

STORMWATER MANAGEMENT REPORT

Special Residential Townhouse Development Prospect Hill Village Bellingham, Massachusetts

November 30, 2023
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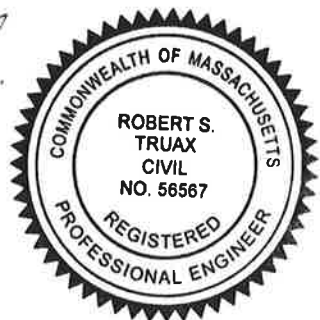
Prepared for:

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Project Introduction:

The applicant, Wall Street Development Corp., is proposing to develop the existing property located off Prospect Street in Bellingham, Massachusetts. The property is identified as Assessor Map 65, Lots 20 & 22, Assessor Map 69, Lot 87 containing approximately 72 +/- acres. The proposed development is submitted for review to the Bellingham Planning Board for review and approval.

The proposal is for a Special Residential Townhouse Development. The project consists of fifty-two (52), three (3) unit building for a total of 156 residential units. The site will be accessed from Prospect Street. The proposed dwellings will be service by Town Water and Sewer.

The purpose of these calculations is to demonstrate design compliance of the Project's stormwater management system for water quantity and quality objectives of the DEP's Stormwater Management Policy, the Town of Bellingham Stormwater Management and Erosion Control Bylaws. As designed, the system will mitigate peak rates and volumes of runoff for storms up to and including the 100-year event under post-construction conditions.

Methodology/Sources of Data:

The pre- and post-development drainage calculations were prepared using the U.S. Soil Conservation Service Technical Release 20 - Urban Hydrology for storm Small Watersheds. Rainfall calculations for Stormwater management BMP's shall be as per the National Resources Conservation Service Precipitation Frequency Analysis for New York and the New England States.

The overall storm water management plan for the project is designed to maintain the peak rate of storm water runoff and runoff volumes from the site after development. The Soil Conservation Service Modified Soil Cover Complex Method, the computer program "HydroCAD" by Applied Microcomputer Systems, and the procedures specified in Urban Hydrology for storm Small Watersheds were used to determine pre-and post-developed peak flow rates of runoff from the site. The 2-year, 10-year, 25-year and 100-year storm events have been utilized for hydrology calculations. The rainfall data for the Type III, 24-hour storm events follow:

<u>24-Hour Storm</u>	<u>Rainfall (inches)</u>
2	3.26
10	4.90
25	6.26
100	8.73

The storm water runoff will be controlled through the use of "Best Management Practices" and in conformance with the MADEP Stormwater Management Policy. The proposed Project will result in an improvement over the existing conditions, by constructing a storm water management system that will provide treatment, groundwater recharge and reduce the peak rates of runoff and offsite runoff volumes.

The piped drainage system has been designed utilizing the Rational Method for the 25 year storm event to size street drains.

Soils:

The Natural Resources Conservation Service (NRCS), Hydrologic Soils Group Map for Norfolk county, Massachusetts indicates that the on-site soils consist of Windsor, loamy sand-245C, Merrima fine sandy loam-254B, Canton fine sandy loam-420B and Pits, sand and gravel-600. NRCS assigned a hydrologic soil rating A for these soil classifications. The Hydrologic Rating for runoff potential is "Group A", which consists mainly of depp, well drained to excessively drained sands and gravelly sands.

On-site soil testing was performed to determine groundwater elevations and confirm soil classifications. The soil testing confirmed the soil rating and no groundwater was encountered during the testing. (See Appendix D) Based on site area limitations and economic factors the "Simple Dynamic" method was used in the design analysis for the stormwater drainage basins.

Existing Conditions Overview:

The Project is located off Prospect Street. The property is identified as Assessor Map 65, Lots 20 & 22, Assessor Map 69, Lot 87 containing approximately 72 +/- acres.

The existing site consists of woodlands, wetlands and remains of a gravel removal operation on the westerly side of the wetland resource area. There is a wetland resource area centrally located within the project locus with associated stream that flows from the north to the southerly property boundary. There is an existing gravel road crossing the wetland area with a 24 inch culvert. The existing site has been divided into subcatchment areas. The streams within the wetland area has been modeled as a reach. The existing wetland crossing has been modeled as a pond (1P).

The runoff from the site has been studied at three (3) design points. Design Point #1 (Link 1L), flows from the site to the south where the stream exits the property. Design Point #2 (Link 2L), flows via overland to the isolated wetland/vernal pool area. Design Point #3 (Link 3L), flows toward the wetland area along Prospect Street.

The existing site is divided into several watershed subcatchment areas to provide a comprehensive review of surface flows to the surrounding area. See the attached Pre-Development Subcatchment Area Plan for delineations with associated, reaches, ponds and design point (links)

Proposed Conditions Overview:

The proposal is for a Special Residential Townhouse Development. The project consists of fifty-two (52), three (3) unit building for a total of 156 residential units. The site will be accessed from Prospect Street. The soil testing confirmed fine to medium clean sands consistent with the Hydrologic Soil Map. The hydrologic rating for runoff potential is "Group A", which is soils having a high infiltration rate.

The Runoff generated from the Project will be collected via deep sump catch basins where it will be conveyed to stormwater recharge basins to provide mitigation. These systems will mitigate the peak rate and volume of runoff through the 100-year storm event. The proposed systems will reduce or match all post-development peak flows for design storms up to and including the 100-year storm event.

The proposed runoff areas have been divided into several subcatchments. The project has three (3) Design Points for comparison of pre- and post-development runoff.

The following is the Design Points for comparison:

Design Point #1(Link 1L): To the south where the stream exits the property.

Design Point #2(Link 2L): Overland to the isolated wetland/vernal pool area.

Design Point #3(Link 3L): Toward the wetland area along Prospect Street.

Design Point #4(Link 4L): Toward the Prospect Street

Note: All recharge basins and chambers have been design to infiltrate up to and including the 100 year storm event. There is no overland outflow from the recharge systems.

The following is summary comparison of Pre- and Post-Developed Rates and Volumes of Runoff:

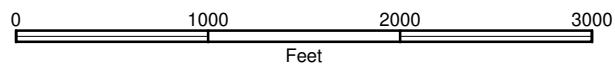
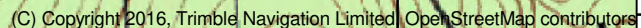
[illegible][illegible]

<u>Summary of Recharge Basins & Chambers</u>				
	<u>100-Yr Storm Event</u>			
<u>Drainage Basin</u>	<u>Peak Flood Elevation (feet)</u>	<u>Bottom Storage Elevation (feet)</u>	<u>Top Storage Elevation (feet)</u>	<u>Emergency Overflow Elev. (feet)</u>
Basin #1 (3P)	231.99	228.00	233.0	232.0
Basin #2 (4P)	235.06	231.0	236.0	235.1
Basin #3 (6P)	230.97	227.0	232.0	231.0
Basin #4 (5P)	242.77	240.0	245.0	244.0
Basin #5 (7P)	240.88	239.0	242.0	241.0
Recharge Chambers (8P)	238.71	235.00	239.50	CB Rim 242.49

Summary:

The calculations performed for all design storm events indicate that the total peak rates and volumes of runoff for the Project as proposed will not exceed those of existing conditions with the implementation of the stormwater management system. With the implementation of the stormwater management system as designed, along with the Operation and Maintenance plan contained herein, all of the objectives of the DEP's Stormwater Management Regulations are satisfied.

Horizontal Datum: NAD27



Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts (Locus Map)



Map Scale: 1:13,000 if printed on A landscape (11" x 8.5") sheet.



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 Rating Polygons

A  A/D  B  B/D  C  C/D  D  Not rated or not available

Soil Rating Lines

A  A/D  B  B/D  C  C/D  D  Not rated or not available

Soil Rating Points

A  A/D  B  B/D 

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

 C

 C/D

 D

 Not rated or not available

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: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 17, Sep 3, 2021

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

Date(s) aerial images were photographed: Jul 5, 2019—Jul 18, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		41.0	6.7%
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	A/D	46.4	7.6%
51	Swansea muck, 0 to 1 percent slopes	B/D	62.0	10.1%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	34.0	5.5%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	4.4	0.7%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	2.2	0.4%
245C	Hinckley loamy sand, 8 to 15 percent slopes	A	30.2	4.9%
253D	Hinckley loamy sand, 15 to 35 percent slopes	A	80.8	13.2%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	51.1	8.3%
255B	Windsor loamy sand, 3 to 8 percent slopes	A	5.0	0.8%
255C	Windsor loamy sand, 8 to 15 percent slopes	A	7.1	1.2%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	B	34.3	5.6%
302B	Montauk fine sandy loam, 0 to 8 percent slopes, extremely stony	C	5.2	0.8%
302C	Montauk fine sandy loam, 8 to 15 percent slopes, extremely stony	C	0.5	0.1%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	17.0	2.8%
315B	Scituate fine sandy loam, 3 to 8 percent slopes	C	26.8	4.4%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	41.0	6.7%
420C	Canton fine sandy loam, 8 to 15 percent slopes	B	5.9	1.0%
420D	Canton fine sandy loam, 15 to 35 percent slopes	A	4.3	0.7%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	15.6	2.5%
422D	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	B	13.4	2.2%
600	Pits, sand and gravel		38.9	6.3%
652	Udorthents, refuse substratum	A	16.6	2.7%
653	Udorthents, sandy	A	30.1	4.9%
Totals for Area of Interest			613.8	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

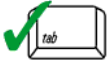
Tie-break Rule: Higher



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 8²
- 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.



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

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 Field¹
- ☒ 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.

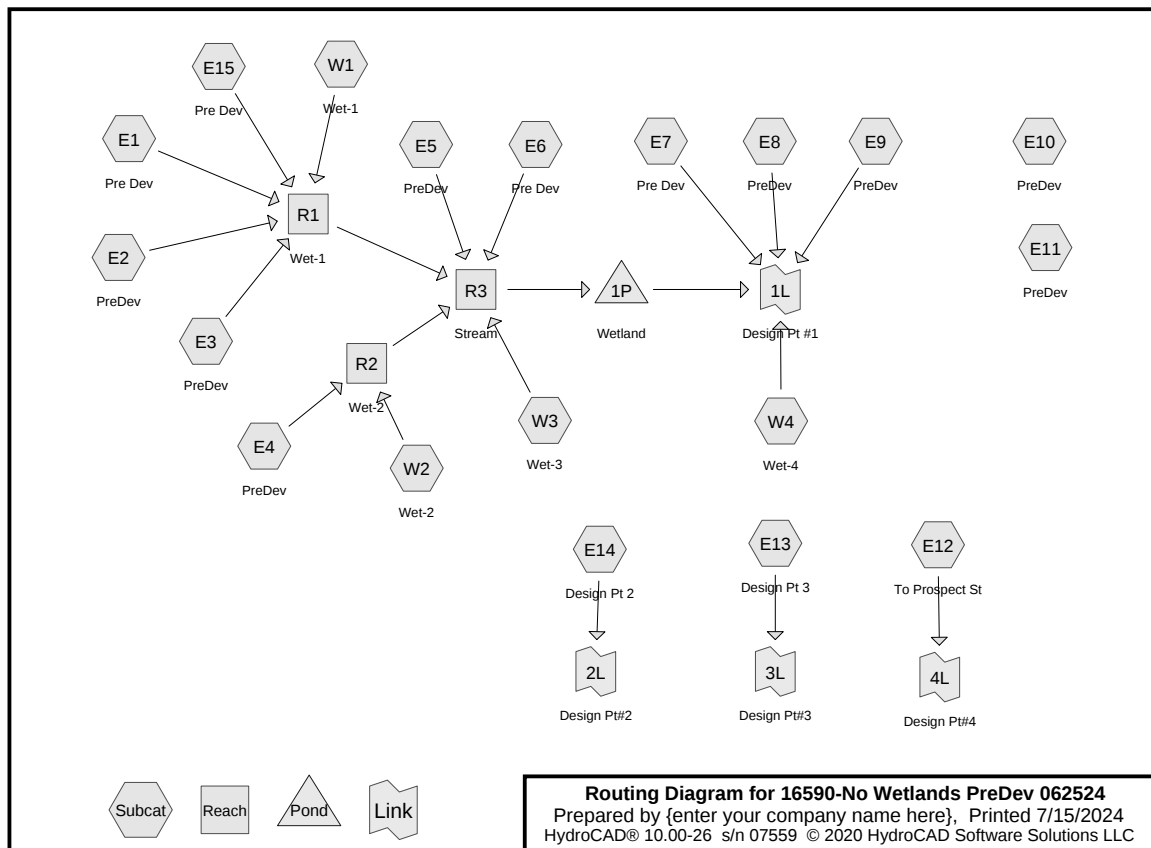
Standard 10: Prohibition of Illicit Discharges

- ☐ 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.

APPENDIX – A1

Hydrogeological Calculations for Pre-Development
Hydro-Cad Computations

Standard 2



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Summary for Subcatchment E1: Pre Dev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
112,334	30	Woods, Good, HSG A
112,334		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.9	310	0.0700	1.3		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
13.2	360	Total			

Summary for Subcatchment E10: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
14,018	30	Woods, Good, HSG A
14,018		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment E11: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
60,390	30	Woods, Good, HSG A
60,390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	65	0.0800	1.4		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
8.7	115	Total			

Summary for Subcatchment E12: To Prospect St

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
11,646	30	Woods, Good, HSG A
11,646		100.00% Pervious Area

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

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Type III 24-hr 2-year Rainfall=3.27"

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Summary for Subcatchment E13: Design Pt 3

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
79,656	30	Woods, Good, HSG A
79,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	130	0.1400	6.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
2.3	270	0.0150	2.0		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
12.0	450	Total			

Summary for Subcatchment E14: Design Pt 2

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
145,168	30	Woods, Good, HSG A
* 0	78	Wetlands Woods
145,168	30	Weighted Average
145,168		100.00% Pervious Area

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Type III 24-hr 2-year Rainfall=3.27"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	30	0.0100	0.0		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	180	0.1000	5.1		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	140	0.0300	2.8		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
12.2	350	Total			

Summary for Subcatchment E15: Pre Dev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
122,235	30	Woods, Good, HSG A
122,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.2	110	0.1000	1.6		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
10.5	160	Total			

Summary for Subcatchment E2: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"**16590-No Wetlands PreDev 062524**

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Type III 24-hr 2-year Rainfall=3.27"

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Area (sf)	CN	Description
195,436	30	Woods, Good, HSG A
195,436		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
11.6	425	0.0150	0.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
23.9	475	Total			

Summary for Subcatchment E3: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
84,405	30	Woods, Good, HSG A
84,405		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	75	0.0200	0.7		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.6	110	0.0500	1.1		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.2	235	Total			

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Type III 24-hr 2-year Rainfall=3.27"

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Summary for Subcatchment E4: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
99,568	30	Woods, Good, HSG A
99,568		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	90	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
12.3	140	Total			

Summary for Subcatchment E5: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
141,814	30	Woods, Good, HSG A
141,814		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.7	350	0.0300	0.9		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
19.0	400	Total			

Summary for Subcatchment E6: Pre Dev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
56,094	30	Woods, Good, HSG A
56,094		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	60	0.2000	2.2		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.2	60	0.0300	0.9		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
8.7	170	Total			

Summary for Subcatchment E7: Pre Dev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

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Area (sf)	CN	Description
65,940	35	Brush, Fair, HSG A
34,090	30	Woods, Good, HSG A
100,030	33	Weighted Average
100,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	410	0.0500	2.2		Shallow Concentrated Flow, B-C Nearly Bare & Untilled Kv= 10.0 fps
10.2	460	Total			

Summary for Subcatchment E8: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
120,304	35	Brush, Fair, HSG A
274,966	30	Woods, Good, HSG A
13,920	36	Woods, Fair, HSG A
409,190	32	Weighted Average
409,190		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0350	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	1.0		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
18.9	400	0.0050	0.4		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
35.0	810	Total			

Summary for Subcatchment E9: PreDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
135,298	30	Woods, Good, HSG A
135,298		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	160	0.0850	1.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
5.9	365	0.0430	1.0		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.0	575	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 4.08 cfs @ 12.23 hrs, Volume= 0.40 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 2.92 cfs @ 12.21 hrs, Volume= 0.28 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Type III 24-hr 2-year Rainfall=3.27"

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Summary for Subcatchment W3: Wet-3

Runoff = 1.54 cfs @ 12.23 hrs, Volume= 0.15 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 0.89 cfs @ 12.23 hrs, Volume= 0.09 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Reach R1: Wet-1

Inflow Area = 15.478 ac, 0.00% Impervious, Inflow Depth > 0.31" for 2-year event
Inflow = 4.08 cfs @ 12.23 hrs, Volume= 0.40 af
Outflow = 3.37 cfs @ 12.53 hrs, Volume= 0.40 af, Atten= 17.25%, Lag= 17.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.5 fps, Min. Travel Time= 10.3 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 25.4 min

Peak Storage= 2,087 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.4'
Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 6.0 ' Top Width= 16.00'
Length= 900.0' Slope= 0.0067 '
Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.812 ac, 0.00% Impervious, Inflow Depth > 0.69" for 2-year event
Inflow = 2.92 cfs @ 12.21 hrs, Volume= 0.28 af
Outflow = 2.42 cfs @ 12.48 hrs, Volume= 0.27 af, Atten= 17.22%, Lag= 16.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 9.8 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 26.2 min

**16590-No Wetlands PreDev 062524**

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Peak Storage= 1,421 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.3'
Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 ' Top Width= 9.60'
Length= 960.0' Slope= 0.0135 '
Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 0.38" for 2-year event
Inflow = 6.69 cfs @ 12.49 hrs, Volume= 0.82 af
Outflow = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af, Atten= 7.16%, Lag= 14.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.4 fps, Min. Travel Time= 8.2 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 21.2 min

Peak Storage= 3,037 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.8'
Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 1.0 ' Top Width= 9.00'
Length= 680.0' Slope= 0.0081 '
Inlet Invert= 227.00', Outlet Invert= 221.50'



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**Summary for Pond 1P: Wetland**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 0.37" for 2-year event
Inflow = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af
Outflow = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af, Atten= 0.00%, Lag= 0.2 min
Primary = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 221.77' @ 12.73 hrs Surf.Area= 317 sf Storage= 60 cf

Plug-Flow detention time= 0.2 min calculated for 0.82 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (888.7 - 888.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
221.51	150	30.0	0	0	150
222.00	510	112.0	153	153	1,077
224.00	8,530	583.0	7,417	7,570	27,136
225.00	18,865	967.0	13,360	20,930	74,507
226.00	26,505	1,272.0	22,577	43,507	128,861

Device	Routing	Invert	Outlet Devices
#1	Primary	221.51'	24.0" Round Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' / ' Cc= 0.90 n= 0.013, Flow Area= 3.14 sf
#2	Primary	221.50'	16.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

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Type III 24-hr 2-year Rainfall=3.27"

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Primary OutFlow Max=6.20 cfs @ 12.73 hrs HW=221.77' (Free Discharge)
1=Culvert (Barrel Controls 0.27 cfs @ 1.7 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 5.93 cfs @ 1.4 fps)

Summary for Link 1L: Design Pt #1

Inflow Area = 41.811 ac, 0.00% Impervious, Inflow Depth > 0.26" for 2-year event
Inflow = 6.48 cfs @ 12.72 hrs, Volume= 0.90 af
Primary = 6.48 cfs @ 12.72 hrs, Volume= 0.90 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt#2

Inflow Area = 3.333 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: Design Pt#3

Inflow Area = 1.829 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

Inflow Area = 0.267 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10-year Rainfall=4.89"

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Summary for Subcatchment E1: Pre Dev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
112,334	30	Woods, Good, HSG A
112,334		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.9	310	0.0700	1.3		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
13.2	360	Total			

Summary for Subcatchment E10: PreDev

Runoff = 0.00 cfs @ 23.99 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
14,018	30	Woods, Good, HSG A
14,018		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment E11: PreDev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
60,390	30	Woods, Good, HSG A
60,390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	65	0.0800	1.4		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
8.7	115	Total			

Summary for Subcatchment E12: To Prospect St

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
11,646	30	Woods, Good, HSG A
11,646		100.00% Pervious Area

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

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Type III 24-hr 10-year Rainfall=4.89"

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Summary for Subcatchment E13: Design Pt 3

Runoff = 0.00 cfs @ 23.99 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
79,656	30	Woods, Good, HSG A
79,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	130	0.1400	6.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
2.3	270	0.0150	2.0		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
12.0	450	Total			

Summary for Subcatchment E14: Design Pt 2

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
145,168	30	Woods, Good, HSG A
0	78	Wetlands Woods
145,168	30	Weighted Average
145,168		100.00% Pervious Area

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Type III 24-hr 10-year Rainfall=4.89"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	30	0.0100	0.0		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	180	0.1000	5.1		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	140	0.0300	2.8		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
12.2	350	Total			

Summary for Subcatchment E15: Pre Dev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
122,235	30	Woods, Good, HSG A
122,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.2	110	0.1000	1.6		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
10.5	160	Total			

Summary for Subcatchment E2: PreDev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

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Type III 24-hr 10-year Rainfall=4.89"

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Area (sf)	CN	Description
195,436	30	Woods, Good, HSG A
195,436		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
11.6	425	0.0150	0.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
23.9	475	Total			

Summary for Subcatchment E3: PreDev

Runoff = 0.00 cfs @ 23.99 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
84,405	30	Woods, Good, HSG A
84,405		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	75	0.0200	0.7		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.6	110	0.0500	1.1		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.2	235	Total			

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Type III 24-hr 10-year Rainfall=4.89"

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Summary for Subcatchment E4: PreDev

Runoff = 0.00 cfs @ 23.99 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
99,568	30	Woods, Good, HSG A
99,568		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	90	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
12.3	140	Total			

Summary for Subcatchment E5: PreDev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
141,814	30	Woods, Good, HSG A
141,814		100.00% Pervious Area

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Type III 24-hr 10-year Rainfall=4.89"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.7	350	0.0300	0.9		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
19.0	400	Total			

Summary for Subcatchment E6: Pre Dev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
56,094	30	Woods, Good, HSG A
56,094		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	60	0.2000	2.2		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.2	60	0.0300	0.9		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
8.7	170	Total			

Summary for Subcatchment E7: Pre Dev

Runoff = 0.01 cfs @ 17.26 hrs, Volume= 0.01 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"**16590-No Wetlands PreDev 062524**

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Type III 24-hr 10-year Rainfall=4.89"

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Area (sf)	CN	Description
65,940	35	Brush, Fair, HSG A
34,090	30	Woods, Good, HSG A
100,030	33	Weighted Average
100,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	410	0.0500	2.2		Shallow Concentrated Flow, B-C Nearly Bare & Untilled Kv= 10.0 fps
10.2	460	Total			

Summary for Subcatchment E8: PreDev

Runoff = 0.02 cfs @ 22.13 hrs, Volume= 0.01 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
120,304	35	Brush, Fair, HSG A
274,966	30	Woods, Good, HSG A
13,920	36	Woods, Fair, HSG A
409,190	32	Weighted Average
409,190		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0350	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	1.0		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
18.9	400	0.0050	0.4		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
35.0	810	Total			

Summary for Subcatchment E9: PreDev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
135,298	30	Woods, Good, HSG A
135,298		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	160	0.0850	1.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
5.9	365	0.0430	1.0		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.0	575	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 8.25 cfs @ 12.23 hrs, Volume= 0.80 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 5.92 cfs @ 12.20 hrs, Volume= 0.55 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Type III 24-hr 10-year Rainfall=4.89"

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Summary for Subcatchment W3: Wet-3

Runoff = 3.11 cfs @ 12.23 hrs, Volume= 0.30 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 1.80 cfs @ 12.23 hrs, Volume= 0.17 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Reach R1: Wet-1

Inflow Area = 15.478 ac, 0.00% Impervious, Inflow Depth > 0.62" for 10-year event
Inflow = 8.25 cfs @ 12.23 hrs, Volume= 0.80 af
Outflow = 7.14 cfs @ 12.46 hrs, Volume= 0.79 af, Atten= 13.46%, Lag= 14.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 8.3 min
Avg. Velocity= 0.7 fps, Avg. Travel Time= 21.3 min

Peak Storage= 3,576 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.5'
Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 6.0 ' Top Width= 16.00'
Length= 900.0' Slope= 0.0067 '
Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.812 ac, 0.00% Impervious, Inflow Depth > 1.37" for 10-year event
Inflow = 5.92 cfs @ 12.20 hrs, Volume= 0.55 af
Outflow = 5.14 cfs @ 12.42 hrs, Volume= 0.54 af, Atten= 13.21%, Lag= 13.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.1 fps, Min. Travel Time= 7.8 min
Avg. Velocity= 0.7 fps, Avg. Travel Time= 21.7 min

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Peak Storage= 2,394 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.4'
Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 ' / Top Width= 9.60'
Length= 960.0' Slope= 0.0135 '/
Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 0.75" for 10-year event
Inflow = 14.26 cfs @ 12.43 hrs, Volume= 1.64 af
Outflow = 13.47 cfs @ 12.61 hrs, Volume= 1.63 af, Atten= 5.50%, Lag= 11.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 6.4 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 17.5 min

Peak Storage= 5,157 cf @ 12.51 hrs
Average Depth at Peak Storage= 1.2'
Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 1.0 ' / Top Width= 9.00'
Length= 680.0' Slope= 0.0081 '/
Inlet Invert= 227.00', Outlet Invert= 221.50'

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Type III 24-hr 10-year Rainfall=4.89"

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**Summary for Pond 1P: Wetland**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 0.74" for 10-year event
Inflow = 13.47 cfs @ 12.61 hrs, Volume= 1.63 af
Outflow = 13.47 cfs @ 12.62 hrs, Volume= 1.63 af, Atten= 0.01%, Lag= 0.2 min
Primary = 13.47 cfs @ 12.62 hrs, Volume= 1.63 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 221.95' @ 12.62 hrs Surf.Area= 463 sf Storage= 128 cf

Plug-Flow detention time= 0.2 min calculated for 1.63 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (863.9 - 863.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
221.51	150	30.0	0	0	150	
222.00	510	112.0	153	153	1,077	
224.00	8,530	583.0	7,417	7,570	27,136	
225.00	18,865	967.0	13,360	20,930	74,507	
226.00	26,505	1,272.0	22,577	43,507	128,861	

Device	Routing	Invert	Outlet Devices			
#1	Primary	221.51'	24.0" Round Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' / Cc= 0.90 n= 0.013, Flow Area= 3.14 sf			
#2	Primary	221.50'	16.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64			

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Primary OutFlow Max=13.46 cfs @ 12.62 hrs HW=221.95' (Free Discharge)

1=Culvert (Barrel Controls 0.74 cfs @ 2.2 fps)

2=Broad-Crested Rectangular Weir (Weir Controls 12.72 cfs @ 1.8 fps)

Summary for Link 1L: Design Pt #1

Inflow Area = 41.811 ac, 0.00% Impervious, Inflow Depth > 0.52" for 10-year event
Inflow = 14.20 cfs @ 12.61 hrs, Volume= 1.82 af
Primary = 14.20 cfs @ 12.61 hrs, Volume= 1.82 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt#2

Inflow Area = 3.333 ac, 0.00% Impervious, Inflow Depth > 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: Design Pt#3

Inflow Area = 1.829 ac, 0.00% Impervious, Inflow Depth > 0.00" for 10-year event
Inflow = 0.00 cfs @ 23.99 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 23.99 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

Inflow Area = 0.267 ac, 0.00% Impervious, Inflow Depth > 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment E1: Pre Dev

Runoff = 0.03 cfs @ 15.41 hrs, Volume= 0.02 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)		CN	Description			
112,334		30	Woods, Good, HSG A			
112,334		100.00% Pervious Area				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps	
3.9	310	0.0700	1.3			
13.2	360	Total				

Summary for Subcatchment E10: PreDev

Runoff = 0.00 cfs @ 15.30 hrs, Volume= 0.00 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)		CN	Description			
14,018		30	Woods, Good, HSG A			
14,018			100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"	

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment E11: PreDev

Runoff = 0.02 cfs @ 15.34 hrs, Volume= 0.01 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
60,390	30	Woods, Good, HSG A
60,390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	65	0.0800	1.4		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
8.7	115	Total			

Summary for Subcatchment E12: To Prospect St

Runoff = 0.00 cfs @ 15.30 hrs, Volume= 0.00 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
11,646	30	Woods, Good, HSG A
11,646		100.00% Pervious Area

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

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment E13: Design Pt 3

Runoff = 0.02 cfs @ 15.40 hrs, Volume= 0.01 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
79,656	30	Woods, Good, HSG A
79,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	130	0.1400	6.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
2.3	270	0.0150	2.0		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
12.0	450	Total			

Summary for Subcatchment E14: Design Pt 2

Runoff = 0.04 cfs @ 15.36 hrs, Volume= 0.02 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
145,168	30	Woods, Good, HSG A
* 0	78	Wetlands Woods
145,168	30	Weighted Average
145,168		100.00% Pervious Area

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Type III 24-hr 25-year Rainfall=6.16"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	30	0.0100	0.0		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	180	0.1000	5.1		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	140	0.0300	2.8		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
12.2	350	Total			

Summary for Subcatchment E15: Pre Dev

Runoff = 0.03 cfs @ 15.34 hrs, Volume= 0.02 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
122,235	30	Woods, Good, HSG A
122,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.2	110	0.1000	1.6		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
10.5	160	Total			

Summary for Subcatchment E2: PreDev

Runoff = 0.05 cfs @ 15.59 hrs, Volume= 0.03 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

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Area (sf)	CN	Description
195,436	30	Woods, Good, HSG A
195,436		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
11.6	425	0.0150	0.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
23.9	475	Total			

Summary for Subcatchment E3: PreDev

Runoff = 0.02 cfs @ 15.46 hrs, Volume= 0.01 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
84,405	30	Woods, Good, HSG A
84,405		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	75	0.0200	0.7		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.6	110	0.0500	1.1		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.2	235	Total			

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment E4: PreDev

Runoff = 0.03 cfs @ 15.40 hrs, Volume= 0.02 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
99,568	30	Woods, Good, HSG A
99,568		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	90	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
12.3	140	Total			

Summary for Subcatchment E5: PreDev

Runoff = 0.04 cfs @ 15.52 hrs, Volume= 0.02 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
141,814	30	Woods, Good, HSG A
141,814		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.7	350	0.0300	0.9		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
19.0	400	Total			

Summary for Subcatchment E6: Pre Dev

Runoff = 0.01 cfs @ 15.34 hrs, Volume= 0.01 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
56,094	30	Woods, Good, HSG A
56,094		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	60	0.2000	2.2		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.2	60	0.0300	0.9		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
8.7	170	Total			

Summary for Subcatchment E7: Pre Dev

Runoff = 0.06 cfs @ 13.77 hrs, Volume= 0.04 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

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Area (sf)	CN	Description
65,940	35	Brush, Fair, HSG A
34,090	30	Woods, Good, HSG A
100,030	33	Weighted Average
100,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	410	0.0500	2.2		Shallow Concentrated Flow, B-C Nearly Bare & Untilled Kv= 10.0 fps
10.2	460	Total			

