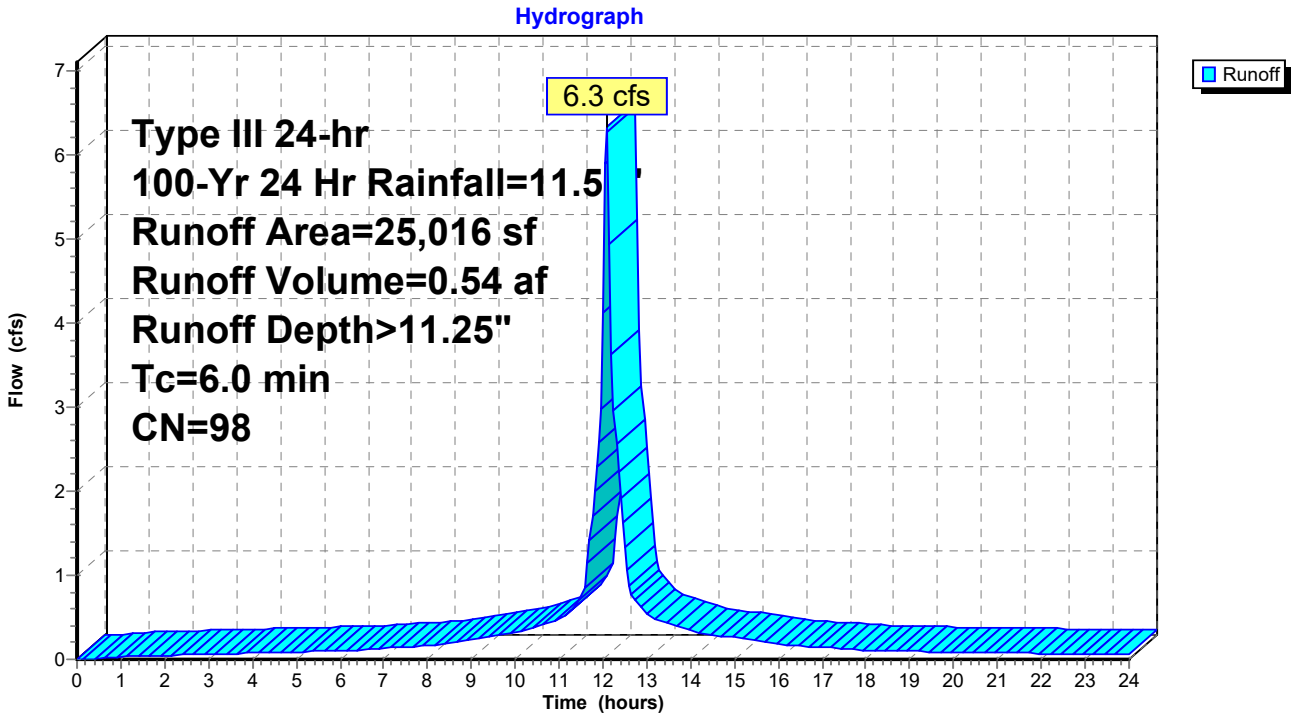
Runoff = 6.3 cfs @ 12.09 hrs, Volume= 0.54 af, Depth>11.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Yr 24 Hr Rainfall=11.50"

	Area (sf)	CN	Description
*	25,016	98	Proposed Roof Area
	25,016		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Min. Engineering Standard**

