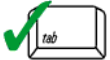




Checklist for Stormwater Report

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.

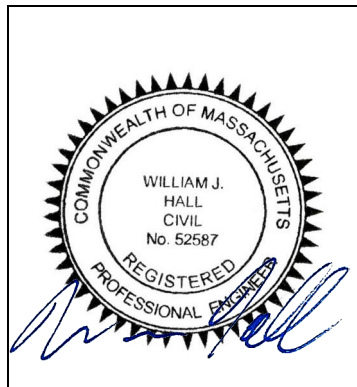
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

3/4/24

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): Roof drywells and porous pavement

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)

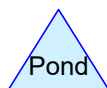
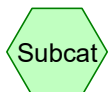
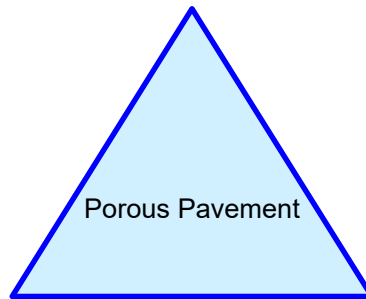
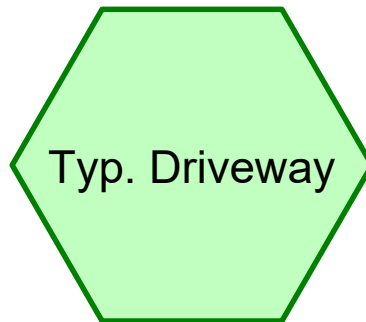
- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and 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.



Routing Diagram for 21-10254 - Post-R6

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Project Notes

Rainfall events imported from "19-6813 Pre-Development.hcp"

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.10	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.50	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.30	2
4	50-Year	Type III 24-hr		Default	24.00	1	5.90	2
5	100-Year	Type III 24-hr		Default	24.00	1	6.50	2

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Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
575	98	Paved parking, HSG A (Typ. Driveway)
575	98	TOTAL AREA

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Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
575	HSG A	Typ. Driveway
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
575		TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchmen Numbers
575	0	0	0	0	575	Paved parking	T y p .
575	0	0	0	0	575	TOTAL AREA	

21-10254 - Post-R6*Type III 24-hr 2-Year Rainfall=3.10"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentTyp. Driveway:

Runoff Area=575 sf 100.00% Impervious Runoff Depth=2.87"

Tc=6.0 min CN=98 Runoff=0.0 cfs 137 cf

Pond Porous Pavement:

Peak Elev=8.34' Storage=1 cf Inflow=0.0 cfs 137 cf

Outflow=0.0 cfs 137 cf

Total Runoff Area = 575 sf Runoff Volume = 137 cf Average Runoff Depth = 2.87"
0.00% Pervious = 0 sf 100.00% Impervious = 575 sf

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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Subcatchment Typ. Driveway:

Runoff = 0.0 cfs @ 12.09 hrs, Volume= 137 cf, Depth= 2.87"
Routed to Pond Porous Pavement :

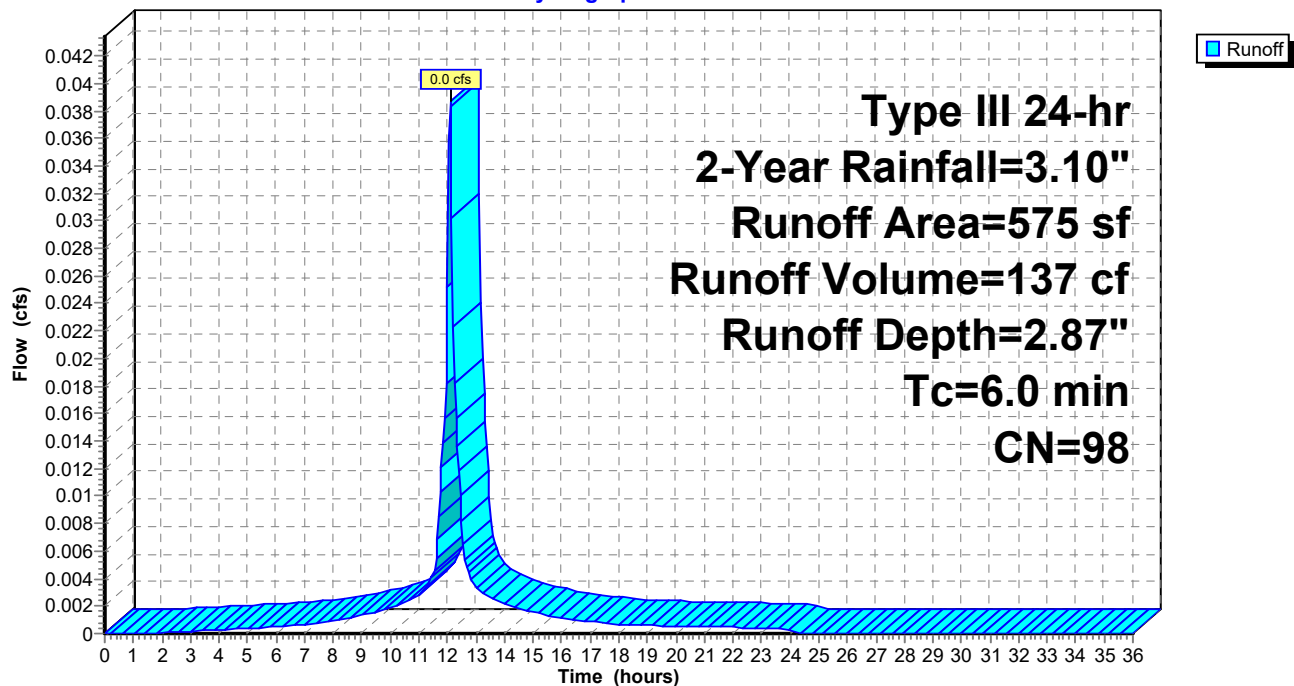
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
0	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
575	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
575	98	Weighted Average
575		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6

Subcatchment Typ. Driveway:

Hydrograph



21-10254 - Post-R6

Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond Porous Pavement:

Inflow Area = 575 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2-Year event
 Inflow = 0.0 cfs @ 12.09 hrs, Volume= 137 cf
 Outflow = 0.0 cfs @ 12.09 hrs, Volume= 137 cf, Atten= 1%, Lag= 0.2 min
 Discarded = 0.0 cfs @ 12.09 hrs, Volume= 137 cf