Summary for Subcatchment E8: PreDev

Runoff = 0.20 cfs @ 15.13 hrs, Volume= 0.12 af, Depth> 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
120,304	35	Brush, Fair, HSG A
274,966	30	Woods, Good, HSG A
13,920	36	Woods, Fair, HSG A
409,190	32	Weighted Average
409,190		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0350	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	1.0		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
18.9	400	0.0050	0.4		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
35.0	810	Total			

Summary for Subcatchment E9: PreDev

Runoff = 0.04 cfs @ 15.47 hrs, Volume= 0.02 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
135,298	30	Woods, Good, HSG A
135,298		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	160	0.0850	1.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
5.9	365	0.0430	1.0		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.0	575	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 11.73 cfs @ 12.22 hrs, Volume= 1.13 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 8.41 cfs @ 12.20 hrs, Volume= 0.78 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment W3: Wet-3

Runoff = 4.42 cfs @ 12.22 hrs, Volume= 0.43 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 2.55 cfs @ 12.22 hrs, Volume= 0.25 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Reach R1: Wet-1

Inflow Area = 15.478 ac, 0.00% Impervious, Inflow Depth > 0.95" for 25-year event
Inflow = 11.73 cfs @ 12.22 hrs, Volume= 1.22 af
Outflow = 10.34 cfs @ 12.44 hrs, Volume= 1.21 af, Atten= 11.86%, Lag= 12.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.0 fps, Min. Travel Time= 7.5 min

Avg. Velocity = 0.8 fps, Avg. Travel Time= 18.7 min

Peak Storage= 4,681 cf @ 12.31 hrs

Average Depth at Peak Storage= 0.7'

Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds

Side Slope Z-value= 6.0 ' Top Width= 16.00'

Length= 900.0' Slope= 0.0067 ' /'

Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.812 ac, 0.00% Impervious, Inflow Depth > 1.99" for 25-year event
Inflow = 8.41 cfs @ 12.20 hrs, Volume= 0.80 af
Outflow = 7.44 cfs @ 12.40 hrs, Volume= 0.79 af, Atten= 11.58%, Lag= 11.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.3 fps, Min. Travel Time= 7.0 min

Avg. Velocity = 0.8 fps, Avg. Travel Time= 19.5 min

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Peak Storage= 3,110 cf @ 12.28 hrs

Average Depth at Peak Storage= 0.5'

Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals

Side Slope Z-value= 4.0 ' Top Width= 9.60'

Length= 960.0' Slope= 0.0135 ' /'

Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 1.13" for 25-year event
Inflow = 20.70 cfs @ 12.40 hrs, Volume= 2.46 af
Outflow = 19.69 cfs @ 12.57 hrs, Volume= 2.44 af, Atten= 4.86%, Lag= 9.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.0 fps, Min. Travel Time= 5.7 min

Avg. Velocity = 0.7 fps, Avg. Travel Time= 15.4 min

Peak Storage= 6,729 cf @ 12.47 hrs

Average Depth at Peak Storage= 1.5'

Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools

Side Slope Z-value= 1.0 ' Top Width= 9.00'

Length= 680.0' Slope= 0.0081 ' /'

Inlet Invert= 227.00', Outlet Invert= 221.50'

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Type III 24-hr 25-year Rainfall=6.16"

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**Summary for Pond 1P: Wetland**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 1.12" for 25-year event
 Inflow = 19.69 cfs @ 12.57 hrs, Volume= 2.44 af
 Outflow = 19.69 cfs @ 12.57 hrs, Volume= 2.44 af, Atten= 0.01%, Lag= 0.2 min
 Primary = 19.69 cfs @ 12.57 hrs, Volume= 2.44 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 222.07' @ 12.57 hrs Surf.Area= 626 sf Storage= 193 cf

Plug-Flow detention time= 0.2 min calculated for 2.44 af (100% of inflow)
 Center-of-Mass det. time= 0.1 min (865.4 - 865.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
221.51	150	30.0	0	0	150
222.00	510	112.0	153	153	1,077
224.00	8,530	583.0	7,417	7,570	27,136
225.00	18,865	967.0	13,360	20,930	74,507
226.00	26,505	1,272.0	22,577	43,507	128,861

Device	Routing	Invert	Outlet Devices
#1	Primary	221.51'	24.0" Round Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' /' Cc= 0.90 n= 0.013, Flow Area= 3.14 sf
#2	Primary	221.50'	16.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

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Primary OutFlow Max=19.68 cfs @ 12.57 hrs HW=222.07' (Free Discharge)
 1=Culvert (Barrel Controls 1.18 cfs @ 2.5 fps)
 2=Broad-Crested Rectangular Weir (Weir Controls 18.50 cfs @ 2.0 fps)

Summary for Link 1L: Design Pt #1

Inflow Area = 41.811 ac, 0.00% Impervious, Inflow Depth > 0.82" for 25-year event
 Inflow = 20.88 cfs @ 12.56 hrs, Volume= 2.87 af
 Primary = 20.88 cfs @ 12.56 hrs, Volume= 2.87 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt#2

Inflow Area = 3.333 ac, 0.00% Impervious, Inflow Depth > 0.09" for 25-year event
 Inflow = 0.04 cfs @ 15.36 hrs, Volume= 0.02 af
 Primary = 0.04 cfs @ 15.36 hrs, Volume= 0.02 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: Design Pt#3

Inflow Area = 1.829 ac, 0.00% Impervious, Inflow Depth > 0.09" for 25-year event
 Inflow = 0.02 cfs @ 15.40 hrs, Volume= 0.01 af
 Primary = 0.02 cfs @ 15.40 hrs, Volume= 0.01 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

Inflow Area = 0.267 ac, 0.00% Impervious, Inflow Depth > 0.09" for 25-year event
 Inflow = 0.00 cfs @ 15.30 hrs, Volume= 0.00 af
 Primary = 0.00 cfs @ 15.30 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 100-year Rainfall=8.73"

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Summary for Subcatchment E1: Pre Dev

Runoff = 0.54 cfs @ 12.48 hrs, Volume= 0.13 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
112,334	30	Woods, Good, HSG A
112,334		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.9	310	0.0700	1.3		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
13.2	360	Total			

Summary for Subcatchment E10: PreDev

Runoff = 0.07 cfs @ 12.39 hrs, Volume= 0.02 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
14,018	30	Woods, Good, HSG A
14,018		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment E11: PreDev

Runoff = 0.31 cfs @ 12.40 hrs, Volume= 0.07 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
60,390	30	Woods, Good, HSG A
60,390		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.8	65	0.0800	1.4		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
8.7	115	Total			

Summary for Subcatchment E12: To Prospect St

Runoff = 0.06 cfs @ 12.36 hrs, Volume= 0.01 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
11,646	30	Woods, Good, HSG A
11,646		100.00% Pervious Area

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

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Summary for Subcatchment E13: Design Pt 3

Runoff = 0.39 cfs @ 12.45 hrs, Volume= 0.09 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
79,656	30	Woods, Good, HSG A
79,656		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	130	0.1400	6.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
2.3	270	0.0150	2.0		Shallow Concentrated Flow, C-D Unpaved Kv= 16.1 fps
12.0	450	Total			

Summary for Subcatchment E14: Design Pt 2

Runoff = 0.70 cfs @ 12.46 hrs, Volume= 0.17 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
145,168	30	Woods, Good, HSG A
0	78	Wetlands Woods
145,168	30	Weighted Average
145,168		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	30	0.0100	0.0		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	180	0.1000	5.1		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.8	140	0.0300	2.8		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
12.2	350	Total			

Summary for Subcatchment E15: Pre Dev

Runoff = 0.61 cfs @ 12.43 hrs, Volume= 0.14 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
122,235	30	Woods, Good, HSG A
122,235		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.2	110	0.1000	1.6		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
10.5	160	Total			

Summary for Subcatchment E2: PreDev

Runoff = 0.79 cfs @ 12.62 hrs, Volume= 0.22 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

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Area (sf)	CN	Description
195,436	30	Woods, Good, HSG A
195,436		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
11.6	425	0.0150	0.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
23.9	475	Total			

Summary for Subcatchment E3: PreDev

Runoff = 0.38 cfs @ 12.52 hrs, Volume= 0.10 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
84,405	30	Woods, Good, HSG A
84,405		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	50	0.0150	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	75	0.0200	0.7		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.6	110	0.0500	1.1		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.2	235	Total			

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Summary for Subcatchment E4: PreDev

Runoff = 0.48 cfs @ 12.45 hrs, Volume= 0.11 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
99,568	30	Woods, Good, HSG A
99,568		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.0	90	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
12.3	140	Total			

Summary for Subcatchment E5: PreDev

Runoff = 0.62 cfs @ 12.56 hrs, Volume= 0.16 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
141,814	30	Woods, Good, HSG A
141,814		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.7	350	0.0300	0.9		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
19.0	400	Total			

Summary for Subcatchment E6: Pre Dev

Runoff = 0.28 cfs @ 12.40 hrs, Volume= 0.06 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
56,094	30	Woods, Good, HSG A
56,094		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	60	0.2000	2.2		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
1.2	60	0.0300	0.9		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
8.7	170	Total			

Summary for Subcatchment E7: Pre Dev

Runoff = 0.94 cfs @ 12.34 hrs, Volume= 0.17 af, Depth> 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"**16590-No Wetlands PreDev 062524**

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Type III 24-hr 100-year Rainfall=8.73"

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Area (sf)	CN	Description
65,940	35	Brush, Fair, HSG A
34,090	30	Woods, Good, HSG A
100,030	33	Weighted Average
100,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.1	410	0.0500	2.2		Shallow Concentrated Flow, B-C Nearly Bare & Untilled Kv= 10.0 fps
10.2	460	Total			

Summary for Subcatchment E8: PreDev

Runoff = 2.30 cfs @ 12.72 hrs, Volume= 0.60 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
120,304	35	Brush, Fair, HSG A
274,966	30	Woods, Good, HSG A
13,920	36	Woods, Fair, HSG A
409,190	32	Weighted Average
409,190		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0350	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
6.2	360	0.0380	1.0		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
18.9	400	0.0050	0.4		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
35.0	810	Total			

Summary for Subcatchment E9: PreDev

Runoff = 0.61 cfs @ 12.52 hrs, Volume= 0.15 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
135,298	30	Woods, Good, HSG A
135,298		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
1.8	160	0.0850	1.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
5.9	365	0.0430	1.0		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
17.0	575	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 18.94 cfs @ 12.22 hrs, Volume= 1.85 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 13.58 cfs @ 12.20 hrs, Volume= 1.27 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Type III 24-hr 100-year Rainfall=8.73"

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Summary for Subcatchment W3: Wet-3

Runoff = 7.14 cfs @ 12.22 hrs, Volume= 0.70 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 4.12 cfs @ 12.22 hrs, Volume= 0.40 af, Depth> 6.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.73"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Reach R1: Wet-1

Inflow Area = 15.478 ac, 0.00% Impervious, Inflow Depth > 1.89" for 100-year event
Inflow = 19.57 cfs @ 12.23 hrs, Volume= 2.44 af
Outflow = 17.79 cfs @ 12.42 hrs, Volume= 2.42 af, Atten= 9.11%, Lag= 11.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 6.5 min
Avg. Velocity= 1.0 fps, Avg. Travel Time= 15.4 min

Peak Storage= 6,968 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.9'
Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 6.0 ' Top Width= 16.00'
Length= 900.0' Slope= 0.0067 '
Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.812 ac, 0.00% Impervious, Inflow Depth > 3.46" for 100-year event
Inflow = 13.72 cfs @ 12.20 hrs, Volume= 1.39 af
Outflow = 12.44 cfs @ 12.37 hrs, Volume= 1.38 af, Atten= 9.35%, Lag= 10.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 6.0 min
Avg. Velocity= 1.0 fps, Avg. Travel Time= 16.7 min

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Peak Storage= 4,491 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.7'
Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 ' / Top Width= 9.60'
Length= 960.0' Slope= 0.0135 '/
Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 2.16" for 100-year event
Inflow = 35.75 cfs @ 12.38 hrs, Volume= 4.72 af
Outflow = 34.39 cfs @ 12.53 hrs, Volume= 4.70 af, Atten= 3.80%, Lag= 8.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 12.6 min

Peak Storage= 10,018 cf @ 12.45 hrs
Average Depth at Peak Storage= 2.1'
Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 1.0 ' / Top Width= 9.00'
Length= 680.0' Slope= 0.0081 '/
Inlet Invert= 227.00', Outlet Invert= 221.50'

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**Summary for Pond 1P: Wetland**

Inflow Area = 26.216 ac, 0.00% Impervious, Inflow Depth > 2.15" for 100-year event
Inflow = 34.39 cfs @ 12.53 hrs, Volume= 4.70 af
Outflow = 34.38 cfs @ 12.53 hrs, Volume= 4.70 af, Atten= 0.02%, Lag= 0.3 min
Primary = 34.38 cfs @ 12.53 hrs, Volume= 4.70 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 222.32' @ 12.53 hrs Surf.Area= 1,150 sf Storage= 416 cf

Plug-Flow detention time= 0.2 min calculated for 4.69 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (863.6 - 863.4)

Volume	Invert	Avail.Storage	Storage Description						
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)						
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)				
221.51	150	30.0	0	0	150				
222.00	510	112.0	153	153	1,077				
224.00	8,530	583.0	7,417	7,570	27,136				
225.00	18,865	967.0	13,360	20,930	74,507				
226.00	26,505	1,272.0	22,577	43,507	128,861				
Device	Routing	Invert	Outlet Devices						
#1	Primary	221.51'	24.0" Round Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' / Cc= 0.90 n= 0.013, Flow Area= 3.14 sf						
#2	Primary	221.50'	16.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64						

Primary OutFlow Max=34.37 cfs @ 12.53 hrs HW=222.32' (Free Discharge)

1=Culvert (Barrel Controls 2.39 cfs @ 2.9 fps)

2=Broad-Crested Rectangular Weir (Weir Controls 31.97 cfs @ 2.4 fps)

Summary for Link 1L: Design Pt #1

Inflow Area = 41.811 ac, 0.00% Impervious, Inflow Depth > 1.73" for 100-year event
Inflow = 39.49 cfs @ 12.53 hrs, Volume= 6.02 af
Primary = 39.49 cfs @ 12.53 hrs, Volume= 6.02 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt#2

Inflow Area = 3.333 ac, 0.00% Impervious, Inflow Depth > 0.60" for 100-year event
Inflow = 0.70 cfs @ 12.46 hrs, Volume= 0.17 af
Primary = 0.70 cfs @ 12.46 hrs, Volume= 0.17 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: Design Pt#3

Inflow Area = 1.829 ac, 0.00% Impervious, Inflow Depth > 0.60" for 100-year event
Inflow = 0.39 cfs @ 12.45 hrs, Volume= 0.09 af
Primary = 0.39 cfs @ 12.45 hrs, Volume= 0.09 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

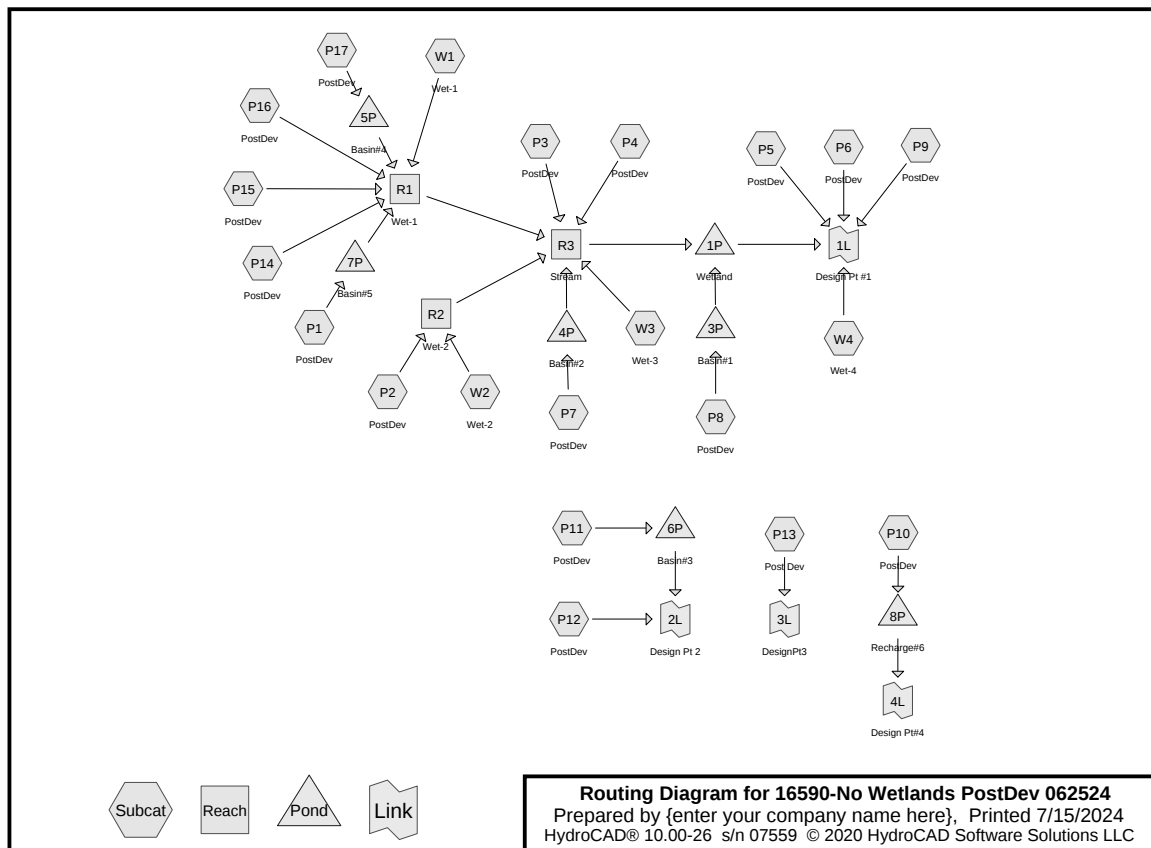
Inflow Area = 0.267 ac, 0.00% Impervious, Inflow Depth > 0.60" for 100-year event
Inflow = 0.06 cfs @ 12.36 hrs, Volume= 0.01 af
Primary = 0.06 cfs @ 12.36 hrs, Volume= 0.01 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX – A2

Hydrogeological Calculations for Post-Development Hydro-Cad Computations

Standard 2



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Summary for Subcatchment P1: PostDev

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.09 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
24,873	98	Paved roads w/curbs & sewers, HSG A
15,708	39	>75% Grass cover, Good, HSG A
40,581	75	Weighted Average
15,708		38.71% Pervious Area
24,873		61.29% Impervious Area

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

Summary for Subcatchment P10: PostDev

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.02 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 5,260	98	Road
* 755	98	Sidewalk
3,045	39	>75% Grass cover, Good, HSG A
9,060	78	Weighted Average
3,045		33.61% Pervious Area
6,015		66.39% Impervious Area

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

Summary for Subcatchment P11: PostDev

Runoff = 1.46 cfs @ 12.27 hrs, Volume= 0.18 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 57,306	98	Road/Drives
* 3,878	98	Sidewalk
* 7,152	98	Com Bldg/Courts
95,378	39	>75% Grass cover, Good, HSG A
163,714	64	Weighted Average
95,378		58.26% Pervious Area
68,336		41.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.1	295	0.0100	1.6		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.7	75	0.0080	1.8		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.2	325	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
15.8	745	Total			

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Summary for Subcatchment P12: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
78,008	30	Woods, Good, HSG A
12,103	39	>75% Grass cover, Good, HSG A
90,111	31	Weighted Average
90,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
2.9	340	0.0150	2.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.4	390	Total			

Summary for Subcatchment P13: Post Dev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
37,535	30	Woods, Good, HSG A
13,400	39	>75% Grass cover, Good, HSG A
50,935	32	Weighted Average
50,935		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.2	300	0.0200	2.3		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.0	350	Total			

Summary for Subcatchment P14: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
92,481	30	Woods, Good, HSG A
28,390	39	>75% Grass cover, Good, HSG A
120,871	32	Weighted Average
120,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.8	160	0.0200	0.7		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
12.0	210	Total			

Summary for Subcatchment P15: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-year Rainfall=3.27"

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Type III 24-hr 2-year Rainfall=3.27"

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Area (sf)	CN	Description
40,243	30	Woods, Good, HSG A
19,828	39	>75% Grass cover, Good, HSG A
60,071	33	Weighted Average
60,071		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	50	0.2000	2.2		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.7	100	Total			

Summary for Subcatchment P16: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
68,337	30	Woods, Good, HSG A
18,863	39	>75% Grass cover, Good, HSG A
87,200	32	Weighted Average
87,200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.6	130	0.0750	1.4		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.8	180	Total			

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Summary for Subcatchment P17: PostDev

Runoff = 0.19 cfs @ 12.31 hrs, Volume= 0.03 af, Depth> 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 15,400	98	Pavement
35,913	39	>75% Grass cover, Good, HSG A
51,313	57	Weighted Average
35,913		69.99% Pervious Area
15,400		30.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	40	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	520	0.0400	4.1		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
9.0	560	Total			

Summary for Subcatchment P2: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
56,759	30	Woods, Good, HSG A
8,171	39	>75% Grass cover, Good, HSG A
64,930	31	Weighted Average
64,930		100.00% Pervious Area

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Type III 24-hr 2-year Rainfall=3.27"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.7	50	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.9	100	Total			

Summary for Subcatchment P3: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
85,553	30	Woods, Good, HSG A
18,643	39	>75% Grass cover, Good, HSG A
104,196	32	Weighted Average
104,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	210	0.0450	1.1		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	260	Total			

Summary for Subcatchment P4: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

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Area (sf)	CN	Description
40,884	30	Woods, Good, HSG A
40,884		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	105	0.1000	5.1		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
6.8	155	Total			

Summary for Subcatchment P5: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
13,479	30	Woods, Good, HSG A
9,660	39	>75% Grass cover, Good, HSG A
23,139	34	Weighted Average
23,139		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
0.8	75	0.1000	1.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.0	125	Total			

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Summary for Subcatchment P6: PostDev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
24,176	39	>75% Grass cover, Good, HSG A
24,176		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0150	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.3	160	0.0800	2.0		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
10.5	210	Total			

Summary for Subcatchment P7: PostDev

Runoff = 0.95 cfs @ 12.40 hrs, Volume= 0.17 af, Depth> 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
74,491	98	Roadway/Drives
3,290	98	Sidewalk
161,491	39	>75% Grass cover, Good, HSG A
239,272	58	Weighted Average
161,491		67.49% Pervious Area
77,781		32.51% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	90	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
2.8	750	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
16.2	945	Total			

Summary for Subcatchment P8: PostDev

Runoff = 1.11 cfs @ 12.47 hrs, Volume= 0.23 af, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 6,988	98	Sidewalk
* 108,445	98	Roadway/Drives
277,981	39	>75% Grass cover, Good, HSG A
393,414	56	Weighted Average
277,981		70.66% Pervious Area
115,433		29.34% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.7	155	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.0	825	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.9	1,080	Total			

Summary for Subcatchment P9: PostDev

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
23,377	30	Woods, Good, HSG A
18,322	39	>75% Grass cover, Good, HSG A
41,699	34	Weighted Average
41,699		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
4.7	140	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
15.5	190	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 4.08 cfs @ 12.23 hrs, Volume= 0.40 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 2.92 cfs @ 12.21 hrs, Volume= 0.28 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment W3: Wet-3

Runoff = 1.54 cfs @ 12.23 hrs, Volume= 0.15 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 0.89 cfs @ 12.23 hrs, Volume= 0.09 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.27"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Reach R1: Wet-1

Inflow Area = 11.934 ac, 7.75% Impervious, Inflow Depth > 0.41" for 2-year event
Inflow = 4.08 cfs @ 12.23 hrs, Volume= 0.40 af
Outflow = 3.37 cfs @ 12.53 hrs, Volume= 0.40 af, Atten= 17.25%, Lag= 17.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.5 fps, Min. Travel Time= 10.3 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 25.4 min

Peak Storage= 2,087 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.4'
Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 6.0 ' Top Width= 16.00'
Length= 900.0' Slope= 0.0067 '
Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.017 ac, 0.00% Impervious, Inflow Depth > 0.83" for 2-year event
Inflow = 2.92 cfs @ 12.21 hrs, Volume= 0.28 af
Outflow = 2.42 cfs @ 12.48 hrs, Volume= 0.27 af, Atten= 17.22%, Lag= 16.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 9.8 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 26.2 min

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Peak Storage= 1,421 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.3'
Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 ' Top Width= 9.60'
Length= 960.0' Slope= 0.0135 '
Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.157 ac, 10.36% Impervious, Inflow Depth > 0.38" for 2-year event
Inflow = 6.69 cfs @ 12.49 hrs, Volume= 0.82 af
Outflow = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af, Atten= 7.16%, Lag= 14.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.4 fps, Min. Travel Time= 8.2 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 21.2 min

Peak Storage= 3,037 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.8'
Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 1.0 ' Top Width= 9.00'
Length= 680.0' Slope= 0.0081 '
Inlet Invert= 227.00', Outlet Invert= 221.50'



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**Summary for Pond 1P: Wetland**

Inflow Area = 35.189 ac, 15.23% Impervious, Inflow Depth > 0.28" for 2-year event
 Inflow = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af
 Outflow = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af, Atten= 0.03%, Lag= 0.4 min
 Primary = 6.21 cfs @ 12.73 hrs, Volume= 0.82 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 221.94' @ 12.73 hrs Surf.Area= 457 sf Storage= 125 cf

Plug-Flow detention time= 0.4 min calculated for 0.81 af (100% of inflow)
 Center-of-Mass det. time= 0.3 min (888.8 - 888.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
221.51	150	30.0	0	0	150
222.00	510	112.0	153	153	1,077
224.00	8,530	583.0	7,417	7,570	27,136
225.00	18,865	967.0	13,360	20,930	74,507
226.00	26,505	1,272.0	22,577	43,507	128,861

Device	Routing	Invert	Outlet Devices		
#1	Primary	221.51'	96.0" W x 48.0" H Box Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' /' Cc= 0.90 n= 0.013, Flow Area= 32.00 sf		

Primary OutFlow Max=6.20 cfs @ 12.73 hrs HW=221.94' (Free Discharge)
 1=Culvert (Barrel Controls 6.20 cfs @ 2.4 fps)

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Summary for Pond 3P: Basin#1

Inflow Area = 9.032 ac, 29.34% Impervious, Inflow Depth > 0.30" for 2-year event
 Inflow = 1.11 cfs @ 12.47 hrs, Volume= 0.23 af
 Outflow = 0.82 cfs @ 12.70 hrs, Volume= 0.22 af, Atten= 26.45%, Lag= 13.4 min
 Discarded = 0.82 cfs @ 12.70 hrs, Volume= 0.22 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 228.37' @ 12.70 hrs Surf.Area= 2,694 sf Storage= 663 cf

Plug-Flow detention time= 7.1 min calculated for 0.22 af (100% of inflow)
 Center-of-Mass det. time= 6.2 min (956.2 - 950.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	228.00'	49,089 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	993	123.0	0	0	993
229.00	7,415	404.0	3,707	3,707	12,780
230.00	10,180	432.0	8,761	12,468	14,689
232.00	12,890	470.0	23,017	35,485	17,562
233.00	14,330	489.0	13,604	49,089	19,089

Device	Routing	Invert	Outlet Devices		
#1	Discarded	228.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 225.70'		

Discarded OutFlow Max=0.82 cfs @ 12.70 hrs HW=228.37' (Free Discharge)
 1=Exfiltration (Controls 0.82 cfs)

Summary for Pond 4P: Basin#2

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Inflow Area = 5.493 ac, 32.51% Impervious, Inflow Depth > 0.36" for 2-year event
Inflow = 0.95 cfs @ 12.40 hrs, Volume= 0.17 af
Outflow = 0.66 cfs @ 12.65 hrs, Volume= 0.17 af, Atten= 30.25%, Lag= 15.0 min
Discarded = 0.66 cfs @ 12.65 hrs, Volume= 0.17 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 231.37' @ 12.65 hrs Surf.Area= 2,113 sf Storage= 613 cf

Plug-Flow detention time= 7.2 min calculated for 0.17 af (100% of inflow)
Center-of-Mass det. time= 6.3 min (941.6 - 935.3)

Volume	Invert	Avail.Storage	Storage Description			
#1	231.00'	30,648 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
231.00	1,200	136.0	0	0	1,200	
232.00	4,205	323.0	2,550	2,550	8,034	
233.00	6,060	356.0	5,104	7,655	9,849	
234.00	7,120	371.0	6,583	14,238	10,790	
236.00	9,340	402.0	16,410	30,648	12,848	

Device	Routing	Invert	Outlet Devices									
#1	Discarded	231.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 229.00'									
#2	Primary	235.10'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
			Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64	

Discarded OutFlow Max=0.66 cfs @ 12.65 hrs HW=231.37' (Free Discharge)
↳ **1=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=231.00' (Free Discharge)
↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 5P: Basin#4

Inflow Area = 1.178 ac, 30.01% Impervious, Inflow Depth > 0.33" for 2-year event
Inflow = 0.19 cfs @ 12.31 hrs, Volume= 0.03 af
Outflow = 0.14 cfs @ 12.52 hrs, Volume= 0.03 af, Atten= 25.62%, Lag= 12.7 min
Discarded = 0.14 cfs @ 12.52 hrs, Volume= 0.03 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 240.26' @ 12.52 hrs Surf.Area= 505 sf Storage= 100 cf

Plug-Flow detention time= 5.5 min calculated for 0.03 af (100% of inflow)
Center-of-Mass det. time= 4.6 min (941.4 - 936.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	240.00'	12,227 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
240.00	276	65.0	0	0	276	
241.00	1,540	194.0	823	823	2,938	
242.00	2,155	213.0	1,839	2,662	3,586	
244.00	3,540	250.0	5,638	8,300	5,026	
245.00	4,329	270.0	3,928	12,227	5,893	

Device	Routing	Invert	Outlet Devices									
#1	Discarded	240.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 235.00'									
#2	Primary	244.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir									
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	
			Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64	

Discarded OutFlow Max=0.14 cfs @ 12.52 hrs HW=240.26' (Free Discharge)
↳ **1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=240.00' (Free Discharge)
↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 6P: Basin#3

Inflow Area = 3.758 ac, 41.74% Impervious, Inflow Depth > 0.59" for 2-year event
Inflow = 1.46 cfs @ 12.27 hrs, Volume= 0.18 af
Outflow = 0.71 cfs @ 12.67 hrs, Volume= 0.18 af, Atten= 51.63%, Lag= 24.0 min
Discarded = 0.71 cfs @ 12.67 hrs, Volume= 0.18 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 227.72' @ 12.67 hrs Surf.Area= 3,286 sf Storage= 1,366 cf

Plug-Flow detention time= 16.9 min calculated for 0.18 af (100% of inflow)
Center-of-Mass det. time= 16.1 min (919.8 - 903.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	227.00'	32,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	800	120.0	0	0	800
228.00	4,724	424.0	2,489	2,489	13,963
230.00	7,485	475.0	12,104	14,593	17,721
232.00	10,515	520.0	17,914	32,507	21,420

Device	Routing	Invert	Outlet Devices									
#1	Discarded	227.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 224.00'									
#2	Primary	231.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60									
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64									

Discarded OutFlow Max=0.71 cfs @ 12.67 hrs HW=227.72' (Free Discharge)