Subcatchment SC-301: Subcatchment 301

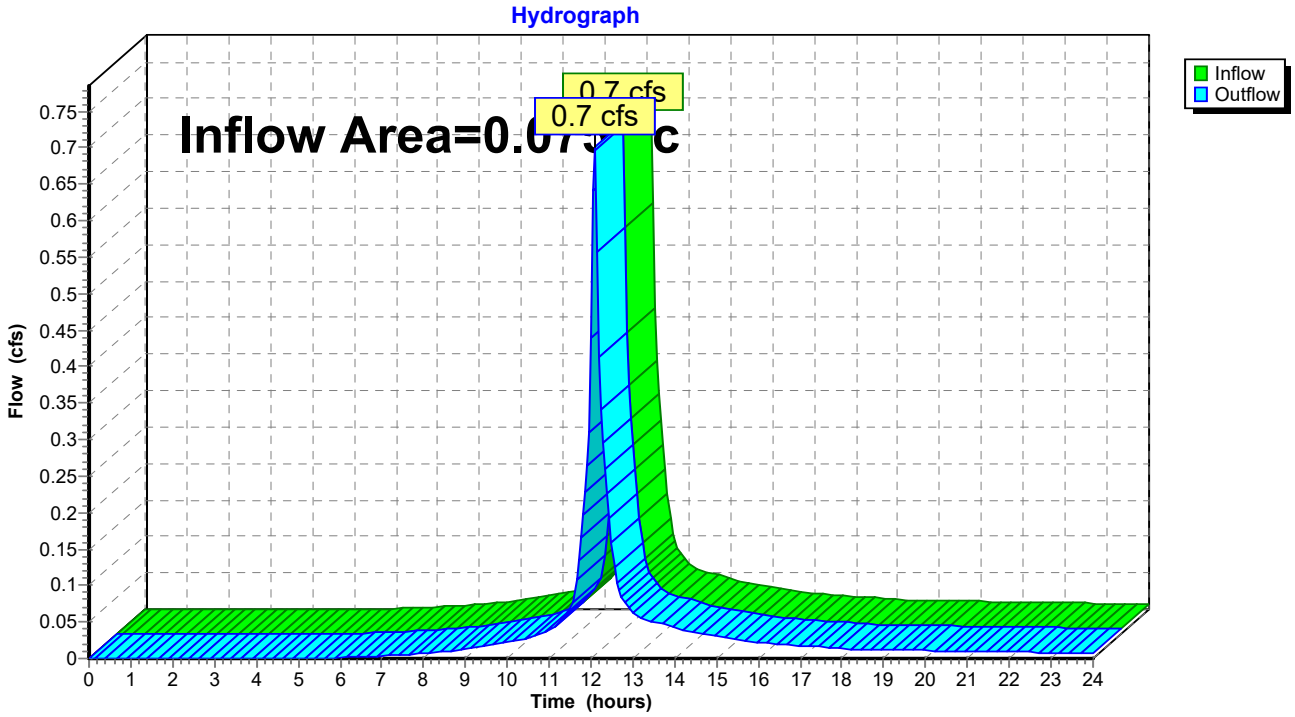


Summary for Reach DP-1: Design Point 1

Inflow Area = 0.075 ac, 61.39% Impervious, Inflow Depth > 8.28" for 100-Yr 24 Hr event
Inflow = 0.7 cfs @ 12.09 hrs, Volume= 0.05 af
Outflow = 0.7 cfs @ 12.09 hrs, Volume= 0.05 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-1: Design Point 1