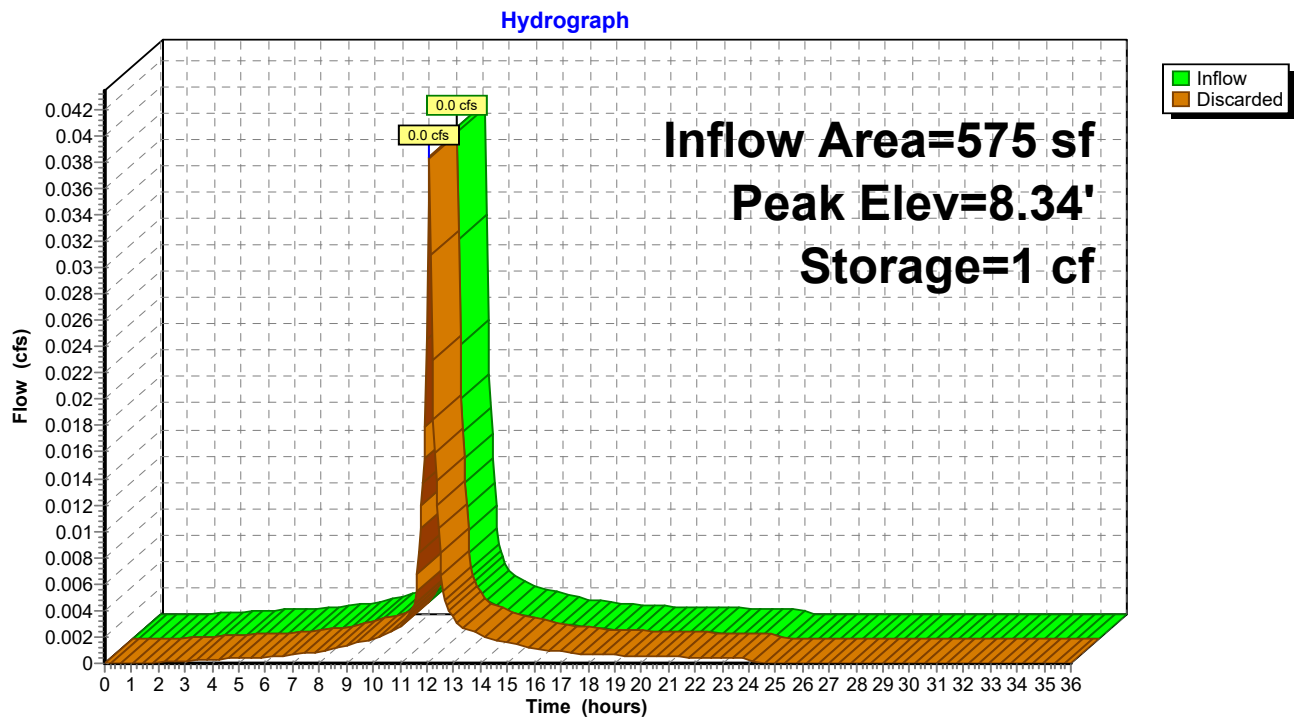
Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 8.34' @ 12.09 hrs Surf.Area= 275 sf Storage= 1 cf

Plug-Flow detention time= 0.3 min calculated for 137 cf (100% of inflow)
 Center-of-Mass det. time= 0.3 min (757.3 - 757.1)

Volume	Invert	Avail.Storage	Storage Description	
#1	8.33'	181 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.33	275	0.0	0	0
8.34	275	30.0	1	1
10.42	275	30.0	172	172
10.75	275	10.0	9	181

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.33'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.1 cfs @ 12.09 hrs HW=8.34' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond Porous Pavement:

21-10254 - Post-R6*Type III 24-hr 10-Year Rainfall=4.50"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Typ. Driveway:

Runoff Area=575 sf 100.00% Impervious Runoff Depth=4.26"

Tc=6.0 min CN=98 Runoff=0.1 cfs 204 cf

Pond Porous Pavement:

Peak Elev=8.34' Storage=1 cf Inflow=0.1 cfs 204 cf

Outflow=0.1 cfs 205 cf

Total Runoff Area = 575 sf Runoff Volume = 204 cf Average Runoff Depth = 4.26"
0.00% Pervious = 0 sf 100.00% Impervious = 575 sf

21-10254 - Post-R6

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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment Typ. Driveway:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 204 cf, Depth= 4.26"
Routed to Pond Porous Pavement :

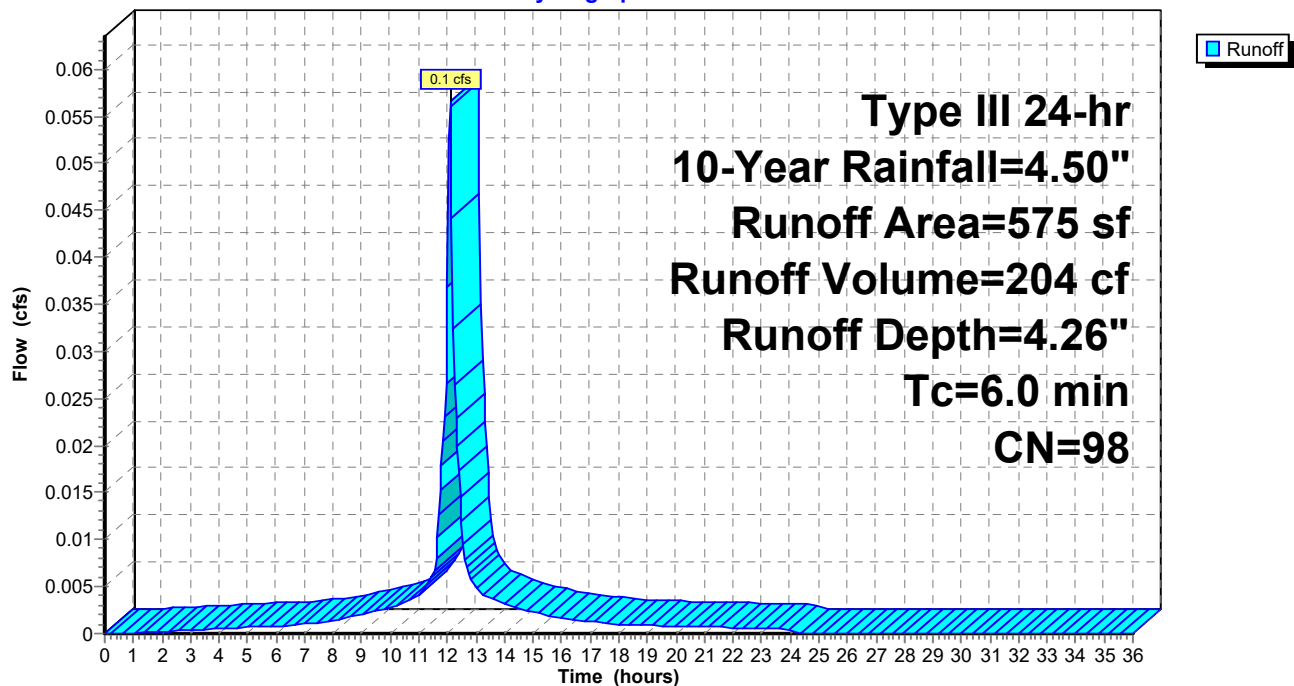
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
0	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
575	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
575	98	Weighted Average
575		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6

