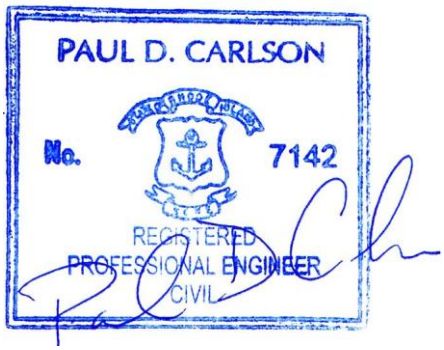
STORMWATER MANAGEMENT NARRATIVE

"290 Public Street"

Providence, Rhode Island

September 02, 2025



Prepared for:
Swap, Inc.
439 Pine Street
Providence, R.I.

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InSite Engineering Services, LLC
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1.0 PROJECT NARRATIVE

1.1 Introduction

InSite Engineering Services (IES) has prepared this report in conjunction with the accompanying site plans "290 Public Street" for Swap, Inc. The report summarizes the proposed stormwater management system for the re-development of the existing building located at 290 Public Street into a new 39-unit residential building and a reconfigured parking layout. The subject property is located on the south side of Public Street and north side of Saratoga Street.

The 0.48 acre (21,115 s.f.) site is identified by the City of Providence as:

- Plat 48 Lots 938 & 949 addressed as 290 Public Street.

The proposed stormwater management of the site for "290 Public Street" has been designed in accordance with the guidelines of the City of Providence Regulations and the Rhode Island Stormwater Design and Installation Standard Manual unless otherwise noted. This report is to be used in conjunction with the Civil Plans titled "290 Public Street".

The stormwater management plan has been developed to employ various types of Best Management Practices (BMP's) to control peak runoff rates, provide water quality, promote groundwater recharge and provide sediment removal. Storm flows from the proposed construction will be treated on site and discharges to offsite areas will be equal or below preconstruction rates. It is anticipated that there will be no flooding impacts or negative impacts to the downstream outfalls resulting from this system.

2.0 EXISTING SITE CONDITIONS

2.1 Property Description

Zoning for the site is "RP" Residential Professional District. The property consists of an existing building with paved parking areas. The existing building has a footprint of approximately 5,118 s.f. and is serviced by public water and sewer. The paved parking area encompasses approximately 8,280 s.f. The grassed portions of the lot cover approximately 6,617 s.f. The existing site is approximately 69% impervious. The site's topography is fairly flat with gentle slopes across the site, totaling a total of 2' in elevation change. Access to the site is currently serviced through Public Street.

Referring to RIDEM's Environmental Resource Maps, the site does not lie within a Natural Heritage Area. The site area does not fall within a FEMA designated Flood Hazard Zone. No wetland resource areas are located on site.

Stormwater runoff from the site is generated on the surface and sheet flows to the Providence storm system located in Public Street.

The existing site was analyzed with one catchment area, being the entire site. The existing stormwater system in Public Street is used as the Design Point (DP) since all stormwater from the site eventually travels to this system.

- Subcatchment Pre-1- Approximately 69% of the catchment area is roof area and paved parking. The remaining area is grassed or landscaped. The stormwater flows uncontrolled to the drainage inlets in Public Street.

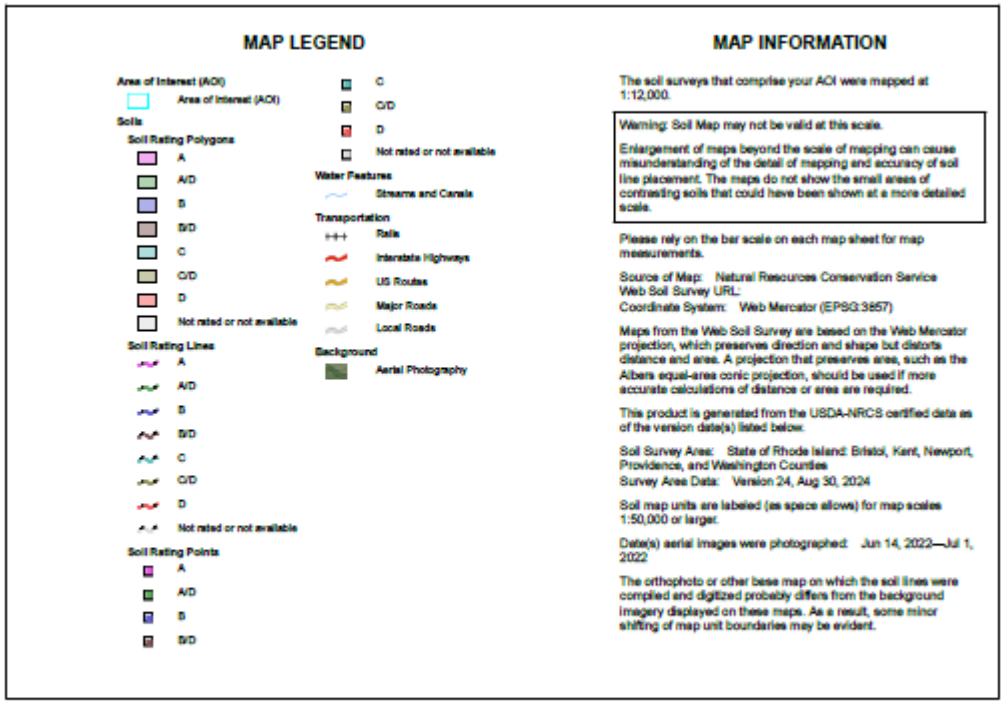
Pre-Development Rates of Runoff and total volumes are summarized in Tables 2 and 3.

2.2 Soil Classification

The USDA Natural Resources Conservation Service's Web Soil Survey classifies surficial Site soils as shown on the accompanying map and soil descriptions.

Soil Map

Hydrologic Soil Group—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
(Haylee's Commons Cumberland RI)

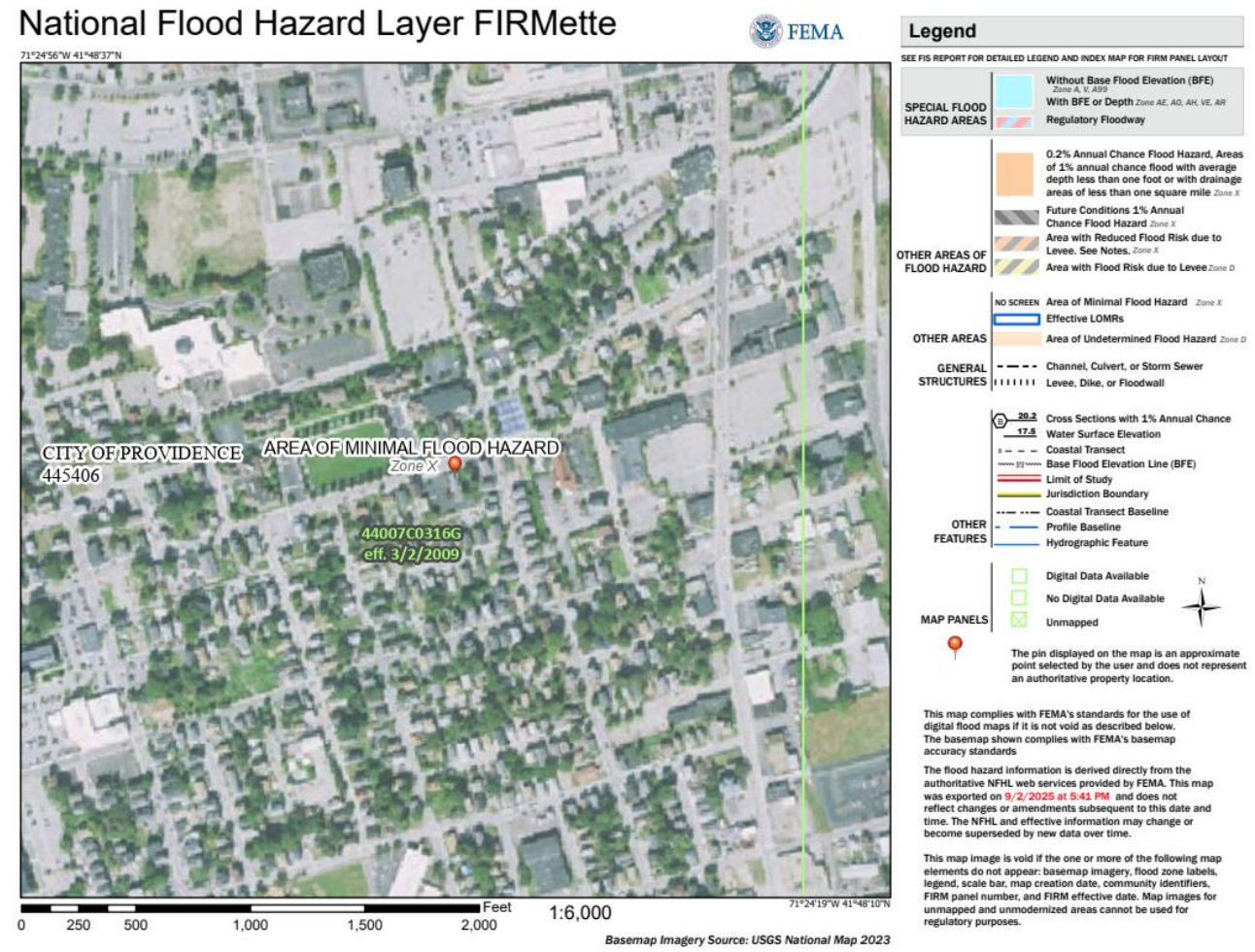


Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MU	Merrimac-Urban land complex, 0 to 8 percent slopes	1.0	100.0%
Totals for Area of Interest		**1.0**	**100.0%**

2.3 Flood Zone Classification

Referencing the National Flood Insurance Program, Flood Insurance Map, Community Panel Number **44007C0177G**, effective on **03/02/2009**. The developable portion of the project falls within the Zone X- an area designated as minimal flooding.