↳ **1=Exfiltration** (Controls 0.71 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 7P: Basin#5

Inflow Area = 0.932 ac, 61.29% Impervious, Inflow Depth > 1.14" for 2-year event
Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.09 af
Outflow = 0.46 cfs @ 12.40 hrs, Volume= 0.09 af, Atten= 61.37%, Lag= 18.3 min
Discarded = 0.46 cfs @ 12.40 hrs, Volume= 0.09 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 239.53' @ 12.40 hrs Surf.Area= 2,190 sf Storage= 728 cf

Plug-Flow detention time= 12.2 min calculated for 0.09 af (100% of inflow)
Center-of-Mass det. time= 11.8 min (868.4 - 856.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	239.00'	12,380 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	680	105.0	0	0	680
240.00	4,210	286.0	2,194	2,194	6,315
242.00	6,030	320.0	10,186	12,380	8,063

Device	Routing	Invert	Outlet Devices									
#1	Discarded	239.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 236.00'									
#2	Primary	241.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60									
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64									

Discarded OutFlow Max=0.46 cfs @ 12.40 hrs HW=239.53' (Free Discharge)

↳ **1=Exfiltration** (Controls 0.46 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=239.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 8P: Recharge#6

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth > 1.32" for 2-year event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.02 af
Outflow = 0.15 cfs @ 12.31 hrs, Volume= 0.02 af, Atten= 54.12%, Lag= 13.2 min
Discarded = 0.15 cfs @ 12.31 hrs, Volume= 0.02 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 235.45' @ 12.31 hrs Surf.Area= 636 sf Storage= 114 cf

Plug-Flow detention time= 4.6 min calculated for 0.02 af (100% of inflow)
Center-of-Mass det. time= 4.3 min (851.5 - 847.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.00'	720 cf	15.13'W x 42.00'L x 4.50'H Field A 2,860 cf Overall - 1,060 cf Embedded = 1,800 cf x 40.0% Voids
#2A	235.50'	798 cf	Concrete Galley 4x4x4 x 18 Inside #1 Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf 18 Chambers in 2 Rows
		1,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	235.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 231.00'
#2	Primary	239.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 12.31 hrs HW=235.45' (Free Discharge)

↳ **1=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=235.00' (Free Discharge)

↳ **2=Orifice/Grate** (Controls 0.00 cfs)

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Summary for Link 1L: Design Pt #1

Inflow Area = 38.031 ac, 14.09% Impervious, Inflow Depth > 0.28" for 2-year event
Inflow = 6.47 cfs @ 12.73 hrs, Volume= 0.90 af
Primary = 6.47 cfs @ 12.73 hrs, Volume= 0.90 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt 2

Inflow Area = 5.827 ac, 26.92% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: DesignPt3

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 10-year Rainfall=4.89"

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Summary for Subcatchment P1: PostDev

Runoff = 2.57 cfs @ 12.09 hrs, Volume= 0.18 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
24,873	98	Paved roads w/curbs & sewers, HSG A
15,708	39	>75% Grass cover, Good, HSG A
40,581	75	Weighted Average
15,708		38.71% Pervious Area
24,873		61.29% Impervious Area

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

Summary for Subcatchment P10: PostDev

Runoff = 0.64 cfs @ 12.09 hrs, Volume= 0.05 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 5,260	98	Road
* 755	98	Sidewalk
3,045	39	>75% Grass cover, Good, HSG A
9,060	78	Weighted Average
3,045		33.61% Pervious Area
6,015		66.39% Impervious Area

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

Summary for Subcatchment P11: PostDev

Runoff = 4.58 cfs @ 12.24 hrs, Volume= 0.47 af, Depth> 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 57,306	98	Road/Drives
* 3,878	98	Sidewalk
* 7,152	98	Com Bldg/Courts
95,378	39	>75% Grass cover, Good, HSG A
163,714	64	Weighted Average
95,378		58.26% Pervious Area
68,336		41.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.1	295	0.0100	1.6		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.7	75	0.0080	1.8		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.2	325	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
15.8	745	Total			

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Summary for Subcatchment P12: PostDev

Runoff = 0.00 cfs @ 23.21 hrs, Volume= 0.00 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
78,008	30	Woods, Good, HSG A
12,103	39	>75% Grass cover, Good, HSG A
90,111	31	Weighted Average
90,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
2.9	340	0.0150	2.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.4	390	Total			

Summary for Subcatchment P13: Post Dev

Runoff = 0.00 cfs @ 21.77 hrs, Volume= 0.00 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
37,535	30	Woods, Good, HSG A
13,400	39	>75% Grass cover, Good, HSG A
50,935	32	Weighted Average
50,935		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.2	300	0.0200	2.3		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.0	350	Total			

Summary for Subcatchment P14: PostDev

Runoff = 0.01 cfs @ 21.80 hrs, Volume= 0.00 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
92,481	30	Woods, Good, HSG A
28,390	39	>75% Grass cover, Good, HSG A
120,871	32	Weighted Average
120,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.8	160	0.0200	0.7		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
12.0	210	Total			

Summary for Subcatchment P15: PostDev

Runoff = 0.01 cfs @ 17.30 hrs, Volume= 0.00 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

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Area (sf)	CN	Description
40,243	30	Woods, Good, HSG A
19,828	39	>75% Grass cover, Good, HSG A
60,071	33	Weighted Average
60,071		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	50	0.2000	2.2		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.7	100	Total			

Summary for Subcatchment P16: PostDev

Runoff = 0.01 cfs @ 21.79 hrs, Volume= 0.00 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
68,337	30	Woods, Good, HSG A
18,863	39	>75% Grass cover, Good, HSG A
87,200	32	Weighted Average
87,200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.6	130	0.0750	1.4		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.8	180	Total			

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Summary for Subcatchment P17: PostDev

Runoff = 1.08 cfs @ 12.15 hrs, Volume= 0.10 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 15,400	98	Pavement
35,913	39	>75% Grass cover, Good, HSG A
51,313	57	Weighted Average
35,913		69.99% Pervious Area
15,400		30.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	40	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	520	0.0400	4.1		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
9.0	560	Total			

Summary for Subcatchment P2: PostDev

Runoff = 0.00 cfs @ 23.11 hrs, Volume= 0.00 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
56,759	30	Woods, Good, HSG A
8,171	39	>75% Grass cover, Good, HSG A
64,930	31	Weighted Average
64,930		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.7	50	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.9	100	Total			

Summary for Subcatchment P3: PostDev

Runoff = 0.01 cfs @ 21.82 hrs, Volume= 0.00 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
85,553	30	Woods, Good, HSG A
18,643	39	>75% Grass cover, Good, HSG A
104,196	32	Weighted Average
104,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	210	0.0450	1.1		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	260	Total			

Summary for Subcatchment P4: PostDev

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.00 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"**16590-No Wetlands PostDev 062524**

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Type III 24-hr 10-year Rainfall=4.89"

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Area (sf)	CN	Description
40,884	30	Woods, Good, HSG A
40,884		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	105	0.1000	5.1		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
6.8	155	Total			

Summary for Subcatchment P5: PostDev

Runoff = 0.00 cfs @ 15.73 hrs, Volume= 0.00 af, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
13,479	30	Woods, Good, HSG A
9,660	39	>75% Grass cover, Good, HSG A
23,139	34	Weighted Average
23,139		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
0.8	75	0.1000	1.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.0	125	Total			

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Summary for Subcatchment P6: PostDev

Runoff = 0.01 cfs @ 13.66 hrs, Volume= 0.01 af, Depth> 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
24,176	39	>75% Grass cover, Good, HSG A
24,176		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0150	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.3	160	0.0800	2.0		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
10.5	210	Total			

Summary for Subcatchment P7: PostDev

Runoff = 4.43 cfs @ 12.26 hrs, Volume= 0.50 af, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 74,491	98	Roadway/Drives
* 3,290	98	Sidewalk
161,491	39	>75% Grass cover, Good, HSG A
239,272	58	Weighted Average
161,491		67.49% Pervious Area
77,781		32.51% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	90	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
2.8	750	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
16.2	945	Total			

Summary for Subcatchment P8: PostDev

Runoff = 5.91 cfs @ 12.30 hrs, Volume= 0.74 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 6,988	98	Sidewalk
* 108,445	98	Roadway/Drives
277,981	39	>75% Grass cover, Good, HSG A
393,414	56	Weighted Average
277,981		70.66% Pervious Area
115,433		29.34% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.7	155	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.0	825	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.9	1,080	Total			

Summary for Subcatchment P9: PostDev

Runoff = 0.01 cfs @ 15.83 hrs, Volume= 0.00 af, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
23,377	30	Woods, Good, HSG A
18,322	39	>75% Grass cover, Good, HSG A
41,699	34	Weighted Average
41,699		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
4.7	140	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
15.5	190	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 8.25 cfs @ 12.23 hrs, Volume= 0.80 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 5.92 cfs @ 12.20 hrs, Volume= 0.55 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment W3: Wet-3

Runoff = 3.11 cfs @ 12.23 hrs, Volume= 0.30 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 1.80 cfs @ 12.23 hrs, Volume= 0.17 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.89"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Reach R1: Wet-1

Inflow Area = 11.934 ac, 7.75% Impervious, Inflow Depth > 0.81" for 10-year event
Inflow = 8.25 cfs @ 12.23 hrs, Volume= 0.81 af
Outflow = 7.14 cfs @ 12.46 hrs, Volume= 0.80 af, Atten= 13.46%, Lag= 14.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 8.3 min
Avg. Velocity= 0.7 fps, Avg. Travel Time= 21.1 min

Peak Storage= 3,576 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.5'
Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 6.0 ' Top Width= 16.00'
Length= 900.0' Slope= 0.0067 '
Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.017 ac, 0.00% Impervious, Inflow Depth > 1.65" for 10-year event
Inflow = 5.92 cfs @ 12.20 hrs, Volume= 0.55 af
Outflow = 5.14 cfs @ 12.42 hrs, Volume= 0.55 af, Atten= 13.21%, Lag= 13.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.1 fps, Min. Travel Time= 7.8 min
Avg. Velocity= 0.7 fps, Avg. Travel Time= 21.7 min

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Peak Storage= 2,394 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.4'
Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 ' / Top Width= 9.60'
Length= 960.0' Slope= 0.0135 ' /
Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.157 ac, 10.36% Impervious, Inflow Depth > 0.76" for 10-year event
Inflow = 14.26 cfs @ 12.43 hrs, Volume= 1.65 af
Outflow = 13.47 cfs @ 12.61 hrs, Volume= 1.64 af, Atten= 5.50%, Lag= 11.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 6.4 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 17.4 min

Peak Storage= 5,157 cf @ 12.51 hrs
Average Depth at Peak Storage= 1.2'
Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 1.0 ' / Top Width= 9.00'
Length= 680.0' Slope= 0.0081 ' /
Inlet Invert= 227.00', Outlet Invert= 221.50'

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**Summary for Pond 1P: Wetland**

Inflow Area = 35.189 ac, 15.23% Impervious, Inflow Depth > 0.56" for 10-year event
Inflow = 13.47 cfs @ 12.61 hrs, Volume= 1.64 af
Outflow = 13.46 cfs @ 12.62 hrs, Volume= 1.64 af, Atten= 0.10%, Lag= 0.7 min
Primary = 13.46 cfs @ 12.62 hrs, Volume= 1.64 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 222.25' @ 12.62 hrs Surf.Area= 988 sf Storage= 340 cf

Plug-Flow detention time= 0.4 min calculated for 1.64 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (866.6 - 866.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
221.51	150	30.0	0	0	150
222.00	510	112.0	153	153	1,077
224.00	8,530	583.0	7,417	7,570	27,136
225.00	18,865	967.0	13,360	20,930	74,507
226.00	26,505	1,272.0	22,577	43,507	128,861

Device	Routing	Invert	Outlet Devices
#1	Primary	221.51'	96.0" W x 48.0" H Box Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' / Cc= 0.90 n= 0.013, Flow Area= 32.00 sf

Primary OutFlow Max=13.45 cfs @ 12.62 hrs HW=222.25' (Free Discharge)
1=Culvert (Barrel Controls 13.45 cfs @ 3.0 fps)

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Summary for Pond 3P: Basin#1

Inflow Area = 9.032 ac, 29.34% Impervious, Inflow Depth > 0.98" for 10-year event
Inflow = 5.91 cfs @ 12.30 hrs, Volume= 0.74 af
Outflow = 3.09 cfs @ 12.67 hrs, Volume= 0.74 af, Atten= 47.69%, Lag= 22.4 min
Discarded = 3.09 cfs @ 12.67 hrs, Volume= 0.74 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 229.19' @ 12.67 hrs Surf.Area= 7,918 sf Storage= 5,197 cf

Plug-Flow detention time= 16.1 min calculated for 0.74 af (100% of inflow)
Center-of-Mass det. time= 15.4 min (914.1 - 898.7)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	49,089 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	993	123.0	0	0	993
229.00	7,415	404.0	3,707	3,707	12,780
230.00	10,180	432.0	8,761	12,468	14,689
232.00	12,890	470.0	23,017	35,485	17,562
233.00	14,330	489.0	13,604	49,089	19,089

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 225.70'

Discarded OutFlow Max=3.09 cfs @ 12.67 hrs HW=229.19' (Free Discharge)

↳ **1=Exfiltration** (Controls 3.09 cfs)

Summary for Pond 4P: Basin#2**16590-No Wetlands PostDev 062524**

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Inflow Area = 5.493 ac, 32.51% Impervious, Inflow Depth > 1.10" for 10-year event
Inflow = 4.43 cfs @ 12.26 hrs, Volume= 0.50 af
Outflow = 2.17 cfs @ 12.64 hrs, Volume= 0.50 af, Atten= 50.89%, Lag= 22.7 min
Discarded = 2.17 cfs @ 12.64 hrs, Volume= 0.50 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 232.30' @ 12.64 hrs Surf.Area= 4,734 sf Storage= 3,911 cf

Plug-Flow detention time= 16.7 min calculated for 0.50 af (100% of inflow)
Center-of-Mass det. time= 16.0 min (906.3 - 890.3)

Volume	Invert	Avail.Storage	Storage Description
#1	231.00'	30,648 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
231.00	1,200	136.0	0	0	1,200
232.00	4,205	323.0	2,550	2,550	8,034
233.00	6,060	356.0	5,104	7,655	9,849
234.00	7,120	371.0	6,583	14,238	10,790
236.00	9,340	402.0	16,410	30,648	12,848

Device	Routing	Invert	Outlet Devices
#1	Discarded	231.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 229.00'
#2	Primary	235.10'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=2.17 cfs @ 12.64 hrs HW=232.30' (Free Discharge)

↳ **1=Exfiltration** (Controls 2.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=231.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 5P: Basin#4

Inflow Area = 1.178 ac, 30.01% Impervious, Inflow Depth > 1.04" for 10-year event
Inflow = 1.08 cfs @ 12.15 hrs, Volume= 0.10 af
Outflow = 0.54 cfs @ 12.46 hrs, Volume= 0.10 af, Atten= 49.93%, Lag= 18.9 min
Discarded = 0.54 cfs @ 12.46 hrs, Volume= 0.10 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 240.92' @ 12.46 hrs Surf.Area= 1,394 sf Storage= 699 cf

Plug-Flow detention time= 12.8 min calculated for 0.10 af (100% of inflow)
Center-of-Mass det. time= 12.1 min (900.5 - 888.5)

Volume	Invert	Avail.Storage	Storage Description							
#1	240.00'	12,227 cf	Custom Stage Data (Irregular) Listed below (Recalc)							
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)					
240.00	276	65.0	0	0	276					
241.00	1,540	194.0	823	823	2,938					
242.00	2,155	213.0	1,839	2,662	3,586					
244.00	3,540	250.0	5,638	8,300	5,026					
245.00	4,329	270.0	3,928	12,227	5,893					
Device	Routing	Invert	Outlet Devices							
#1	Discarded	240.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 235.00'							
#2	Primary	244.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir							
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60							
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64							

Discarded OutFlow Max=0.54 cfs @ 12.46 hrs HW=240.92' (Free Discharge)
↳ **1=Exfiltration** (Controls 0.54 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=240.00' (Free Discharge)
↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 6P: Basin#3

Inflow Area = 3.758 ac, 41.74% Impervious, Inflow Depth > 1.50" for 10-year event
Inflow = 4.58 cfs @ 12.24 hrs, Volume= 0.47 af
Outflow = 1.37 cfs @ 12.75 hrs, Volume= 0.47 af, Atten= 70.15%, Lag= 31.0 min
Discarded = 1.37 cfs @ 12.75 hrs, Volume= 0.47 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 228.62' @ 12.75 hrs Surf.Area= 5,513 sf Storage= 5,661 cf

Plug-Flow detention time= 38.5 min calculated for 0.47 af (100% of inflow)
Center-of-Mass det. time= 37.8 min (909.5 - 871.7)

Volume	Invert	Avail.Storage	Storage Description							
#1	227.00'	32,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)							
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)					
227.00	800	120.0	0	0	800					
228.00	4,724	424.0	2,489	2,489	13,963					
230.00	7,485	475.0	12,104	14,593	17,721					
232.00	10,515	520.0	17,914	32,507	21,420					
Device	Routing	Invert	Outlet Devices							
#1	Discarded	227.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 224.00'							
#2	Primary	231.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir							
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60							
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64							

Discarded OutFlow Max=1.37 cfs @ 12.75 hrs HW=228.62' (Free Discharge)
↳ **1=Exfiltration** (Controls 1.37 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)
↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 7P: Basin#5

Inflow Area = 0.932 ac, 61.29% Impervious, Inflow Depth > 2.36" for 10-year event
 Inflow = 2.57 cfs @ 12.09 hrs, Volume= 0.18 af
 Outflow = 0.85 cfs @ 12.42 hrs, Volume= 0.18 af, Atten= 66.83%, Lag= 19.7 min
 Discarded = 0.85 cfs @ 12.42 hrs, Volume= 0.18 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 239.93' @ 12.42 hrs Surf.Area= 3,874 sf Storage= 1,918 cf

Plug-Flow detention time= 20.1 min calculated for 0.18 af (100% of inflow)
 Center-of-Mass det. time= 19.7 min (854.9 - 835.2)

Volume	Invert	Avail.Storage	Storage Description			
#1	239.00'	12,380 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
239.00	680	105.0	0	0	680	
240.00	4,210	286.0	2,194	2,194	6,315	
242.00	6,030	320.0	10,186	12,380	8,063	

Device	Routing	Invert	Outlet Devices								
#1	Discarded	239.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 236.00'								
#2	Primary	241.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir								
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
			Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Discarded OutFlow Max=0.85 cfs @ 12.42 hrs HW=239.93' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.85 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=239.00' (Free Discharge)
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 8P: Recharge#6

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth > 2.62" for 10-year event
 Inflow = 0.64 cfs @ 12.09 hrs, Volume= 0.05 af
 Outflow = 0.19 cfs @ 12.44 hrs, Volume= 0.05 af, Atten= 69.91%, Lag= 21.1 min
 Discarded = 0.19 cfs @ 12.44 hrs, Volume= 0.05 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 236.28' @ 12.44 hrs Surf.Area= 636 sf Storage= 415 cf

Plug-Flow detention time= 13.5 min calculated for 0.05 af (100% of inflow)
 Center-of-Mass det. time= 13.3 min (840.7 - 827.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.00'	720 cf	15.13'W x 42.00'L x 4.50'H Field A
			2,860 cf Overall - 1,060 cf Embedded = 1,800 cf x 40.0% Voids
#2A	235.50'	798 cf	Concrete Galley 4x4x4 x 18 Inside #1
			Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf
			Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf
			18 Chambers in 2 Rows
		1,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	235.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 231.00'
#2	Primary	239.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.19 cfs @ 12.44 hrs HW=236.28' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=235.00' (Free Discharge)
 ↳ **2=Orifice/Grate** (Controls 0.00 cfs)

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Summary for Link 1L: Design Pt #1

Inflow Area = 38.031 ac, 14.09% Impervious, Inflow Depth > 0.58" for 10-year event
Inflow = 14.18 cfs @ 12.61 hrs, Volume= 1.83 af
Primary = 14.18 cfs @ 12.61 hrs, Volume= 1.83 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt 2

Inflow Area = 5.827 ac, 26.92% Impervious, Inflow Depth > 0.00" for 10-year event
Inflow = 0.00 cfs @ 23.21 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 23.21 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: DesignPt3

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 0.02" for 10-year event
Inflow = 0.00 cfs @ 21.77 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 21.77 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Summary for Subcatchment P1: PostDev

Runoff = 3.74 cfs @ 12.09 hrs, Volume= 0.27 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description			
24,873	98	Paved roads w/curbs & sewers, HSG A			
15,708	39	>75% Grass cover, Good, HSG A			
40,581	75	Weighted Average			
15,708		38.71% Pervious Area			
24,873		61.29% Impervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment P10: PostDev

Runoff = 0.91 cfs @ 12.09 hrs, Volume= 0.06 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 5,260	98	Road
* 755	98	Sidewalk
3,045	39	>75% Grass cover, Good, HSG A
9,060	78	Weighted Average
3,045		33.61% Pervious Area
6,015		66.39% Impervious Area

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

Summary for Subcatchment P11: PostDev

Runoff = 7.53 cfs @ 12.23 hrs, Volume= 0.74 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 57,306	98	Road/Drives
* 3,878	98	Sidewalk
* 7,152	98	Com Bldg/Courts
95,378	39	>75% Grass cover, Good, HSG A
163,714	64	Weighted Average
95,378		58.26% Pervious Area
68,336		41.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.1	295	0.0100	1.6		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.7	75	0.0080	1.8		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.2	325	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
15.8	745	Total			

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Summary for Subcatchment P12: PostDev

Runoff = 0.03 cfs @ 15.08 hrs, Volume= 0.02 af, Depth> 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
78,008	30	Woods, Good, HSG A
12,103	39	>75% Grass cover, Good, HSG A
90,111	31	Weighted Average
90,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
2.9	340	0.0150	2.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.4	390	Total			

Summary for Subcatchment P13: Post Dev

Runoff = 0.02 cfs @ 14.75 hrs, Volume= 0.02 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
37,535	30	Woods, Good, HSG A
13,400	39	>75% Grass cover, Good, HSG A
50,935	32	Weighted Average
50,935		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.20"
2.2	300	0.0200	2.3		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.0	350	Total			

Summary for Subcatchment P14: PostDev

Runoff = 0.06 cfs @ 14.76 hrs, Volume= 0.04 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
92,481	30	Woods, Good, HSG A
28,390	39	>75% Grass cover, Good, HSG A
120,871	32	Weighted Average
120,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.20"
3.8	160	0.0200	0.7		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
12.0	210	Total			

Summary for Subcatchment P15: PostDev

Runoff = 0.04 cfs @ 13.76 hrs, Volume= 0.02 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-year Rainfall=6.16"

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Area (sf)	CN	Description
40,243	30	Woods, Good, HSG A
19,828	39	>75% Grass cover, Good, HSG A
60,071	33	Weighted Average
60,071		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	50	0.2000	2.2		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
9.7	100	Total			

Summary for Subcatchment P16: PostDev

Runoff = 0.04 cfs @ 14.71 hrs, Volume= 0.03 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
68,337	30	Woods, Good, HSG A
18,863	39	>75% Grass cover, Good, HSG A
87,200	32	Weighted Average
87,200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.20"
1.6	130	0.0750	1.4		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
9.8	180	Total			

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment P17: PostDev

Runoff = 2.03 cfs @ 12.14 hrs, Volume= 0.17 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 15,400	98	Pavement
35,913	39	>75% Grass cover, Good, HSG A
51,313	57	Weighted Average
35,913		69.99% Pervious Area
15,400		30.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	40	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	520	0.0400	4.1		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
9.0	560	Total			

Summary for Subcatchment P2: PostDev

Runoff = 0.02 cfs @ 14.99 hrs, Volume= 0.01 af, Depth> 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
56,759	30	Woods, Good, HSG A
8,171	39	>75% Grass cover, Good, HSG A
64,930	31	Weighted Average
64,930		100.00% Pervious Area

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Type III 24-hr 25-year Rainfall=6.16"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.7	50	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.9	100	Total			

Summary for Subcatchment P3: PostDev

Runoff = 0.05 cfs @ 14.81 hrs, Volume= 0.03 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
85,553	30	Woods, Good, HSG A
18,643	39	>75% Grass cover, Good, HSG A
104,196	32	Weighted Average
104,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	210	0.0450	1.1		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	260	Total			

Summary for Subcatchment P4: PostDev

Runoff = 0.01 cfs @ 15.30 hrs, Volume= 0.01 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

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Type III 24-hr 25-year Rainfall=6.16"

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Area (sf)	CN	Description
40,884	30	Woods, Good, HSG A
40,884		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	105	0.1000	5.1		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
6.8	155	Total			

Summary for Subcatchment P5: PostDev

Runoff = 0.02 cfs @ 12.53 hrs, Volume= 0.01 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
13,479	30	Woods, Good, HSG A
9,660	39	>75% Grass cover, Good, HSG A
23,139	34	Weighted Average
23,139		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
0.8	75	0.1000	1.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.0	125	Total			

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment P6: PostDev

Runoff = 0.11 cfs @ 12.40 hrs, Volume= 0.02 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
24,176	39	>75% Grass cover, Good, HSG A
24,176		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0150	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.3	160	0.0800	2.0		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
10.5	210	Total			

Summary for Subcatchment P7: PostDev

Runoff = 8.11 cfs @ 12.24 hrs, Volume= 0.85 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
74,491	98	Roadway/Drives
3,290	98	Sidewalk
161,491	39	>75% Grass cover, Good, HSG A
239,272	58	Weighted Average
161,491		67.49% Pervious Area
77,781		32.51% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	90	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
2.8	750	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
16.2	945	Total			

Summary for Subcatchment P8: PostDev

Runoff = 11.41 cfs @ 12.27 hrs, Volume= 1.27 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 6,988	98	Sidewalk
* 108,445	98	Roadway/Drives
277,981	39	>75% Grass cover, Good, HSG A
393,414	56	Weighted Average
277,981		70.66% Pervious Area
115,433		29.34% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.7	155	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.0	825	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.9	1,080	Total			

Summary for Subcatchment P9: PostDev

Runoff = 0.03 cfs @ 12.93 hrs, Volume= 0.02 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
23,377	30	Woods, Good, HSG A
18,322	39	>75% Grass cover, Good, HSG A
41,699	34	Weighted Average
41,699		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
4.7	140	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
15.5	190	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 11.73 cfs @ 12.22 hrs, Volume= 1.13 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 8.41 cfs @ 12.20 hrs, Volume= 0.78 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment W3: Wet-3

Runoff = 4.42 cfs @ 12.22 hrs, Volume= 0.43 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 2.55 cfs @ 12.22 hrs, Volume= 0.25 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Reach R1: Wet-1

Inflow Area = 11.934 ac, 7.75% Impervious, Inflow Depth > 1.23" for 25-year event
Inflow = 11.73 cfs @ 12.22 hrs, Volume= 1.22 af
Outflow = 10.34 cfs @ 12.44 hrs, Volume= 1.21 af, Atten= 11.86%, Lag= 12.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.0 fps, Min. Travel Time= 7.5 min

Avg. Velocity = 0.8 fps, Avg. Travel Time= 18.8 min

Peak Storage= 4,681 cf @ 12.31 hrs

Average Depth at Peak Storage= 0.7'

Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds

Side Slope Z-value= 6.0 ' Top Width= 16.00'

Length= 900.0' Slope= 0.0067 ' /'

Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.017 ac, 0.00% Impervious, Inflow Depth > 2.38" for 25-year event
Inflow = 8.41 cfs @ 12.20 hrs, Volume= 0.80 af
Outflow = 7.44 cfs @ 12.40 hrs, Volume= 0.79 af, Atten= 11.58%, Lag= 11.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.3 fps, Min. Travel Time= 7.0 min

Avg. Velocity = 0.8 fps, Avg. Travel Time= 19.5 min

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Peak Storage= 3,110 cf @ 12.28 hrs

Average Depth at Peak Storage= 0.5'

Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals

Side Slope Z-value= 4.0 ' Top Width= 9.60'

Length= 960.0' Slope= 0.0135 ' /'

Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.157 ac, 10.36% Impervious, Inflow Depth > 1.13" for 25-year event
Inflow = 20.70 cfs @ 12.40 hrs, Volume= 2.46 af
Outflow = 19.69 cfs @ 12.57 hrs, Volume= 2.45 af, Atten= 4.86%, Lag= 9.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Max. Velocity= 2.0 fps, Min. Travel Time= 5.7 min

Avg. Velocity = 0.7 fps, Avg. Travel Time= 15.4 min

Peak Storage= 6,729 cf @ 12.47 hrs

Average Depth at Peak Storage= 1.5'

Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools

Side Slope Z-value= 1.0 ' Top Width= 9.00'

Length= 680.0' Slope= 0.0081 ' /'

Inlet Invert= 227.00', Outlet Invert= 221.50'



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Type III 24-hr 25-year Rainfall=6.16"

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**Summary for Pond 1P: Wetland**

Inflow Area = 35.189 ac, 15.23% Impervious, Inflow Depth > 0.83" for 25-year event
 Inflow = 19.69 cfs @ 12.57 hrs, Volume= 2.45 af
 Outflow = 19.65 cfs @ 12.58 hrs, Volume= 2.45 af, Atten= 0.22%, Lag= 0.9 min
 Primary = 19.65 cfs @ 12.58 hrs, Volume= 2.45 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 222.48' @ 12.58 hrs Surf.Area= 1,547 sf Storage= 624 cf

Plug-Flow detention time= 0.4 min calculated for 2.44 af (100% of inflow)
 Center-of-Mass det. time= 0.3 min (863.0 - 862.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
221.51	150	30.0	0	0	150
222.00	510	112.0	153	153	1,077
224.00	8,530	583.0	7,417	7,570	27,136
225.00	18,865	967.0	13,360	20,930	74,507
226.00	26,505	1,272.0	22,577	43,507	128,861

Device	Routing	Invert	Outlet Devices		
#1	Primary	221.51'	96.0" W x 48.0" H Box Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' /' Cc= 0.90 n= 0.013, Flow Area= 32.00 sf		

Primary OutFlow Max=19.64 cfs @ 12.58 hrs HW=222.48' (Free Discharge)
 1=Culvert (Barrel Controls 19.64 cfs @ 3.4 fps)

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Summary for Pond 3P: Basin#1

Inflow Area = 9.032 ac, 29.34% Impervious, Inflow Depth > 1.68" for 25-year event
 Inflow = 11.41 cfs @ 12.27 hrs, Volume= 1.27 af
 Outflow = 4.20 cfs @ 12.75 hrs, Volume= 1.26 af, Atten= 63.19%, Lag= 28.7 min
 Discarded = 4.20 cfs @ 12.75 hrs, Volume= 1.26 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 230.06' @ 12.75 hrs Surf.Area= 10,253 sf Storage= 13,054 cf

Plug-Flow detention time= 28.2 min calculated for 1.26 af (100% of inflow)
 Center-of-Mass det. time= 27.1 min (907.3 - 880.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	228.00'	49,089 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	993	123.0	0	0	993
229.00	7,415	404.0	3,707	3,707	12,780
230.00	10,180	432.0	8,761	12,468	14,689
232.00	12,890	470.0	23,017	35,485	17,562
233.00	14,330	489.0	13,604	49,089	19,089