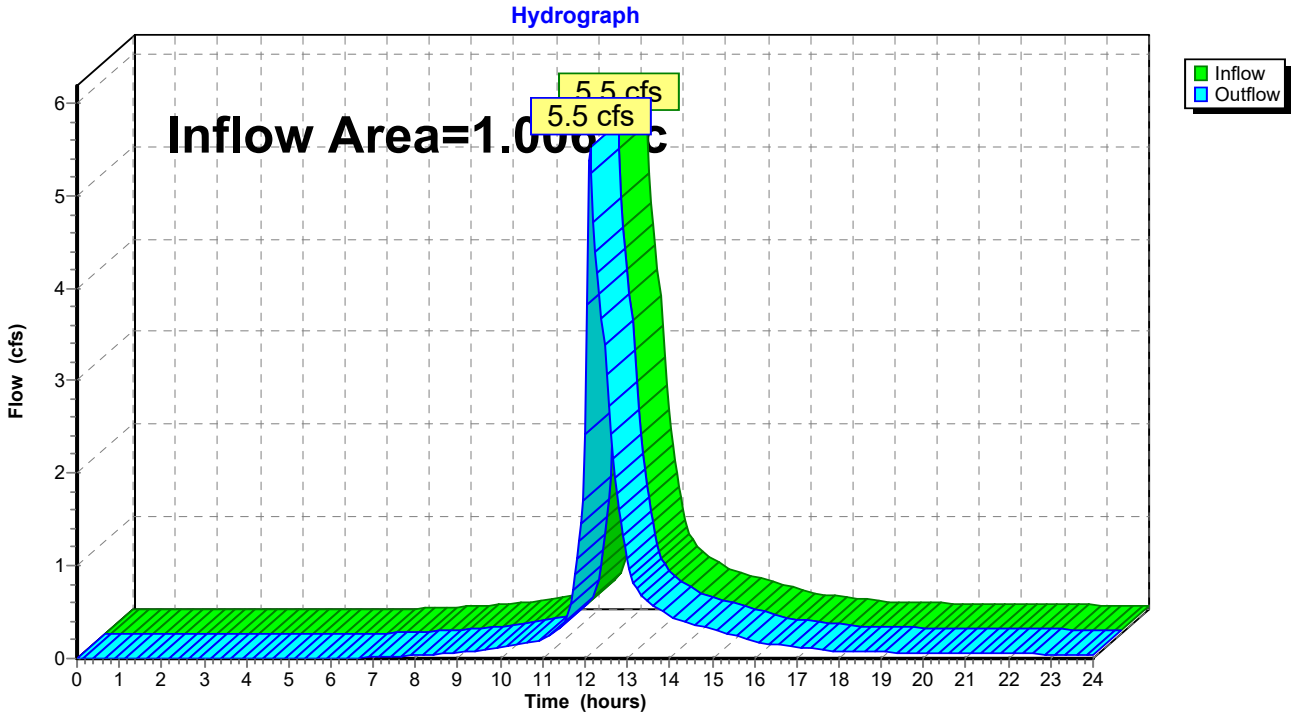


Summary for Reach DP-2: Design Point 2

Inflow Area = 1.006 ac, 58.75% Impervious, Inflow Depth > 5.75" for 100-Yr 24 Hr event
Inflow = 5.5 cfs @ 12.12 hrs, Volume= 0.48 af
Outflow = 5.5 cfs @ 12.12 hrs, Volume= 0.48 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-2: Design Point 2



Summary for Pond PSIS: PSIS

Inflow Area = 0.574 ac,100.00% Impervious, Inflow Depth > 11.25" for 100-Yr 24 Hr event
Inflow = 6.3 cfs @ 12.09 hrs, Volume= 0.54 af
Outflow = 2.6 cfs @ 12.29 hrs, Volume= 0.43 af, Atten= 58%, Lag= 12.3 min
Discarded = 0.1 cfs @ 7.40 hrs, Volume= 0.24 af
Primary = 2.5 cfs @ 12.29 hrs, Volume= 0.19 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 90.90' @ 12.29 hrs Surf.Area= 2,530 sf Storage= 8,436 cf

Plug-Flow detention time= 146.3 min calculated for 0.43 af (80% of inflow)
Center-of-Mass det. time= 68.0 min (804.7 - 736.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	85.50'	3,583 cf	**29.92'W x 84.57'L x 5.50'H Field A** 13,915 cf Overall - 4,957 cf Embedded = 8,958 cf x 40.0% Voids
#2A	86.25'	4,957 cf	**ADS_StormTech MC-3500 d +Cap** x 44 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 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 44 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		8,540 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	85.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	88.90'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.1 cfs @ 7.40 hrs HW=85.56' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=2.5 cfs @ 12.29 hrs HW=90.89' (Free Discharge)
└**2=Orifice/Grate** (Orifice Controls 2.5 cfs @ 6.4 fps)

Pond PSIS: PSIS - Chamber Wizard Field A

Chamber Model = ADS_StormTech MC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 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= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

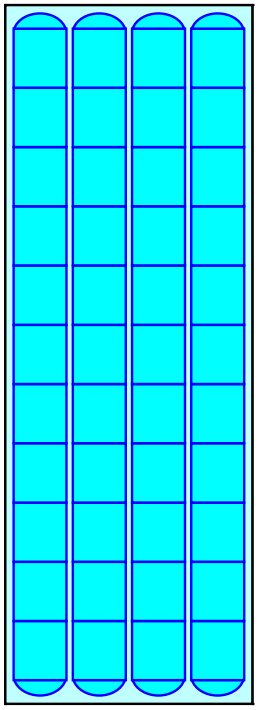
11 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 82.57' Row Length +12.0" End Stone x 2 = 84.57' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

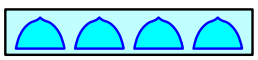
44 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 4,957.1 cf Chamber Storage

13,915.3 cf Field - 4,957.1 cf Chambers = 8,958.2 cf Stone x 40.0% Voids = 3,583.3 cf Stone Storage