2.4 Groundwater

Groundwater on the Site falls within a single category classified by RIDEM as "GB". The watershed contributes to the Providence River Estuary, east of the site.

2.5 Surface Water

The Environmental Resource Map indicates the nearest surface water body is the Providence River located east of the site.

3.0 - PROPOSED SITE CONDITIONS

3.1 Site Plan

"290 Public Street" proposes redevelopment of the existing property with improvements described as follows.

- Development of a residential building
- Development of a new parking lot configuration
- Construction of stormwater management system utilizing LID strategies to include the following:
  - underground infiltration systems for parking lot and roof runoff
- Public sewer, water, and gas - install new sewer, water, and gas services
- Extension of Overhead and Underground Electrical

Consideration was given to conserving environmentally sensitive features and minimizing impact on the existing hydrology.

3.2 Stormwater Management Considerations

The drainage design is separated into two (2) Subcatchment areas. The total drainage area analyzed is the same as the existing analysis, approximately 21,115 sf.

- Subcatchment Post-1- This subcatchment area consists of all of the impervious area under proposed conditions. This area is entirely controlled and conveyed to BMP-1.
- Subcatchment Post-2- This subcatchment contains all of the uncontrolled areas under proposed conditions. All of which are grassed. Stormwater flows uncontrolled to the drainage inlets in Public Street.

For both the Pre-construction and Post Construction scenarios, the times of concentrations (TOC) for the longest overland flow path within each area were determined using the TR-55 Method. Each flow path is minimized at 6 minutes. A weighted curve number CN, was derived for each subarea based on proposed land usage and soil types. The respective pre-construction rates of runoff were interpreted as allowable release rates for post-construction design.

4.0 STORMWATER MANAGEMENT STANDARDS

This proposed Stormwater Management System complies with the current regulations of the Rhode Island Department of Environmental Management (RIDEM). Compliance and applicability of the eleven (11) Stormwater Management Standards outlined in the Rhode Island Stormwater Design and Installation Standards Manual, amended March 2015 are listed below.

4.1 Minimum Standard 1: LID Site Planning and Design Strategies

LID site planning and design strategies must be used to the maximum extent practicable in order to reduce the generation of the water runoff volume for both new and development projects.

The LID Site Planning and Design Criteria was utilized in the site planning process. The full list of approved LID methods and/or procedures were explored at the site. LID methods proposed for this site are cultec underground infiltration system, These items are documented in the Stormwater Management Checklist found in Appendix C.

4.2 Minimum Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub watershed to maintain baseflow at pre-development recharge levels to the maximum extent practicable in accordance with the requirements and exemptions described in Section 3.3.2 of the Rhode Island Stormwater Management Standards. For development sites with 40% or more existing impervious coverage, Standard 2 must be addressed. Recharge and Water Quality shall be managed in accordance with the acceptable technique of utilizing on-site structural BMPs to provide recharge and water quality management for at least 50% of development area.

The objective of the groundwater recharge standard is to protect water table levels, stream baseflow, wetlands, and soil moisture levels. Infiltrating stormwater may also provide significant water quality benefits such as reduction of bacteria, nutrients, and metals when infiltrated into the soil profile.

The Groundwater Recharge (Rev) volume of stormwater is based on the amount of impervious area and hydrologic soil group (HSG) as follows:

$$Re_V = (1") (F) (I)/12$$

Where:

Re_V = groundwater recharge volume (c.f.)
F = recharge factor
I = impervious area (s.f.)

Development Impervious area = 16,528 s.f.

F= 0.60(HSG-A)

Rev (100%) = (1") (16,528 s.f.) (0.60)/12 = 826.4 c.f.

Total required Rev = 826.4 c.f.

Storage Volume provided in underground Cultec Recharger Units (BMP-1):

- *elevation (65-68.5) = 2,118 c.f.*

Total available storage = 2,118 c.f.

Recharge volume provided = 2,118 c.f.> Recharge volume required = 826.4 c.f.

4.3 Minimum Standard 3: Water Quality

For development sites with 40% or more existing impervious coverage, Standard 3 must be addressed. Recharge and Water Quality shall be managed in accordance with the acceptable technique of utilizing on-site structural BMPs to provide recharge and water quality management for at least 50% of development area.

Stormwater runoff must be treated before discharge. The amount that must be treated from each rainfall event is known as the required water quality volume (WQv) and is the portion of runoff containing the majority of the pollutants. The water quality volume is calculated using the following equation:

$$WQ_v = (1")(I_{imp\ area})(^1/_{12})$$

A minimum (WQv) volume of 0.2 watershed inches (0.2" over entire disturbed area) is required.
The total site area is 21,115 sf and can be considered as the disturbed area.
The minimum WQv for this area is

21,115 (.2") (1/12) = 352 c.f.

Development Impervious area = 16,528 s.f.

Impervious Area x 1"

Total Impervious area (I) = 16,528 square feet

16,528 sf x 1" x 1/12 = 1,377 cf

Total Required Water Quality Volume, WQV = 1,377 cf

The total WQv provided for this site is 2,188 c.f. as tabulated below.

Water Quality Storage and Recharge Volume Provided:

Volume provided in Cultec underground Infiltration 3

- *elevation (65-68.5) = 2,188 c.f.*

Total storage provided = 2,080 cf > required storage of 866 cf

4.4 Minimum Standard 4: Conveyance and Natural Channel Protection

Open drainage and pipe conveyance systems must be designed to provide adequate passage for flows leading to, from, and through stormwater management facilities for at least the peak flow from the 10-year, 24-hour Type III design storm event. Protection for natural channels downstream must be supplied by providing 24-hour extended detention of the one-year, 24-hour Type III design storm event runoff volume.

This standard is waived for small facilities with 1-acre impervious cover or less.
The site contains 0.379 Acres of impervious area (16,528 sf).
Although exempt, the Cultec infiltration units and pipe conveyance, have been designed to provide adequate passage of flows from the 10-year, 24-hour Type III design storm event.

4.5 Minimum Standard 5: Overbank Flood Protection

Larger storm events also can cause flood damage and other impacts. These impacts can be significantly reduced by storing and releasing stormwater runoff in a gradual manner that ensures pre-development peak discharges are not exceeded. Downstream overbank flood protection must be provided by attenuating the post-development peak discharge rate to the pre-development levels for the 1-year, 10-year and 100-year, 24-hour Type III design storm events.

The stormwater system was designed using a computerization of the Soil Conservation Service (SCS) method, for the computation of runoff hydrographs and peak discharge rates. All stormwater management computations and pond modeling has been performed through the use of the ***Hydrocad*** *V 10.20 Stormwater modeling software.*

The rainfall duration intensity curves were developed from 24-hour rainfall intensities were obtained from the U.S. Weather Bureau, for the Providence, RI area. The drainage analysis is based on the SCS method with a rainfall distribution Type III, for the 1-year, 10-year, and 100-year design frequency storms.

1 year = 2.7 inches
10 year = 4.9 inches
100 year = 8.7 inches

Evaluation of the contributing area(s), size, soil type(s), slope, and ground cover provide the necessary information required to develop rainfall event hydrographs. Rainfall event hydrographs are time/volume mathematical representations of how stormwater runoff volume is generated from different size storm events over a period of 24 hours for a specific watershed area. Each hydrograph depicts a bell-shaped curve where the area under the curve represents the volume of stormwater flow in cubic feet.

Hydrographs were developed for each sub catchment area for existing-and proposed conditions. The peak discharge rate was determined for each storm event. The site was designed to reduce the stormwater volume generated for each storm even including the 100-year design storm (worst case scenario). The flow from the site will be discharged from the site at rates below or equal to the existing conditions discharge rates for each storm event.

TABLE 1: "290 PUBLIC STREET" WATERSHED AREA			
EXISTING CONDITIONS WATERSHED NAME	TOTAL AREA (ACRES)	PROPOSED CONDITIONS WATERSHED NAME	TOTAL AREA (ACRES)
Existing Conditions		Post-Development	
PRE-1	.485	POST 1 POST 2	.379 .105
TOTAL =	.485	TOTAL =	.485

	Peak Discharge Rate (cfs)		
	1-yr	10-yr	100-yr
Design Point 1	-	-	-
Existing Runoff	0.56	1.56	3.42
Proposed Runoff	0	0.77	3.21
ΔQ	*-0.56*	*-0.79*	*-0.21*

TABLE 2: "290 PUBLIC STREET" WATERSHED RUNOFF SUMMARY (DP-1)

A *Comparison of Pre- and Post-Development Peak Discharge Rates*

The conclusion of the results shows that under proposed conditions, the peak discharge rates are less than the pre-development condition rates for the 1, 10, 25, and 100-year (City of Providence) design frequency storms. The proposed stormwater treatment practices and detention facilities will not have potential detrimental effects on downstream areas.