Device	Routing	Invert	Outlet Devices		
#1	Discarded	228.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 225.70'		

Discarded OutFlow Max=4.20 cfs @ 12.75 hrs HW=230.06' (Free Discharge)
 1=Exfiltration (Controls 4.20 cfs)

Summary for Pond 4P: Basin#2

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Type III 24-hr 25-year Rainfall=6.16"

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Inflow Area = 5.493 ac, 32.51% Impervious, Inflow Depth > 1.85" for 25-year event
Inflow = 8.11 cfs @ 12.24 hrs, Volume= 0.85 af
Outflow = 3.07 cfs @ 12.68 hrs, Volume= 0.85 af, Atten= 62.21%, Lag= 26.5 min
Discarded = 3.07 cfs @ 12.68 hrs, Volume= 0.85 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 233.18' @ 12.68 hrs Surf.Area= 6,249 sf Storage= 8,788 cf

Plug-Flow detention time= 26.3 min calculated for 0.85 af (100% of inflow)
Center-of-Mass det. time= 25.7 min (899.1 - 873.4)

Volume	Invert	Avail.Storage	Storage Description								
#1	231.00'	30,648 cf	Custom Stage Data (Irregular) Listed below (Recalc)								
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)						
231.00	1,200	136.0	0	0	1,200						
232.00	4,205	323.0	2,550	2,550	8,034						
233.00	6,060	356.0	5,104	7,655	9,849						
234.00	7,120	371.0	6,583	14,238	10,790						
236.00	9,340	402.0	16,410	30,648	12,848						
Device	Routing	Invert	Outlet Devices								
#1	Discarded	231.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 229.00'								
#2	Primary	235.10'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir								
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
			Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Discarded OutFlow Max=3.07 cfs @ 12.68 hrs HW=233.18' (Free Discharge)

↳ **1=Exfiltration** (Controls 3.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=231.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Pond 5P: Basin#4

Inflow Area = 1.178 ac, 30.01% Impervious, Inflow Depth > 1.77" for 25-year event
Inflow = 2.03 cfs @ 12.14 hrs, Volume= 0.17 af
Outflow = 0.72 cfs @ 12.53 hrs, Volume= 0.17 af, Atten= 64.46%, Lag= 23.4 min
Discarded = 0.72 cfs @ 12.53 hrs, Volume= 0.17 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 241.49' @ 12.53 hrs Surf.Area= 1,826 sf Storage= 1,640 cf

Plug-Flow detention time= 19.6 min calculated for 0.17 af (100% of inflow)
Center-of-Mass det. time= 19.0 min (889.6 - 870.6)

Volume	Invert	Avail.Storage	Storage Description								
#1	240.00'	12,227 cf	Custom Stage Data (Irregular) Listed below (Recalc)								
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)						
240.00	276	65.0	0	0	276						
241.00	1,540	194.0	823	823	2,938						
242.00	2,155	213.0	1,839	2,662	3,586						
244.00	3,540	250.0	5,638	8,300	5,026						
245.00	4,329	270.0	3,928	12,227	5,893						
Device	Routing	Invert	Outlet Devices								
#1	Discarded	240.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 235.00'								
#2	Primary	244.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir								
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
			Coef. (English)	2.49	2.56	2.70	2.69	2.68	2.69	2.67	2.64

Discarded OutFlow Max=0.72 cfs @ 12.53 hrs HW=241.49' (Free Discharge)

↳ **1=Exfiltration** (Controls 0.72 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=240.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 6P: Basin#3

Inflow Area = 3.758 ac, 41.74% Impervious, Inflow Depth > 2.37" for 25-year event
Inflow = 7.53 cfs @ 12.23 hrs, Volume= 0.74 af
Outflow = 1.83 cfs @ 12.81 hrs, Volume= 0.74 af, Atten= 75.65%, Lag= 34.8 min
Discarded = 1.83 cfs @ 12.81 hrs, Volume= 0.74 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 229.42' @ 12.81 hrs Surf.Area= 6,622 sf Storage= 10,517 cf

Plug-Flow detention time= 58.0 min calculated for 0.74 af (100% of inflow)
Center-of-Mass det. time= 57.4 min (915.3 - 857.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	227.00'	32,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	800	120.0	0	0	800
228.00	4,724	424.0	2,489	2,489	13,963
230.00	7,485	475.0	12,104	14,593	17,721
232.00	10,515	520.0	17,914	32,507	21,420

Device	Routing	Invert	Outlet Devices									
#1	Discarded	227.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 224.00'									
#2	Primary	231.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60									
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64									

Discarded OutFlow Max=1.83 cfs @ 12.81 hrs HW=229.42' (Free Discharge)

↳ **1=Exfiltration** (Controls 1.83 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 7P: Basin#5

Inflow Area = 0.932 ac, 61.29% Impervious, Inflow Depth > 3.41" for 25-year event
Inflow = 3.74 cfs @ 12.09 hrs, Volume= 0.27 af
Outflow = 1.02 cfs @ 12.47 hrs, Volume= 0.26 af, Atten= 72.69%, Lag= 22.6 min
Discarded = 1.02 cfs @ 12.47 hrs, Volume= 0.26 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 240.22' @ 12.47 hrs Surf.Area= 4,397 sf Storage= 3,153 cf

Plug-Flow detention time= 26.3 min calculated for 0.26 af (100% of inflow)
Center-of-Mass det. time= 26.0 min (850.5 - 824.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	239.00'	12,380 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	680	105.0	0	0	680
240.00	4,210	286.0	2,194	2,194	6,315
242.00	6,030	320.0	10,186	12,380	8,063

Device	Routing	Invert	Outlet Devices									
#1	Discarded	239.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 236.00'									
#2	Primary	241.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60									
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64									

Discarded OutFlow Max=1.02 cfs @ 12.47 hrs HW=240.22' (Free Discharge)

↳ **1=Exfiltration** (Controls 1.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=239.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 8P: Recharge#6

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth > 3.72" for 25-year event
Inflow = 0.91 cfs @ 12.09 hrs, Volume= 0.06 af
Outflow = 0.24 cfs @ 12.47 hrs, Volume= 0.06 af, Atten= 73.73%, Lag= 22.9 min
Discarded = 0.24 cfs @ 12.47 hrs, Volume= 0.06 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 237.04' @ 12.47 hrs Surf.Area= 636 sf Storage= 700 cf

Plug-Flow detention time= 20.6 min calculated for 0.06 af (100% of inflow)
Center-of-Mass det. time= 20.4 min (837.7 - 817.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.00'	720 cf	15.13'W x 42.00'L x 4.50'H Field A 2,860 cf Overall - 1,060 cf Embedded = 1,800 cf x 40.0% Voids
#2A	235.50'	798 cf	Concrete Galley 4x4x4 x 18 Inside #1 Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf 18 Chambers in 2 Rows
		1,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	235.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 231.00'
#2	Primary	239.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.24 cfs @ 12.47 hrs HW=237.04' (Free Discharge)

↳ **1=Exfiltration** (Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=235.00' (Free Discharge)

↳ **2=Orifice/Grate** (Controls 0.00 cfs)

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Summary for Link 1L: Design Pt #1

Inflow Area = 38.031 ac, 14.09% Impervious, Inflow Depth > 0.87" for 25-year event
Inflow = 20.89 cfs @ 12.57 hrs, Volume= 2.74 af
Primary = 20.89 cfs @ 12.57 hrs, Volume= 2.74 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt 2

Inflow Area = 5.827 ac, 26.92% Impervious, Inflow Depth > 0.04" for 25-year event
Inflow = 0.03 cfs @ 15.08 hrs, Volume= 0.02 af
Primary = 0.03 cfs @ 15.08 hrs, Volume= 0.02 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: DesignPt3

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 0.16" for 25-year event
Inflow = 0.02 cfs @ 14.75 hrs, Volume= 0.02 af
Primary = 0.02 cfs @ 14.75 hrs, Volume= 0.02 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth = 0.00" for 25-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Summary for Subcatchment P1: PostDev

Runoff = 6.22 cfs @ 12.09 hrs, Volume= 0.44 af, Depth> 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
24,873	98	Paved roads w/curbs & sewers, HSG A
15,708	39	>75% Grass cover, Good, HSG A
40,581	75	Weighted Average
15,708		38.71% Pervious Area
24,873		61.29% Impervious Area

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

Summary for Subcatchment P10: PostDev

Runoff = 1.47 cfs @ 12.09 hrs, Volume= 0.11 af, Depth> 6.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 5,260	98	Road
* 755	98	Sidewalk
3,045	39	>75% Grass cover, Good, HSG A
9,060	78	Weighted Average
3,045		33.61% Pervious Area
6,015		66.39% Impervious Area

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

Summary for Subcatchment P11: PostDev

Runoff = 14.30 cfs @ 12.22 hrs, Volume= 1.37 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 57,306	98	Road/Drives
* 3,878	98	Sidewalk
* 7,152	98	Com Bldg/Courts
95,378	39	>75% Grass cover, Good, HSG A
163,714	64	Weighted Average
95,378		58.26% Pervious Area
68,336		41.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.1	295	0.0100	1.6		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.7	75	0.0080	1.8		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.2	325	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
15.8	745	Total			

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Summary for Subcatchment P12: PostDev

Runoff = 0.56 cfs @ 12.44 hrs, Volume= 0.12 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
78,008	30	Woods, Good, HSG A
12,103	39	>75% Grass cover, Good, HSG A
90,111	31	Weighted Average
90,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
2.9	340	0.0150	2.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.4	390	Total			

Summary for Subcatchment P13: Post Dev

Runoff = 0.39 cfs @ 12.41 hrs, Volume= 0.08 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
37,535	30	Woods, Good, HSG A
13,400	39	>75% Grass cover, Good, HSG A
50,935	32	Weighted Average
50,935		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.2	300	0.0200	2.3		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.0	350	Total			

Summary for Subcatchment P14: PostDev

Runoff = 0.94 cfs @ 12.39 hrs, Volume= 0.18 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
92,481	30	Woods, Good, HSG A
28,390	39	>75% Grass cover, Good, HSG A
120,871	32	Weighted Average
120,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.8	160	0.0200	0.7		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
12.0	210	Total			

Summary for Subcatchment P15: PostDev

Runoff = 0.58 cfs @ 12.32 hrs, Volume= 0.10 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

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Area (sf)	CN	Description
40,243	30	Woods, Good, HSG A
19,828	39	>75% Grass cover, Good, HSG A
60,071	33	Weighted Average
60,071		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	50	0.2000	2.2		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.7	100	Total			

Summary for Subcatchment P16: PostDev

Runoff = 0.70 cfs @ 12.36 hrs, Volume= 0.13 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
68,337	30	Woods, Good, HSG A
18,863	39	>75% Grass cover, Good, HSG A
87,200	32	Weighted Average
87,200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.6	130	0.0750	1.4		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.8	180	Total			

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Summary for Subcatchment P17: PostDev

Runoff = 4.34 cfs @ 12.13 hrs, Volume= 0.35 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 15,400	98	Pavement
35,913	39	>75% Grass cover, Good, HSG A
51,313	57	Weighted Average
35,913		69.99% Pervious Area
15,400		30.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	40	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	520	0.0400	4.1		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
9.0	560	Total			

Summary for Subcatchment P2: PostDev

Runoff = 0.42 cfs @ 12.39 hrs, Volume= 0.09 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
56,759	30	Woods, Good, HSG A
8,171	39	>75% Grass cover, Good, HSG A
64,930	31	Weighted Average
64,930		100.00% Pervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.7	50	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.9	100	Total			

Summary for Subcatchment P3: PostDev

Runoff = 0.79 cfs @ 12.44 hrs, Volume= 0.16 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
85,553	30	Woods, Good, HSG A
18,643	39	>75% Grass cover, Good, HSG A
104,196	32	Weighted Average
104,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	210	0.0450	1.1		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	260	Total			

Summary for Subcatchment P4: PostDev

Runoff = 0.22 cfs @ 12.37 hrs, Volume= 0.05 af, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-year Rainfall=8.76"

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Area (sf)	CN	Description
40,884	30	Woods, Good, HSG A
40,884		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	105	0.1000	5.1		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
6.8	155	Total			

Summary for Subcatchment P5: PostDev

Runoff = 0.27 cfs @ 12.21 hrs, Volume= 0.04 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
13,479	30	Woods, Good, HSG A
9,660	39	>75% Grass cover, Good, HSG A
23,139	34	Weighted Average
23,139		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
0.8	75	0.1000	1.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.0	125	Total			

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Summary for Subcatchment P6: PostDev

Runoff = 0.60 cfs @ 12.18 hrs, Volume= 0.07 af, Depth> 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description			
24,176	39	>75% Grass cover, Good, HSG A			
24,176		100.00% Pervious Area			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0150	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.3	160	0.0800	2.0		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
10.5	210	Total			

Summary for Subcatchment P7: PostDev

Runoff = 17.04 cfs @ 12.23 hrs, Volume= 1.68 af, Depth> 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 74,491	98	Roadway/Drives
* 3,290	98	Sidewalk
161,491	39	>75% Grass cover, Good, HSG A
239,272	58	Weighted Average
161,491		67.49% Pervious Area
77,781		32.51% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	90	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
2.8	750	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
16.2	945	Total			

Summary for Subcatchment P8: PostDev

Runoff = 24.92 cfs @ 12.26 hrs, Volume= 2.57 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 6,988	98	Sidewalk
* 108,445	98	Roadway/Drives
277,981	39	>75% Grass cover, Good, HSG A
393,414	56	Weighted Average
277,981		70.66% Pervious Area
115,433		29.34% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.7	155	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.0	825	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.9	1,080	Total			

Summary for Subcatchment P9: PostDev

Runoff = 0.45 cfs @ 12.39 hrs, Volume= 0.08 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
23,377	30	Woods, Good, HSG A
18,322	39	>75% Grass cover, Good, HSG A
41,699	34	Weighted Average
41,699		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
4.7	140	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
15.5	190	Total			

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Summary for Subcatchment W1: Wet-1

Runoff = 19.02 cfs @ 12.22 hrs, Volume= 1.86 af, Depth> 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 13.64 cfs @ 12.20 hrs, Volume= 1.28 af, Depth> 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Subcatchment W3: Wet-3

Runoff = 7.17 cfs @ 12.22 hrs, Volume= 0.70 af, Depth> 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 4.14 cfs @ 12.22 hrs, Volume= 0.40 af, Depth> 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

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Summary for Reach R1: Wet-1

Inflow Area = 11.934 ac, 7.75% Impervious, Inflow Depth > 2.29" for 100-year event
Inflow = 20.87 cfs @ 12.23 hrs, Volume= 2.27 af
Outflow = 18.86 cfs @ 12.41 hrs, Volume= 2.26 af, Atten= 9.65%, Lag= 11.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 6.4 min
Avg. Velocity= 0.9 fps, Avg. Travel Time= 16.0 min

Peak Storage= 7,275 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.9'
Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 6.0 ' Top Width= 16.00'
Length= 900.0' Slope= 0.0067 '
Inlet Invert= 236.00', Outlet Invert= 230.00'

**Summary for Reach R2: Wet-2**

Inflow Area = 4.017 ac, 0.00% Impervious, Inflow Depth > 4.08" for 100-year event
Inflow = 13.91 cfs @ 12.20 hrs, Volume= 1.37 af
Outflow = 12.59 cfs @ 12.37 hrs, Volume= 1.36 af, Atten= 9.49%, Lag= 10.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 6.0 min
Avg. Velocity= 1.0 fps, Avg. Travel Time= 16.8 min

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Peak Storage= 4,531 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.7'
Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 ' / Top Width= 9.60'
Length= 960.0' Slope= 0.0135 '/
Inlet Invert= 240.00', Outlet Invert= 227.00'

**Summary for Reach R3: Stream**

Inflow Area = 26.157 ac, 10.36% Impervious, Inflow Depth > 2.07" for 100-year event
Inflow = 37.31 cfs @ 12.38 hrs, Volume= 4.52 af
Outflow = 35.81 cfs @ 12.52 hrs, Volume= 4.49 af, Atten= 4.02%, Lag= 8.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.4 fps, Min. Travel Time= 4.8 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 13.0 min

Peak Storage= 10,321 cf @ 12.44 hrs
Average Depth at Peak Storage= 2.1'
Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 1.0 ' / Top Width= 9.00'
Length= 680.0' Slope= 0.0081 '/
Inlet Invert= 227.00', Outlet Invert= 221.50'

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**Summary for Pond 1P: Wetland**

Inflow Area = 35.189 ac, 15.23% Impervious, Inflow Depth > 1.53" for 100-year event
Inflow = 35.81 cfs @ 12.52 hrs, Volume= 4.49 af
Outflow = 35.57 cfs @ 12.55 hrs, Volume= 4.49 af, Atten= 0.66%, Lag= 1.6 min
Primary = 35.57 cfs @ 12.55 hrs, Volume= 4.49 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 222.98' @ 12.55 hrs Surf.Area= 3,218 sf Storage= 1,787 cf

Plug-Flow detention time= 0.5 min calculated for 4.49 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (854.1 - 853.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
221.51	150	30.0	0	0	150
222.00	510	112.0	153	153	1,077
224.00	8,530	583.0	7,417	7,570	27,136
225.00	18,865	967.0	13,360	20,930	74,507
226.00	26,505	1,272.0	22,577	43,507	128,861

Device	Routing	Invert	Outlet Devices
#1	Primary	221.51'	96.0" W x 48.0" H Box Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' / Cc= 0.90 n= 0.013, Flow Area= 32.00 sf

Primary OutFlow Max=35.57 cfs @ 12.55 hrs HW=222.98' (Free Discharge)
1=Culvert (Barrel Controls 35.57 cfs @ 4.0 fps)

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Summary for Pond 3P: Basin#1

Inflow Area = 9.032 ac, 29.34% Impervious, Inflow Depth > 3.42" for 100-year event
Inflow = 24.92 cfs @ 12.26 hrs, Volume= 2.57 af
Outflow = 6.69 cfs @ 12.83 hrs, Volume= 2.57 af, Atten= 73.14%, Lag= 34.0 min
Discarded = 6.69 cfs @ 12.83 hrs, Volume= 2.57 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 231.99' @ 12.83 hrs Surf.Area= 12,877 sf Storage= 35,373 cf

Plug-Flow detention time= 53.6 min calculated for 2.56 af (100% of inflow)
Center-of-Mass det. time= 51.8 min (910.4 - 858.6)

Volume	Invert	Avail.Storage	Storage Description
#1	228.00'	49,089 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	993	123.0	0	0	993
229.00	7,415	404.0	3,707	3,707	12,780
230.00	10,180	432.0	8,761	12,468	14,689
232.00	12,890	470.0	23,017	35,485	17,562
233.00	14,330	489.0	13,604	49,089	19,089

Device	Routing	Invert	Outlet Devices
#1	Discarded	228.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 225.70'

Discarded OutFlow Max=6.69 cfs @ 12.83 hrs HW=231.99' (Free Discharge)

↳ **1=Exfiltration** (Controls 6.69 cfs)

Summary for Pond 4P: Basin#2**16590-No Wetlands PostDev 062524**

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Inflow Area = 5.493 ac, 32.51% Impervious, Inflow Depth > 3.66" for 100-year event
Inflow = 17.04 cfs @ 12.23 hrs, Volume= 1.68 af
Outflow = 4.86 cfs @ 12.74 hrs, Volume= 1.67 af, Atten= 71.48%, Lag= 30.7 min
Discarded = 4.86 cfs @ 12.74 hrs, Volume= 1.67 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 235.06' @ 12.74 hrs Surf.Area= 8,262 sf Storage= 22,405 cf

Plug-Flow detention time= 46.3 min calculated for 1.67 af (100% of inflow)
Center-of-Mass det. time= 45.1 min (898.0 - 852.9)

Volume	Invert	Avail.Storage	Storage Description
#1	231.00'	30,648 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
231.00	1,200	136.0	0	0	1,200
232.00	4,205	323.0	2,550	2,550	8,034
233.00	6,060	356.0	5,104	7,655	9,849
234.00	7,120	371.0	6,583	14,238	10,790
236.00	9,340	402.0	16,410	30,648	12,848

Device	Routing	Invert	Outlet Devices
#1	Discarded	231.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 229.00'
#2	Primary	235.10'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=4.86 cfs @ 12.74 hrs HW=235.06' (Free Discharge)

↳ **1=Exfiltration** (Controls 4.86 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=231.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond 5P: Basin#4

Inflow Area = 1.178 ac, 30.01% Impervious, Inflow Depth > 3.55" for 100-year event
Inflow = 4.34 cfs @ 12.13 hrs, Volume= 0.35 af
Outflow = 1.04 cfs @ 12.59 hrs, Volume= 0.35 af, Atten= 75.94%, Lag= 27.6 min
Discarded = 1.04 cfs @ 12.59 hrs, Volume= 0.35 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 242.77' @ 12.59 hrs Surf.Area= 2,650 sf Storage= 4,514 cf

Plug-Flow detention time= 39.2 min calculated for 0.35 af (100% of inflow)
Center-of-Mass det. time= 38.5 min (888.0 - 849.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	240.00'	12,227 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	276	65.0	0	0	276
241.00	1,540	194.0	823	823	2,938
242.00	2,155	213.0	1,839	2,662	3,586
244.00	3,540	250.0	5,638	8,300	5,026
245.00	4,329	270.0	3,928	12,227	5,893

Device	Routing	Invert	Outlet Devices
#1	Discarded	240.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 235.00' 10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	244.00'	

Discarded OutFlow Max=1.04 cfs @ 12.59 hrs HW=242.77' (Free Discharge)
1=Exfiltration (Controls 1.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=240.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond 6P: Basin#3

Inflow Area = 3.758 ac, 41.74% Impervious, Inflow Depth > 4.38" for 100-year event
Inflow = 14.30 cfs @ 12.22 hrs, Volume= 1.37 af
Outflow = 2.85 cfs @ 12.87 hrs, Volume= 1.37 af, Atten= 80.08%, Lag= 38.9 min
Discarded = 2.85 cfs @ 12.87 hrs, Volume= 1.37 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 230.97' @ 12.87 hrs Surf.Area= 8,893 sf Storage= 22,542 cf

Plug-Flow detention time= 88.7 min calculated for 1.37 af (100% of inflow)
Center-of-Mass det. time= 86.8 min (926.9 - 840.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	227.00'	32,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	800	120.0	0	0	800
228.00	4,724	424.0	2,489	2,489	13,963
230.00	7,485	475.0	12,104	14,593	17,721
232.00	10,515	520.0	17,914	32,507	21,420

Device	Routing	Invert	Outlet Devices
#1	Discarded	227.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 224.00' 10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Primary	231.00'	

Discarded OutFlow Max=2.85 cfs @ 12.87 hrs HW=230.97' (Free Discharge)
1=Exfiltration (Controls 2.85 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=227.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond 7P: Basin#5

Inflow Area = 0.932 ac, 61.29% Impervious, Inflow Depth > 5.73" for 100-year event
Inflow = 6.22 cfs @ 12.09 hrs, Volume= 0.44 af
Outflow = 1.30 cfs @ 12.52 hrs, Volume= 0.44 af, Atten= 79.15%, Lag= 25.9 min
Discarded = 1.30 cfs @ 12.52 hrs, Volume= 0.44 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 240.88' @ 12.52 hrs Surf.Area= 4,969 sf Storage= 6,221 cf

Plug-Flow detention time= 41.5 min calculated for 0.44 af (100% of inflow)
Center-of-Mass det. time= 41.2 min (851.0 - 809.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	239.00'	12,380 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	680	105.0	0	0	680
240.00	4,210	286.0	2,194	2,194	6,315
242.00	6,030	320.0	10,186	12,380	8,063

Device	Routing	Invert	Outlet Devices	
#1	Discarded	239.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 236.00'	
#2	Primary	241.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir	
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60	
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64	

Discarded OutFlow Max=1.30 cfs @ 12.52 hrs HW=240.88' (Free Discharge)
↳ **1=Exfiltration** (Controls 1.30 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=239.00' (Free Discharge)
↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Type III 24-hr 100-year Rainfall=8.76"

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Summary for Pond 8P: Recharge#6

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth > 6.09" for 100-year event
Inflow = 1.47 cfs @ 12.09 hrs, Volume= 0.11 af
Outflow = 0.35 cfs @ 12.49 hrs, Volume= 0.11 af, Atten= 76.46%, Lag= 24.0 min
Discarded = 0.35 cfs @ 12.49 hrs, Volume= 0.11 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 238.71' @ 12.49 hrs Surf.Area= 636 sf Storage= 1,320 cf

Plug-Flow detention time= 31.2 min calculated for 0.11 af (100% of inflow)
Center-of-Mass det. time= 31.0 min (834.4 - 803.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.00'	720 cf	15.13'W x 42.00'L x 4.50'H Field A 2,860 cf Overall - 1,060 cf Embedded = 1,800 cf x 40.0% Voids
#2A	235.50'	798 cf	Concrete Galley 4x4x4 x 18 Inside #1 Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf 18 Chambers in 2 Rows
		1,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	235.00'	8.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 231.00'
#2	Primary	239.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.35 cfs @ 12.49 hrs HW=238.71' (Free Discharge)
↳ **1=Exfiltration** (Controls 0.35 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=235.00' (Free Discharge)
↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link 1L: Design Pt #1

Inflow Area = 38.031 ac, 14.09% Impervious, Inflow Depth > 1.61" for 100-year event
Inflow = 38.37 cfs @ 12.54 hrs, Volume= 5.09 af
Primary = 38.37 cfs @ 12.54 hrs, Volume= 5.09 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt 2

Inflow Area = 5.827 ac, 26.92% Impervious, Inflow Depth > 0.25" for 100-year event
Inflow = 0.56 cfs @ 12.44 hrs, Volume= 0.12 af
Primary = 0.56 cfs @ 12.44 hrs, Volume= 0.12 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: DesignPt3

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 0.78" for 100-year event
Inflow = 0.39 cfs @ 12.41 hrs, Volume= 0.08 af
Primary = 0.39 cfs @ 12.41 hrs, Volume= 0.08 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

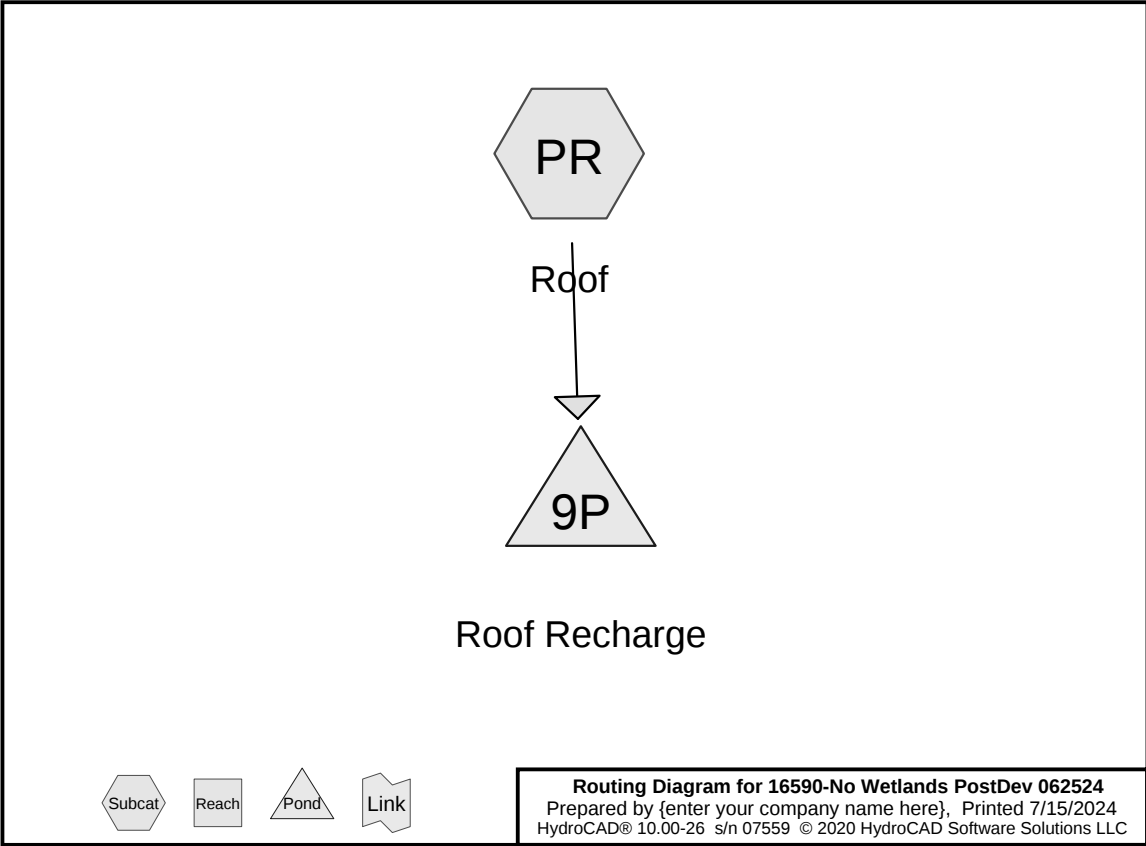
Summary for Link 4L: Design Pt#4

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth = 0.00" for 100-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX – A3

Hydrogeological Calculations for Roof Runoff



Summary for Subcatchment PR: Roof

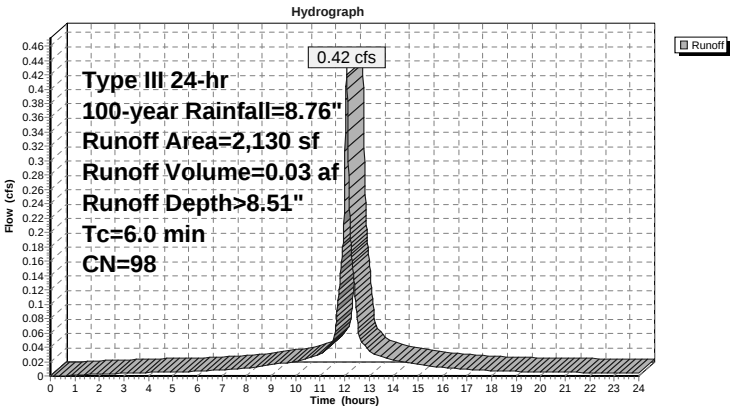
Runoff = 0.42 cfs @ 12.08 hrs, Volume= 0.03 af, Depth> 8.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.76"

Area (sf)	CN	Description
* 2,130	98	Roof Area
2,130		100.00% Impervious Area

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

Subcatchment PR: Roof



Summary for Pond 9P: Roof Recharge

Inflow Area = 0.049 ac, 100.00% Impervious, Inflow Depth > 8.51" for 100-year event
 Inflow = 0.42 cfs @ 12.08 hrs, Volume= 0.03 af
 Outflow = 0.08 cfs @ 12.51 hrs, Volume= 0.03 af, Atten= 80.09%, Lag= 25.4 min
 Discarded = 0.08 cfs @ 12.51 hrs, Volume= 0.03 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 236.70' @ 12.51 hrs Surf.Area= 261 sf Storage= 388 cf

Plug-Flow detention time= 28.3 min calculated for 0.03 af (100% of inflow)
 Center-of-Mass det. time= 28.2 min (767.8 - 739.6)