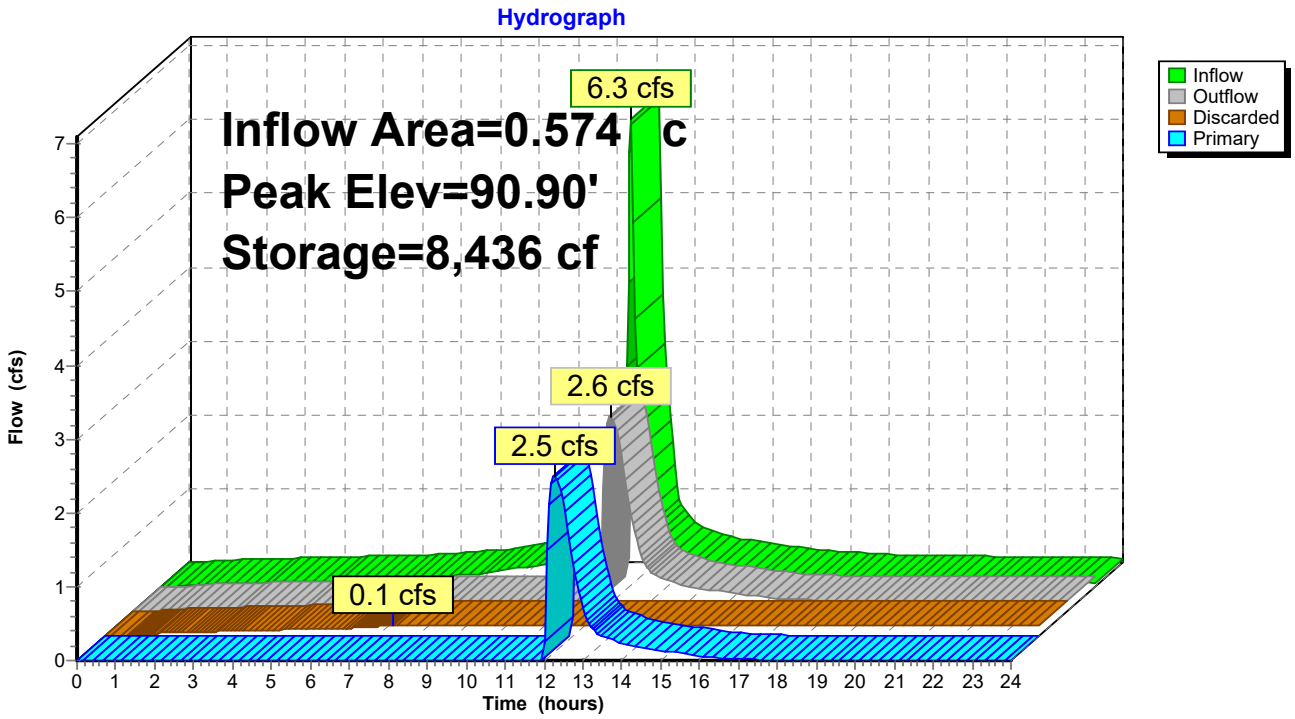
Chamber Storage + Stone Storage = 8,540.4 cf = 0.20 af
Overall Storage Efficiency = 61.4%
Overall System Size = 84.57' x 29.92' x 5.50'

44 Chambers
515.4 cy Field
331.8 cy Stone





Pond PSIS: PSIS



Non-automated: Mar.4, 2008

INSTRUCTIONS:
1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calcualtions must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: 1021 & 1025 Massachusetts Avenue, Arlington MA

Train 1+2: PSIS

TSS Removal Calculation

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Proposed Subsurface Infiltration System (PSIS)	80%	1.00	0.80	0.20

Total TSS Removal = 80.0%

Project: 21583
Prepared By: Patriot Engineering
Date: 9/9/2022

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

** See portion of STEP Fact Sheet for removal rate

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

CAPTURE AREA ADJUSTMENT

Due to a limitation of grading adjustments that can be made for this project the amount of runoff that can be directed to the infiltration facility. Therefor the storage capacity of the infiltration facilities has been increased to allow for so it may capture more of the runoff from the impervious surface within the drainage area.

The following calculation in accordance with MA Stormwater Handbook demonstrates at the storage capacity of the infiltration BMP's is sufficient to meet Standard #3.

Steps:

1. Required recharge volume for total site impervious area.

   From Standard #3 recharge calculations page, summation of required recharge volume = 1,387 CF

2. Site impervious area draining to recharge facilities (from previous). Roof runoff captured completely within infiltration systems on each lot.

   Area = 25,016 SF

3. Divide total site impervious area by impervious area draining to recharge facilities. Roof runnof captured completely within infiltration systems on each lot.

   Total Site Impervious =27,748 SF

   27,748 SF / 25,016 SF = 1.11

4. Multiply result of #3 by original recharge volume in #1.

   1.11 x 1,387= 1,540 CF

5. Ensure minimum 65% impervious area draining to recharge facilities.

   25,016 SF / 27,748 SF = 0.90 = 90%

6. Recharge facilities provide total recharge volume of 6,014 CF (below to outlet). Recharge volume 6,014 CF > 1,540 CF adjusted total recharge volume.