4.6 Minimum Standard 6: Redevelopment and Infill Projects

The purpose of this minimum standard is to establish the alternative requirements for projects or portions of a project where existing impervious areas will be redeveloped or where the site qualifies as infill. In no case on a development or infill project shall the levels of stormwater treatment and recharge be less than the levels prior to initiation of the proposed project.

The 290 Public Street project meets redevelopment standards.
Total Pre-Construction Impervious Area (TIA)/ Site Size(SS) =
14,498 sf/ 21,115 = 0.69
0.69 > 0.4 -> therefore meets the redevelopment standard
The project will meet all of the requirements of Standard 6. Stormwater treatment and recharge will be greater than existing levels.

4.7 Minimum Standard 7: Pollution Prevention

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff. These measures shall be outlined in a stormwater pollution prevention plan. The intent of this standard is to prevent, to the maximum extent practicable, pollutants from coming into contact with stormwater runoff.

This Standard is addressed in Minimum Standard 10 and 11 below.

4.8 Minimum Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.

The 290 Public Street *site is not a land use with higher potential pollutant loads (LUHPPL). Standard 8 is not applicable for this project.*

4.9 Minimum Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, and sub-drains and French drains near OWTSs that do not meet the State's OWTS Rules (setbacks vary depending on the capacity of the OWTS, the type of conveyance system, and the sensitivity of the receiving waters). The stormwater management system is the system for conveying, treating, and infiltrating stormwater on site, including stormwater best management practices and any pipes intended to transport stormwater to ground water, surface water, or municipal separate storm sewer system (MS4). Illicit discharges to the stormwater management system, i.e., illicit connections, are discharges not entirely comprised of stormwater that are not specifically authorized by a National Pollutant Discharge Elimination System (NPDES) or RIPDES permit. The objective of this

standard is to prevent pollutants from being discharged into MS4s and Waters of the State, and to safeguard the environment and public health, safety, and welfare.

The owner shall be responsible for the prohibition of illicit discharges on site. The site has a connection to the existing sewer system.

4.10 Minimum Standard 10: Construction Activity Soil Erosion, Runoff, Sedimentation, and Pollution Prevention Control Measure Requirements

Erosion and sedimentation control (ESC) practices must be utilized during the construction phase as well as during any land disturbing activities.

The site shall be developed in a manner to minimize land disturbances in accordance with State of Rhode Island Soil Erosion and Sediment Control Manual issued 2009 and amended 2015. The following specific construction strategies, techniques and erosion control measures are more specifically described as follows:

1. Avoid and Protect Sensitive Areas and Natural Features

Areas of existing and remaining vegetation and areas that are to be protected during construction are delineated on the plans. The proposed activities are consistent with Minimum Standard 1, Low Impact Development (LID) Site Planning and Design Strategies and have been designed to maximize the protection of natural drainage areas.

2. Minimize Area of Disturbance

Limits of Disturbance (LOD) are clearly marked on all SESC plans. The amount of land area for the project site has been minimized. Existing vegetation will remain in place to maximum extent possible. The project has been designed to control the peak runoff and flows under the post construction design. The site has been designed in accordance with Minimum Standard 1, Low Impact Development Site Planning and Design Strategies, Section 3.3.1.3., Appendix A Checklist 1.D. and Chapter Four – LID Site Planning and Design Strategies, Section 4.5.1.

3. Minimize the Disturbance of Steep Slopes

The site development will minimize the steep slopes on the property. The maximum slope on the property is 5 %. The site design will comply with Minimum Standard 1, Low Impact Development Site Planning and Design Strategies, Section 3.3.1.3 and Appendix A Checklist 1.D. Locating Sites in Less Sensitive Areas, and Chapter Four – LID Site Planning and Design Strategies, Section 4.5.1 Avoid the Impacts.

4. Preserve Topsoil

The site operator shall preserve and stockpile existing topsoil. The topsoil will be reused on site. All remaining material shall be hauled off site.

5. Stabilize Soils

The site shall be stabilized immediately whenever clearing, grading, excavating activities have permanently ceased within the site. Hydro seed will be used throughout the site. Any disturbed soils exposed prior to October 15th will be seeded by that date. Any areas that do not have adequate vegetative stabilization by November 15th will be stabilized through the use of degradable mulches that will cover and protect soil surfaces. If construction continues within the site during the period from October 15th through April 15th, care will be taken to ensure that only the area required for that day's work is exposed, and all erodible soil will re-stabilize within 5 working days.

6. Protect Storm Drain Inlets

The site operator shall install inlet protection measures at existing catch basins and paved waterways that remove sediment from discharge prior to entry into the storm drain system. The operator will clean and/or remove and replace, the protection measures as sediment accumulates. Accumulated sediment adjacent to the inlet protection measures will be removed by the end of the same work day in which it is found.

7. Protect Storm Drain Outlets

Haybales and riprap are to be used at the outfall to protect and prevent scour and erosion at discharge points.

8. Establish Temporary Controls for the Protection of Post- Construction Stormwater Control Measures

Straw wattles shall be installed to protect bioretention basins and infiltration areas as they are installed and throughout the construction phase of the project so that they will function properly when they are brought online. The erosion and sediment control plan identify areas where infiltration measures are proposed and the site contractor shall restrict construction activity within these areas to prevent compaction of the area.

9. Establish Sediment Barriers

Straw wattles shall be installed along the perimeter areas of the site. The site contractor will maintain the sediment barriers in accordance with the maintenance requirements specified by the product manufacturer or the Rhode Island Soil Erosion and Sediment Control Handbook.

10. Divert or Manage Run-on from Up-gradient Areas

Straw wattles will be used to limit stormwater flow from coming onto the project area, and to divert and slow on-site stormwater flow from exposed soils to limit erosion, runoff, and the discharge of pollutants from the site.

11. Properly Design Constructed Stormwater Conveyance Channels

The paved waterways and stone weirs have been sized to handle the peak flow from the 10-year, 24-hour Type III design storm.

12. Retain Sediment On-Site

The SESC Plan states different stormwater practices that control erosion, control run-off, and control sediment. The combination of practices must be designed to prevent discharges of sediment. The plans shall include inlet protection, construction entrances, and containment of stockpiled materials.

13. Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows

The Construction Plan identifies the discharge points and location of bioretention basins and pervious pavers that control both peak flow rates and total runoff volume that will minimize flooding, channel erosion, and stream bank erosion.

14. Construction Activity Pollution Prevention Control Measures

The SESC Plan describes all of the pollution prevention measures that will be implemented to control pollutants in stormwater. The operator shall install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants in accordance with the SESC Plan requirements outlined in the Rhode Island Soil Erosion and Sediment Control Handbook

15. Control Measure Installation, Inspections, Maintenance, and Corrective Actions

The installation of straw wattles will be completed by the time each phase of earth-disturbance has begun. The site will be inspected by the engineer or owner at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff. If an inspection reveals a problem, the operator will work to fix the problem immediately after discovering the problem and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance. If new straw wattles or haybales are needed, the operator will install and make operational by no later than seven (7) calendar days from the time of discovery.

Site specific areas of concern are:

* *Construction of the cultec infiltration system*
* *Construction of new utilities*
* *Slope stabilization*
* *Prevention of erosion and sediments adjacent properties*
* *At the Engineer's discretion, and following final grading of the surrounding slopes, a line of staked straw wattle shall be installed near the property line to prevent eroded soils from depositing in the drainage systems and on adjacent properties, and a line of straw wattle shall be installed as shown on the plans.*

4.11 Minimum Standard 11: Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, must have an operation and maintenance plan to ensure that it continues to function as designed.

The owner of 290 Public Street *will be responsible for the operation and maintenance of the stormwater management system and all of its appurtenances. The owner will keep a written record of inspection dates and findings, maintenance operations, and all repairs. Refer to the Stormwater Management System Operation and Maintenance (Standard 11) section of this report for the maintenance program. A separate Operation and Maintenance Plan will be recorded and maintained on site.*

O&M Access and Safety:

- *Access to ALL Stormwater management systems should be safe and efficient*
- *All egress and ingress routes should be maintained to design standard below:*
- *Access routes should be inspected and maintained*
- *Obstacles preventing maintenance personnel and / or equipment access should be removed*
- *Walkways should be clear of obstructions and maintained to design standards*
- *Roadways should be maintained to accommodate the size and weight of vehicles that use the roadways*
- *Gravel or ground cover should be added if erosion occurs (for example, as a result of vehicle or pedestrian traffic)*
- *All fences should be maintained to preserve their functionality and appearance*
- *Collapsed fences should be restored to an upright position*
- *Jagged edges and damaged fences should be repaired or replaced*

5.0 Conclusions

*The proposed "*290 Public Street*" project will incorporate a drainage system comprising the use of an underground infiltration system. The use of this BMP results in:*

- *An equal or less peak discharge rate for the 1-year, 10-year, and 100-year design frequency storms.*
- *Compliance with the Rhode Island Stormwater Design and Installation Standards Manual*
- *80% TSS Removal*
- *No detrimental effects of the water quality due to the basin's ability to retain and/or remove nutrients or act as a natural pollution filter.*
- *No decrease in flood storage capacity that would impair the wetland's ability to protect life and/or property.*
- *Minimal impacts to the natural characteristics of the wetland and to the plants and habitats of the wetlands.*

The drainage system has been designed to accommodate the anticipated flows in accordance with Cumberland's Rules and Regulations. Pre- and Post-Construction Watershed Plans are included, demonstrating watershed areas, flow paths and Curve numbers.