Subcatchment Typ. Driveway:

Hydrograph



21-10254 - Post-R6

Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Pond Porous Pavement:

Inflow Area = 575 sf, 100.00% Impervious, Inflow Depth = 4.26" for 10-Year event
 Inflow = 0.1 cfs @ 12.09 hrs, Volume= 204 cf
 Outflow = 0.1 cfs @ 12.09 hrs, Volume= 205 cf, Atten= 7%, Lag= 0.3 min
 Discarded = 0.1 cfs @ 12.09 hrs, Volume= 205 cf

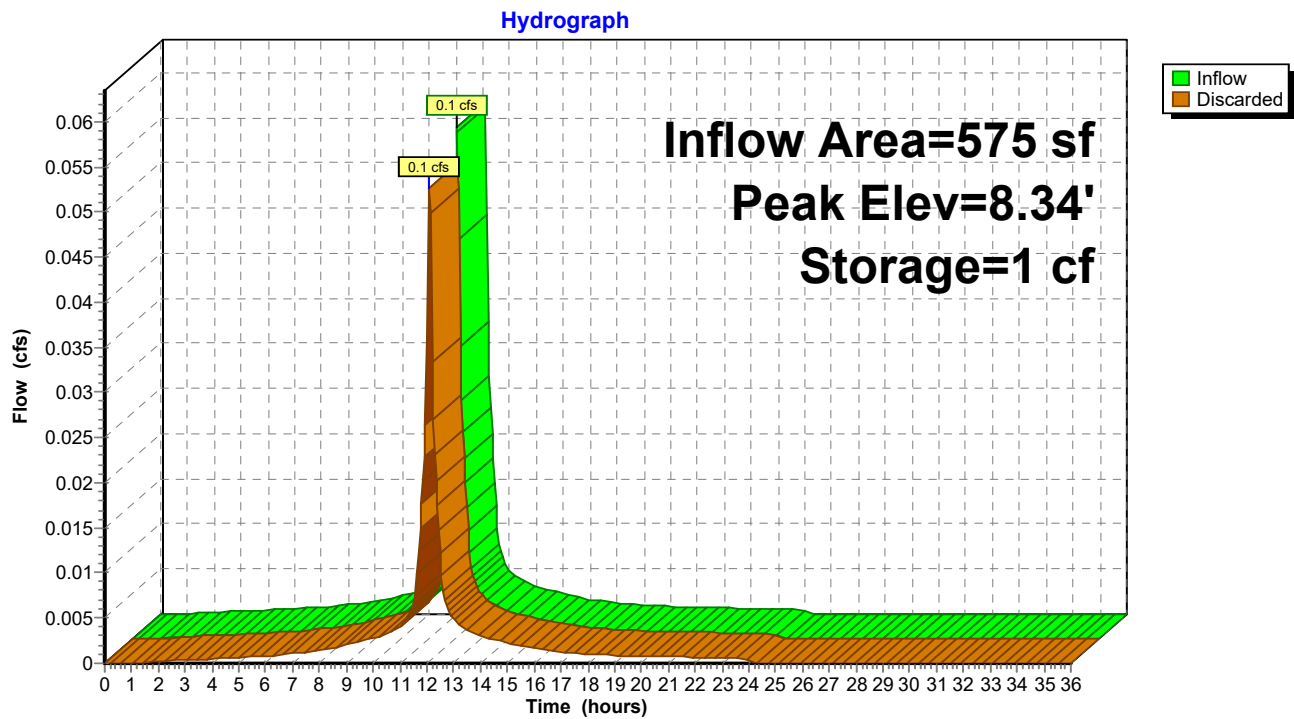
Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 8.34' @ 12.10 hrs Surf.Area= 275 sf Storage= 1 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.2 min (750.1 - 749.8)

Volume	Invert	Avail.Storage	Storage Description	
#1	8.33'	181 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.33	275	0.0	0	0
8.34	275	30.0	1	1
10.42	275	30.0	172	172
10.75	275	10.0	9	181

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.33'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.1 cfs @ 12.09 hrs HW=8.34' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond Porous Pavement:

21-10254 - Post-R6*Type III 24-hr 25-Year Rainfall=5.30"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentTyp. Driveway:

Runoff Area=575 sf 100.00% Impervious Runoff Depth=5.06"
Tc=6.0 min CN=98 Runoff=0.1 cfs 243 cf

Pond Porous Pavement:

Peak Elev=8.38' Storage=5 cf Inflow=0.1 cfs 243 cf
Outflow=0.1 cfs 241 cf

Total Runoff Area = 575 sf Runoff Volume = 243 cf Average Runoff Depth = 5.06"
0.00% Pervious = 0 sf 100.00% Impervious = 575 sf

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Type III 24-hr 25-Year Rainfall=5.30"

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Summary for Subcatchment Typ. Driveway:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 243 cf, Depth= 5.06"
Routed to Pond Porous Pavement :