All Recharge Volumes have been achieved as required by the Massachusetts Stormwater Management Standards

72-HOUR DRAW DOWN CALCULATIONS

$$\text{Time} = \frac{Rv}{(K)(BottomArea)(n)}$$

R_v = Storage Volume
K = Saturated Hydraulic Conductivity for Sandy Loam = 1.02 in/hour
Bottom Area = Bottom Area of Recharge Structure
n = Porosity (1)

PSIS-1

R_v = 6,014 cf
Bottom Area = 2,530 sf

Time = 6,014cf / (2.41 in/hr)(1'/12")(2,530 sf)(1)

Time = 11.8 hours

11.8 hours < 72 hours

OPERATION AND MAINTENANCE &
EROSION AND SEDIMENTATION CONTROL PROGRAM
for
A PROPOSED STORMWATER MANAGEMENT SYSTEM
located at
1021 & 1025 MASSACHUSETTS AVENUE
ARLINGTON, MASSACHUSETTS

Applicant:

MAJ Investment, LLC
13 Wheeling Avenue
Woburn, Massachusetts 01801

Prepared by:

Patriot Engineering
35 Bedford Street, Suite 4
Lexington, Massachusetts 02420
(978) 726-2654

September 9, 2022

Project Name: 1021 & 1025 Massachusetts Ave, Arlington Ma

Owner Name: The Maggiore Companies

Party Responsible for Maintenance During Construction: Contractor

Party Responsible for Maintenance After Construction: Homeowner's Association

Erosion and Sedimentation Control Measures during Construction Activities

Filtermitt (or approved equal)

Filtermitt (or approved equal) will be installed along the down gradient limit of work as depicted on the Site Plan. The filtermitt shall be installed prior to the commencement of any work on-site and in accordance with the design plans. An additional supply of filtermitt shall be on-site to replace and/or repair any filtermitt that have been disturbed or are in poor condition. The line of filtermitt shall be inspected and maintained on a weekly basis and after every major storm event (2-year) during construction. No construction activities are to occur beyond the filtermitt at any time. Deposited sediments shall be removed when the volume of the deposition reaches approximately one-half the height of the filtermitt.

Stockpiles

All unused debris, soil, and other material shall be stockpiled in locations of relatively flat grades, away from any trees identified to be saved and upgradient of the filtermitt. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by a row of filtermitt. Surrounding filtermitt shall be inspected and maintained on a daily basis.

Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction. Disturbed areas remaining idle for more than 14 days shall be stabilized. Temporary measures shall be taken during construction to prevent erosion and siltation. No construction sediment shall be allowed to enter any infiltration system or formal drainage system. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

a. Temporary Seeding
b. Temporary Mulching
c. Permanent Seeding
d. Placement of Sod
e. Hydroseeding
f. Placement of Hay
g. Placement of Jute Netting

Dust shall be controlled at the site.

Tree Protection

Existing trees to be saved shall be protected with orange construction fence (offset from the tree trunk by professional standard based on canopy).

Construction Tracking Pad

A construction tracking pad shall be installed at the designated entrances/exits, as shown on the Site plans, to the site to reduce the amount of sediment transported off site. The construction tracking pad shall be inspected weekly.

Silt Sacks

Silt Sacks shall be installed within the basins. The performance of the basins shall be checked after every major storm event during construction, in the event of clogging within the Silt Sack, it shall be removed and replaced with a clean Silt Sack. Stormwater quality unit shall be checked bi-weekly.

Subsurface Infiltration Facility

Construction activity above and around the proposed location of the subsurface infiltration facility shall be limited to prevent compaction of the existing soil. Care shall be taken to redirect stormwater runoff from this area to prevent ponding. Installation of this system shall occur under dry weather conditions and system shall be backfilled immediately to prohibit the introduction of fines or other material that would compromise the functionality of this system.

Removal of Sediment and Erosion Controls

At the completion of construction activities and after receiving approval from the Town of Arlington, all physical sediment and erosion controls shall be removed from the site per Town of Arlington. The areas where the controls have been removed shall be seeded and stabilized immediately upon removal.

Long-Term Inspection and Maintenance Measures after Construction

Erosion Control

Eroded sediments can adversely affect the performance of the stormwater management system. Eroding or barren areas should be immediately re-vegetated.

Subsurface Infiltration Facility

The infiltration system inspections should include inspections following the first several rainfall events or first few months after construction, after all major storms (3.2” inches of rain over a 24-hour period or greater), and on regular bi-annual scheduled dates, to ascertain whether captured runoff drains within 72 hours following the event. Ponded water inside the system (as visible from the observation well) after several dry days often indicates that the bottom of the system is clogged. If the water does not drain, then a qualified professional should be retained to determine the cause of apparent infiltration failure and

recommend corrective action. Such corrective action should be immediately implemented by the homeowner. If depth of sediment is observed to be greater than 3" then the system should be cleaned. The homeowner shall contact a sewer and drain cleaning company to flood the system via pump truck so the water is forced back to the upstream cleanout where sediment can be vacuumed out.

Debris and Litter Removal

Trash may collect in the BMP's, potentially causing clogging of the facilities. All debris and litter shall be removed when necessary, and after each storm event. Sediment and debris collected from vacuuming and/or sweeping should be disposed of at a permitted waste disposal facility. Avoid disposing of this material on site, where it could be washed into the proposed subsurface infiltration systems.