The discharge has been designed to withhold the peak rates of runoff to below the pre-construction rate analyzed for the site. The system was designed to provide cleansing of the stormwater and to provide the required storage volume in order to detain the peak flow rates and provide a zero-net-increase to the surrounding areas. The discharge with appropriate BMP's, accounts for a composite of the post construction controlled and uncontrolled flows as indicated on the schematic diagram and watershed maps.

*It is the opinion of this engineer that the proposed "*290 Public Street*" stormwater management program is in compliance with the latest Rhode Island Stormwater Design and Installation Standards Manual.*

APPENDIX A

1, 10, & 100-Year Storm Calculations

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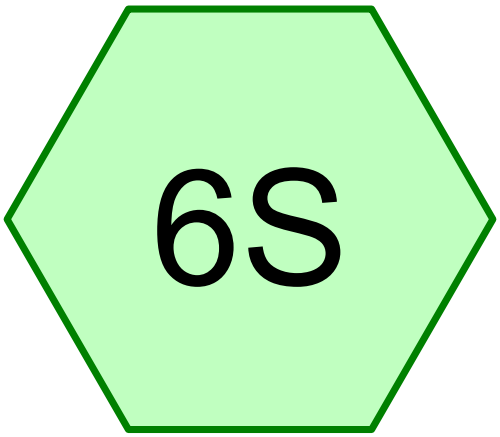
1.2" Peak Flow

(Pre-and Post-Construction)



Existing

Subcat Reach Pond Link

Routing Diagram for 22-087_Stormwater Analysis
Prepared by InSite Engineering Services, Printed 9/8/2025

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
6,617	39	>75% Grass cover, Good, HSG A (6S)
8,280	98	Paved parking, HSG A (6S)
5,118	98	Roofs, HSG A (6S)
1,100	98	Unconnected pavement, HSG A (6S)
21,115	**80**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
21,115	HSG A	6S
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
21,115		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 6S: Existing Runoff Area=21,115 sf 68.66% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=80 Runoff=0.56 cfs 1,812 cf

Total Runoff Area = 21,115 sf Runoff Volume = 1,812 cf Average Runoff Depth = 1.03"
31.34% Pervious = 6,617 sf 68.66% Impervious = 14,498 sf

Summary for Subcatchment 6S: Existing

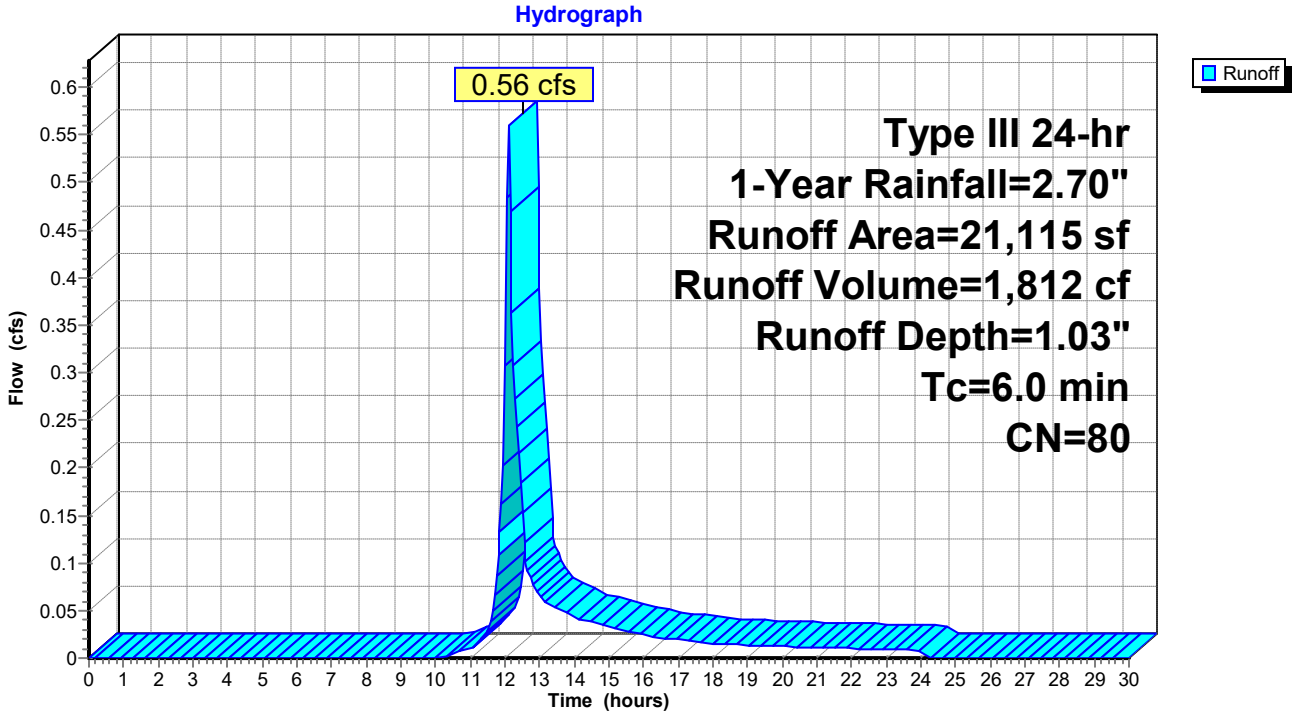
Runoff = 0.56 cfs @ 12.10 hrs, Volume= 1,812 cf, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
5,118	98	Roofs, HSG A
8,280	98	Paved parking, HSG A
1,100	98	Unconnected pavement, HSG A
6,617	39	>75% Grass cover, Good, HSG A
21,115	80	Weighted Average
6,617	39	31.34% Pervious Area
14,498	98	68.66% Impervious Area
1,100		7.59% Unconnected

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

Subcatchment 6S: Existing



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 6S: Existing Runoff Area=21,115 sf 68.66% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=80 Runoff=1.56 cfs 4,937 cf

Total Runoff Area = 21,115 sf Runoff Volume = 4,937 cf Average Runoff Depth = 2.81"
31.34% Pervious = 6,617 sf 68.66% Impervious = 14,498 sf

Summary for Subcatchment 6S: Existing

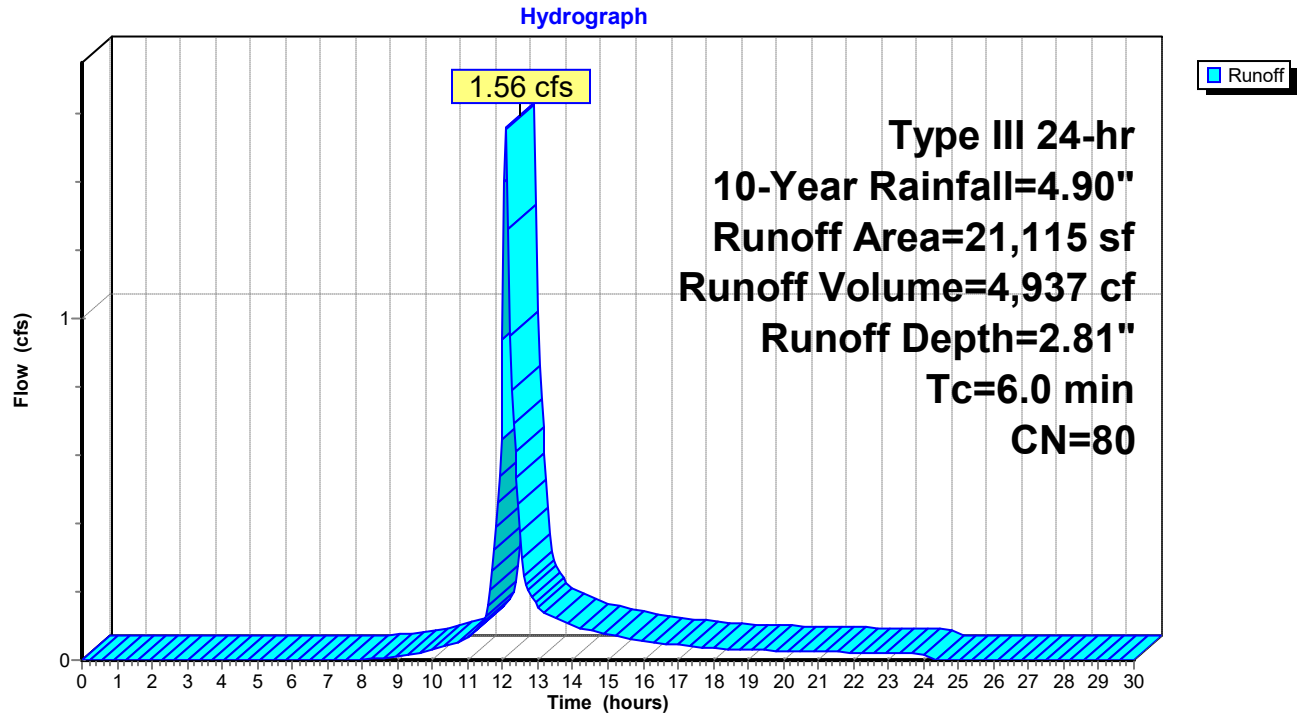
Runoff = 1.56 cfs @ 12.09 hrs, Volume= 4,937 cf, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
5,118	98	Roofs, HSG A
8,280	98	Paved parking, HSG A
1,100	98	Unconnected pavement, HSG A
6,617	39	>75% Grass cover, Good, HSG A
21,115	80	Weighted Average
6,617	39	31.34% Pervious Area
14,498	98	68.66% Impervious Area
1,100		7.59% Unconnected