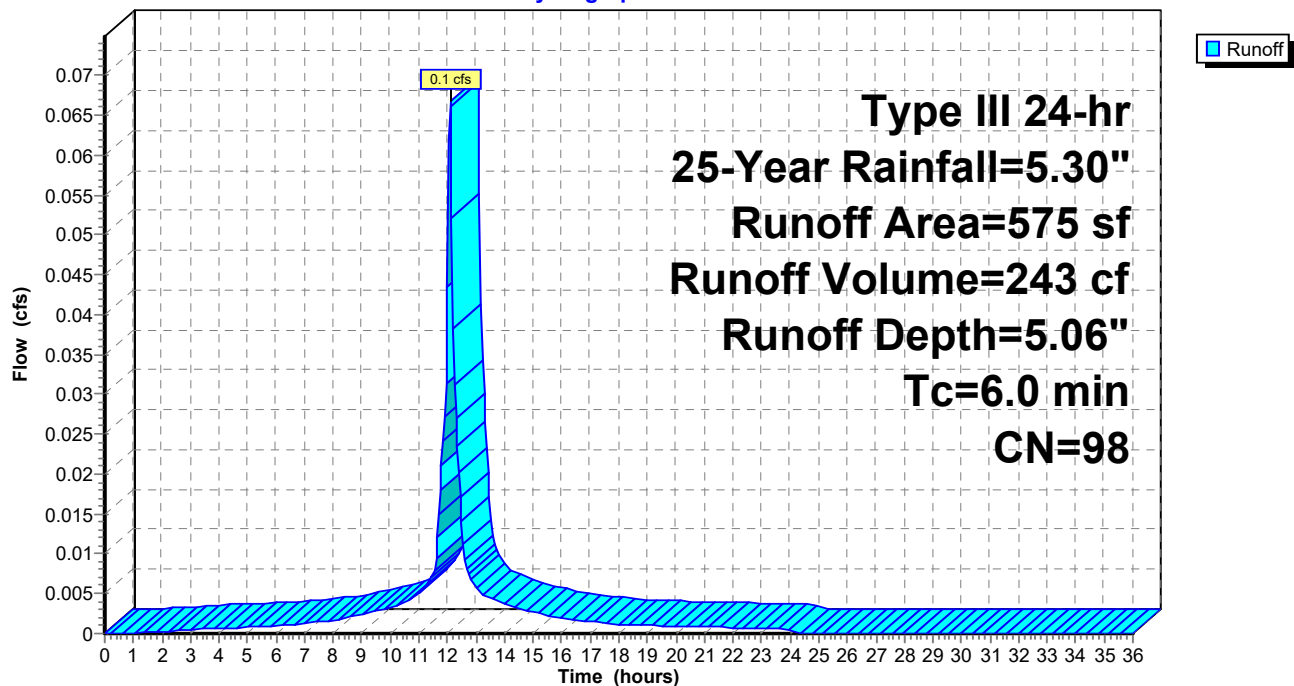
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.30"

Area (sf)	CN	Description
0	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
575	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
575	98	Weighted Average
575		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6

Subcatchment Typ. Driveway:

Hydrograph



21-10254 - Post-R6

Type III 24-hr 25-Year Rainfall=5.30"

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Summary for Pond Porous Pavement:

Inflow Area = 575 sf, 100.00% Impervious, Inflow Depth = 5.06" for 25-Year event
 Inflow = 0.1 cfs @ 12.09 hrs, Volume= 243 cf
 Outflow = 0.1 cfs @ 12.05 hrs, Volume= 241 cf, Atten= 21%, Lag= 0.0 min
 Discarded = 0.1 cfs @ 12.05 hrs, Volume= 241 cf

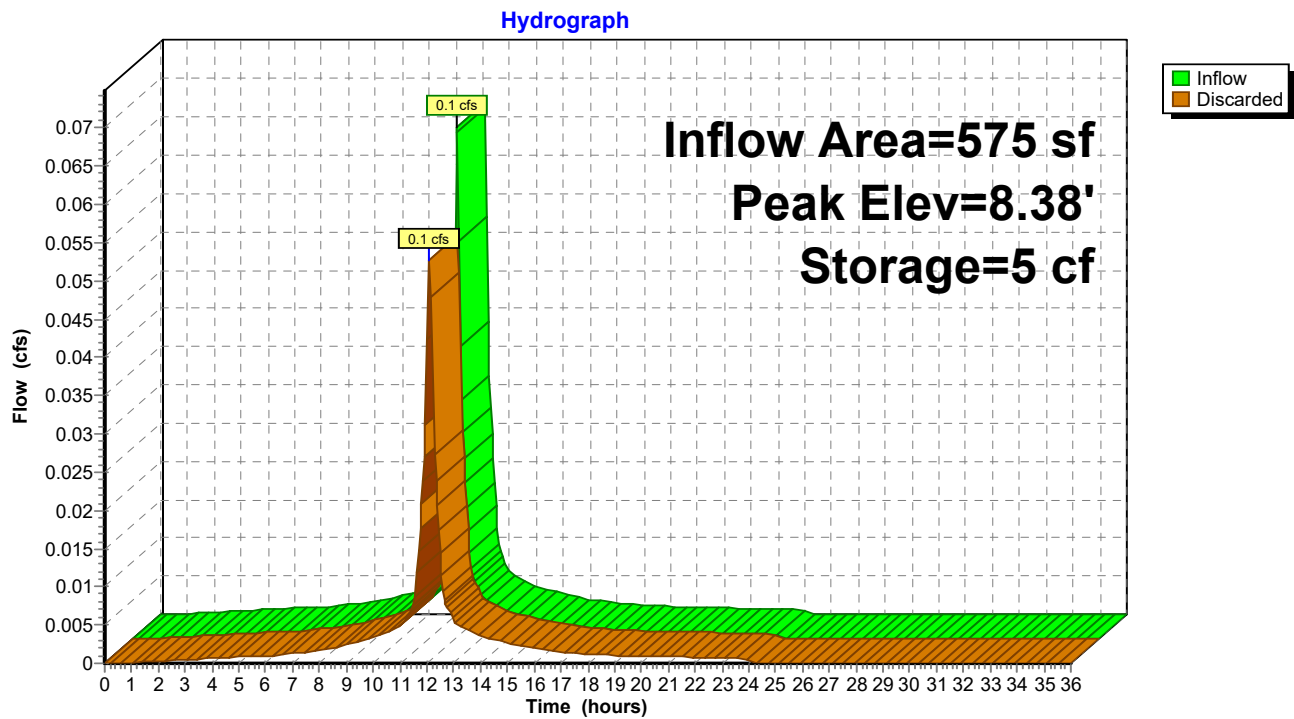
Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 8.38' @ 12.15 hrs Surf.Area= 275 sf Storage= 5 cf

Plug-Flow detention time= 4.0 min calculated for 241 cf (99% of inflow)
 Center-of-Mass det. time= 0.5 min (747.5 - 747.1)

Volume	Invert	Avail.Storage	Storage Description	
#1	8.33'	181 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.33	275	0.0	0	0
8.34	275	30.0	1	1
10.42	275	30.0	172	172
10.75	275	10.0	9	181

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.33'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.1 cfs @ 12.05 hrs HW=8.35' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond Porous Pavement:

21-10254 - Post-R6*Type III 24-hr 50-Year Rainfall=5.90"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentTyp. Driveway:

Runoff Area=575 sf 100.00% Impervious Runoff Depth=5.66"

Tc=6.0 min CN=98 Runoff=0.1 cfs 271 cf

Pond Porous Pavement:

Peak Elev=8.43' Storage=8 cf Inflow=0.1 cfs 271 cf

Outflow=0.1 cfs 272 cf

Total Runoff Area = 575 sf Runoff Volume = 271 cf Average Runoff Depth = 5.66"
0.00% Pervious = 0 sf 100.00% Impervious = 575 sf

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Type III 24-hr 50-Year Rainfall=5.90"

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Summary for Subcatchment Typ. Driveway:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 271 cf, Depth= 5.66"
Routed to Pond Porous Pavement :