Lawn Mowing

All lawn mowing to take place will be done with a mulch mower so grass clippings will not be an issue.

<u>Good Housekeeping Practices</u> (in accordance with Standard 10 of the Stormwater Management Handbook to prevent illicit discharges)

Provisions for storing paints, cleaners, automotive waste and other potentially hazardous household waste products inside or under cover

- All materials on site will be stored inside in a neat, orderly, manner in their appropriate containers with the original manufacturer's label.
- Only store enough material necessary. Whenever possible, all of a product shall be used up before disposing of container.
- Manufacturer, local, and State recommendations for proper use and disposal shall be followed.

Vehicle washing controls

- A commercial car wash shall be used when possible. Car washes treat and/or recycle water.
- Cars shall be washed on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Use biodegradable soaps.
- A water hose with a nozzle that automatically turns off when left unattended.

Requirements for routine inspection and maintenance of stormwater BMPs

- See Inspection and Maintenance Measures after Construction.

Spill prevention and response plans

- Spill Control Practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP)

Provisions for maintenance of lawns, gardens, and other landscaped areas

- Grass shall not be cut shorter than 2 to 3 inches and mulch clipping should be left on lawn as a natural fertilizer.

- Use low volume water approaches such as drip-type or sprinkler systems. Water plants only when needed to enhance root growth and avoid runoff problems.
- The use of mulch shall be utilized where possible. Mulch helps retain water and prevents erosion.

Requirements for storage and use of fertilizers, herbicides and pesticides

- Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
- Do not fertilize before a rainstorm.
- Consider using organic fertilizers. They release nutrients more slowly.
- Pesticides shall be applied on lawns and gardens only when necessary and applied only in the minimum amounts recommended by the manufacturer.

Pet waste management

- Scoop up and seal pet wastes in a plastic bag. Dispose of properly, in the garbage.

Provisions for solid waste management

- All solid waste shall be disposed of or recycled in accordance with local town regulations.

Snow disposal and plowing plans relative to Resource Area

- Snow shall be plowed and stored on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Once snow melts all sand salt and debris shall be extracted from surface and properly disposed of.
- Snow shall not be disposed of in any resource area or waterbody.
- Avoid disposing snow on top of storm drain catchbasins or stormwater drainage swale.

Winter Road Salt and/or Sand use and storage restrictions

- Sand storage piles should be located outside the 100-year buffer zone and shall be covered at all times. No salt to be stored or used on site.
- Alternative materials, such as sand or gravel, should be used in especially sensitive areas.

Roadway and Parking Lot sweeping schedule

- Pavement sweeping shall be conducted at a frequency of not less than once per year.
- Removal of any accumulated sand, grit, and debris from driveway after the snow melts shall be completed shortly after snow melts for the season.

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

Not Applicable

Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan

To be determined by the owner.

List of Emergency contacts for implementing Long-Term Pollution Prevention Plan

To be determined by the owner.

Applicant's Certification

I certify under penalty of law that I have read, understand and agree to abide by the practices outlined in this document.

Signed:_____ Date:_____

The Maggiore Companies

Contractor's Certification

I certify under penalty of law that I have read, understand and agree to abide by the practices outlined in this document.

Signed:_____ Date:_____

Contractor

STORMWATER MANAGEMENT
CONSTRUCTION PHASE

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 1021 & 1025 Massachusetts Ave, Arlington MA **WEATHER:** _____

Inspection Date	*Inspector*	*Area Inspected*	*Required Inspection Frequency if BMP*	*Comments*	*Recommendation*	*Follow-up Inspection Required (yes/no)*
		Filtermitt	*Weekly and After Major Storm Events*			
		Construction Tracking Pad	*Weekly and After Major Storm Events*			
		Subsurface Infiltration System	*Weekly and After Major Storm Events*			

(1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.
(2) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.
Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)
Stormwater Control Manager: _____

STORMWATER MANAGEMENT
AFTER CONSTRUCTION

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 1021 & 1025 Massachusetts Ave, Arlington MA **WEATHER:** _____

Inspection Date	***Inspector***	***Area Inspected***	***Required Inspection Frequency if BMP***	***Comments***	***Recommendation***	***Follow-up Inspection Required (yes/no)***
		Subsurface Infiltration System	*Bi-annually and After Major Storm Events*			