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

Subcatchment 6S: Existing



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 6S: Existing Runoff Area=21,115 sf 68.66% Impervious Runoff Depth=6.28"
Tc=6.0 min CN=80 Runoff=3.42 cfs 11,057 cf

Total Runoff Area = 21,115 sf Runoff Volume = 11,057 cf Average Runoff Depth = 6.28"
31.34% Pervious = 6,617 sf 68.66% Impervious = 14,498 sf

Summary for Subcatchment 6S: Existing

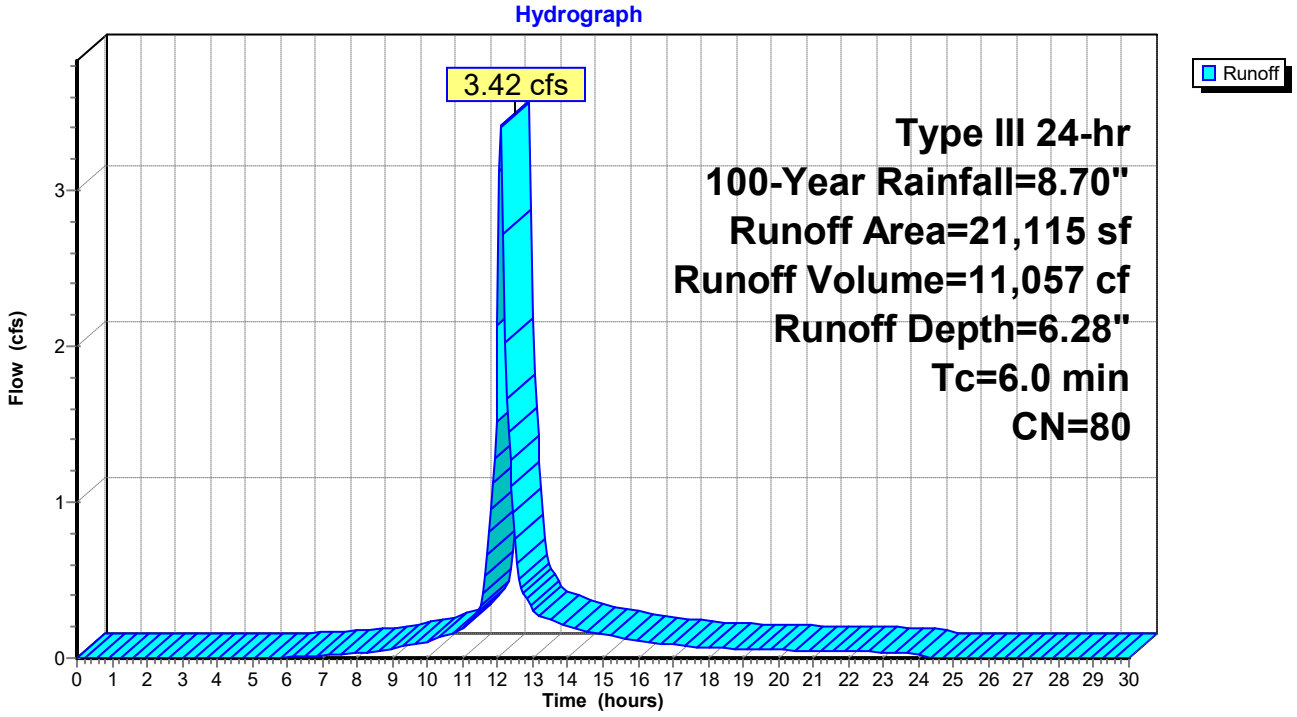
Runoff = 3.42 cfs @ 12.09 hrs, Volume= 11,057 cf, Depth= 6.28"

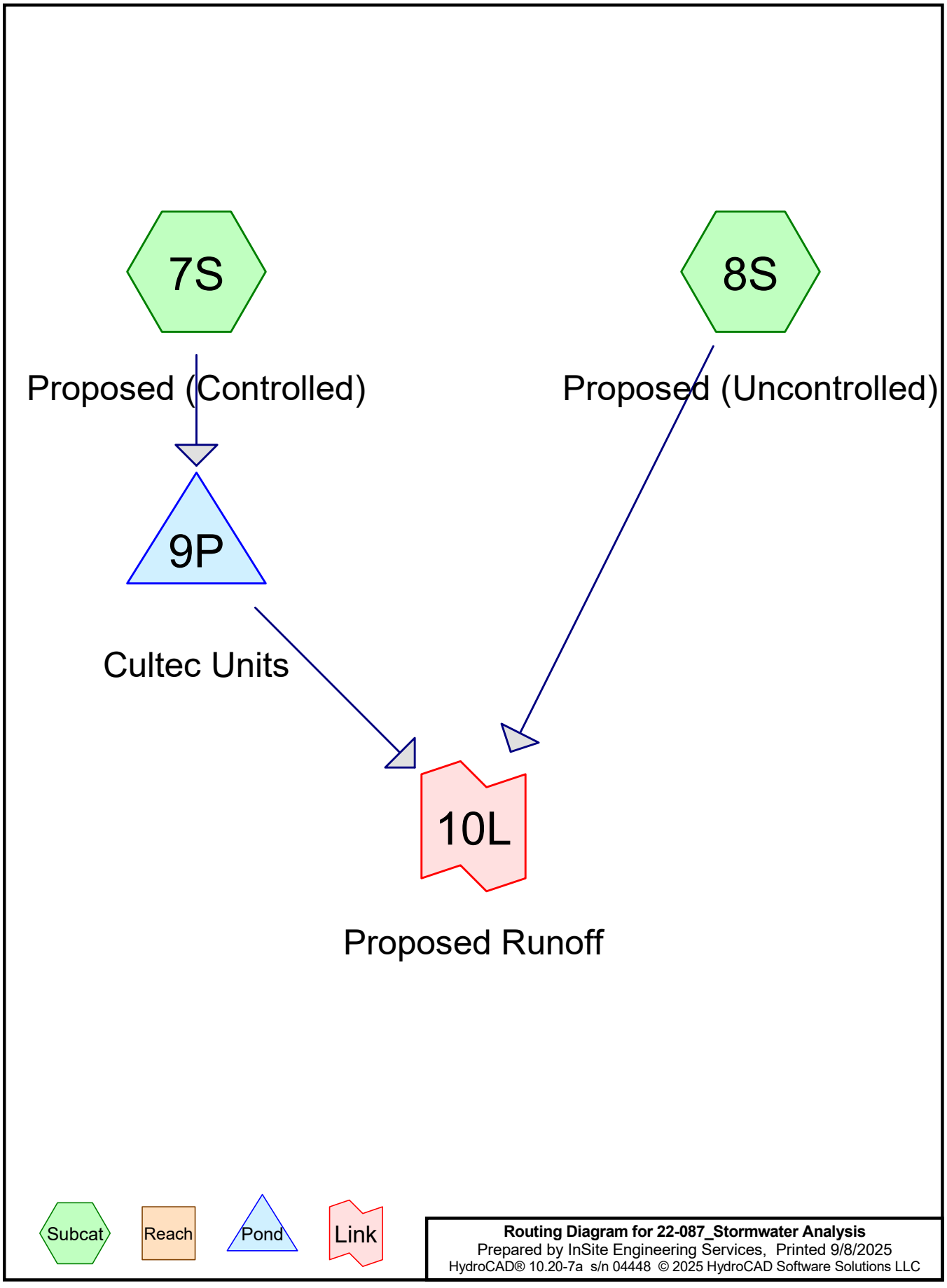
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
5,118	98	Roofs, HSG A
8,280	98	Paved parking, HSG A
1,100	98	Unconnected pavement, HSG A
6,617	39	>75% Grass cover, Good, HSG A
21,115	80	Weighted Average
6,617	39	31.34% Pervious Area
14,498	98	68.66% Impervious Area
1,100		7.59% Unconnected