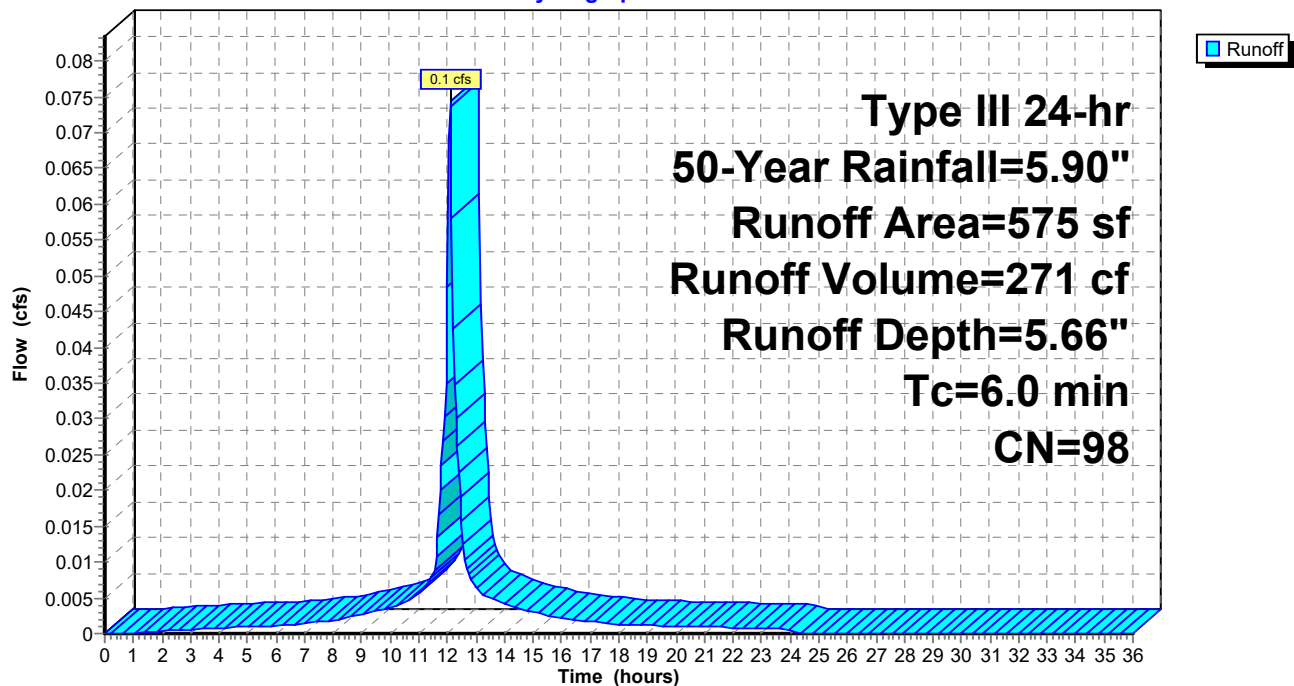
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=5.90"

Area (sf)	CN	Description
0	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
575	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
575	98	Weighted Average
575		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6

Subcatchment Typ. Driveway:

Hydrograph



21-10254 - Post-R6

Type III 24-hr 50-Year Rainfall=5.90"

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Summary for Pond Porous Pavement:

Inflow Area = 575 sf, 100.00% Impervious, Inflow Depth = 5.66" for 50-Year event
 Inflow = 0.1 cfs @ 12.09 hrs, Volume= 271 cf
 Outflow = 0.1 cfs @ 12.05 hrs, Volume= 272 cf, Atten= 29%, Lag= 0.0 min
 Discarded = 0.1 cfs @ 12.05 hrs, Volume= 272 cf

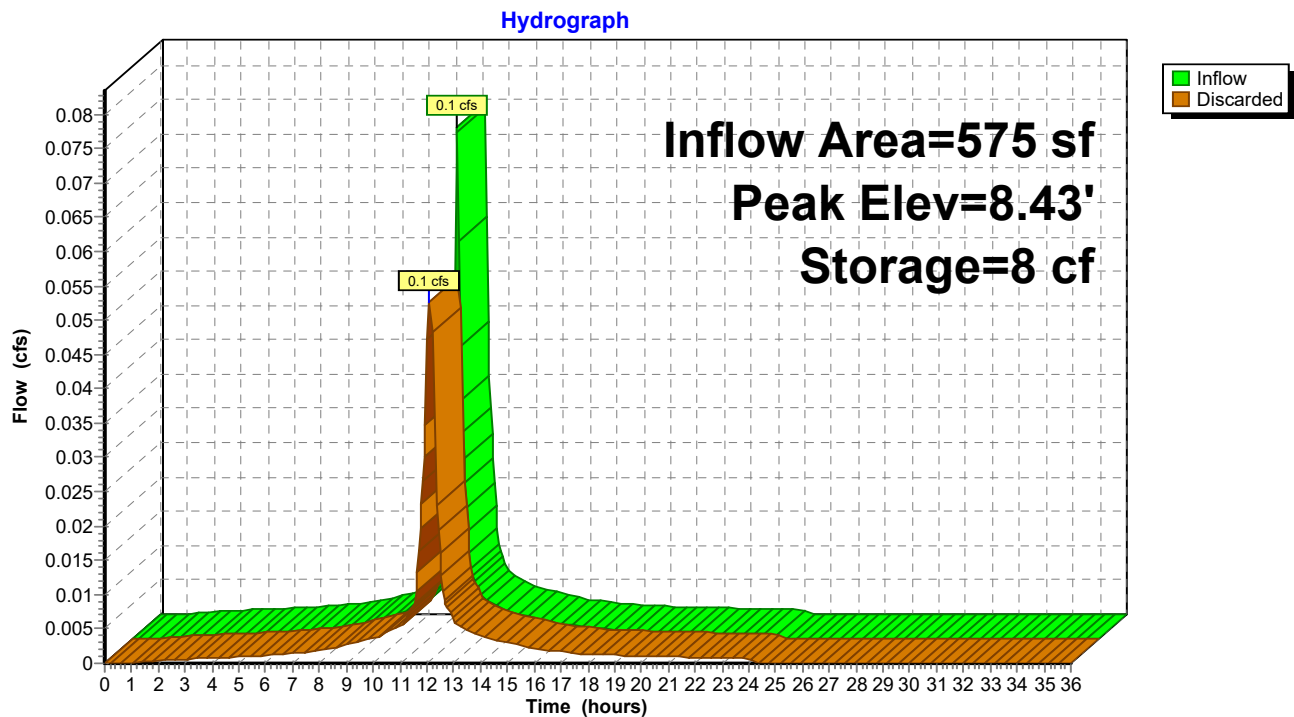
Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 8.43' @ 12.17 hrs Surf.Area= 275 sf Storage= 8 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.5 min (745.9 - 745.4)