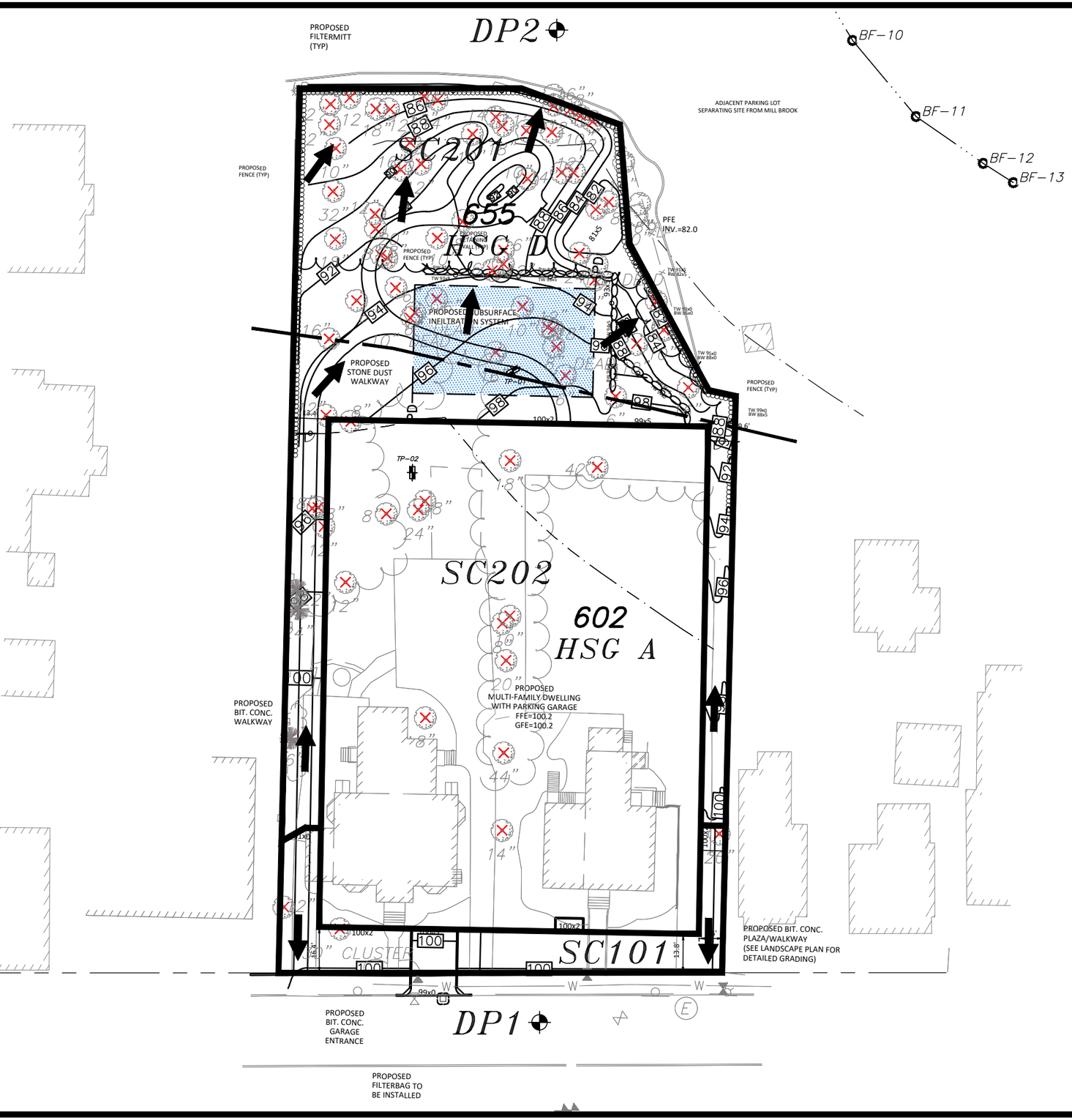
(3) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(4) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.

Other notes: (Include deviations from: Con. Comm. Order of Conditions, PB Approval, Construction Sequence and Approved Plan)

Stormwater Control Manager: _____



LEGEND:

→	OVERLAND FLOW DIRECTION
———	SUBCATCHMENT DIVIDE
SC101	SUBCATCHMENT
DP1	DESIGN POINT
602	SOIL TYPE
HSG	HYDROLOGIC SOIL GROUP
— - —	SOIL DIVIDE