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

Subcatchment 6S: Existing





Routing Diagram for 22-087_Stormwater Analysis
Prepared by InSite Engineering Services, Printed 9/8/2025

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,587	39	>75% Grass cover, Good, HSG A (8S)
7,833	98	Paved parking, HSG A (7S)
8,020	98	Roofs, HSG A (7S)
675	98	Unconnected pavement, HSG A (7S)
21,115	**85**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
21,115	HSG A	7S, 8S
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
21,115		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 7S: Proposed (Controlled) Runoff Area=16,528 sf 100.00% Impervious Runoff Depth=2.47"
Tc=6.0 min CN=98 Runoff=0.97 cfs 3,402 cf

Subcatchment 8S: Proposed (Uncontrolled) Runoff Area=4,587 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0 cf

Pond 9P: Cultec Units Peak Elev=67.07' Storage=1,313 cf Inflow=0.97 cfs 3,402 cf
Discarded=0.07 cfs 3,402 cf Primary=0.00 cfs 0 cf Outflow=0.07 cfs 3,402 cf

Link 10L: Proposed Runoff Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 21,115 sf Runoff Volume = 3,402 cf Average Runoff Depth = 1.93"
21.72% Pervious = 4,587 sf 78.28% Impervious = 16,528 sf

Summary for Subcatchment 7S: Proposed (Controlled)

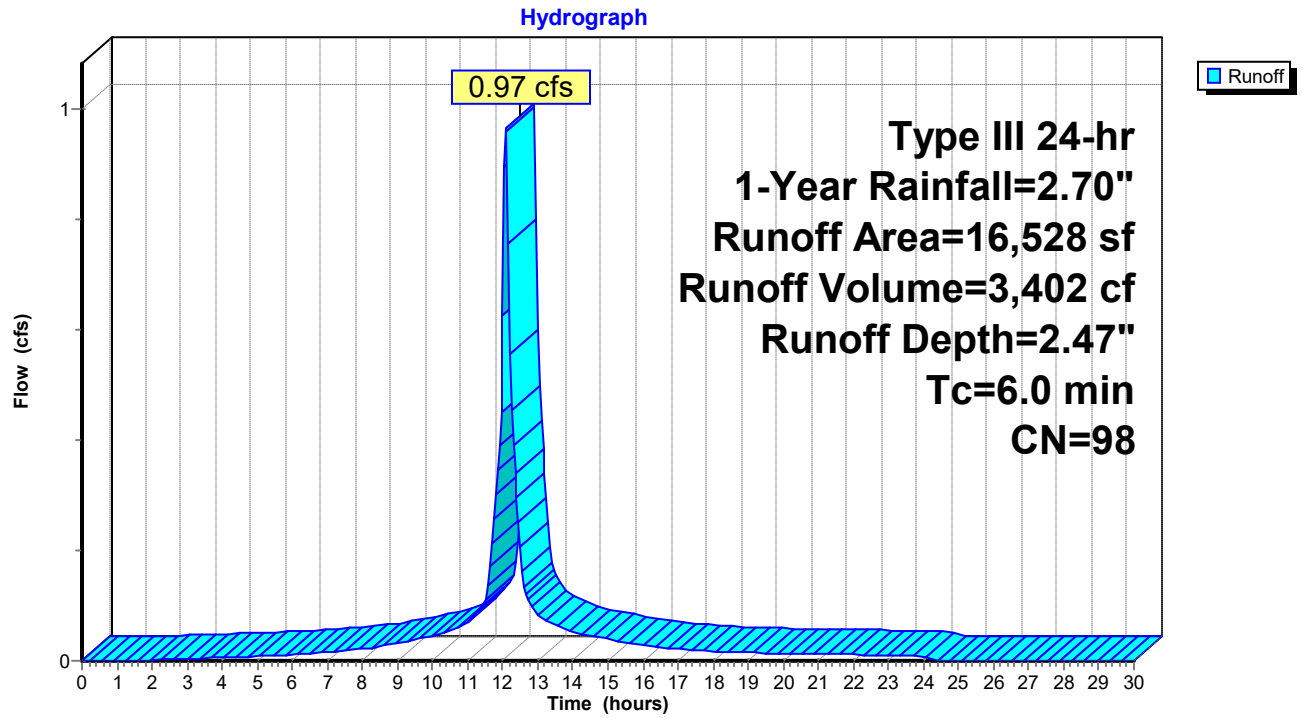
Runoff = 0.97 cfs @ 12.09 hrs, Volume= 3,402 cf, Depth= 2.47"
Routed to Pond 9P : Cultec Units

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
8,020	98	Roofs, HSG A
7,833	98	Paved parking, HSG A
675	98	Unconnected pavement, HSG A
16,528	98	Weighted Average
16,528	98	100.00% Impervious Area
675		4.08% Unconnected

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

Subcatchment 7S: Proposed (Controlled)



Summary for Subcatchment 8S: Proposed (Uncontrolled)

[45] Hint: Runoff=Zero

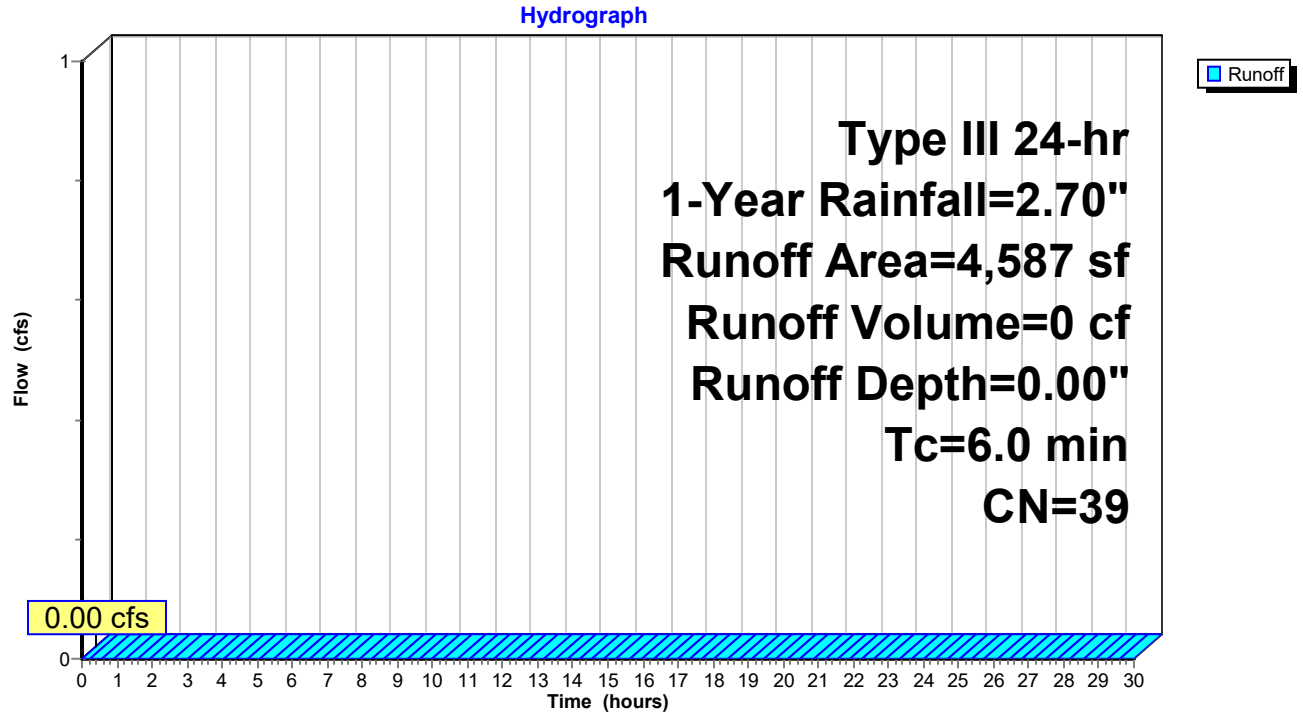
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"
Routed to Link 10L : Proposed Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
4,587	39	>75% Grass cover, Good, HSG A
4,587	39	100.00% Pervious Area

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

Subcatchment 8S: Proposed (Uncontrolled)



Summary for Pond 9P: Cultec Units

Inflow Area = 16,528 sf,100.00% Impervious, Inflow Depth = 2.47" for 1-Year event
Inflow = 0.97 cfs @ 12.09 hrs, Volume= 3,402 cf
Outflow = 0.07 cfs @ 11.15 hrs, Volume= 3,402 cf, Atten= 93%, Lag= 0.0 min
Discarded = 0.07 cfs @ 11.15 hrs, Volume= 3,402 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 10L : Proposed Runoff

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 67.07' @ 13.20 hrs Surf.Area= 1,296 sf Storage= 1,313 cf

Plug-Flow detention time= 138.0 min calculated for 3,396 cf (100% of inflow)
Center-of-Mass det. time= 137.8 min (897.9 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	1,032 cf	**Cultec R-280HD** x 24 Inside #2 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 2 rows
#2	65.00'	1,370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) x 24 5,184 cf Overall - 1,032 cf Embedded = 4,152 cf x 33.0% Voids
		2,402 cf	Total Available Storage