Volume	Invert	Avail.Storage	Storage Description	
#1	8.33'	181 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.33	275	0.0	0	0
8.34	275	30.0	1	1
10.42	275	30.0	172	172
10.75	275	10.0	9	181

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.33'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.1 cfs @ 12.05 hrs HW=8.35' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond Porous Pavement:

21-10254 - Post-R6*Type III 24-hr 100-Year Rainfall=6.50"*

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Typ. Driveway:

Runoff Area=575 sf 100.00% Impervious Runoff Depth=6.26"

Tc=6.0 min CN=98 Runoff=0.1 cfs 300 cf

Pond Porous Pavement:

Peak Elev=8.47' Storage=12 cf Inflow=0.1 cfs 300 cf

Outflow=0.1 cfs 299 cf

Total Runoff Area = 575 sf Runoff Volume = 300 cf Average Runoff Depth = 6.26"
0.00% Pervious = 0 sf 100.00% Impervious = 575 sf

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Type III 24-hr 100-Year Rainfall=6.50"

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Summary for Subcatchment Typ. Driveway:

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 300 cf, Depth= 6.26"
Routed to Pond Porous Pavement :

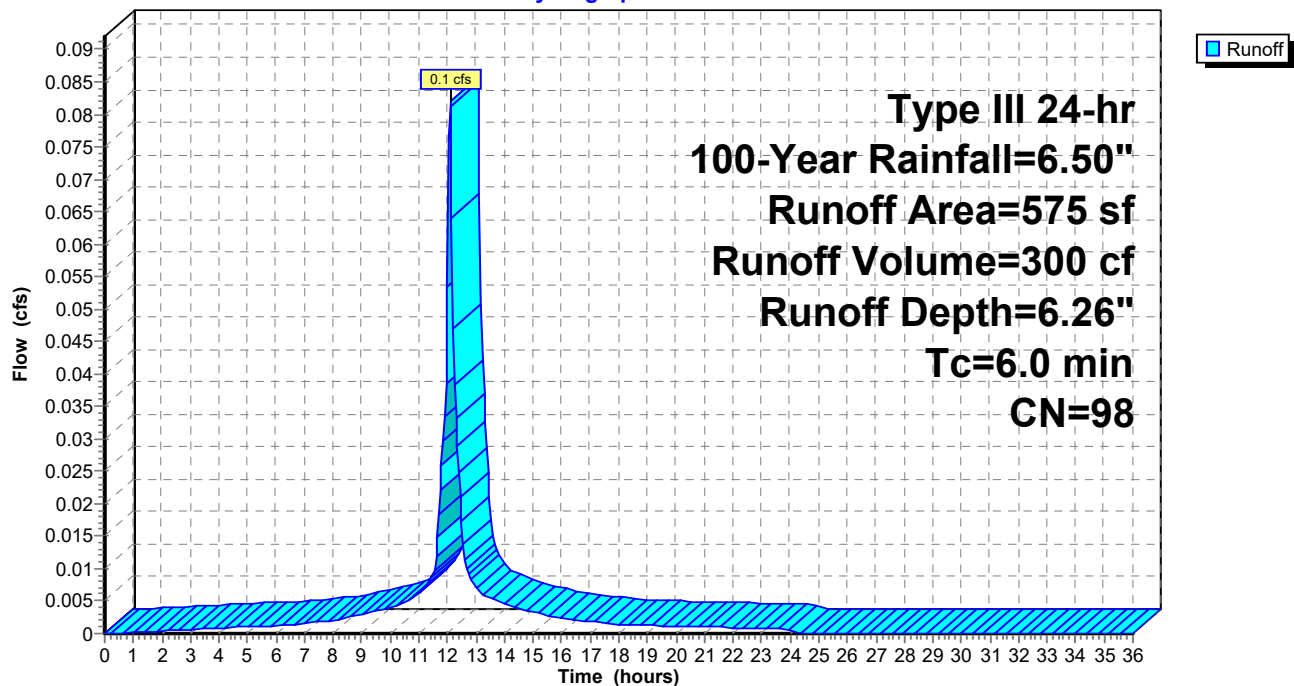
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
0	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
575	98	Paved parking, HSG A
0	30	Woods, Good, HSG A
575	98	Weighted Average
575		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6

Subcatchment Typ. Driveway:

Hydrograph



21-10254 - Post-R6

Type III 24-hr 100-Year Rainfall=6.50"

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Summary for Pond Porous Pavement:

Inflow Area = 575 sf, 100.00% Impervious, Inflow Depth = 6.26" for 100-Year event
 Inflow = 0.1 cfs @ 12.09 hrs, Volume= 300 cf
 Outflow = 0.1 cfs @ 12.05 hrs, Volume= 299 cf, Atten= 36%, Lag= 0.0 min
 Discarded = 0.1 cfs @ 12.05 hrs, Volume= 299 cf

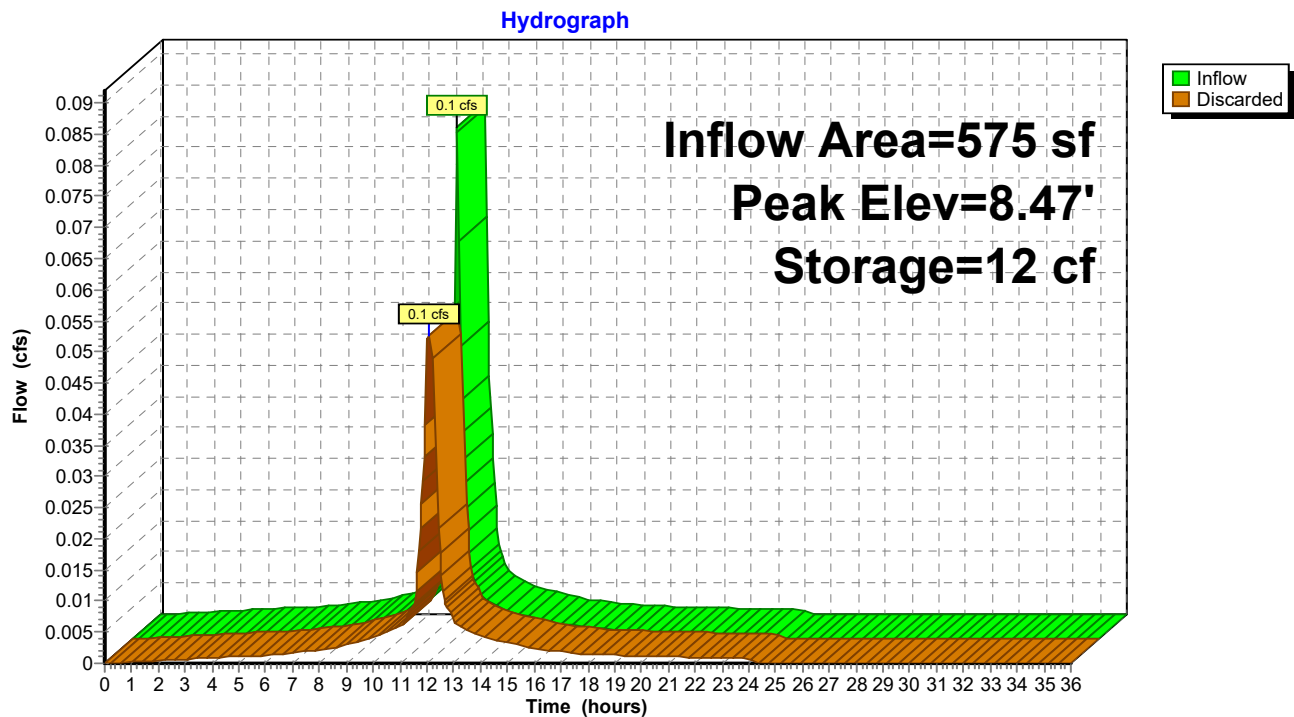
Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 8.47' @ 12.19 hrs Surf.Area= 275 sf Storage= 12 cf