1021 & 1025 MASSACHUSETTS AVE
POST-DEVELOPMENT DRAINAGE PLAN

LOCATED IN

ARLINGTON, MASSACHUSETTS

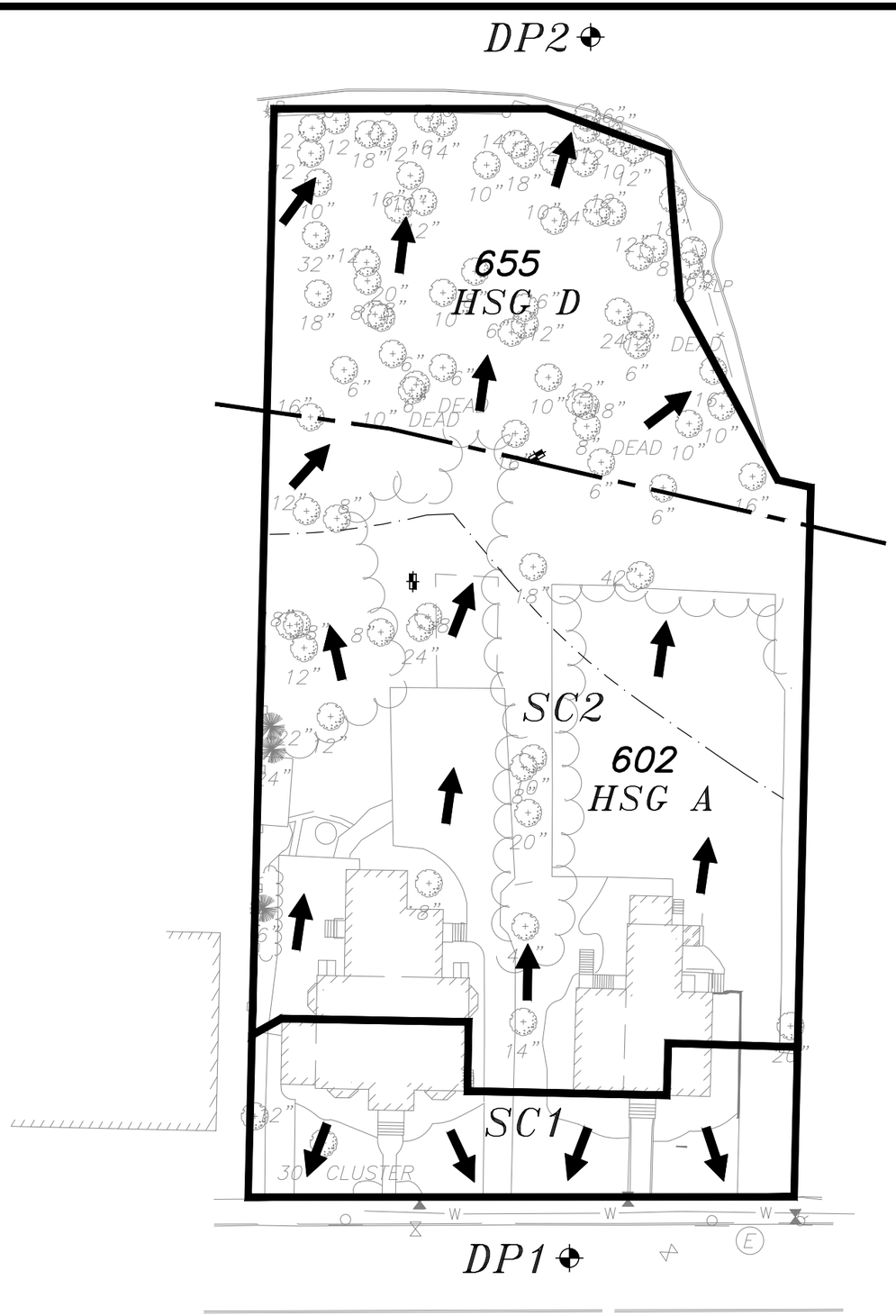
(MIDDLESEX COUNTY)

PREPARED FOR

MAJ INVESTMENT, LLC

SCALE: 1"= 40' DATE: SEPTEMBER 9, 2022

20 0 20 40 80



LEGEND:

→	OVERLAND FLOW DIRECTION
———	SUBCATCHMENT DIVIDE
SC1	SUBCATCHMENT
DP1	DESIGN POINT
602	SOIL TYPE
HSG	HYDROLOGIC SOIL GROUP
— - —	SOIL DIVIDE

1021 & 1025 MASSACHUSETTS AVE
PRE-DEVELOPMENT
DRAINAGE PLAN

LOCATED IN

ARLINGTON, MASSACHUSETTS

(MIDDLESEX COUNTY)

PREPARED FOR

MAJ INVESTMENT, LLC

SCALE: 1"= 40' DATE: SEPTEMBER 9, 2022

20 0 20 40 80

Soil Map—Middlesex County, Massachusetts
(1021-1025 Massachusetts Ave, Arlington Ma)

Map Scale: 1:991 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 10 20 40 60

Feet
0 45 90 180 270

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 21, Sep 2, 2021

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

Date(s) aerial images were photographed: Aug 13, 2020—Sep 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
602	Urban land	3.4	72.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	0.3	6.8%
655	Udorthents, wet substratum	1.0	20.8%
Totals for Area of Interest		**4.7**	**100.0%**