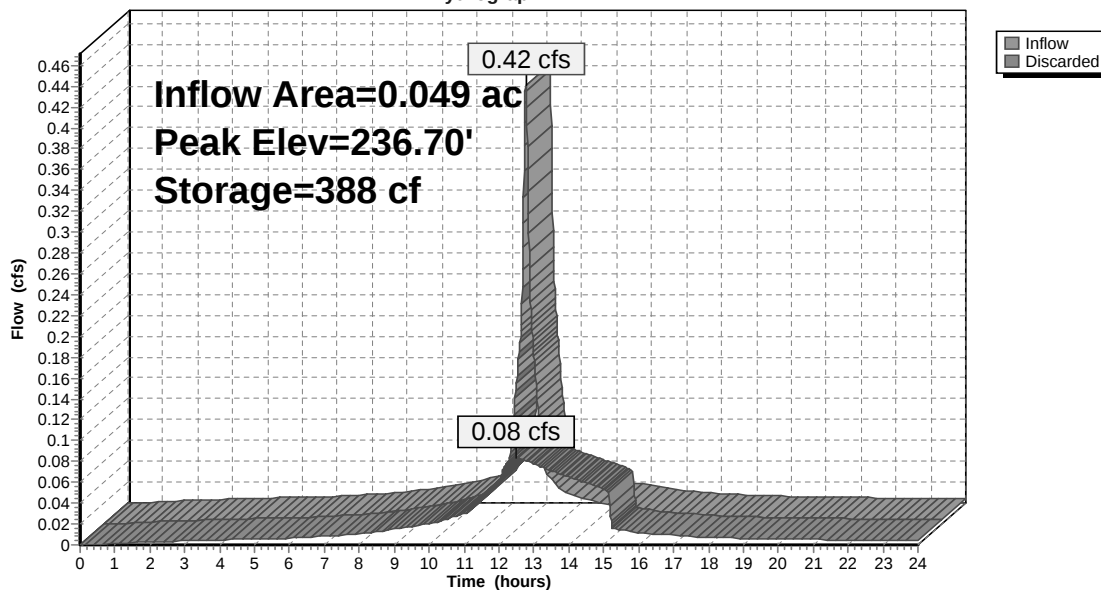
Volume	Invert	Avail.Storage	Storage Description
#1A	234.00'	247 cf	7.92'W x 33.00'L x 3.04'H Field A 795 cf Overall - 176 cf Embedded = 619 cf x 40.0% Voids
#2A	234.50'	176 cf	Cultec R-280HD x 4 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		424 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	234.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 230.00'

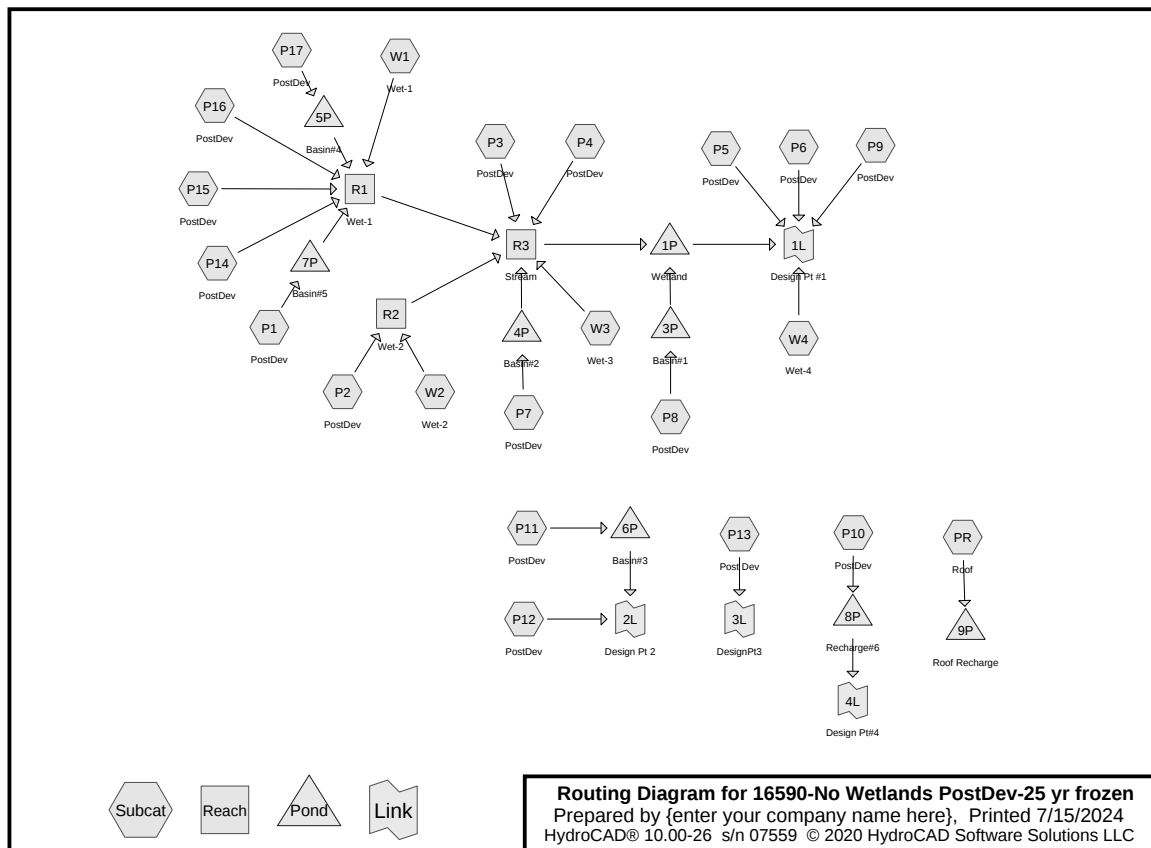
Discarded OutFlow Max=0.08 cfs @ 12.51 hrs HW=236.70' (Free Discharge)

1=Exfiltration (Controls 0.08 cfs)

Pond 9P: Roof Recharge**Hydrograph**

APPENDIX – A4

Hydrogeological Calculations for 25 year storm frozen conditions.



16590-No Wetlands PostDev-25 yr frozen

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Subcatchment P1: PostDev

Runoff = 3.74 cfs @ 12.09 hrs, Volume= 0.27 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
24,873	98	Paved roads w/curbs & sewers, HSG A
15,708	39	>75% Grass cover, Good, HSG A
40,581	75	Weighted Average
15,708		38.71% Pervious Area
24,873		61.29% Impervious Area

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

Summary for Subcatchment P10: PostDev

Runoff = 0.91 cfs @ 12.09 hrs, Volume= 0.06 af, Depth> 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 5,260	98	Road
* 755	98	Sidewalk
3,045	39	>75% Grass cover, Good, HSG A
9,060	78	Weighted Average
3,045		33.61% Pervious Area
6,015		66.39% Impervious Area

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

Summary for Subcatchment P11: PostDev

Runoff = 7.53 cfs @ 12.23 hrs, Volume= 0.74 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 57,306	98	Road/Drives
* 3,878	98	Sidewalk
* 7,152	98	Com Bldg/Courts
95,378	39	>75% Grass cover, Good, HSG A
163,714	64	Weighted Average
95,378		58.26% Pervious Area
68,336		41.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.1	295	0.0100	1.6		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
0.7	75	0.0080	1.8		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
1.2	325	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
15.8	745	Total			

Summary for Subcatchment P12: PostDev

Runoff = 0.03 cfs @ 15.08 hrs, Volume= 0.02 af, Depth> 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
78,008	30	Woods, Good, HSG A
12,103	39	>75% Grass cover, Good, HSG A
90,111	31	Weighted Average
90,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	50	0.0300	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
2.9	340	0.0150	2.0		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
13.4	390	Total			

Summary for Subcatchment P13: Post Dev

Runoff = 0.02 cfs @ 14.75 hrs, Volume= 0.02 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
37,535	30	Woods, Good, HSG A
13,400	39	>75% Grass cover, Good, HSG A
50,935	32	Weighted Average
50,935		100.00% Pervious Area

16590-No Wetlands PostDev-25 yr frozen

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Type III 24-hr 25-year Rainfall=6.16"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.20"
2.2	300	0.0200	2.3		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
13.0	350	Total			

Summary for Subcatchment P14: PostDev

Runoff = 0.06 cfs @ 14.76 hrs, Volume= 0.04 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
92,481	30	Woods, Good, HSG A
28,390	39	>75% Grass cover, Good, HSG A
120,871	32	Weighted Average
120,871		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.20"
3.8	160	0.0200	0.7		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
12.0	210	Total			

Summary for Subcatchment P15: PostDev

Runoff = 0.04 cfs @ 13.76 hrs, Volume= 0.02 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"**16590-No Wetlands PostDev-25 yr frozen**

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Type III 24-hr 25-year Rainfall=6.16"

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Area (sf)	CN	Description
40,243	30	Woods, Good, HSG A
19,828	39	>75% Grass cover, Good, HSG A
60,071	33	Weighted Average
60,071		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	50	0.0400	0.1		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.20"
0.4	50	0.2000	2.2		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
9.7	100	Total			

Summary for Subcatchment P16: PostDev

Runoff = 0.04 cfs @ 14.71 hrs, Volume= 0.03 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
68,337	30	Woods, Good, HSG A
18,863	39	>75% Grass cover, Good, HSG A
87,200	32	Weighted Average
87,200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.20"
1.6	130	0.0750	1.4		Shallow Concentrated Flow, B-C
					Woodland Kv= 5.0 fps
9.8	180	Total			

Summary for Subcatchment P17: PostDev

Runoff = 2.03 cfs @ 12.14 hrs, Volume= 0.17 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 15,400	98	Pavement
35,913	39	>75% Grass cover, Good, HSG A
51,313	57	Weighted Average
35,913		69.99% Pervious Area
15,400		30.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	40	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	520	0.0400	4.1		Shallow Concentrated Flow, B-C Paved Kv= 20.3 fps
9.0	560	Total			

Summary for Subcatchment P2: PostDev

Runoff = 0.02 cfs @ 14.99 hrs, Volume= 0.01 af, Depth> 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
56,759	30	Woods, Good, HSG A
8,171	39	>75% Grass cover, Good, HSG A
64,930	31	Weighted Average
64,930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.7	50	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.9	100	Total			

Summary for Subcatchment P3: PostDev

Runoff = 0.05 cfs @ 14.81 hrs, Volume= 0.03 af, Depth> 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
85,553	30	Woods, Good, HSG A
18,643	39	>75% Grass cover, Good, HSG A
104,196	32	Weighted Average
104,196		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	50	0.0250	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	210	0.0450	1.1		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	260	Total			

Summary for Subcatchment P4: PostDev

Runoff = 0.01 cfs @ 15.30 hrs, Volume= 0.01 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
40,884	30	Woods, Good, HSG A
40,884		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	105	0.1000	5.1		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
6.8	155	Total			

Summary for Subcatchment P5: PostDev

Runoff = 0.02 cfs @ 12.53 hrs, Volume= 0.01 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
13,479	30	Woods, Good, HSG A
9,660	39	>75% Grass cover, Good, HSG A
23,139	34	Weighted Average
23,139		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0200	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
0.8	75	0.1000	1.6		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
9.0	125	Total			

Summary for Subcatchment P6: PostDev

Runoff = 0.11 cfs @ 12.40 hrs, Volume= 0.02 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
24,176	39	>75% Grass cover, Good, HSG A
24,176		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	50	0.0150	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
1.3	160	0.0800	2.0		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
10.5	210	Total			

Summary for Subcatchment P7: PostDev

Runoff = 8.11 cfs @ 12.24 hrs, Volume= 0.85 af, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
74,491	98	Roadway/Drives
3,290	98	Sidewalk
161,491	39	>75% Grass cover, Good, HSG A
239,272	58	Weighted Average
161,491		67.49% Pervious Area
77,781		32.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
2.1	90	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.5	55	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
2.8	750	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
16.2	945	Total			

Summary for Subcatchment P8: PostDev

Runoff = 11.41 cfs @ 12.27 hrs, Volume= 1.27 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 6,988	98	Sidewalk
* 108,445	98	Roadway/Drives
277,981	39	>75% Grass cover, Good, HSG A
393,414	56	Weighted Average
277,981		70.66% Pervious Area
115,433		29.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
3.7	155	0.0100	0.7		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0100	2.0		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.0	825	0.0100	4.5	3.6	Pipe Channel, D-E 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.9	1,080	Total			

Summary for Subcatchment P9: PostDev

Runoff = 0.03 cfs @ 12.93 hrs, Volume= 0.02 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
23,377	30	Woods, Good, HSG A
18,322	39	>75% Grass cover, Good, HSG A
41,699	34	Weighted Average
41,699		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.1		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.20"
4.7	140	0.0100	0.5		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
15.5	190	Total			

Summary for Subcatchment PR: Roof

Runoff = 0.30 cfs @ 12.08 hrs, Volume= 0.02 af, Depth> 5.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 2,130	98	Roof Area
2,130		100.00% Impervious Area

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

Summary for Subcatchment W1: Wet-1

Runoff = 11.73 cfs @ 12.22 hrs, Volume= 1.13 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 159,796	78	Wetlands Wooded
159,796		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W2: Wet-2

Runoff = 8.41 cfs @ 12.20 hrs, Volume= 0.78 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 110,058	78	Wetlands Wooded
110,058		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	50	0.0130	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W3: Wet-3

Runoff = 4.42 cfs @ 12.22 hrs, Volume= 0.43 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 60,240	78	Wetlands Wooded
60,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Subcatchment W4: Wet-4

Runoff = 2.55 cfs @ 12.22 hrs, Volume= 0.25 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.16"

Area (sf)	CN	Description
* 34,779	78	Wetland Wooded
34,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.1		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.20"

Summary for Reach R1: Wet-1

Inflow Area = 11.934 ac, 7.75% Impervious, Inflow Depth > 1.33" for 25-year event
Inflow = 11.73 cfs @ 12.22 hrs, Volume= 1.33 af
Outflow = 10.34 cfs @ 12.44 hrs, Volume= 1.31 af, Atten= 11.86%, Lag= 12.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.0 fps, Min. Travel Time= 7.5 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 18.0 min

Peak Storage= 4,681 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.7'
Bank-Full Depth= 1.0' Flow Area= 10.0 sf, Capacity= 25.17 cfs

4.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 6.0 ' / ' Top Width= 16.00'
Length= 900.0' Slope= 0.0067 ' / '
Inlet Invert= 236.00', Outlet Invert= 230.00'



Summary for Reach R2: Wet-2

Inflow Area = 4.017 ac, 0.00% Impervious, Inflow Depth > 2.38" for 25-year event
Inflow = 8.41 cfs @ 12.20 hrs, Volume= 0.80 af
Outflow = 7.44 cfs @ 12.40 hrs, Volume= 0.79 af, Atten= 11.58%, Lag= 11.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 7.0 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 19.5 min

Peak Storage= 3,110 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.5'
Bank-Full Depth= 0.7' Flow Area= 4.8 sf, Capacity= 12.74 cfs

4.00' x 0.70' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 4.0 ' / ' Top Width= 9.60'
Length= 960.0' Slope= 0.0135 ' / '
Inlet Invert= 240.00', Outlet Invert= 227.00'



Summary for Reach R3: Stream

Inflow Area = 26.157 ac, 10.36% Impervious, Inflow Depth > 1.32" for 25-year event
Inflow = 20.70 cfs @ 12.40 hrs, Volume= 2.89 af
Outflow = 19.69 cfs @ 12.57 hrs, Volume= 2.86 af, Atten= 4.86%, Lag= 9.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.0 fps, Min. Travel Time= 5.7 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 14.1 min

Peak Storage= 6,729 cf @ 12.47 hrs
Average Depth at Peak Storage= 1.5'
Bank-Full Depth= 2.0' Flow Area= 14.0 sf, Capacity= 32.06 cfs

5.00' x 2.00' deep channel, n= 0.070 Sluggish weedy reaches w/pools
Side Slope Z-value= 1.0 ' Top Width= 9.00'
Length= 680.0' Slope= 0.0081 '
Inlet Invert= 227.00', Outlet Invert= 221.50'



Summary for Pond 1P: Wetland

Inflow Area = 35.189 ac, 15.23% Impervious, Inflow Depth > 1.22" for 25-year event
Inflow = 19.69 cfs @ 12.57 hrs, Volume= 3.58 af
Outflow = 19.65 cfs @ 12.58 hrs, Volume= 3.58 af, Atten= 0.22%, Lag= 0.9 min
Primary = 19.65 cfs @ 12.58 hrs, Volume= 3.58 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 222.48' @ 12.58 hrs Surf.Area= 1,547 sf Storage= 624 cf

Plug-Flow detention time= 0.4 min calculated for 3.58 af (100% of inflow)

Center-of-Mass det. time= 0.3 min (914.2 - 913.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	221.51'	43,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
221.51	150	30.0	0	0	150
222.00	510	112.0	153	153	1,077
224.00	8,530	583.0	7,417	7,570	27,136
225.00	18,865	967.0	13,360	20,930	74,507
226.00	26,505	1,272.0	22,577	43,507	128,861

Device	Routing	Invert	Outlet Devices		
#1	Primary	221.51'	96.0" W x 48.0" H Box Culvert L= 31.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 221.51' / 221.40' S= 0.0035 ' S Cc= 0.90 n= 0.013, Flow Area= 32.00 sf		

Primary OutFlow Max=19.64 cfs @ 12.58 hrs HW=222.48' (Free Discharge)
1=Culvert (Barrel Controls 19.64 cfs @ 3.4 fps)

Summary for Pond 3P: Basin#1

Inflow Area = 9.032 ac, 29.34% Impervious, Inflow Depth > 1.68" for 25-year event
Inflow = 11.41 cfs @ 12.27 hrs, Volume= 1.27 af
Outflow = 1.96 cfs @ 13.38 hrs, Volume= 0.72 af, Atten= 82.86%, Lag= 66.6 min
Primary = 1.96 cfs @ 13.38 hrs, Volume= 0.72 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 231.22' @ 13.38 hrs Surf.Area= 11,788 sf Storage= 25,803 cf

Plug-Flow detention time= 245.4 min calculated for 0.72 af (56% of inflow)
Center-of-Mass det. time= 119.3 min (999.5 - 880.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	228.00'	49,089 cf	Custom Stage Data (Irregular) Listed below (Recalc)		

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Type III 24-hr 25-year Rainfall=6.16"

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
228.00	993	123.0	0	0	993
229.00	7,415	404.0	3,707	3,707	12,780
230.00	10,180	432.0	8,761	12,468	14,689
232.00	12,890	470.0	23,017	35,485	17,562
233.00	14,330	489.0	13,604	49,089	19,089

Device	Routing	Invert	Outlet Devices
#1	Primary	231.00'	8.0' long x 8.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=1.95 cfs @ 13.38 hrs HW=231.22' (Free Discharge)**1=Broad-Crested Rectangular Weir** (Weir Controls 1.95 cfs @ 1.1 fps)**Summary for Pond 4P: Basin#2**

Inflow Area = 5.493 ac, 32.51% Impervious, Inflow Depth > 1.85" for 25-year event
Inflow = 8.11 cfs @ 12.24 hrs, Volume= 0.85 af
Outflow = 0.81 cfs @ 14.86 hrs, Volume= 0.32 af, Atten= 90.04%, Lag= 156.8 min
Primary = 0.81 cfs @ 14.86 hrs, Volume= 0.32 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 235.20' @ 14.86 hrs Surf.Area= 8,418 sf Storage= 23,561 cf

Plug-Flow detention time= 340.8 min calculated for 0.32 af (38% of inflow)
Center-of-Mass det. time= 201.8 min (1,075.2 - 873.4)

Volume	Invert	Avail.Storage	Storage Description
#1	231.00'	30,648 cf	Custom Stage Data (Irregular) Listed below (Recalc)

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Type III 24-hr 25-year Rainfall=6.16"

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
231.00	1,200	136.0	0	0	1,200
232.00	4,205	323.0	2,550	2,550	8,034
233.00	6,060	356.0	5,104	7,655	9,849
234.00	7,120	371.0	6,583	14,238	10,790
236.00	9,340	402.0	16,410	30,648	12,848

Device	Routing	Invert	Outlet Devices
#1	Primary	235.10'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.81 cfs @ 14.86 hrs HW=235.20' (Free Discharge)**1=Broad-Crested Rectangular Weir** (Weir Controls 0.81 cfs @ 0.8 fps)**Summary for Pond 5P: Basin#4**

Inflow Area = 1.178 ac, 30.01% Impervious, Inflow Depth > 1.77" for 25-year event
Inflow = 2.03 cfs @ 12.14 hrs, Volume= 0.17 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 100.00%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 243.79' @ 24.00 hrs Surf.Area= 3,377 sf Storage= 7,566 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	240.00'	12,227 cf	Custom Stage Data (Irregular) Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	276	65.0	0	0	276
241.00	1,540	194.0	823	823	2,938
242.00	2,155	213.0	1,839	2,662	3,586
244.00	3,540	250.0	5,638	8,300	5,026
245.00	4,329	270.0	3,928	12,227	5,893

Device	Routing	Invert	Outlet Devices
#1	Primary	244.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=240.00' (Free Discharge)

1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 6P: Basin#3

Inflow Area = 3.758 ac, 41.74% Impervious, Inflow Depth > 2.37" for 25-year event
 Inflow = 7.53 cfs @ 12.23 hrs, Volume= 0.74 af
 Outflow = 0.53 cfs @ 15.55 hrs, Volume= 0.21 af, Atten= 92.92%, Lag= 199.4 min
 Primary = 0.53 cfs @ 15.55 hrs, Volume= 0.21 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 231.08' @ 15.55 hrs Surf.Area= 9,050 sf Storage= 23,467 cf

Plug-Flow detention time= 388.7 min calculated for 0.21 af (29% of inflow)
 Center-of-Mass det. time= 252.8 min (1,110.7 - 857.9)

Volume	Invert	Avail.Storage	Storage Description
#1	227.00'	32,507 cf	Custom Stage Data (Irregular) Listed below (Recalc)

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Type III 24-hr 25-year Rainfall=6.16"

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
227.00	800	120.0	0	0	800
228.00	4,724	424.0	2,489	2,489	13,963
230.00	7,485	475.0	12,104	14,593	17,721
232.00	10,515	520.0	17,914	32,507	21,420

Device	Routing	Invert	Outlet Devices
#1	Primary	231.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.51 cfs @ 15.55 hrs HW=231.08' (Free Discharge)

1=Broad-Crested Rectangular Weir (Weir Controls 0.51 cfs @ 0.7 fps)

Summary for Pond 7P: Basin#5

Inflow Area = 0.932 ac, 61.29% Impervious, Inflow Depth > 3.41" for 25-year event
 Inflow = 3.74 cfs @ 12.09 hrs, Volume= 0.27 af
 Outflow = 0.31 cfs @ 13.33 hrs, Volume= 0.11 af, Atten= 91.70%, Lag= 74.4 min
 Primary = 0.31 cfs @ 13.33 hrs, Volume= 0.11 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 241.05' @ 13.33 hrs Surf.Area= 5,127 sf Storage= 7,101 cf

Plug-Flow detention time= 290.2 min calculated for 0.11 af (40% of inflow)
 Center-of-Mass det. time= 168.7 min (993.2 - 824.5)

Volume	Invert	Avail.Storage	Storage Description
#1	239.00'	12,380 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
239.00	680	105.0	0	0	680
240.00	4,210	286.0	2,194	2,194	6,315
242.00	6,030	320.0	10,186	12,380	8,063

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Type III 24-hr 25-year Rainfall=6.16"

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Device	Routing	Invert	Outlet Devices
#1	Primary	241.00'	10.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.30 cfs @ 13.33 hrs HW=241.05' (Free Discharge)**1=Broad-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 0.6 fps)**Summary for Pond 8P: Recharge#6**

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth > 3.72" for 25-year event
Inflow = 0.91 cfs @ 12.09 hrs, Volume= 0.06 af
Outflow = 0.25 cfs @ 12.45 hrs, Volume= 0.03 af, Atten= 72.16%, Lag= 21.7 min
Primary = 0.25 cfs @ 12.45 hrs, Volume= 0.03 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 239.44' @ 12.45 hrs Surf.Area= 636 sf Storage= 1,510 cf

Plug-Flow detention time= 244.3 min calculated for 0.03 af (46% of inflow)
Center-of-Mass det. time= 128.5 min (945.8 - 817.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	235.00'	720 cf	15.13'W x 42.00'L x 4.50'H Field A 2,860 cf Overall - 1,060 cf Embedded = 1,800 cf x 40.0% Voids
#2A	235.50'	798 cf	Concrete Galley 4x4x4 x 18 Inside #1 Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf 18 Chambers in 2 Rows
		1,518 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	239.40'	24.0" x 24.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Primary OutFlow Max=0.23 cfs @ 12.45 hrs HW=239.44' (Free Discharge)**1=Orifice/Grate** (Weir Controls 0.23 cfs @ 0.7 fps)**16590-No Wetlands PostDev-25 yr frozen**

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Type III 24-hr 25-year Rainfall=6.16"

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Summary for Pond 9P: Roof Recharge

Inflow Area = 0.049 ac, 100.00% Impervious, Inflow Depth > 5.92" for 25-year event
Inflow = 0.30 cfs @ 12.08 hrs, Volume= 0.02 af
Outflow = 0.07 cfs @ 12.47 hrs, Volume= 0.02 af, Atten= 76.39%, Lag= 23.0 min
Discarded = 0.07 cfs @ 12.47 hrs, Volume= 0.02 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 235.58' @ 12.47 hrs Surf.Area= 261 sf Storage= 231 cf

Plug-Flow detention time= 17.7 min calculated for 0.02 af (100% of inflow)
Center-of-Mass det. time= 17.6 min (761.8 - 744.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	234.00'	247 cf	7.92'W x 33.00'L x 3.04'H Field A 795 cf Overall - 176 cf Embedded = 619 cf x 40.0% Voids
#2A	234.50'	176 cf	Cultec R-280HD x 4 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 1 rows
		424 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	234.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 230.00'

Discarded OutFlow Max=0.07 cfs @ 12.47 hrs HW=235.58' (Free Discharge)**1=Exfiltration** (Controls 0.07 cfs)**Summary for Link 1L: Design Pt #1**

Inflow Area = 38.031 ac, 14.09% Impervious, Inflow Depth > 1.22" for 25-year event
Inflow = 20.89 cfs @ 12.57 hrs, Volume= 3.88 af
Primary = 20.89 cfs @ 12.57 hrs, Volume= 3.88 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 2L: Design Pt 2

Inflow Area = 5.827 ac, 26.92% Impervious, Inflow Depth > 0.48" for 25-year event
Inflow = 0.57 cfs @ 15.55 hrs, Volume= 0.23 af
Primary = 0.57 cfs @ 15.55 hrs, Volume= 0.23 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 3L: DesignPt3

Inflow Area = 1.169 ac, 0.00% Impervious, Inflow Depth > 0.16" for 25-year event
Inflow = 0.02 cfs @ 14.75 hrs, Volume= 0.02 af
Primary = 0.02 cfs @ 14.75 hrs, Volume= 0.02 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link 4L: Design Pt#4

Inflow Area = 0.208 ac, 66.39% Impervious, Inflow Depth > 1.72" for 25-year event
Inflow = 0.25 cfs @ 12.45 hrs, Volume= 0.03 af
Primary = 0.25 cfs @ 12.45 hrs, Volume= 0.03 af, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX – B

Hydraulic Calculations and Pipe Design (Manning's Equation)

Time of flow

Average CN Values

Rainfall-Extreme Precipitation Table

STORM DRAINAGE CALCULATIONS
Pipe Flow Calculations - Manning's Equation

Project: Prospect Hill Estates
Town: Bellingham, MA

Date: 11/30/23

Revised:

Job No: 16,590

Calc. by: rst

i = Rainfall Intensity at 25 Year Storm

Line		Length (Feet)	Drain Area (Ac)	Total Area (Ac)	Runoff "C"	Time of Concentration (min.)			Rainfall i (in./hr.)	Required Capacity Q(cfs)		Pipe Diameter (in.)	Slope (ft./ft.)	Design Conditions		Invert Elevation		Rim Elev. Upper	n
From	To					Upper End	In Pipe	Total		Inlet	Pipe			Depth (in.)	Velocity (f.p.s.)	Upper	Lower		
CB 1	DMH 3	24	0.10		0.68	6.93	0.11	7.04	5.83	0.41		12	0.017	2.40	3.60	239.00	238.60	242.21	0.013
CB 2	DMH 3	17	0.10		0.79	5.42	0.06	5.48	6.27	0.51		12	0.024	2.50	4.40	239.00	238.60	242.21	0.013
DMH 3	DMH 4	31		0.21	0.73	5.48	0.11	5.59	6.25		0.95	12	0.016	3.70	4.50	238.50	238.00	242.83	0.013
DMH 4	R5	4		0.21	0.73	5.59	0.01	5.60	6.22		0.95	12	0.050	2.70	6.80	237.70	237.50	246.00	0.013
CB 6	DMH 8	20	0.08		0.70	7.37	0.08	7.45	5.72	0.32		12	0.030	1.90	4.10	239.00	238.40	242.77	0.013
CB 7	DMH 8	35	0.14		0.49	6.51	0.16	6.66	5.95	0.42		12	0.017	2.40	3.70	239.00	238.40	242.77	0.013
DMH 8	DMH 9	85		0.22	0.57	7.45	0.24	7.70	5.70		0.72	12	0.040	2.60	5.80	238.30	234.90	242.16	0.013
CB 10	DMH 12	14	0.99		0.49	29.47	0.03	29.50	3.25	1.57		12	0.036	3.90	7.00	236.00	235.50	239.27	0.013
CB 11	DMH 12	6	0.42		0.75	14.34	0.01	14.35	4.54	1.44		12	0.083	3.00	9.20	236.00	235.50	239.27	0.013
DMH 12	DMH 9	65		1.42	0.57	29.50	0.23	29.73	3.25		2.61	12	0.009	7.90	4.70	235.50	234.90	239.46	0.013
DMH 9	DMH 15	40		1.64	0.57	29.73	0.10	29.83	3.24		3.01	12	0.020	6.70	6.70	234.80	234.00	239.76	0.013
CB 13	DMH 15	10	0.05		0.66	7.85	0.04	7.89	5.61	0.18		12	0.050	1.20	4.20	234.50	234.00	238.74	0.013
CB 14	DMH 15	15	0.19		0.61	6.80	0.05	6.84	5.87	0.70		12	0.033	2.70	5.40	234.50	234.00	238.74	0.013
DMH 15	DMH 16	60		1.88	0.57	29.83	0.11	29.95	3.23		3.49	12	0.040	5.90	9.00	233.90	231.50	238.50	0.013
DMH 16	HW 17	125		1.88	0.57	29.95	0.37	30.32	3.23		3.49	12	0.012	8.90	5.60	231.50	230.00	236.50	0.013
CB 18	DMH 20	27	0.37		0.69	12.28	0.13	12.41	4.81	1.24		12	0.007	5.30	3.60	230.70	230.50	233.78	0.013
CB 19	DMH 20	23	0.26		0.75	8.81	0.10	8.91	5.41	1.05		12	0.009	4.60	3.80	230.70	230.50	233.78	0.013
DMH 20	FE 21	60		0.63	0.72	12.41	0.24	12.65	4.80		2.16	12	0.007	7.60	4.10	230.40	230.00	233.91	0.013
CB 22	DMH 24	20	0.42		0.54	15.70	0.07	15.76	4.38	0.98		12	0.020	3.60	5.00	239.20	238.80	243.27	0.013
CB 23	DMH 24	25	0.81		0.40	15.07	0.08	15.15	4.45	1.43		12	0.016	4.60	5.10	239.20	238.80	243.27	0.013
DMH 24	DMH 25	185		1.23	0.44	15.76	0.63	16.39	4.37		2.38	12	0.010	7.20	4.90	238.70	236.85	242.76	0.013
CB 26	DMH 25	10	0.64		0.45	18.93	0.03	18.96	4.04	1.16		12	0.020	3.90	5.20	237.05	236.85	240.14	0.013
CB 27	DMH 25	17	0.84		0.38	18.93	0.06	18.99	4.04	1.29		12	0.012	4.70	4.50	237.05	236.85	240.14	0.013
DMH 25	DMH 28	40		2.70	0.43	18.99	0.11	19.11	4.04		4.65	18	0.010	8.40	5.80	236.50	236.10	240.14	0.013
CB 29	DMH 31	15	0.97		0.49	20.96	0.04	21.01	3.86	1.83		12	0.020	5.00	5.90	236.75	236.45	239.94	0.013
CB 30	DMH 31	20	0.36		0.69	15.67	0.07	15.74	4.38	1.09		12	0.015	4.10	4.60	236.75	236.45	239.94	0.013
DMH 31	DMH 28	35		1.33	0.54	15.74	0.11	15.86	4.37		3.15	12	0.010	8.80	5.10	236.35	236.00	239.86	0.013
DMH 28	DMH 32	85		4.03	0.53	21.01	0.21	21.22	3.86		8.19	18	0.010	12.00	6.60	236.00	235.15	239.78	0.013
DMH 32	DMH 33	135		4.03	0.53	21.22	0.34	21.56	3.84		8.15	18	0.010	11.90	6.60	235.05	233.70	239.06	0.013
CB 34	DMH 33	17	0.46		0.51	20.96	0.05	21.02	3.86	0.89		12	0.029	3.10	5.50	234.50	234.00	237.94	0.013
CB 35	DMH 33	10	0.57		0.55	15.67	0.03	15.70	4.38	1.37		12	0.050	3.80	6.20	234.50	234.00	237.94	0.013
DMH 33	DMH 37	210		5.05	0.53	21.56	0.57	22.14	3.81		10.16	24	0.007	12.50	6.10	233.55	232.00	237.94	0.013
DMH 37	DMH 40	55		5.05	0.53	22.14	0.15	22.29	3.76		10.04	24	0.007	12.40	6.10	231.90	231.50	236.22	0.013
CB 38	DMH 40	15	1.41		0.43	20.96	0.04	21.00	3.86	2.33		12	0.020	5.70	6.30	232.30	232.00	235.86	0.013
CB 39	DMH 40	10	0.49		0.74	23.42	0.03	23.45	3.66	1.35		12	0.030	3.80	6.30	232.30	232.00	235.86	0.013
DMH 40	DMH 41	60		6.96	0.52	23.45	0.15	23.60	3.66		13.32	24	0.007	14.80	6.50	231.40	231.00	236.00	0.013
DMH 41	FE 42	80		6.96	0.52	23.60	0.21	23.81	3.65		13.27	24	0.007	14.80	6.50	230.90	230.30	236.47	0.013