Plug-Flow detention time= 3.1 min calculated for 299 cf (100% of inflow)
 Center-of-Mass det. time= 0.7 min (744.7 - 744.0)

Volume	Invert	Avail.Storage	Storage Description	
#1	8.33'	181 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.33	275	0.0	0	0
8.34	275	30.0	1	1
10.42	275	30.0	172	172
10.75	275	10.0	9	181

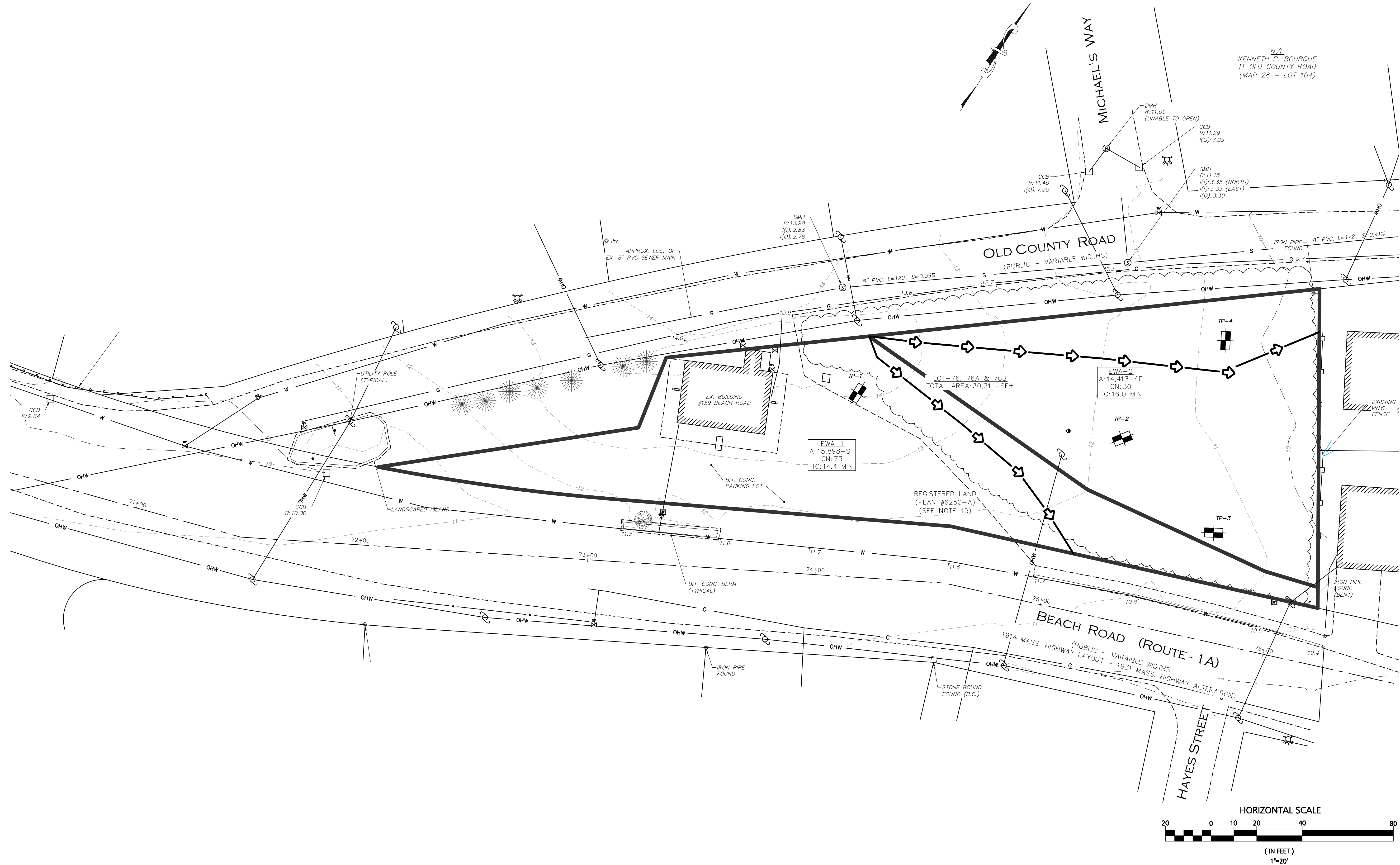
Device	Routing	Invert	Outlet Devices
#1	Discarded	8.33'	8.270 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.1 cfs @ 12.05 hrs HW=8.37' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond Porous Pavement:

LEGEND	
PROPERTY LINE	_____
ABUTTERS PROPERTY LINE	_____
EXISTING EDGE OF PAVEMENT	-----
EXISTING CONTOUR	-----
WATERSHED BOUNDARY	=====
TIME OF CONCENTRATION	-----

SOILS SUMMARY:		
SYMBOL	DESCRIPTION	HSG
32A	WAREHAM LOAMY SAND, 0-3% SLOPES	A
255B	WINDSOR LOAMY SAND, 3-8% SLOPES	A



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THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS FOR RECORDING ADOPTED BY THE REGISTERS OF DEEDS IN 1978 AND AMENDED JANUARY 12, 1988.

ENGINEER _____ DATE _____
APPROVED BY THE TOWN OF SALISBURY PLANNING BOARD

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
CERTIFICATE OF ACTION	_____
DATE OF ENDORSEMENT	_____

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

DATE	DESCRIPTION
REVISIONS	

PREPARED FOR:
LARKIN REAL ESTATE GROUP INC.
383 MAIN STREET
MEDFIELD, MA 02052

PROJECT:
159 BEACH ROAD
TAX MAP 28 - LOT 1
SALISBURY, MA. 01952

DATE ISSUED:	JUNE 14, 2022
PROJECT #:	21-10254
PREPARED BY:	WILLIAM HALL, P.E.