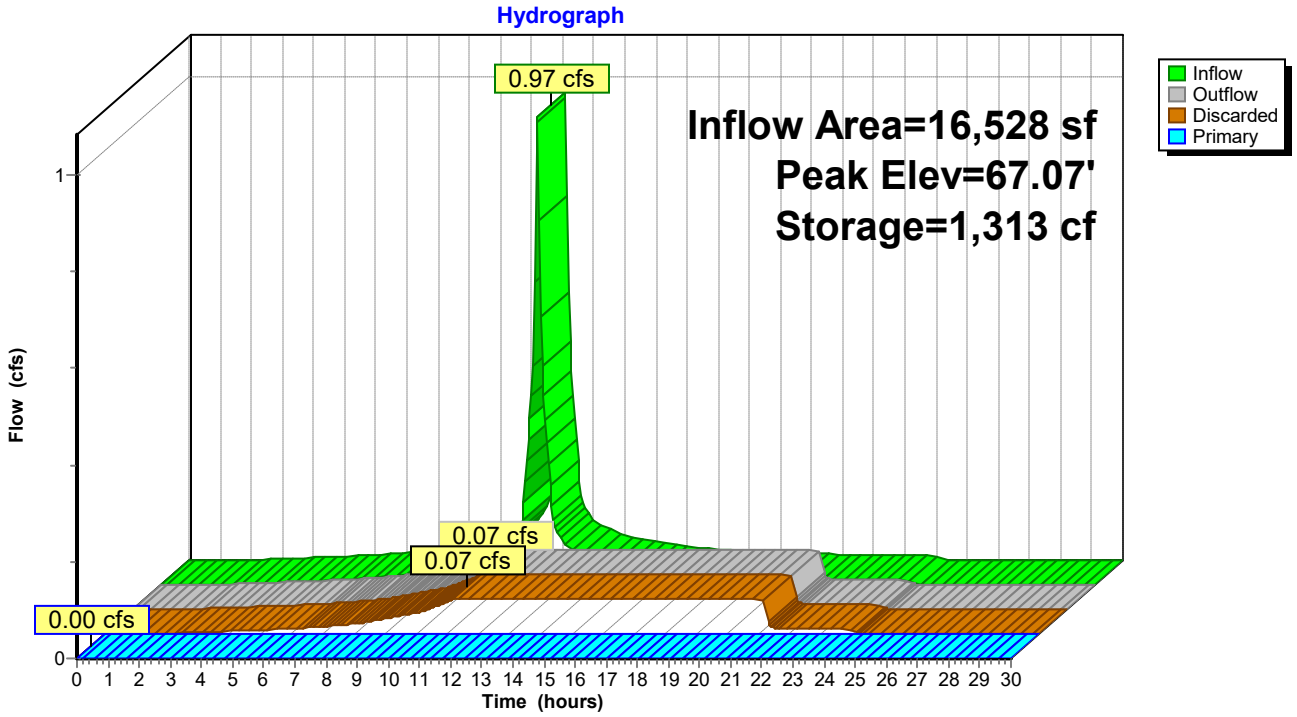
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	54	0	0
69.00	54	216	216

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Device 3	68.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	64.50'	**24.0" Round Culvert** L= 120.0' Ke= 0.900 Inlet / Outlet Invert= 64.50' / 60.00' S= 0.0375 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf

Discarded OutFlow Max=0.07 cfs @ 11.15 hrs HW=65.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=65.00' (Free Discharge)
↑**3=Culvert** (Passes 0.00 cfs of 1.17 cfs potential flow)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 9P: Cultec Units



Stage-Area-Storage for Pond 9P: Cultec Units

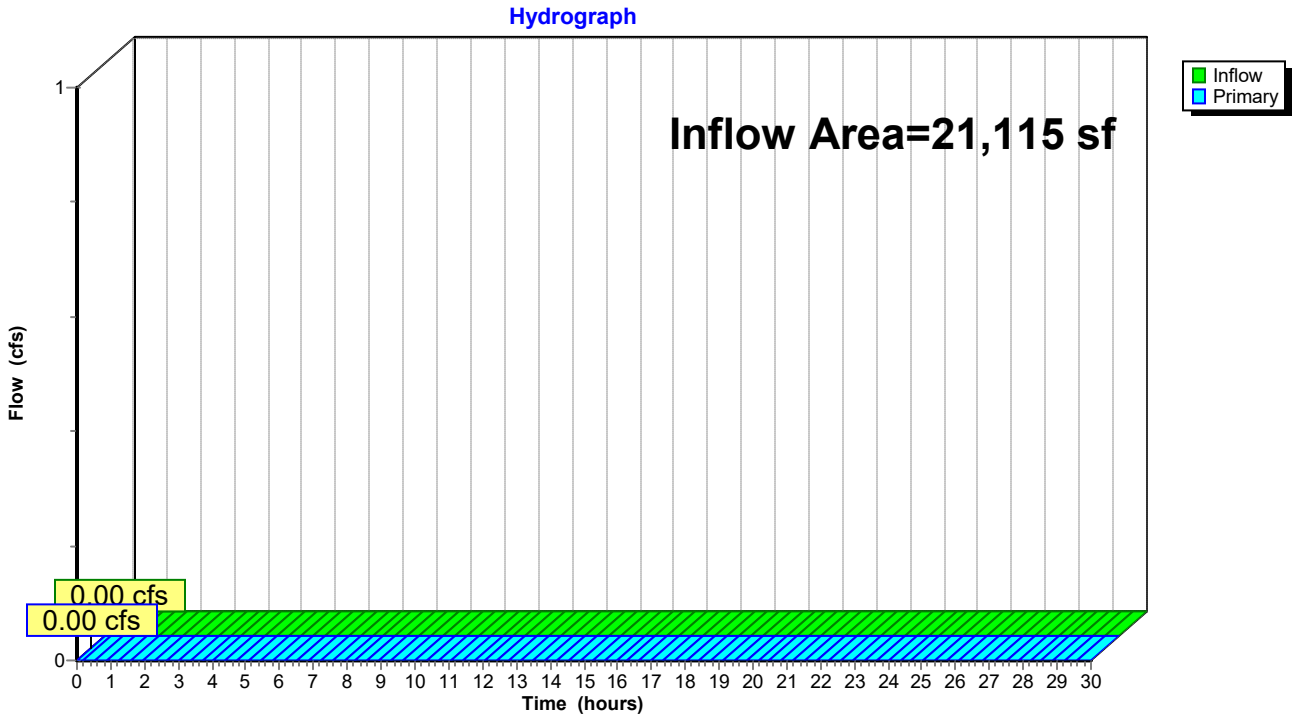
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
65.00	**1,296**	0
65.05	1,296	21
65.10	1,296	43
65.15	1,296	64
65.20	1,296	86
65.25	1,296	107
65.30	1,296	128
65.35	1,296	150
65.40	1,296	171
65.45	1,296	192
65.50	1,296	214
65.55	1,296	235
65.60	1,296	257
65.65	1,296	278
65.70	1,296	299
65.75	1,296	321
65.80	1,296	342
65.85	1,296	364
65.90	1,296	385
65.95	1,296	406
66.00	1,296	428
66.05	1,296	471
66.10	1,296	514
66.15	1,296	557
66.20	1,296	600
66.25	1,296	643
66.30	1,296	685
66.35	1,296	727
66.40	1,296	770
66.45	1,296	812
66.50	1,296	854
66.55	1,296	896
66.60	1,296	937
66.65	1,296	978
66.70	1,296	1,019
66.75	1,296	1,060
66.80	1,296	1,101
66.85	1,296	1,141
66.90	1,296	1,181
66.95	1,296	1,221
67.00	1,296	1,261
67.05	1,296	1,301
67.10	1,296	1,340
67.15	1,296	1,380
67.20	1,296	1,418
67.25	1,296	1,457
67.30	1,296	1,495
67.35	1,296	1,532
67.40	1,296	1,570
67.45	1,296	1,606
67.50	1,296	1,643
67.55	1,296	1,678
67.60	1,296	1,714
67.65	1,296	1,748
67.70	1,296	1,782
67.75	1,296	1,816
67.80	1,296	1,848
67.85	1,296	1,880
67.90	1,296	1,910
67.95	1,296	1,939
68.00	1,296	1,967
68.05	1,296	1,992
68.10	1,296	2,016
68.15	1,296	2,039
68.20	1,296	2,060
68.25	1,296	2,082
68.30	1,296	2,103
68.35	1,296	2,124
68.40	1,296	2,146
68.45	1,296	2,167
68.50	1,296	2,188
68.55	1,296	2,210
68.60	1,296	2,231
68.65	1,296	2,253
68.70	1,296	2,274
68.75	1,296	2,295
68.80	1,296	2,317
68.85	1,296	2,338
68.90	1,296	2,360
68.95	1,296	2,381
69.00	1,296	**2,402**

Summary for Link 10L: Proposed Runoff

Inflow Area = 21,115 sf, 78.28% Impervious, Inflow Depth = 0.00" for 1-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 10L: Proposed Runoff