CB 43	DMH 45	10	0.20			0.65	12.98	0.04	13.02	4.72	0.62		12	0.020	2.80	4.40	240.20	240.00	243.36	0.013
CB 44	DMH 45	17	0.37			0.43	18.70	0.08	18.77	4.07	0.64		12	0.012	3.30	3.70	240.20	240.00	243.36	0.013
DMH 45	DMH 46	55		0.58		0.51	18.77	0.22	19.00	4.06		1.18	12	0.010	4.80	4.10	239.90	239.35	243.63	0.013
DMH 46	DMH 47	112		0.58		0.51	19.00	0.46	19.45	4.04		1.17	12	0.010	4.80	4.10	239.25	238.10	244.23	0.013
CB 55	DMH 47	40	0.46			0.48	15.70	0.10	15.80	4.38	0.97		12	0.050	2.80	6.90	240.10	238.10	244.73	0.013
CB 56	DMH 47	40	0.12			0.51	11.59	0.14	11.72	4.92	0.30		12	0.050	1.60	4.90	240.10	238.10	244.73	0.013
DMH 47	DMH 48	84		1.15		0.50	15.80	0.27	16.07	4.37		2.49	12	0.011	7.20	5.10	238.00	237.10	244.86	0.013
CB 68	DMH 70	25	1.02			0.36	19.23	0.08	19.31	4.01	1.46		12	0.024	4.60	5.30	239.60	239.00	242.87	0.013
CB 69	DMH 70	20	0.26			0.73	13.62	0.07	13.69	4.63	0.87		12	0.030	3.30	5.00	239.60	239.00	242.87	0.013
DMH 70	DMH 49	95		1.28		0.43	19.31	0.33	19.64	4.01		2.21	12	0.010	6.80	4.80	239.00	238.05	241.03	0.013
CB 50	DMH 49	10	0.18			0.73	12.95	0.03	12.97	4.72	0.62		12	0.045	2.30	5.80	238.50	238.05	243.51	0.013
CB 51	DMH 49	17	0.17			0.65	12.21	0.06	12.27	4.82	0.53		12	0.026	2.50	4.60	238.50	238.05	243.51	0.013
DMH 49	DMH 48	35		1.63		0.49	19.64	0.08	19.72	3.98		3.16	12	0.024	6.50	7.30	237.95	237.10	243.75	0.013
CB 52	DMH 54	15	0.34			0.55	15.60	0.05	15.65	4.39	0.82		12	0.027	3.00	5.30	240.20	239.80	244.00	0.013
CB 53	DMH 54	8	0.12			0.51	11.59	0.03	11.61	4.92	0.30		12	0.050	1.60	4.80	240.20	239.80	244.00	0.013
DMH 54	DMH 48	30		0.46		0.54	15.65	0.10	15.75	4.38		1.09	12	0.020	3.80	5.10	239.70	239.10	243.91	0.013
DMH 48	DMH 57	175		3.24		0.50	19.72	0.54	20.26	3.97		6.41	18	0.007	11.40	5.40	237.00	235.70	244.18	0.013
DMH 57	DMH 58	100		3.24		0.50	20.26	0.29	20.56	3.92		6.33	18	0.008	10.80	5.70	235.60	234.80	241.20	0.013
CB 60	DMH 59	20	0.75			0.55	22.97	0.07	23.04	3.70	1.53		12	0.015	4.90	5.10	235.50	235.20	239.03	0.013
CB 61	DMH 59	15	0.44			0.65	16.70	0.05	16.75	4.27	1.23		12	0.020	4.00	5.30	235.50	235.20	239.03	0.013
DMH 58	DMH 62	40		4.44		0.52	23.04	0.10	23.14	3.69		8.55	18	0.010	12.30	6.60	234.70	234.30	239.32	0.013
CB 63	DMH 65	22	0.40			0.63	14.03	0.06	14.09	4.58	1.18		12	0.016	4.20	6.10	237.50	237.15	241.11	0.013
CB 64	DMH 65	25	0.31			0.61	15.63	0.10	15.73	4.38	0.83		12	0.014	3.60	4.20	237.50	237.15	241.11	0.013
DMH 65	DMH 66	70		0.71		0.63	15.73	0.22	15.95	4.37		1.95	12	0.014	5.70	5.30	237.05	236.10	241.03	0.013
DMH 66	DMH 62	90		0.71		0.63	15.95	0.30	16.25	4.35		1.94	12	0.012	6.00	5.00	236.00	234.90	240.43	0.013
DMH 62	FE 67	120		5.15		0.54	23.14	0.29	23.43	3.69		10.18	18	0.010	14.20	6.80	234.20	233.00	239.68	0.013
CB 77	DMH 79	14	0.30			0.50	7.56	0.04	7.60	5.68	0.86		12	0.036	2.90	5.90	245.30	244.80	249.36	0.013
CB 78	DMH 79	6	0.21			0.57	12.07	0.01	12.08	4.85	0.58		12	0.083	1.90	7.10	245.30	244.80	249.36	0.013
DMH 79	DMH 80	210		0.51		0.53	12.08	0.90	12.98	4.84		1.31	12	0.008	5.40	3.90	244.70	243.00	248.15	0.013
DMH 80	FE 81	50		0.51		0.53	12.98	0.20	13.18	4.72		1.27	12	0.010	5.00	4.20	242.90	242.40	246.07	0.013
CB 73	DMH 75	14	0.19			0.60	9.91	0.06	9.97	5.20	0.58		12	0.014	3.00	3.80	242.40	242.20	245.43	0.013
CB 74	DMH 75	6	0.13			0.75	9.91	0.01	9.92	5.20	0.49		12	0.033	1.70	6.70	242.40	242.20	245.43	0.013
DMH 75	FE 76	20		0.31		0.66	9.92	0.08	10.01	5.19		1.07	12	0.010	4.50	4.00	242.10	241.90	245.47	0.013
CB 82	DMH 84	12	0.28			0.75	12.07	0.04	12.11	4.85	1.01		12	0.017	3.80	4.70	243.40	243.20	246.43	0.013
CB 83	DMH 84	18	0.26			0.64	9.91	0.08	9.99	5.20	0.88		12	0.011	4.00	3.90	243.40	243.20	246.43	0.013
DMH 84	DMH 85	60		0.54		0.70	12.11	0.25	12.36	4.84		1.82	12	0.007	6.80	4.00	243.10	242.70	246.60	0.013
CB 86	DMH 88	6	0.25			0.74	9.91	0.01	9.92	5.20	0.95		12	0.067	2.60	7.60	248.50	248.10	252.73	0.013
CB 87	DMH 88	15	0.14			0.64	11.69	0.06	11.75	4.90	0.44		12	0.027	2.20	4.40	248.50	248.10	252.73	0.013
DMH 88	DMH 85	160		0.39		0.70	9.92	0.40	10.33	5.19		1.42	12	0.033	3.80	6.60	248.00	242.70	252.55	0.013
DMH 85	FE 89	160		0.93		0.70	12.36	0.52	12.88	4.80		3.12	12	0.010	8.70	5.10	242.60	241.00	247.60	0.013
CB 90	DMH 91	60	1.20			0.65	22.41	0.15	22.56	3.74	2.91		12	0.020	1.70	6.70	234.50	233.30	238.15	0.013
DMH 91	FE 92	190		1.20		0.65	22.56	0.79	23.35	3.73		2.90	12	0.017	4.50	4.00	233.20	230.00	240.00	0.013

OVERLAND FLOW TRAVEL TIME

STORM RUNOFF DATA

Project: **Prospect Hill Estates**
Town: **Bellingham, MA**

Date: **11/12/23**
Revised:
Job No: **16,590**
Calc. by: **rst**

Structure	Impervious			Lawn			Wooded			Total
	Length (ft)	Slope (")	Time (min.)	Length (ft)	Slope (")	Time (min.)	Length (ft)	Slope (")	Time (min.)	Travel Time (min.)
1	125	0.020	1.45	10	0.020	5.48				6.93
2	125	0.020	1.45	5	0.020	3.97				5.42
6	30	0.020	0.48	20	0.030	6.89				7.37
7	30	0.020	0.48	15	0.030	6.02				6.51
10	85	0.010	1.41	330	0.020	28.07				29.47
11	200	0.010	2.72	50	0.020	11.63				14.34
13	10	0.020	0.21	25	0.030	7.65				7.85
14	110	0.020	1.31	10	0.020	5.48				6.80
18	190	0.030	1.71	50	0.030	10.57				12.28
19	260	0.010	3.32	10	0.020	5.48				8.81
22	165	0.025	1.65	75	0.020	14.05				15.70
23	240	0.025	2.20	125	0.080	12.88				15.07
26	110	0.016	1.43	120	0.020	17.50				18.93
27	110	0.016	1.43	120	0.020	17.50				18.93
29	215	0.008	3.13	125	0.020	17.84				20.96
30	300	0.008	4.04	50	0.020	11.63				15.67
34	215	0.008	3.13	125	0.020	17.84				20.96
35	300	0.008	4.04	50	0.020	11.63				15.67
38	215	0.008	3.13	125	0.020	17.84				20.96
39	100	0.008	1.74	190	0.020	21.69				23.42
43	180	0.010	2.50	40	0.020	10.48				12.98
44	45	0.010	0.86	125	0.020	17.84				18.70
50	70	0.008	1.32	50	0.020	11.63				12.95
51	100	0.008	1.74	40	0.020	10.48				12.21
52	150	0.013	2.00	70	0.020	13.60				15.60
53	70	0.013	1.11	40	0.020	10.48				11.59
55	160	0.013	2.10	70	0.020	13.60				15.70
56	70	0.013	1.11	40	0.020	10.48				11.59
60	200	0.008	2.96	160	0.020	20.01				22.97
61	300	0.008	4.04	60	0.020	12.66				16.70
63	200	0.008	2.96	45	0.020	11.07				14.03
64	160	0.008	2.49	65	0.020	13.14				15.63
68	100	0.008	1.74	120	0.020	17.50				19.23
69	120	0.008	2.00	50	0.020	11.63				13.62
77	200	0.040	1.59	12	0.020	5.97				7.56
78	200	0.040	1.59	40	0.020	10.48				12.07
73	290	0.008	3.94	12	0.020	5.97				9.91
74	290	0.008	3.94	12	0.020	5.97				9.91
82	210	0.030	1.85	35	0.020	9.84				11.69
83	210	0.030	1.85	10	0.020	5.48				7.33
86	235	0.030	2.01	35	0.020	9.84				11.86
88	235	0.030	2.01	12	0.020	5.97				7.98
90	320	0.020	2.99	150	0.020	19.42				22.41

AVERAGE 'c' VALUE FOR STRUCTURES

STORM RUNOFF DATA

Date: **11/30/23**
Revised:

Project: **Prospect Hill Village**
Town: **Bellingham, MA**

Job No: **16,590**
Calc. by: **RST**

Structure	Total Area (SF)	Ground Cover	Area (SF)	c	$\Sigma(\text{Area} \cdot c)$	Average c	Total Area (Ac)
CB#1	4,530	imp	2,630	0.95	2,498.50	0.68	0.10
		lawn	1,900	0.30	570.00		
CB#2	4,530	wooded	0	0.20	0.00		
		imp	3,385	0.95	3,215.75	0.79	0.104
CB#6	3,511	lawn	1,145	0.30	343.50		
		wooded	0	0.20	0.00		
CB#7	6,212	imp	2,172	0.95	2,063.40	0.70	0.081
		lawn	1,339	0.30	401.70		
CB#10	43,292	wooded	0	0.20	0.00		
		imp	1,838	0.95	1,746.10	0.49	0.143
CB#11	18,414	lawn	4,374	0.30	1,312.20		
		wooded	0	0.20	0.00		
CB#13	2,164	imp	12,454	0.95	11,831.30	0.49	0.994
		lawn	30,838	0.30	9,251.40		
CB#14	8,460	wooded	0	0.20	0.00		
		imp	12,816	0.95	12,175.20	0.75	0.423
CB#18	16,133	lawn	5,598	0.30	1,679.40		
		wooded	0	0.20	0.00		
CB#19	11,258	imp	1,187	0.95	1,127.65	0.66	0.050
		lawn	977	0.30	293.10		
CB#19	11,258	wooded	0	0.20	0.00		
		imp	4,085	0.95	3,880.75	0.61	0.194
CB#19	11,258	lawn	4,375	0.30	1,312.50		
		wooded	0	0.20	0.00		
CB#19	11,258	imp	9,745	0.95	9,257.75	0.69	0.37
		lawn	6,388	0.30	1,916.40		
CB#19	11,258	wooded	0	0.20	0.00		
		imp	7,811	0.95	7,420.45	0.75	0.26
CB#19	11,258	lawn	3,447	0.30	1,034.10		

CB#22	18,294	wooded imp lawn	0 6,620 11,674	0.2 0.95 0.30	0 6,289.00 3,502.20	0.54	0.420
CB#23	35,336	wooded imp lawn	0 5,185 30,151	0.20 0.95 0.30	0.00 4,925.75 9,045.30	0.40	0.811
CB#26	27,682	wooded imp lawn	0 6,471 21,211	0.20 0.95 0.30	0.00 6,147.45 6,363.30	0.45	0.635
CB#27	36,511	wooded imp lawn	0 4,598 31,913	0.20 0.95 0.30	0.00 4,368.10 9,573.90	0.38	0.838
CB#29	42,117	wooded imp lawn	0 12,242 29,875	0.20 0.95 0.30	0.00 11,629.90 8,962.50	0.49	0.967
CB#30	15,604	wooded imp lawn	0 9,471 6,133	0.20 0.95 0.30	0.00 8,997.45 1,839.90	0.69	0.358
CB#34	19,842	wooded imp lawn	0 6,266 13,576	0.20 0.95 0.30	0.00 5,952.70 4,072.80	0.51	0.456
CB#35	24,739	wooded imp lawn	0 9,555 15,184	0.20 0.95 0.30	0.00 9,077.25 4,555.20	0.55	0.568
CB#39	21,546	wooded imp lawn	0 14,745 6,801	0.20 0.95 0.30	0.00 14,007.75 2,040.30	0.74	0.495
CB#38	61,437	wooded imp lawn	0 12,027 49,410	0.20 0.95 0.30	0.00 11,425.65 14,823.00	0.43	1.410
CB#43	8,870	wooded imp lawn	0 4,782 4,088	0.20 0.95 0.30	0.00 4,542.90 1,226.40	0.65	0.204
CB#44	16,183	wooded imp lawn	0 3,152 13,031	0.20 0.95 0.30	0.00 2,994.40 3,909.30	0.43	0.372
CB#50	7,831	wooded imp lawn	0 5,211 2,620	0.20 0.95 0.30	0.00 4,950.45 786.00	0.73	0.180
CB#51	7,400	wooded imp lawn	0 3,977 3,423	0.20 0.95 0.30	0.00 3,778.15 1,026.90	0.65	0.170

CB#52	14,863	wooded imp lawn	0 5,689 9,174	0.20 0.95 0.30	0.00 5,404.55 2,752.20	0.55	0.341
CB#53	5,186	wooded imp lawn	0 1,715 3,471	0.20 0.95 0.30	0.00 1,629.25 1,041.30	0.51	0.119
CB#55	20,112	wooded imp lawn	0 5,496 14,616	0.20 0.95 0.30	0.00 5,221.20 4,384.80	0.48	0.462
CB#56	5,122	wooded imp lawn	0 1,657 3,465	0.20 0.95 0.30	0.00 1,574.15 1,039.50	0.51	0.118
CB#60	32,872	wooded imp lawn	0 6,690 26,182	0.20 0.95 0.30	0.00 6,355.50 7,854.60	0.43	0.755
CB#61	19,329	wooded imp lawn	0 12,310 7,019	0.20 0.95 0.30	0.00 11,694.50 2,105.70	0.71	0.444
CB#63	17,630	wooded imp lawn	0 9,074 8,556	0.20 0.95 0.30	0.00 8,620.30 2,566.80	0.63	0.405
CB#64	13,386	wooded imp lawn	0 6,463 6,923	0.20 0.95 0.30	0.00 6,139.85 2,076.90	0.61	0.307
CB#68	44,262	wooded imp lawn	0 3,873 40,389	0.20 0.95 0.30	0.00 3,679.35 12,116.70	0.36	1.016
CB#69	11,321	wooded imp lawn	0 7,436 3,885	0.20 0.95 0.30	0.00 7,064.20 1,165.50	0.73	0.260
CB#73	8,120	wooded imp lawn	0 3,770 4,350	0.20 0.95 0.30	0.00 3,581.50 1,305.00	0.60	0.186
CB#74	5,445	wooded imp lawn	0 3,770 1,675	0.20 0.95 0.30	0.00 3,581.50 502.50	0.75	0.125
CB#77	13,100	wooded imp lawn	0 4,060 9,040	0.20 0.95 0.30	0.00 3,857.00 2,712.00	0.50	0.301
CB#78	9,115	wooded imp lawn	0 3,798 5,317	0.20 0.95 0.30	0.00 3,608.10 1,595.10	0.57	0.209

CB#82	12,047	wooded imp lawn	0 8,343 3,704	0.20 0.95 0.30	0.00 7,925.85 1,111.20	0.75	0.277
CB#83	11,504	wooded imp lawn	0 6,011 5,493	0.20 0.95 0.30	0.00 5,710.45 1,647.90	0.64	0.264
CB#86	10,838	wooded imp lawn	0 7,298 3,540	0.20 0.95 0.30	0.00 6,933.10 1,062.00	0.74	0.249
CB#87	6,192	wooded imp lawn	0 3,220 2,972	0.20 0.95 0.30	0.00 3,059.00 891.60	0.64	0.142
CB#72	55,052	wooded imp lawn	0 27,344 27,708	0.20 0.95 0.30	0.00 25,976.80 8,312.40	0.62	1.264
CB#90	52,055	wooded imp lawn	0 28,150 23,905	0.20 0.95 0.30	0.00 26,742.50 7,171.50	0.65	1.195
		wooded	0	0.20	0.00		

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	Massachusetts
Location	Norfolk, Massachusetts, United States
Latitude	42.066 degrees North
Longitude	71.455 degrees West
Elevation	70 feet
Date/Time	Tue Jun 25 2024 09:38:01 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.29	0.45	0.56	0.73	0.91	1.15	1yr	0.79	1.09	1.34	1.69	2.15	2.74	3.01	1yr	2.42	2.89
2yr	0.36	0.55	0.68	0.90	1.13	1.43	2yr	0.98	1.32	1.65	2.07	2.60	3.27	3.59	2yr	2.89	3.46
5yr	0.42	0.66	0.83	1.11	1.42	1.80	5yr	1.22	1.64	2.09	2.63	3.29	4.11	4.58	5yr	3.64	4.40
10yr	0.48	0.76	0.95	1.30	1.68	2.16	10yr	1.45	1.93	2.51	3.16	3.94	4.89	5.50	10yr	4.33	5.29
25yr	0.56	0.90	1.15	1.59	2.11	2.74	25yr	1.82	2.41	3.20	4.02	4.99	6.16	7.01	25yr	5.45	6.74
50yr	0.65	1.04	1.33	1.87	2.51	3.28	50yr	2.17	2.85	3.83	4.82	5.98	7.34	8.44	50yr	6.50	8.11
100yr	0.74	1.20	1.54	2.19	2.99	3.92	100yr	2.58	3.37	4.60	5.78	7.16	8.76	10.15	100yr	7.75	9.76
200yr	0.85	1.39	1.80	2.58	3.56	4.69	200yr	3.07	3.98	5.51	6.92	8.56	10.45	12.22	200yr	9.25	11.75
500yr	1.03	1.69	2.20	3.20	4.49	5.96	500yr	3.87	4.97	7.01	8.81	10.87	13.21	15.63	500yr	11.69	15.03

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.24	0.38	0.46	0.62	0.76	0.91	1yr	0.66	0.89	1.09	1.42	1.86	2.45	2.66	1yr	2.17	2.56
2yr	0.34	0.53	0.65	0.89	1.09	1.30	2yr	0.94	1.27	1.49	1.95	2.49	3.17	3.47	2yr	2.80	3.34
5yr	0.39	0.60	0.75	1.02	1.30	1.55	5yr	1.13	1.51	1.76	2.30	2.90	3.80	4.21	5yr	3.36	4.05
10yr	0.43	0.66	0.82	1.15	1.49	1.76	10yr	1.28	1.72	1.99	2.61	3.26	4.34	4.87	10yr	3.84	4.68
25yr	0.50	0.76	0.94	1.35	1.77	2.08	25yr	1.53	2.04	2.36	3.08	3.80	5.20	5.89	25yr	4.61	5.67
50yr	0.55	0.84	1.04	1.50	2.02	2.37	50yr	1.74	2.31	2.68	3.49	4.28	5.97	6.83	50yr	5.28	6.57
100yr	0.61	0.93	1.16	1.68	2.30	2.69	100yr	1.99	2.63	3.04	3.96	4.82	6.85	7.93	100yr	6.06	7.62
200yr	0.68	1.02	1.30	1.88	2.62	3.07	200yr	2.26	3.00	3.45	4.52	5.43	7.88	9.19	200yr	6.97	8.84
500yr	0.78	1.16	1.50	2.18	3.10	3.64	500yr	2.67	3.56	4.08	5.37	6.38	9.49	11.22	500yr	8.40	10.79

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day
1yr	0.32	0.50	0.61	0.82	1.01	1.22	1yr	0.87	1.19	1.39	1.81	2.34	2.97	3.26	1yr	2.62	3.13
2yr	0.37	0.57	0.71	0.96	1.18	1.39	2yr	1.02	1.36	1.60	2.08	2.66	3.40	3.75	2yr	3.01	3.60
5yr	0.46	0.71	0.89	1.22	1.55	1.81	5yr	1.34	1.77	2.07	2.68	3.37	4.47	4.97	5yr	3.95	4.78
10yr	0.56	0.85	1.06	1.48	1.91	2.22	10yr	1.65	2.17	2.52	3.25	4.04	5.49	6.18	10yr	4.86	5.94
25yr	0.71	1.08	1.34	1.92	2.52	2.92	25yr	2.18	2.85	3.28	4.17	5.13	7.24	8.23	25yr	6.41	7.91
50yr	0.85	1.30	1.61	2.32	3.12	3.58	50yr	2.69	3.50	4.01	5.04	6.15	8.91	10.23	50yr	7.89	9.84
100yr	1.03	1.56	1.95	2.82	3.87	4.40	100yr	3.34	4.30	4.90	6.09	7.37	10.98	12.70	100yr	9.72	12.21
200yr	1.25	1.87	2.37	3.44	4.79	5.41	200yr	4.14	5.29	5.99	7.37	8.83	13.52	15.76	200yr	11.96	15.16
500yr	1.62	2.40	3.09	4.49	6.39	7.10	500yr	5.51	6.94	7.82	9.49	11.23	17.79	20.98	500yr	15.74	20.17



APPENDIX – C

**Stormwater Recharge Calculations, Water Quality Volumes, TSS Removal &
Infiltration BMP Drain Time
Groundwater Mounding Calculations**

Standards 3 & 4:

**Stormwater Recharge & Water Quality Volume and
Forebay Calculations
Standard 3:**

Project:

Prospect Hill Village
Bellingham, Massachusetts
Date: November 30, 2023

Water Quality Volume (WQV): Based on 1.0 inch rainfall

Recharge Volume(Rv): Based on Soil Classification

$R_v = F * \text{Impervious Area}$

Rv = Required Recharge Volume

F = Depth Factor

Soil Type A – 0.60 inch

K Factor = 8.27 in/hr (Soil type A)

Sediment Forebay Volume: 0.1 inch rainfall

Roof Runoff (See Subcatchment P10):

Each dwelling shall be required to provide individual recharge systems to accommodate a 100 year storm event. The proposal is to provide to leaching systems at each dwelling. Each recharge system will capture ½ of the roof area. (Total Roof Area: 4,260 s.f.)

Imp. Area roof: 2,130 s.f. (1/2 roof)

Recharge Volume Required: (Soil Type A – 0.60 inch)

$R_v = (2,130 \text{ sf} * 0.60 \text{ in})/12 = \underline{107 \text{ c.f.}}$

Recharge Galley's

Total storage provided: 303 c.f.

303 c.f. > 107 c.f.

Time to drain(Static Method):

Drawdown time = Volume/(K*Bottom Area)

Volume = 303 cf

K = 8.27/hr = 0.67 ft/hr

Bottom Area = 206 sf

Drawdown time = $303 \text{ c.f.}/(0.67 \text{ ft/hr} * 206 \text{ sf})$

Drawdown time = 2.2 hr < 72 hr **ok**

Drainage Basin #1(See Subcatchment P8):

Imp. Area Pavement: 115,433 s.f.

$WQV = (115,433 \text{ sf} * 1.0 \text{ in})/12 = \underline{9,620 \text{ c.f.}}$

Recharge Volume Required: (Soil Type A – 0.60 inch)

Tot. Imp Area: 115,433 s.f.

$R_v = (115,433 \text{ sf} * 0.60 \text{ in})/12 = \underline{5,772 \text{ c.f.}}$

Basin Storage Provided:

Elev. 229.80: Storage Capacity Provided=10,491 cu.ft.

Forebay Sizing Required (Outlet #21):

Impervious Area: 17,556 s.f.

$(0.1 \text{ in} * 17,556) / 12 = \underline{146 \text{ c.f.}}$

Forebay Provided:

Elev.	Area(sf)	Avg.	Depth	Vol.
229	306			
230	559	432	1.0	<u>432 c.f. > 146 c.f.</u>

Forebay Sizing Required (Outlet #42 & 71):

Impervious Area: 97,877 s.f.

$(0.1 \text{ in} * 97,877) / 12 = \underline{816 \text{ c.f.}}$

Forebay Provided:

Elev.	Area(sf)	Avg.	Depth	Vol.
229	700			
230	1106	903	1.0	<u>903 c.f. > 816 c.f.</u>

Time to drain basin (Static Method):

Drawdown time = Volume / (K * Bottom Area)

Volume = 35,072 cf (100 year storm volume see hydroCAD Pond 3P)

K = 8.27 in/hr = 0.67 ft/hr (Soil Type A)

Bottom Area = 7415 sf (El. 229)

Drawdown time = $35,072 \text{ c.f.} / (0.67 \text{ ft/hr} * 7415 \text{ sf})$

Drawdown time = 7.1 hrs < 72 hr **ok**

Drainage Basin #2(See Subcatchment P7):

Imp. Area Pavement: 77,781 s.f.

WQV = $(77,781 \text{ sf} * 1.0 \text{ in}) / 12 = \underline{6,482 \text{ c.f.}}$

Recharge Volume Required: (Soil Type A – 0.60 inch)

Tot. Imp Area: 77,781 s.f.

Rv = $(77,781 \text{ sf} * 0.60 \text{ in}) / 12 = \underline{3,889 \text{ c.f.}}$

Basin Storage Provided:

Elev. 232.90: Storage Capacity Provided=6,964 cu.ft.

Forebay Sizing Required (Outlet #21):

Impervious Area: 77,781 s.f.

$(0.1 \text{ in} * 77,781) / 12 = \underline{648 \text{ c.f.}}$

Forebay Provided:

Elev.	Area(sf)	Avg.	Depth	Vol.
232	5100			
233	870	690	1.0	<u>690 c.f. > 648 c.f.</u>

Time to drain basin (Static Method):

Drawdown time = Volume/(K*Bottom Area)

Volume = 22,091 cf (100 year storm volume see hydroCAD Pond 4P)

K = 8.27 in/hr = 0.67 ft/hr (Soil Type A)

Bottom Area = 4,205 sf (El. 232.0)

Drawdown time = 22,091 c.f./(0.67 ft/hr x 4205 sf)

Drawdown time = 7.8 hrs < 72 hr **ok**

Drainage Basin #3(See Subcatchment P11):

Imp. Area Pavement: 61,184 s.f.