PROFESSIONAL ENGINEER FOR CIVIL DESIGN
CONSULTANTS, INC.

CIVIL DESIGN
Consultants, Inc.
SURVEY • DESIGN • PERMITTING • CONSTRUCTION ADMINISTRATION

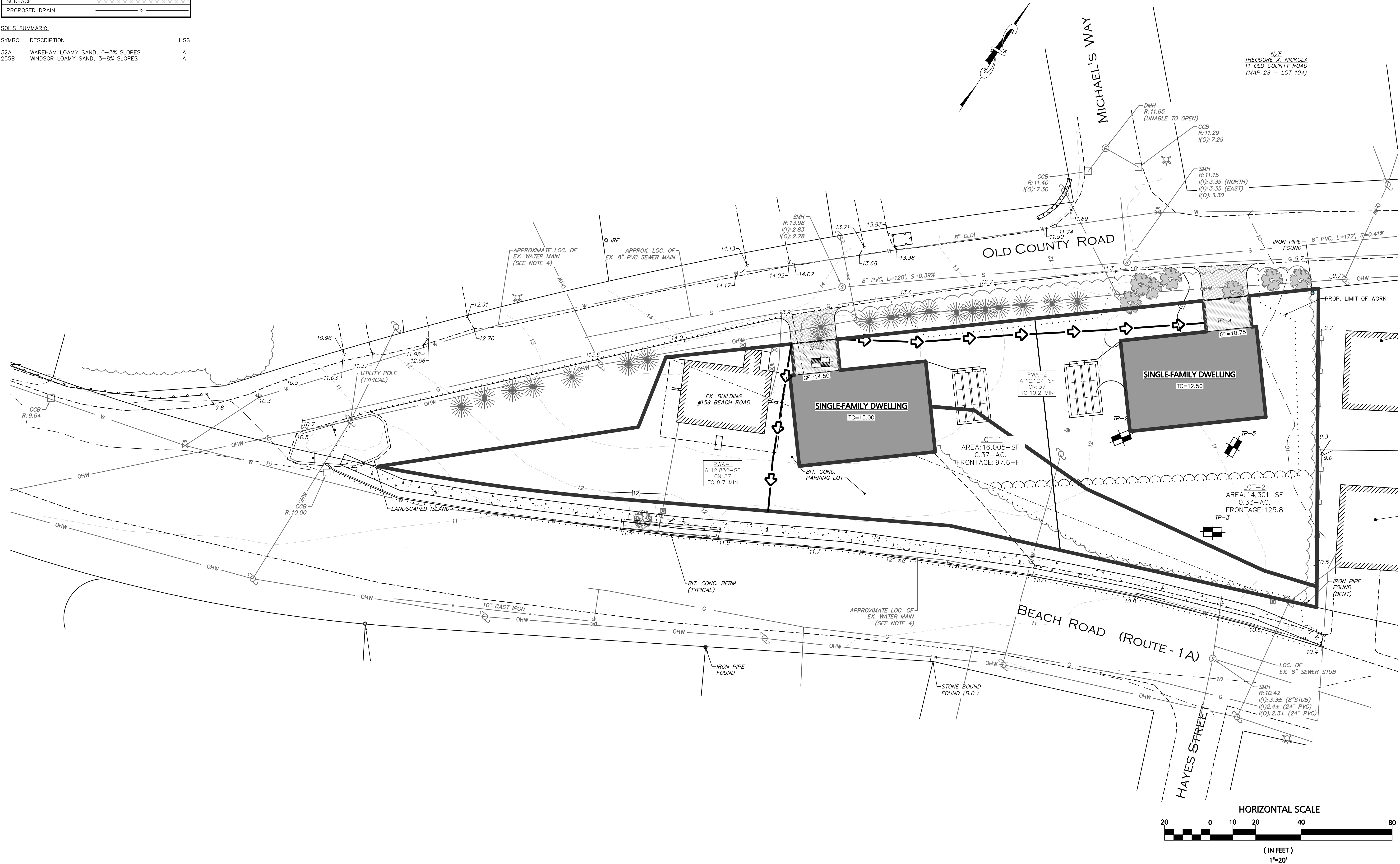
344 North Main Street
Andover, MA 01810
Tel: (978) 416-0920
Fax: (978) 416-7865

DRAWING TITLE:
EXISTING WATERSHED PLAN

DRAWING #:
EWP-1

LEGEND	
PROPERTY LINE	_____
ABUTTERS PROPERTY LINE	_____
EXISTING EDGE OF PAVEMENT	_____
EXISTING CONTOUR	_____
WATERSHED BOUNDARY	_____
TIME OF CONCENTRATION	_____
PROPOSED BUILDING	_____
PROPOSED CONTOUR	_____
PROPOSED SPOT GRADE	_____
PROPOSED IMPERVIOUS SURFACE	_____
PROPOSED DRAIN	_____

SOILS SUMMARY:		
SYMBOL	DESCRIPTION	HSG
32A	WAREHAM LOAMY SAND, 0-3% SLOPES	A
255B	WINDSOR LOAMY SAND, 3-8% SLOPES	A



FOR REGISTRY USE ONLY
THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS FOR RECORDING ADOPTED BY THE REGISTERS OF DEEDS IN 1978 AND AMENDED JANUARY 12, 1988.

ENGINEER DATE
APPROVED BY THE TOWN OF SALISBURY PLANNING BOARD

CERTIFICATE OF ACTION
DATE OF ENDORSEMENT

3/4/24 REV. PER PEER REVIEW
DATE DESCRIPTION
REVISIONS

PREPARED FOR:
LARKIN REAL ESTATE GROUP INC.
383 MAIN STREET
MEDFIELD, MA 02052

PROJECT:
159 BEACH ROAD
TAX MAP 28 - LOT 1
SALISBURY, MA. 01952

DATE ISSUED: DECEMBER 5, 2023
PROJECT #: 21-10254
PREPARED BY: WILLIAM HALL, P.E.

PROFESSIONAL ENGINEER FOR CIVIL DESIGN CONSULTANTS, INC.

CIVIL DESIGN Consultants, Inc.
SURVEY • DESIGN • PERMITTING • CONSTRUCTION ADMINISTRATION

344 North Main Street Andover, MA 01810 Tel: (978) 416-0920 Fax: (978) 416-7865

DRAWING TITLE:
PROPOSED WATERSHED PLAN

DRAWING #:

PWP-1