WQV = (61,184 sf * 1.0 in)/12 = 5,099 c.f.

Recharge Volume Required: (Soil Type A – 0.60 inch)

Tot. Imp Area: 61,184 s.f.

Rv = (61,184 sf * 0.60 in)/12 = 3,059 c.f.

Basin Storage Provided:

Elev. 228.70: Storage Capacity Provided=6,105 cu.ft.

Forebay Sizing Required (Outlet #17):

Impervious Area: 34,552 s.f.

(0.1 in * 34,552)/12 = 289 c.f.

Forebay Provided:

Elev.	Area(sf)	Avg.	Depth	Vol.
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228	346			
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229	598	472	1.0	<u>472 c.f > 289 c.f.</u>
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Forebay Sizing Required (Outlet #92):

Impervious Area: 26,632 s.f.

(0.1 in * 26,632)/12 = 222 c.f.

Forebay Provided:

Elev.	Area(sf)	Avg.	Depth	Vol.
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228	300			
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229	531	415	1.0	<u>415 c.f > 222 c.f.</u>
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Time to drain basin (Static Method):

Drawdown time = Volume/(K*Bottom Area)

Volume = 22,391 cf (100 year storm volume see hydroCAD Pond 6P)

K = 8.27 in/hr = 0.67 ft/hr (Soil Type A)

Bottom Area = 4724 sf (El. 228)

Drawdown time = 22,391 c.f./(0.67 ft/hr x 4724 sf)

Drawdown time = 7.1 hrs < 72 hr **ok**

Drainage Basin #4(See Subcatchment P17):

Imp. Area Pavement: 15,400 s.f.

WQV = $(15,400 \text{ sf} * 1.0 \text{ in})/12 = \underline{1,284 \text{ c.f.}}$

Recharge Volume Required: (Soil Type A – 0.60 inch)

Tot. Imp Area: 15,400 s.f.

Rv = $(15,400 \text{ sf} * 0.60 \text{ in})/12 = 770 \underline{\text{ c.f.}}$

Basin Storage Provided:

Elev. 241.30: Storage Capacity Provided = 1,310 cu.ft.

Forebay Sizing Required (Outlets #76 & 81):

Impervious Area: 15,400 s.f.

$(0.1 \text{ in} * 15,400)/12 = \underline{128 \text{ c.f.}}$

Forebay Provided:

Elev.	Area(sf)	Avg.	Depth	Vol.
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241	190			
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229	380	285	1.0	<u>285 c.f > 128 c.f.</u>
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Time to drain basin (Static Method):

Drawdown time = Volume/(K*Bottom Area)

Volume = 4,093 cf (100 year storm volume see hydroCAD Pond 5P)

K = 8.27 in/hr = 0.67 ft/hr (Soil Type A)

Bottom Area = 1,540 sf (El. 241.0)

Drawdown time = $4,093 \text{ c.f.}/(0.67 \text{ ft/hr} * 1540 \text{ sf})$

Drawdown time = 1.5 hrs < 72 hr **ok**

Drainage Basin #5(See Subcatchment P1):

Imp. Area Pavement: 24,873 s.f.

WQV = $(24,873 \text{ sf} * 1.0 \text{ in})/12 = \underline{2,073 \text{ c.f.}}$

Recharge Volume Required: (Soil Type A – 0.60 inch)

Tot. Imp Area: 24,873 s.f.

Rv = $(24,873 \text{ sf} * 0.60 \text{ in})/12 = 1,243 \underline{\text{ c.f.}}$

Basin Storage Provided:

Elev. 240.00: Storage Capacity Provided = 2,194 cu.ft.

Forebay Sizing Required (Outlets #89):

Impervious Area: 24,873 s.f.

$(0.1 \text{ in} * 24,873)/12 = \underline{207 \text{ c.f.}}$

Forebay Provided:

Elev.	Area(sf)	Avg.	Depth	Vol.
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240	509			
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241	799	654	1.0	<u>654 c.f > 207 c.f.</u>
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Time to drain basin (Static Method):

Drawdown time = Volume/(K*Bottom Area)

Volume = 6,641 cf (100 year storm volume see hydroCAD Pond 7P)

K = 8.27 in/hr = 0.67 ft/hr (Soil Type A)

Bottom Area = 4,210 sf (El. 240.0)

Drawdown time = 6,641 c.f./((0.67 ft/hr x 4210 sf)

Drawdown time = 2.4 hrs < 72 hr **ok**

Drainage Basin Chambers #4(See Subcatchment P10):

Imp. Area Pavement: 6,015 s.f.

WQV = (6,015 sf * 1.0 in)/12 = 501 c.f.

Recharge Volume Required: (Soil Type A – 0.60 inch)

Tot. Imp Area: 6015 s.f.

Rv = (6015 sf * 0.60 in)/12 = 301 c.f.

Infiltration System #8P(Galley's)

"Static" Storage Volume Provided:

Total storage volume provided = 1,518 cf

1,518 cf > 501 cf **ok**

Time to drain forebay(Static Method):

Drawdown time = Volume/(K*Bottom Area)

Volume = 1518 cf

K = 8.27 in/hr = 0.67 ft/hr (Soil Type A)

Bottom Area = 630 sf

Drawdown time = 1518 c.f./((0.67 ft/hr x 630 sf)

Drawdown time = 3.6 hr < 72 hr **ok**

INSTRUCTIONS:

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

Location: Pretreatment to Drainage Basins #1-5

B	C	D	E	F
BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Sediment Forebay	0.25	0.75	0.19	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56
	0.00	0.56	0.00	0.56

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

44%

Total TSS Removal =

Project:	Prospect Hill Village
Prepared By:	GLM Eng Cons. Inc
Date:	11/30/2023

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

INSTRUCTIONS:

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

Location: TSS Removal Drainage Basins #1-5

B	C	D	E	F
BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Infiltration Basin	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

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

85%

Total TSS Removal =

Project:	Prospect Hill Village
Prepared By:	GLM Eng Cons. Inc
Date:	7/16/2024

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

Estimated Net Annual Solids Load Reduction
Based on the Rational Rainfall Method



Prospect Hill Village
Bellingham, MA
WQS



AREA	.02	acres	CASCADE MODEL	CS-4
WEIGHTED C	0.78			
TC	6.00	minutes	RAINFALL STATION	68

Rainfall Intensity ¹ (in/hr)	Percent Rainfall Volume ¹	Hydraulic Loading Rate (gpm/ft ²)	Removal Efficiency (%)	Incremental Removal (%)
0.02	9.3%	0.49	100.0	9.3
0.04	9.5%	0.98	100.0	9.5
0.06	8.7%	1.47	100.0	8.7
0.08	10.1%	1.95	100.0	10.1
0.10	7.2%	2.44	100.0	7.2
0.12	6.0%	2.93	100.0	6.0
0.14	6.3%	3.42	100.0	6.3
0.16	5.6%	3.91	100.0	5.6
0.18	4.7%	4.40	100.0	4.7
0.20	3.6%	4.89	100.0	3.6
0.25	8.2%	6.11	100.0	8.2
0.50	14.9%	12.22	100.0	14.9
0.75	3.2%	18.32	94.7	3.1
1.00	1.2%	24.43	88.9	1.1
1.50	0.7%	36.65	77.5	0.6
2.00	0.8%	48.86	66.0	0.5
				99.3
Removal Efficiency Adjustment ² =				6.5%
Predicted % Annual Rainfall Treated =				93.5%
Predicted Net Annual Load Removal Efficiency =				92.8%

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. **The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed** otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
8.6900	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
165.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
75.000	x	1/2 length of basin (x direction, in feet)			
30.000	y	1/2 width of basin (y direction, in feet)	hours	days	
1.000	t	duration of infiltration period (days)	36	1.50	
100.000	hi(0)	initial thickness of saturated zone (feet)			
101.668	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
1.668	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

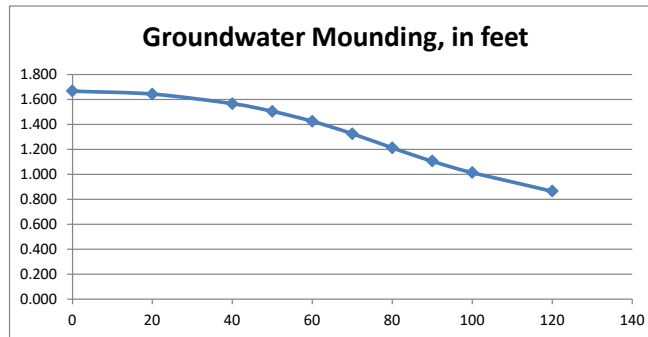
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

1.668	0
1.643	20
1.567	40
1.505	50
1.426	60
1.326	70
1.213	80
1.106	90
1.015	100
0.865	120



Re-Calculate Now



Disclaimer

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Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
8.8000	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
165.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
65.000	x	1/2 length of basin (x direction, in feet)			
22.000	y	1/2 width of basin (y direction, in feet)	hours	days	
1.000	t	duration of infiltration period (days)	36	1.50	
100.000	hi(0)	initial thickness of saturated zone (feet)			
101.164	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
1.164	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

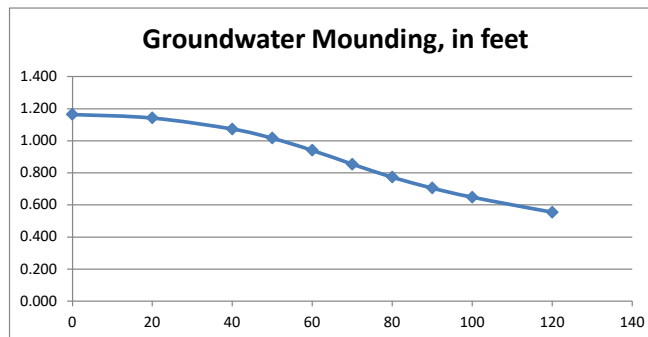
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

1.164	0
1.142	20
1.073	40
1.016	50
0.940	60
0.854	70
0.773	80
0.705	90
0.648	100
0.554	120



Re-Calculate Now



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Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
6.7000	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
165.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
90.000	x	1/2 length of basin (x direction, in feet)			
20.000	y	1/2 width of basin (y direction, in feet)	hours	days	
1.000	t	duration of infiltration period (days)	36	1.50	
100.000	hi(0)	initial thickness of saturated zone (feet)			
101.004	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
1.004	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

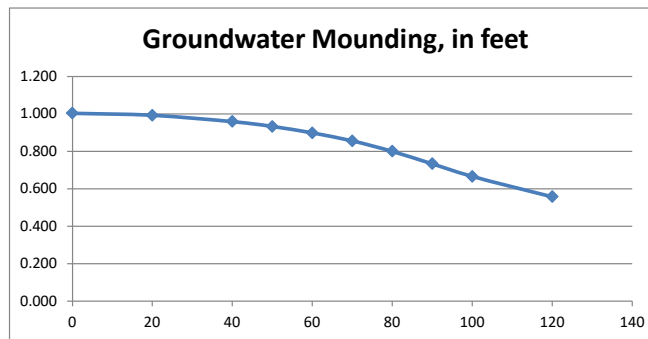
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

1.004	0
0.993	20
0.960	40
0.933	50
0.899	60
0.856	70
0.801	80
0.734	90
0.666	100
0.558	120



Re-Calculate Now



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The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated. Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. **The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed** otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
5.4600	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
165.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
36.000	x	1/2 length of basin (x direction, in feet)			
15.000	y	1/2 width of basin (y direction, in feet)	hours	days	
1.000	t	duration of infiltration period (days)	36	1.50	
100.000	hi(0)	initial thickness of saturated zone (feet)			
100.334	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
0.334	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

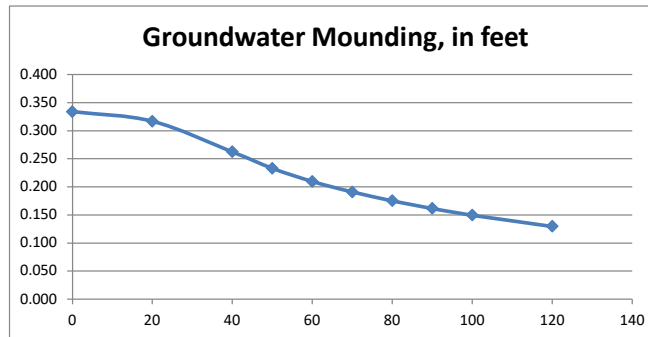
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

0.334	0
0.317	20
0.262	40
0.233	50
0.210	60
0.191	70
0.175	80
0.162	90
0.150	100
0.130	120



Re-Calculate Now



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Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
4.0500	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
165.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
55.000	x	1/2 length of basin (x direction, in feet)			
22.000	y	1/2 width of basin (y direction, in feet)	hours	days	
1.000	t	duration of infiltration period (days)	36	1.50	
100.000	hi(0)	initial thickness of saturated zone (feet)			
100.478	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
0.478	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

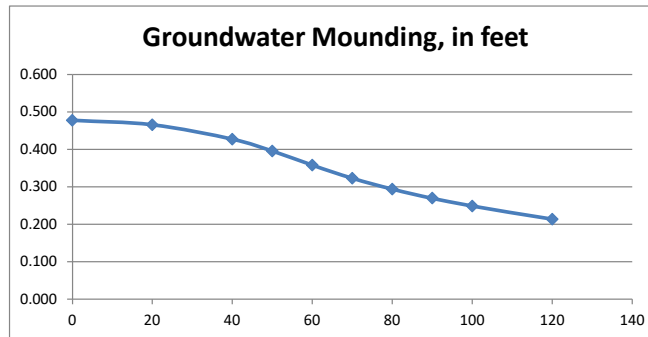
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

0.478	0
0.466	20
0.428	40
0.396	50
0.358	60
0.323	70
0.294	80
0.270	90
0.249	100
0.214	120



Re-Calculate Now



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Input Values		use consistent units (e.g. feet & days or inches & hours)	Conversion Table		
			inch/hour	feet/day	
7.5300	R	Recharge (infiltration) rate (feet/day)	0.67	1.33	
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)			
165.40	K	Horizontal hydraulic conductivity, Kh (feet/day)*	2.00	4.00	In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).
21.000	x	1/2 length of basin (x direction, in feet)			
7.550	y	1/2 width of basin (y direction, in feet)	hours	days	
1.000	t	duration of infiltration period (days)	36	1.50	
100.000	hi(0)	initial thickness of saturated zone (feet)			
100.162	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)			
0.162	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)			

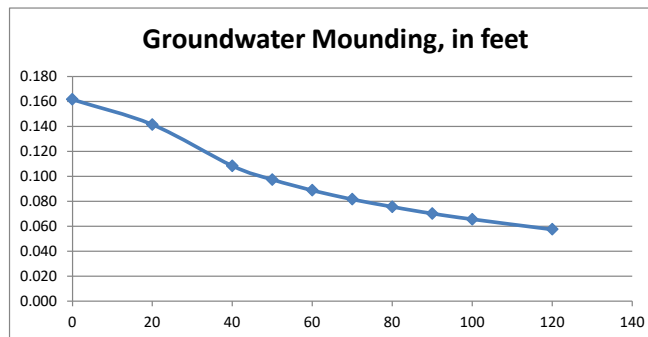
Ground-water Mounding, in feet

Distance from center of basin in x direction, in feet

0.162	0
0.142	20
0.108	40
0.097	50
0.089	60
0.082	70
0.076	80
0.070	90
0.066	100
0.058	120



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APPENDIX – D

Soil test log data



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Wall Street Development Corp

Owner Name

Prospect Street

Street Address

Bellingham

City

MA

State

Map/Lot #

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes:

Source

Soil Map Unit

Merrimac

Soil Name

Soil Limitations

Sand

Soil Parent material

Landform

3. Surficial Geological Report Available? ☐ Yes ☐ No

If yes:

Year Published/Source

Map Unit

Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No

If yes, MassGIS Wetland Data Layer:

7. Current Water Resource Conditions (USGS):

Month/Day/ Year

Range: ☐ Above Normal

☐ Normal

☐ Below Normal

Wetland Type

8. Other references reviewed:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 22-1

Date 4/5/2022

Time am

Weather

Latitude

Longitude: 2.0

Hole #

Yes

Brush/tree mix

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material: Sand

Moraine

Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body n.a. feet

Drainage Way n.a. feet

Wetlands 50+ feet

Property Line 0 feet

Drinking Water Well 0 feet

Other 0 feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

If yes: 0 Depth Weeping from Pit

94" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
16	Fill										
36	B	SL	10yr5/6								
108	C	S	2.5y5/4						Med Coarse 40% Gravel		

Additional Notes:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 22-2 **Hole #** 4/5/2022 **Date** am **Time** Weather Latitude Longitude:
2.0
Land Use: Woodland **Brush/Tree mix** yes **Surface Stones** (e.g., cobbles, stones, boulders, etc.) Slope (%)

Description of Location: _____

Soil Parent Material: Sand **Moraine** Position on Landscape (SU, SH, BS, FS, TS)
Distances from: Open Water Body n.a. feet **Drainage Way** n.a. feet **Wetlands** 50+ feet
Property Line 40 feet **Drinking Water Well** n.a. feet **Other** _____ feet
Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
Groundwater Observed: ☐ Yes ☒ No **If yes:** _____ Depth Weeping from Pit 102" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
33	Fill										
35	A	L	10yr3/2								
54	B	LS	10yr5/6								
120	C	S	2.5y5/4						Med-Coarse 40%Gravel		

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 22-3 Date: 4/5/2022 Time: am Weather: _____ Latitude: _____ Longitude: 2.0

1. Land Use: Woodland Brush/tree mix: _____ Vegetation: _____ Surface Stones (e.g., cobbles, stones, boulders, etc.): _____ Slope (%): _____

Description of Location: _____

2. Soil Parent Material: Sand Moraine Landform: _____ Position on Landscape (SU, SH, BS, FS, TS): _____

3. Distances from: Open Water Body: n.a. feet Drainage Way: n.a. feet Wetlands: 50+ feet Other: _____ feet

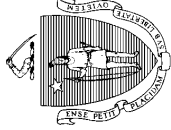
4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
36	Fill										
120	C	S	2.5y5/4						Med-Coarse 40%Gravel		

Additional Notes:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 22-4 **Hole #** 4/5/2022 **Date** am **Time** Weather Latitude Longitude:
Woodland **Land Use:** Brush/Tree mix **yes** 2.0
(e.g., woodland, agricultural field, vacant lot, etc.) **Vegetation** yes Surface Stones (e.g., cobbles, stones, boulders, etc.) **Slope (%)**

Description of Location: _____

Soil Parent Material: Sand **Moraine** Position on Landscape (SU, SH, BS, FS, TS)
Landform Wetlands 50+ **feet**
Distances from: Open Water Body n.a. **feet** Drainage Way n.a. **feet** Wetlands 50+ **feet**
Property Line 40 **feet** Drinking Water Well n.a. **feet** Other _____ **feet**
Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
Groundwater Observed: ☐ Yes ☒ No **If yes:** _____ **Depth Weeping from Pit** _____ **Depth Standing Water in Hole**

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
42	Fill										
94	C	S	2.5y5/4						Med-Coarse 40%Gravel		Hole callapse unable to read groundwater

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 22-5 Date: 4/5/2022 Time: am Weather: _____ Latitude: _____ Longitude: 2.0

Hole # _____

1. Land Use: Woodland Brush/tree mix: _____ Yes _____ Surface Stones (e.g., cobbles, stones, boulders, etc.): _____ Slope (%): _____

Description of Location: _____

2. Soil Parent Material: Sand Moraine Landform: _____ Position on Landscape (SU, SH, BS, FS, TS): _____

3. Distances from: Open Water Body: n.a. feet Drainage Way: n.a. feet Wetlands: 50+ feet

Property Line: _____ Drinking Water Well: _____ feet Other: _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
4	A	L	10yr3/2								
20	B	LS	10yr5/6								
100	C	S	2.5y5/4	60"	10yr5/6	Many			Med-Coarse Sand		

Additional Notes:



C. On-Site Review (*minimum of two holes required at every proposed primary and reserve disposal area*)

Description of Location:

3. Distances from:

Open Water Body	<u>n.a.</u> feet	Drainage Way	<u>n.a.</u> feet	Wetlands	<u>50+</u> feet
Property Line	<u>40</u> feet	Drinking Water Well	<u>n.a.</u> feet	Other	feet

Soil Log

[illegible]

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Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 22-7

Date 4/5/2022

Time am

Weather _____

Latitude _____

Longitude: 2.0

Hole #

Brush/tree mix

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Vegetation

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location: _____

2. Soil Parent Material: Sand

Moraine

Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body n.a. feet

Drainage Way n.a. feet

Wetlands 50+ feet

Other _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

If Yes: ☐ Yes ☐ No

Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

Other _____ feet

5. Groundwater Observed: ☒ Yes ☐ No

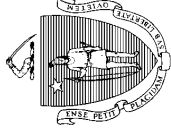
If yes: _____ Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
2	Fill										
60"	C	S	2.5y5/4	32"	10yr5/6				Med-Coarse Sand/Gravel		

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 22-8 **Hole #** 4/5/2022 **Date** am **Time** Weather Latitude Longitude:
2.0
Land Use: Woodland **Brush/Tree mix** yes **Surface Stones** (e.g., cobbles, stones, boulders, etc.) Slope (%)

Description of Location: _____

Soil Parent Material: Sand **Moraine** Position on Landscape (SU, SH, BS, FS, TS)
Distances from: Open Water Body n.a. feet **Drainage Way** n.a. feet **Wetlands** 50+ feet
Property Line 40 feet **Drinking Water Well** n.a. feet **Other** _____ feet
Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
Groundwater Observed: ☐ Yes ☒ No **If yes:** _____ Depth Weeping from Pit 39" Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
48	C	S	2.5Y5/4	39"					Med-Coarse Gravel		

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 22-9 **Date:** 4/5/2022 **Time:** am **Weather:** _____ **Latitude:** _____ **Longitude:** 2.0

1. Land Use Woodland **Brush/tree mix** Yes **Surface Stones** (e.g., cobbles, stones, boulders, etc.) _____ **Slope (%)** _____

Description of Location: _____

2. Soil Parent Material: Sand **Moraine Landform** _____ **Position on Landscape** (SU, SH, BS, FS, TS) _____

3. Distances from: **Open Water Body** n.a. feet **Drainage Way** n.a. feet **Wetlands** 50+ feet

Property Line _____ feet **Drinking Water Well** _____ feet **Other** _____ feet

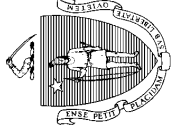
4. Unsuitable Materials Present: ☐ Yes ☐ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No **If yes:** _____ Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
2	Fill										
120"	C	S	2.5y5/4						Med-Coarse Sand/Gravel		

Additional Notes:



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator
Robert Truax SE#2476
Typed or Printed Name of Soil Evaluator / License #
Bruce Wilson
Name of Approving Authority Witness

Date
Expiration Date of License
BOH
Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with [Percolation Test Form 12](#).

Field Diagrams: Use this area for field diagrams:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Wall Street Development Corp

Owner Name

Prospect Street

Street Address

Bellingham

City

MA

State

Map/Lot #

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes:

Source

Soil Map Unit

Merrimac

Soil Name

Soil Limitations

Sand

Soil Parent material

Landform

3. Surficial Geological Report Available? ☐ Yes ☐ No

If yes:

Year Published/Source

Map Unit

Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No

If yes, MassGIS Wetland Data Layer:

7. Current Water Resource Conditions (USGS):

Month/Day/ Year

Range: ☐ Above Normal

☐ Normal

☐ Below Normal

Wetland Type

8. Other references reviewed:



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City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-1 **Hole #** 9/20/23 **Date** am **Time** Weather Latitude Longitude:
2.0

1. Land Use Woodland Brush/tree mix Yes Surface Stones (e.g., cobbles, stones, boulders, etc.) Slope (%)

Description of Location: _____

2. Soil Parent Material: Sand Moraine Landform Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body n.a. feet Drainage Way n.a. feet Wetlands 50+ feet
Property Line Drinking Water Well feet Other feet

4. Unsuitable Materials Present: ☐ Yes ☐ No ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No 64" Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
4	A	L									
120	C	S	2.5y5/4	64"					Med Coarse 35% Gravel		

Additional Notes:



C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number:		23-2	9/20/23	am			
		Hole #	Date	Time	Weather	Latitude	Longitude:
1. Land Use:	Woodland			Brush/Tree mix	yes		2.0
	(e.g., woodland, agricultural field, vacant lot, etc.)			Vegetation	Surface Stones (e.g., cobbles, stones, boulders, etc.)		Slope (%)

2. Soil Parent Material:	Sand	Moraine Landform	Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:	Open Water Body	<u>n.a.</u> feet	Drainage Way	<u>n.a.</u> feet	Wetlands	<u>50+</u> feet
	Property Line	40 feet	Drinking Water Well	<u>n.a.</u> feet	Other	feet

4. Unsuitable
Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If Yes: 48" Depth Weeping from Pit _____ Depth Standing Water in Hole _____

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Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-3 **Hole #** 9/20/23 **Date** am **Time** Weather Latitude Longitude:
2.0

1. Land Use Woodland Brush/tree mix Yes Surface Stones (e.g., cobbles, stones, boulders, etc.) Slope (%)

Description of Location: _____

2. Soil Parent Material: Sand Moraine Landform Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body n.a. feet Drainage Way n.a. feet Wetlands 50+ feet
Property Line Drinking Water Well feet Other feet

4. Unsuitable Materials Present: ☐ Yes ☐ No ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
40"	C	S	2.5y5/4						Med-Coarse 35%Gravel		Refusal

Additional Notes:



C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

1. Land Use:	Woodland (e.g., woodland, agricultural field, vacant lot, etc.)	Brush/Tree mix Vegetation	yes Surface Stones (e.g., cobbles, stones, boulders, etc.)	2.0 Slope (%)

2. Soil Parent Material:	Sand	Moraine Landform	Position on Landscape (SU, SH, BS, FS, TS)

4. Unsuitable
Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If Yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole _____

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City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-5 Date: 9/20/23 Time: am Weather: Latitude: Longitude: 2.0
Hole # Date Time Weather Latitude Longitude

1. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) Brush/tree mix: Yes Surface Stones (e.g., cobbles, stones, boulders, etc.): Slope (%):

Description of Location: _____

2. Soil Parent Material: Sand Moraine Landform Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body: n.a. feet Drainage Way: n.a. feet Wetlands: 50+ feet
Property Line: Yes ☐ No ☐ Drinking Water Well: feet Other: feet

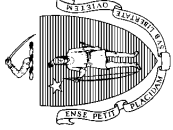
4. Unsuitable Materials Present: ☐ Yes ☐ No ☐ If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 50" Depth Weeping from Pit Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
81	C	S	2.5y5/4						Med-Coarse 35%Gravel		Refusal

Additional Notes:



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City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-6 **Hole #** 9/20/23 **Date** am **Time** Weather Latitude Longitude:
Woodland **Land Use:** Brush/Tree mix **yes** 2.0
(e.g., woodland, agricultural field, vacant lot, etc.) **Vegetation** Surface Stones (e.g., cobbles, stones, boulders, etc.) **Slope (%)**

Description of Location: _____

2. Soil Parent Material: Sand **Moraine** Position on Landscape (SU, SH, BS, FS, TS)
Landform
3. Distances from: Open Water Body n.a. **feet** Drainage Way n.a. **feet** Wetlands 50+ **feet**
Property Line 40 **feet** Drinking Water Well n.a. **feet** Other _____ **feet**
4. Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No **If yes:** 84" **Depth Weeping from Pit** _____ **Depth Standing Water in Hole**

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
96	C	S	2.5Y5/4						Med-Coarse 35%Gravel		

Additional Notes: _____



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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-7

Hole #

Date

Time

am

Weather

Latitude

Longitude:

2.0

1. Land Use

Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Brush/tree mix

Vegetation

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material: Sand

Moraine

Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body n.a. feet

Drainage Way n.a. feet

Wetlands

Property Line

feet

Drinking Water Well

feet

Other

feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes:

Disturbed Soil

☐

Fill Material

☐

Weathered/Fractured Rock

☐

Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

If yes:

40"

Depth Weeping from Pit

Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
84	C	S	2.5y5/4						Med-Coarse 35%Gravel		

Additional Notes:



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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

Deep Observation Hole Number: 23-8 **Hole #** 9/20/23 **Date** am **Time** Weather Latitude Longitude:
Woodland **Land Use:** Brush/Tree mix **yes** 2.0
(e.g., woodland, agricultural field, vacant lot, etc.) **Vegetation** yes **Surface Stones (e.g., cobbles, stones, boulders, etc.)** Slope (%)

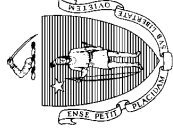
Description of Location: _____

2. Soil Parent Material: Sand **Moraine** Position on Landscape (SU, SH, BS, FS, TS)
Landform
3. Distances from: **Open Water Body** n.a. **feet** **Drainage Way** n.a. **feet** **Wetlands** feet
Property Line 40 **feet** **Drinking Water Well** n.a. **feet** **Other** feet
4. Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No **If yes:** 62" **Depth Weeping from Pit** Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
92	C	S	2.5Y5/4						Med-Coarse 35%Gravel		

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-9 **Hole #** 9/20/23 **Date** am **Time** Weather Latitude Longitude:
2.0

1. Land Use Woodland **Brush/tree mix** Yes **Surface Stones (e.g., cobbles, stones, boulders, etc.)** Slope (%)
(e.g., woodland, agricultural field, vacant lot, etc.) **Vegetation**

Description of Location: _____

2. Soil Parent Material: Sand **Moraine** Landform **Position on Landscape (SU, SH, BS, FS, TS)**

3. Distances from: Open Water Body n.a. **feet** Drainage Way n.a. **feet** Wetlands feet
Property Line feet Drinking Water Well feet Other feet

4. Unsuitable Materials Present: ☐ Yes ☐ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No **If yes:** 96" **Depth Weeping from Pit** _____ **Depth Standing Water in Hole**

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
110	C	S	2.5y5/4						Med-Coarse 35%Gravel		

Additional Notes:



C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

1. Land Use:	Woodland (e.g., woodland, agricultural field, vacant lot, etc.)	Brush/Tree mix Vegetation	yes Surface Stones (e.g., cobbles, stones, boulders, etc.)	2.0 Slope (%)

	Sand	Moraine Landform	Position on Landscape (SU, SH, BS, FS, TS)
2. Soil Parent Material:			

4. Unsuitable

Materials Present: ☐ Yes ☒ No
 If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
 5. Groundwater Observed: ☐ Yes ☒ No If Yes: 24" Depth Weeping from Pit ☐ Depth Standing Water in Hole ☐

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Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-11
Hole #

Date 9/20/23

Time am

Weather _____

Latitude _____

Longitude: 2.0

1. Land Use _____

Woodland
(e.g., woodland, agricultural field, vacant lot, etc.)

Brush/tree mix
Vegetation

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%) _____

Description of Location: _____

2. Soil Parent Material: Sand

Moraine
Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body n.a. feet

Drainage Way n.a. feet

Wetlands _____ feet

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes:

☐ Disturbed Soil

☐ Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

If yes:

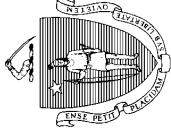
36" Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
72	C	S	2.5y5/4						Med-Coarse 35%Gravel		

Additional Notes:



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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-12 **Hole #** 9/20/23 **Date** am **Time** **Weather** **Latitude** **Longitude:** 2.0

1. Land Use: Woodland **Brush/Tree mix** yes **Vegetation** **Surface Stones** (e.g., cobbles, stones, boulders, etc.) **Slope (%)**

Description of Location:

2. Soil Parent Material: Sand **Moraine Landform** **Position on Landscape** (SU, SH, BS, FS, TS)

3. Distances from: **Open Water Body** n.a. **feet** **Drainage Way** n.a. **feet** **Wetlands** **feet**

Property Line 40 **feet** **Drinking Water Well** n.a. **feet** **Other** **feet**

4. Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No **If yes:** **Depth Weeping from Pit** **Depth Standing Water in Hole**

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
144	C	S	2.5Y5/4						Med-Coarse 35%Gravel		

Additional Notes:



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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-13
Hole #

Date 9/20/23

Time am

Weather _____

Latitude _____

Longitude: 2.0

1. Land Use

Woodland (e.g., woodland, agricultural field, vacant lot, etc.)

Brush/tree mix

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location: _____

2. Soil Parent Material: Sand

Moraine

Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body n.a. feet

Drainage Way n.a. feet

Wetlands _____ feet

Other _____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

Property Line _____ feet

Drinking Water Well _____ feet

Other _____ feet

Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

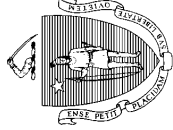
If yes: 124" Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
144	C	S	2.5y5/4						Med-Coarse 35%Gravel		

Additional Notes: _____



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-14 **Hole #** 9/20/23 **Date** am **Time** **Weather** **Latitude** **Longitude:** 2.0

1. Land Use: Woodland **Brush/Tree mix** yes **Vegetation** **Surface Stones** (e.g., cobbles, stones, boulders, etc.) **Slope (%)**

Description of Location:

2. Soil Parent Material: Sand **Moraine** **Landform** **Position on Landscape** (SU, SH, BS, FS, TS)

3. Distances from: **Open Water Body** n.a. **feet** **Drainage Way** n.a. **feet** **Wetlands** **feet**

Property Line 40 **feet** **Drinking Water Well** n.a. **feet** **Other** **feet**

4. Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No **If yes:** **Depth Weeping from Pit** **Depth Standing Water in Hole**

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
101"	C	S	2.5Y5/4						Med-Coarse 35%Gravel		

Additional Notes:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 23-15
Hole #

9/20/23
Date

am
Time

Weather

Latitude

Longitude:
2.0

Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Brush/tree mix

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material: Sand

Moraine

Landform

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body n.a. feet

Drainage Way n.a. feet

Wetlands feet

Property Line feet

Drinking Water Well feet

Other feet

4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No

If yes: Depth Weeping from Pit

Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
144	C	S	2.5y5/4						Med-Coarse 35%Gravel		

Additional Notes:



C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

1. Land Use:	Woodland (e.g., woodland, agricultural field, vacant lot, etc.)	Brush/Tree mix Vegetation	yes Surface Stones (e.g., cobbles, stones, boulders, etc.)	2.0 Slope (%)

2. Soil Parent Material:	Sand	Moraine Landform	Position on Landscape (SU, SH, BS, FS, TS)

Property Line	40 feet	Drinking Water Well	n.a. feet	Other	feet

4. Unsuitable
Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No If Yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole _____

[illegible]

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Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Wall Street Development Corp
Owner Name
Prospect Street
Street Address
Bellingham MA
City State
Map/Lot #
Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair
2. Soil Survey Available? ☒ Yes ☐ No If yes: Source Soil Map Unit

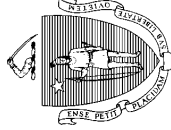
Merrimac
Soil Name
Soil Limitations

Sand
Soil Parent material
Landform

3. Surficial Geological Report Available? ☐ Yes ☐ No If yes: Year Published/Source Map Unit

Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No
5. Within a velocity zone? ☐ Yes ☒ No
6. Within a Mapped Wetland Area? ☐ Yes ☒ No If yes, MassGIS Wetland Data Layer: Wetland Type
☐ Normal ☐ Below Normal
7. Current Water Resource Conditions (USGS): Range: ☐ Above Normal ☐ Below Normal
Month/Day/ Year
8. Other references reviewed:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 24-1

Hole #

Date

am

Time

Weather

Latitude

Longitude:

2.0

1. Land Use

Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Brush/tree mix

Yes

Latitude

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material: Sand

Moraine

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body

Landform

Drainage Way

feet

Wetlands

Property Line

Drinking Water Well

feet

Other

4. Unsuitable Materials Present:

Yes ☐ No ☐

Disturbed Soil

Fill Material

Weathered/Fractured Rock

Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

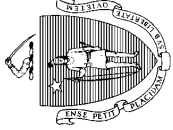
If yes: 110" Depth Weeping from Pit

Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
6	A	L	10yr3/3								
26	B	SL	10yr5/6								
74	C1	S	2.5y5/4	74"	10y5/6	>5.0%			Fine-Med Sand		
120	C2	S	2.5y5/3				10%		Med-Coarse		

Additional Notes:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

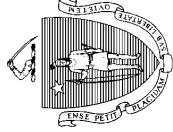
Deep Observation Hole Number: 24-2 **Hole #** 6/11/24 **Date** am **Time** Latitude Longitude:
Woodland **Land Use:** Brush/Tree mix **yes** 2.0
(e.g., woodland, agricultural field, vacant lot, etc.) **Vegetation** Surface Stones (e.g., cobbles, stones, boulders, etc.) **Slope (%)**

Description of Location: Moraine **Landform** Position on Landscape (SU, SH, BS, FS, TS)
Soil Parent Material: Sand **Drainage Way** n.a. **feet** **Wetlands** feet
Distances from: **Open Water Body** n.a. **feet** **Drinking Water Well** n.a. **feet** **Other** feet
Property Line 40 **feet**
4. Unsuitable Materials Present: ☐ Yes ☒ No **If Yes:** ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock
5. Groundwater Observed: ☐ Yes ☒ No **If yes:** Depth Weeping from Pit Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
10	A	L	10yr3/3								
32"	B	SL	10yr5/6								
144	C	S	2.5y5/4				10%		Med-Coarse		

Additional Notes:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 24-3

Hole #

Date

am

Time

Weather

Latitude

Longitude:

2.0

1. Land Use

Woodland

(e.g., woodland, agricultural field, vacant lot, etc.)

Brush/tree mix

Vegetation

Yes

Surface Stones (e.g., cobbles, stones, boulders, etc.)

Slope (%)

Description of Location:

2. Soil Parent Material: Sand

Moraine

Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from:

Open Water Body

n.a. feet

Drainage Way

n.a. feet

Wetlands

_____ feet

Property Line

_____ feet

Drinking Water Well

_____ feet

Other

_____ feet

4. Unsuitable Materials Present: ☐ Yes ☐ No

If Yes:

☐ Disturbed Soil

☐ Fill Material

☐ Weathered/Fractured Rock

☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No

If yes:

110" Depth Weeping from Pit

_____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
10	A	L	10yr3/3								
32	B	SL	10yr5/6								
72	C1	S	2.5y5/4						Fine-Med Sand		
120	C2	S	2.5y5/3				10%		Med-Coarse		

Additional Notes:



C. On-Site Review (minimum of two holes required at every proposed primary and reserve disposal area)

1. Land Use:	Woodland (e.g., woodland, agricultural field, vacant lot, etc.)	Brush/Tree mix Vegetation	yes Surface Stones (e.g., cobbles, stones, boulders, etc.)	2.0 Slope (%)

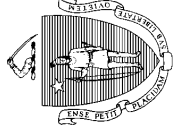
	Sand	Moraine Landform	Position on Landscape (SU, SH, BS, FS, TS)
2. Soil Parent Material:			

4. Unsuitable
Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If Yes: 84" Depth Weeping from Pit _____ Depth Standing Water in Hole _____

[illegible]

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Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: 24-5 Date: 6/11/2024 Time: am Weather: Longitude: 2.0
Hole # Date Time Weather Longitude

1. Land Use: Woodland Brush/tree mix Yes Surface Stones (e.g., cobbles, stones, boulders, etc.) Slope (%)

Description of Location: _____

2. Soil Parent Material: Sand Moraine Landform Position on Landscape (SU, SH, BS, FS, TS)

3. Distances from: Open Water Body n.a. feet Drainage Way n.a. feet Wetlands feet
Property Line n.a. feet Drinking Water Well feet Other feet

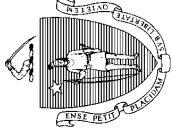
4. Unsuitable Materials Present: ☐ Yes ☐ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: Depth Weeping from Pit Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA)	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
8	A	L	10yr3/3								
30	B	SL	10yr5/6								
60	C1	S	2.5y5/4	60"	10yr5/6	>5.0			Med-Coarse		
100	C2	S	2.5y5/3						Fine-Med firm		

Additional Notes:



Commonwealth of Massachusetts
City/Town of Bellingham

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

- ☐ Depth observed standing water in observation hole
- ☐ Depth weeping from side of observation hole
- ☐ Depth to soil redoximorphic features (mottles)
- ☐ Depth to adjusted seasonal high groundwater (S_h) (USGS methodology)

Obs. Hole # _____ inches

Obs. Hole # _____ inches

Obs. Hole # _____ inches

Obs. Hole # _____ inches

Index Well Number _____ Reading Date _____

$$S_h = S_c - [S_r \times (OW_c - OW_{max}) / OW_r]$$

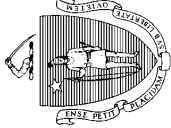
Obs. Hole/Well# _____ S_c _____ S_r _____ OW_c _____ OW_{max} _____ OW_r _____ S_h _____

2. Estimated Depth to High Groundwater: _____ inches

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

- a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil system? ☒ Yes ☐ No absorption
- b. If yes, at what depth was it observed (exclude A and O Horizons)? Upper boundary: _____ inches Lower boundary: _____ inches
- c. If no, at what depth was impervious material observed? Upper boundary: _____ inches Lower boundary: _____ inches



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator
Robert Truax SE#2476
Typed or Printed Name of Soil Evaluator / License #

Name of Approving Authority Witness

Date
2026
Expiration Date of License

Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with [Percolation Test Form 12](#).

Field Diagrams: Use this area for field diagrams:

APPENDIX – E

Stormwater Operation and Maintenance Plan

Standard 9

Stormwater Management Operation and Maintenance Plan
And Long Term Pollution Prevention Plan

Maintenance Agreement
Prospect Hill Estates
Bellingham, Massachusetts

November 30, 2023

In accordance with Standard 9 of the Massachusetts Department of Environmental Protection Stormwater Handbook (February 2008), the attached on-site maintenance program for the proposed stormwater management system has been developed to ensure the Best Management Practices (BMP's) in place will remain functioning as designed. The landowner/operator, or its successors, of the Project Site, Prospect Hill Estates, (Assessor Map 38, Parcels 23 & 24), shall be responsible for financing maintenance and emergency repairs of the entire stormwater management system on the property. The Plan contains both construction period operations and maintenance as well as post construction responsibilities that shall "run" with the property when the ownership is transferred.

Responsible Operator:

WALL STREET DEVELOPMENT CORP.
Attn: Lou Petrozzi
P.O. Box 272
Westwood, MA 02090
Office: 781-440-0306

Lou Petrozzi

Date

Construction Period Operation and Maintenance:

- It should be noted that the US EPA mandated NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more, including smaller sites in a larger common plan of development or sale, to obtain coverage under an NPDES permit for their stormwater discharges. The Project is subject to this permit and therefore, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to commencement of construction. The SWPPP will contain additional construction period and post construction erosion control requirements.

Good Housekeeping Practices:

- Remove all debris from site and dispose of in trash dumpsters
- Plan for adequate disposal of scrap, waste and surplus materials
- Keep work area clean
- Secure loose or light material that is stored on the site
- Store flammable materials apart from other materials
- Secure all materials at the end of each work day
- Maintain a clean neat and orderly site

Safety:

Always keep safety considerations at the forefront of inspection procedures. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc) without proper training or equipment. A confined space should never be entered without at least one additional person present. If a toxic or flammable substance is discovered, leave the immediate area and contact the local authorities at 911.

All cast iron storm water structure grates and covers shall be kept in good condition and kept always closed. Any damaged or broken structures will be replaced immediately upon discovery.

Subsurface Infiltration Chambers:

Rope or fence off the area selected for the infiltration chambers. Stabilize the site prior to installing the subsurface chambers. Do not allow runoff from any disturbed areas on site to flow to the chambers. Never allow construction equipment not performing the excavation to drive across the area where the chambers will be installed. Provide an access port, manway, and an observation well to enable inspection of water levels within the system.

Erosion Control Barriers:

Filtermitts in combination with construction fencing shall be installed where indicated on the plans and in other appropriate locations where warranted. These barriers shall be installed prior to the commencement of any work on-site and in accordance with the construction plans. A supply of filtermitts shall be kept on-site to replace and/or repair barriers that are damaged or degraded. The barriers shall be observed and maintained on a weekly basis during construction.

Construction Entrances:

The purpose of stabilizing entrances to a construction site is to minimize the amount of sediment leaving the area as mud and sediment attached to vehicles. The entrances shall be sized according to the Massachusetts DEP and US EPA guidelines and will be maintained on a weekly basis during construction. A Detail is included in the Site Plans prepared for the Project.

Sediment Traps/Basins:

Sediment basins and rock dams can be used to capture sediment from stormwater runoff before it leaves a construction site. Both structures allow a pool to form in an excavated or natural depression, where sediment can settle. The pool is dewatered through a single riser and drainage hole leading to a suitable outlet on the downstream side of the embankment or through the gravel of the rock dam. Design a sediment trap to maximize the surface area for infiltration and sediment settling. This increases the effectiveness of the trap and decreases the likelihood of backup during and after periods of high runoff intensity. Site conditions dictate specific design criteria, but the minimum storage capacity should be 1,800 ft³ per acre of total drainage area (Smolen et al., 1988). The volume of a natural sediment trap can be approximated using the following equation (Smolen et al., 1988): *Volume (ft³) = 0.4 x surface area (ft²) x maximum pool depth (ft)*. Sediment traps have a useful life of about 18 to 24 months (USEPA, 1993), but their effectiveness depends on the amount and intensity of rainfall and erosion, and proper maintenance.

Dust Control:

Soils information for the site indicates that it is comprised of sandy soils. Therefore, Dust control BMPs to reduce surface activities and air movement that causes dust to be generated from disturbed soil surfaces will be required. The preferred measure for dust control is sprinkling/irrigation. This is an on-going/as-needed requirement until surfaces have been stabilized. There shall be a water truck on-site available as needed.

Diversions:

Temporary diversion swales and mounds will be constructed to divert stormwater away from areas under construction to limit sediment transport. These diversions will be relocated as construction progresses. Stone check dams will be installed in swales as necessary to limit scour and sediment transport.

Catch Basin Protection:

Temporary inlet protection barriers consisting of Silt Sacks® will be placed within all constructed inlets to prevent inflow of sediments into the constructed drainage system. The barriers shall remain in place until a permanent cover is established or diversions away from the inlets are constructed. The barriers shall be observed and maintained as necessary on a weekly basis and after every rainfall of 0.5 inches or more.

Infiltration Basins:

During Construction, the basins shall be observed during and after all storm events to ensure there is no sediment accumulation or degradation of infiltrative surfaces. The basin bottoms shall be maintained at an elevation at least 1-foot above the proposed finished bottom elevation to protect final infiltrative surfaces. The basins will be excavated to final grades after all surfaces contributing runoff to the basins have been stabilized. Ensure all stumps are fully removed from the area of the system to ensure proper function. Care should be taken by the contractor to prevent compaction of the final basin bottom. Use deep tilling to break up compacted surfaces, should it occur.

Spill Control:

A contingency plan to address the spillage/release of petroleum products and any hazardous materials will be implemented for the site during construction. The plan will include the following measures:

- Equipment necessary to quickly attend to inadvertent spills or leaks shall be on-site in a secure but accessible location. Such equipment will include, but not be limited to, the following: urethane drain cover seals (mats), a spill containment kit which includes sand and shovels, suitable absorbent materials, storage containers, safety goggles, chemically resistant gloves and overshoe boots, water and chemical fire extinguishers, and first aid equipment.
- Spills or leaks will be treated properly according to material type, volume of spillage and location of spill. Mitigation will include preventing further spillage, containing the spilled material to the smallest practical area, removing spilled material in a safe and environmentally friendly manner, and remediating any damage to the environment.
- The contractor shall be familiar with the reporting requirements of the Massachusetts Contingency Plan (310 CMR 40.00) as issued by the Massachusetts Department of Environmental Protection (DEP); specifically Subpart C Notification of Releases and Threats of Release of Oil and Hazardous Materials and Subpart D Preliminary Response Activities and Risk Reduction Measures.
- For any large spills. The Massachusetts DEP Hazardous Waste Incident Response Group shall be notified immediately at 1-617-792-7653 and an emergency response contractor will be called in.

Stormwater Inspection Report
Prospect Hill Village
Bellingham, Massachusetts

General Information			
Project Name			
Location:			
Date of Inspection			
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Type of Inspection: ☒ Regular ☐ Pre-storm event ☐ During storm event ☐ Post-storm event			
Weather Information			
Weather at time of this inspection? Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snowing ☐ High Winds ☐ Other: Temperature:			
Have any discharges occurred since the last inspection? ☐ Yes ☐ No If yes, describe:			
Are there any discharges at the time of inspection? ☐ Yes ☐ No If yes, describe:			

	BMP Inspected	Notes
1		
2		
3		
4		
5		
6		
7		
8		
8		
10		

Non-Compliance

There was no non-compliance issues observed during the site inspection.
The overall site was clean and landscaping was sufficient

CERTIFICATION STATEMENT

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Print name and title: _____

Signature: _____ **Date:** _____

Stormwater Management Operation and Maintenance Plan
Post-Construction Period:

Maintenance Agreement
Prospect Hill Estates
Bellingham, Massachusetts

November 30, 2023

In accordance with Standard 9 of the Massachusetts Department of Environmental Protection Stormwater Handbook (February 2008), the attached on-site maintenance program for the proposed stormwater management system has been developed to ensure the Best Management Practices (BMP's) in place will remain functioning as designed. The landowner/operator, or its successors, of the Project Site, Prospect Hill Estates, (Assessor Map 38, Parcels 23 & 24), shall be responsible for financing maintenance and emergency repairs of the entire stormwater management system on the property. The Plan contains both construction period operations and maintenance as well as post construction responsibilities that shall "run" with the property when the ownership is transferred.

Responsible Operator:

WALL STREET DEVELOPMENT CORP.
Attn: Lou Petrozzi
P.O. Box 272
Westwood, MA 02090
Office: 781-440-0306

Lou Petrozzi

Date

Estimated Maintenance Budget:

- | | |
|---------------------------------------|-------------------------|
| • Catch Basin Cleaning (Annual cost): | \$1,500.00 per cleaning |
| • Drainage Basin Grass Mowing: | \$1,500.00 per year |
| • Road Sweeping: | \$1,200.00 per service |
| • Drainage System Inspection: | \$ 500.00/inspection |
| Estimated Total Annual Cost: | \$4,700.00/year |

Pavement Sweeping:

Sweeping has been shown to be an effective initial treatment for reducing contaminants in stormwater runoff. Sweeping is not required to meet TSS removal goals in this case but should be performed at least once per year, in the spring to remove winter accumulations or at other when warranted.

Safety:

Always keep safety considerations at the forefront of inspection procedures. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc) without proper training or equipment. A confined space should never be entered without at least one additional person present. If a toxic or flammable substance is discovered, leave the immediate area and contact the local authorities at 911.

All cast iron storm water structure grates and covers shall be kept in good condition and kept always closed. Any damaged or broken structures will be replaced immediately upon discovery.

Gutter Cleaning:

Gutter cleaning shall be done at least once per year, in the fall after the trees have dropped their leaves. Inspect downspouts and overflows periodically to prevent debris buildup.

Recharge Systems (Infiltration Chambers) :

The inlet pipe and observation access port shall be inspected 4 times per year. Inspect recharge facilities following a rainfall event greater than 2.5 inches in a 24 hour period. Any accumulated debris shall be removed.

If standing water is observed for more than 72 hours following a storm event, immediately retain a qualified professional to assess whether infiltration function has been lost and develop recommended correction actions.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the chambers, clean-out should be performed. Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles.

Deep Sump Catch Basins:

Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Inspect and clean sumps when sediments whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert to the lowest pipe in the basin, at least once (1) time per year, at the end of the foliage and snow removal seasons. Clamshell buckets or vacuum trucks shall be utilized.

CDS Proprietary Treatment Unit:

Sediments, associated pollutants and trash are removed only when inlets or sumps are cleaned out, so regular maintenance is essential. Cleaning includes removal of accumulated oil and grease and sediment using a vacuum truck or other ordinary catch basin cleaning device. In areas of high sediment loading, inspect and clean inlets after every major storm. At a minimum, inspect oil grit separators and clean them out at least twice per year. Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system.

CDS Treatment Units:

<u>Activity</u>	<u>Inspection Frequency</u>
Inspect Inlet and Outlet	2 times per yr. After a heavy rain event 1" storm or larger
Sediment buildup & Clean	2 times per yr. (minimum) Accumulated sediment buildup shall be Vacuumed cleaned as necessary

Infiltration Basins:

Vehicle access if necessary will be via the 10 foot wide access way from the project to the retention basin. The drainage easement shall be mowed twice a year and kept clear of any trees.

Inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary to take corrective action. Also inspect the basin every time there is a discharge through the high outlet weir. A major storm is defined as a storm that is equal to or greater than the 2.5 inches in a 24-hour storm. Note how long the water remains standing after a storm. If longer than 72 hours, there may be clogging of the infiltrative surfaces. Inspect the basin and mow it at least twice per year. Remove grass clippings, organic matter and trash. Use deep tilling to break up compacted or clogged surfaces.

Sediment Forebays:

Inspect sediment forebays monthly. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. When mowing grasses, keep the grass height no greater than 6 inches. Set mower blades no lower than 3 to 4 inches. Check for signs of rilling and gullyng and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while seeds germinate and develop roots.

Snow Removal and De-icing:

The use of Sodium Chloride ("rock salt") for de-icing of paved surfaces will be limited; except when found to be necessary for safety of the workers. Sand will be the primary icing control agent. Alternative de-icing products such as calcium chloride may be used as temperatures or other conditions warrant.

Fertilizer:

Slow release organic fertilizers will be used in landscape areas to limit nutrient transport to groundwater and wetland areas. Application will be limited to 3 lbs. per 1000 sf of lawn area.

Spill Control:

A contingency plan to address the spillage/release of petroleum products and any hazardous materials will be implemented for the site during construction. The plan will include the following measures:

- Equipment necessary to quickly attend to inadvertent spills or leaks shall be on-site in a secure but accessible location. Such equipment will include, but not be limited to, the following: urethane drain cover seals (mats), a spill containment kit which includes sand and shovels, suitable absorbent materials, storage containers, safety goggles, chemically resistant gloves and overshoe boots, water and chemical fire extinguishers, and first aid equipment.
- Spills or leaks will be treated properly according to material type, volume of spillage and location of spill. Mitigation will include preventing further spillage, containing the spilled material to the smallest practical area, removing spilled material in a safe and environmentally friendly manner, and remediating any damage to the environment.
- The contractor shall be familiar with the reporting requirements of the Massachusetts Contingency Plan (310 CMR 40.00) as issued by the Massachusetts Department of Environmental Protection (DEP); specifically Subpart C Notification of Releases and Threats of Release of Oil and Hazardous Materials and Subpart D Preliminary Response Activities and Risk Reduction Measures.
- For any large spills. The Massachusetts DEP Hazardous Waste Incident Response Group shall be notified immediately at 1-617-792-7653 and an emergency response contractor will be called in.

Stormwater Inspection Report
Prospect Hill Village
Bellingham, Massachusetts

General Information			
Project Name			
Location:			
Date of Inspection			
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Type of Inspection:			
☒ Regular ☐ Pre-storm event ☐ During storm event ☐ Post-storm event			
Weather Information			
Weather at time of this inspection?			
Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snowing ☐ High Winds			
☐ Other: Temperature:			
Have any discharges occurred since the last inspection? ☐ Yes ☐ No			
If yes, describe:			
Are there any discharges at the time of inspection? ☐ Yes ☐ No			
If yes, describe:			

	BMP Inspected	Notes
1		
2		
3		
4		
5		
6		
7		
8		
8		
10		

Non-Compliance

There was no non-compliance issues observed during the site inspection.
The overall site was clean and landscaping was sufficient

CERTIFICATION STATEMENT

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Print name and title: _____

Signature: _____ **Date:** _____

Appendix B

Maintenance Procedures & Manuals

CDS® Inspection and Maintenance Guide



Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

[illegible]

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

Contactor® & Recharger® Stormwater Chambers



Operation and Maintenance Guidelines for CULTEC Stormwater Management Systems

The Founder of Plastic Chamber Technology

www.cultec.com | 1(800) 4-CULTEC |  





Operations and Maintenance Guidelines

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Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

Doc ID: CULG008 05-17
May 2017

*These instructions are for single-layer traffic applications only. For multi-layer applications, contact CULTEC.
All illustrations and photos shown herein are examples of typical situations. Be sure to follow the engineer's drawings.
Actual designs may vary.*

This manual contains guidelines recommended by CULTEC, Inc. and may be used in conjunction with, but not to supersede, local regulations or regulatory authorities. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Introduction

The CULTEC Subsurface Stormwater Management System is a high-density polyethylene (HDPE) chamber system arranged in parallel rows surrounded by washed stone. The CULTEC chambers create arch-shaped voids within the washed stone to provide stormwater detention, retention, infiltration, and reclamation. Filter fabric is placed between the native soil and stone interface to prevent the intrusion of fines into the system. In order to minimize the amount of sediment which may enter the CULTEC system, a sediment collection device (stormwater pretreatment device) is recommended upstream from the CULTEC chamber system. Examples of pretreatment devices include, but are not limited to, an appropriately sized catch basin with sump, pretreatment catchment device, oil grit separator, or baffled distribution box. Manufactured pretreatment devices may also be used in accordance with CULTEC chambers. Installation, operation, and maintenance of these devices shall be in accordance with manufacturer's recommendations. Almost all of the sediment entering the stormwater management system will be collected within the pretreatment device.

Best Management Practices allow for the maintenance of the preliminary collection systems prior to feeding the CULTEC chambers. The pretreatment structures shall be inspected for any debris that will restrict inlet flow rates. Outfall structures, if any, such as outlet control must also be inspected for any obstructions that would restrict outlet flow rates. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Operation and Maintenance Requirements

I. Operation

CULTEC stormwater management systems shall be operated to receive only stormwater run-off in accordance with applicable local regulations. CULTEC subsurface stormwater management chambers operate at peak performance when installed in series with pretreatment. Pretreatment of suspended solids is superior to treatment of solids once they have been introduced into the system. The use of pretreatment is adequate as long as the structure is maintained and the site remains stable with finished impervious surfaces such as parking lots, walkways, and pervious areas are properly maintained. If there is to be an unstable condition, such as improvements to buildings or parking areas, all proper silt control measures shall be implemented according to local regulations.

II. Inspection and Maintenance Options

- A. The CULTEC system may be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pretreatment device). CCTV inspection of this row can be deployed through this access port to determine if any sediment has accumulated in the inlet row.
- B. If the CULTEC bed is not equipped with an inspection port, then access to the inlet row will be through an upstream manhole or the CULTEC StormFilter.
 1. **Manhole Access**
This inspection should only be carried out by persons trained in confined space entry and sewer inspection services. After the manhole cover has been removed a gas detector must be lowered into the manhole to ensure that there are not high concentrations of toxic gases present. The inspector should be lowered into the manhole with the proper safety equipment as per OSHA requirements. The inspector may be able to observe sediment from this location. If this is not possible, the inspector will need to deploy a CCTV robot to permit viewing of the sediment.

2. StormFilter Access

Remove the manhole cover to allow access to the unit. Typically a 30-inch (750 mm) pipe is used as a riser from the StormFilter to the surface. As in the case with manhole access, this access point requires a technician trained in confined space entry with proper gas detection equipment. This individual must be equipped with the proper safety equipment for entry into the StormFilter. The technician will be lowered onto the StormFilter unit. The hatch on the unit must be removed. Inside the unit are two filters which may be removed according to StormFilter maintenance guidelines. Once these filters are removed the inspector can enter the StormFilter unit to launch the CCTV camera robot.

- C. The inlet row of the CULTEC system is placed on a polyethylene liner to prevent scouring of the washed stone beneath this row. This also facilitates the flushing of this row with high pressure water through a culvert cleaning nozzle. The nozzle is deployed through a manhole or the StormFilter and extended to the end of the row. The water is turned on and the inlet row is back-flushed into the manhole or StormFilter. This water is to be removed from the manhole or StormFilter using a vacuum truck.

III. Maintenance Guidelines

The following guidelines shall be adhered to for the operation and maintenance of the CULTEC stormwater management system:

- A. The owner shall keep a maintenance log which shall include details of any events which would have an effect on the system's operational capacity.
- B. The operation and maintenance procedure shall be reviewed periodically and changed to meet site conditions.
- C. Maintenance of the stormwater management system shall be performed by qualified workers and shall follow applicable occupational health and safety requirements.
- D. Debris removed from the stormwater management system shall be disposed of in accordance with applicable laws and regulations.

IV. Suggested Maintenance Schedules

A. Minor Maintenance

The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris, as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris, as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris, as required.

B. Major Maintenance

The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers. (See table on next page)

	Frequency	Action
Inlets and Outlets	Every 3 years	Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
	Spring and Fall	Check inlet and outlets for clogging and remove any debris as required.
CULTEC Stormwater Chambers	2 years after commissioning	- Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. - Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
	9 years after commissioning every 9 years following	- Clean stormwater management chambers and feed connectors of any debris. - Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. - Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
	45 years after commissioning	- Clean stormwater management chambers and feed connectors of any debris. - Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. - Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. - Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. - Attain the appropriate approvals as required. - Establish a new operation and maintenance schedule.
Surrounding Site	Monthly in 1 st year	Check for depressions in areas over and surrounding the stormwater management system.
	Spring and Fall	Check for depressions in areas over and surrounding the stormwater management system.
	Yearly	Confirm that no unauthorized modifications have been performed to the site.

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.

APPENDIX – F

Illicit Discharge Statement

Standard 10

Illicit Discharge Compliance Statement

Prospect Hill Village
Bellingham, Massachusetts

December 30, 2023

This statement is provided in accordance with the provisions of the Massachusetts Stormwater Management Standard #10.

To the best of the applicant's/owners knowledge there are no illicit discharges to the site's stormwater management system.

All proposed uses on the site will not generate, store or discharge any pollutants to the groundwater and/or wetland resource areas.

Any illicit discharges identified during or after construction will be terminated immediately.

Applicant:

WALL STREET DEVELOPMENT CORP.
Attn: Lou Petrozzi
P.O. Box 272
Westwood, MA 02090
Office: 781-440-0306

APPENDIX – G

Supplemental Stormwater Plans

Pre-Development Subcatchment Areas
Post-Development Subcatchment Areas
Hydraulic Subcatchment Areas