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 7S: Proposed (Controlled) Runoff Area=16,528 sf 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=1.78 cfs 6,423 cf

Subcatchment 8S: Proposed (Uncontrolled) Runoff Area=4,587 sf 0.00% Impervious Runoff Depth=0.18"
Tc=6.0 min CN=39 Runoff=0.00 cfs 69 cf

Pond 9P: Cultec Units Peak Elev=68.61' Storage=2,236 cf Inflow=1.78 cfs 6,423 cf
Discarded=0.07 cfs 5,424 cf Primary=0.77 cfs 999 cf Outflow=0.85 cfs 6,423 cf

Link 10L: Proposed Runoff Inflow=0.77 cfs 1,068 cf
Primary=0.77 cfs 1,068 cf

Total Runoff Area = 21,115 sf Runoff Volume = 6,492 cf Average Runoff Depth = 3.69"
21.72% Pervious = 4,587 sf 78.28% Impervious = 16,528 sf

Summary for Subcatchment 7S: Proposed (Controlled)

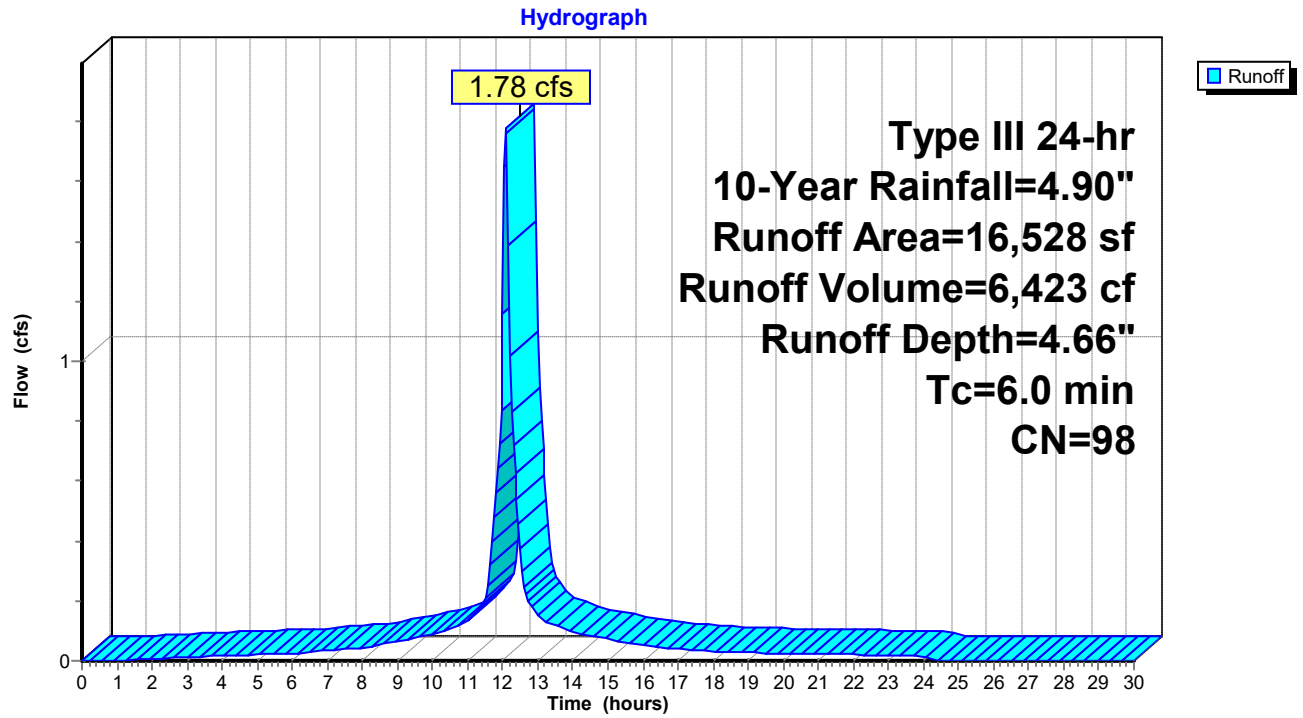
Runoff = 1.78 cfs @ 12.09 hrs, Volume= 6,423 cf, Depth= 4.66"
Routed to Pond 9P : Cultec Units

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
8,020	98	Roofs, HSG A
7,833	98	Paved parking, HSG A
675	98	Unconnected pavement, HSG A
16,528	98	Weighted Average
16,528	98	100.00% Impervious Area
675		4.08% Unconnected

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

Subcatchment 7S: Proposed (Controlled)



Summary for Subcatchment 8S: Proposed (Uncontrolled)

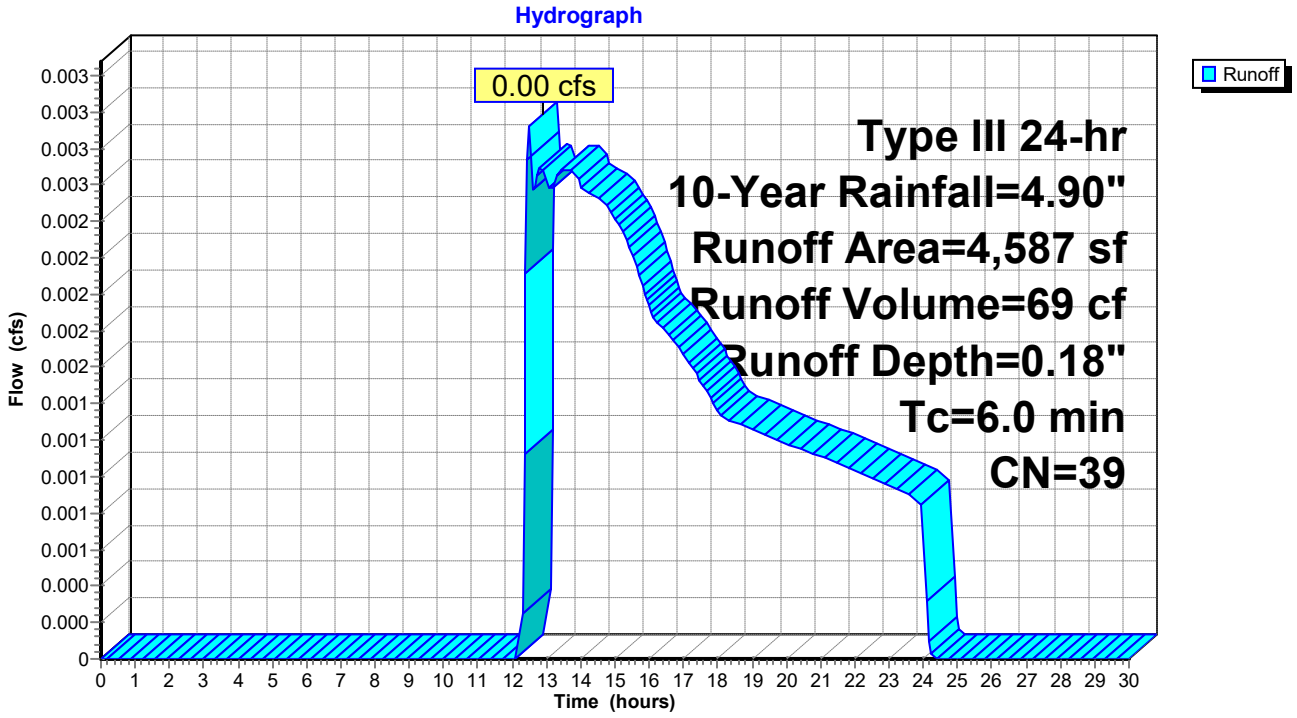
Runoff = 0.00 cfs @ 12.50 hrs, Volume= 69 cf, Depth= 0.18"
Routed to Link 10L : Proposed Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
4,587	39	>75% Grass cover, Good, HSG A
4,587	39	100.00% Pervious Area

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

Subcatchment 8S: Proposed (Uncontrolled)



Summary for Pond 9P: Cultec Units

Inflow Area = 16,528 sf,100.00% Impervious, Inflow Depth = 4.66" for 10-Year event
Inflow = 1.78 cfs @ 12.09 hrs, Volume= 6,423 cf
Outflow = 0.85 cfs @ 12.30 hrs, Volume= 6,423 cf, Atten= 52%, Lag= 13.0 min
Discarded = 0.07 cfs @ 9.45 hrs, Volume= 5,424 cf
Primary = 0.77 cfs @ 12.30 hrs, Volume= 999 cf
Routed to Link 10L : Proposed Runoff

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 68.61' @ 12.30 hrs Surf.Area= 1,296 sf Storage= 2,236 cf

Plug-Flow detention time= 216.2 min calculated for 6,423 cf (100% of inflow)
Center-of-Mass det. time= 216.1 min (964.5 - 748.4)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	1,032 cf	**Cultec R-280HD** x 24 Inside #2 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 2 rows
#2	65.00'	1,370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) x 24 5,184 cf Overall - 1,032 cf Embedded = 4,152 cf x 33.0% Voids
		2,402 cf	Total Available Storage

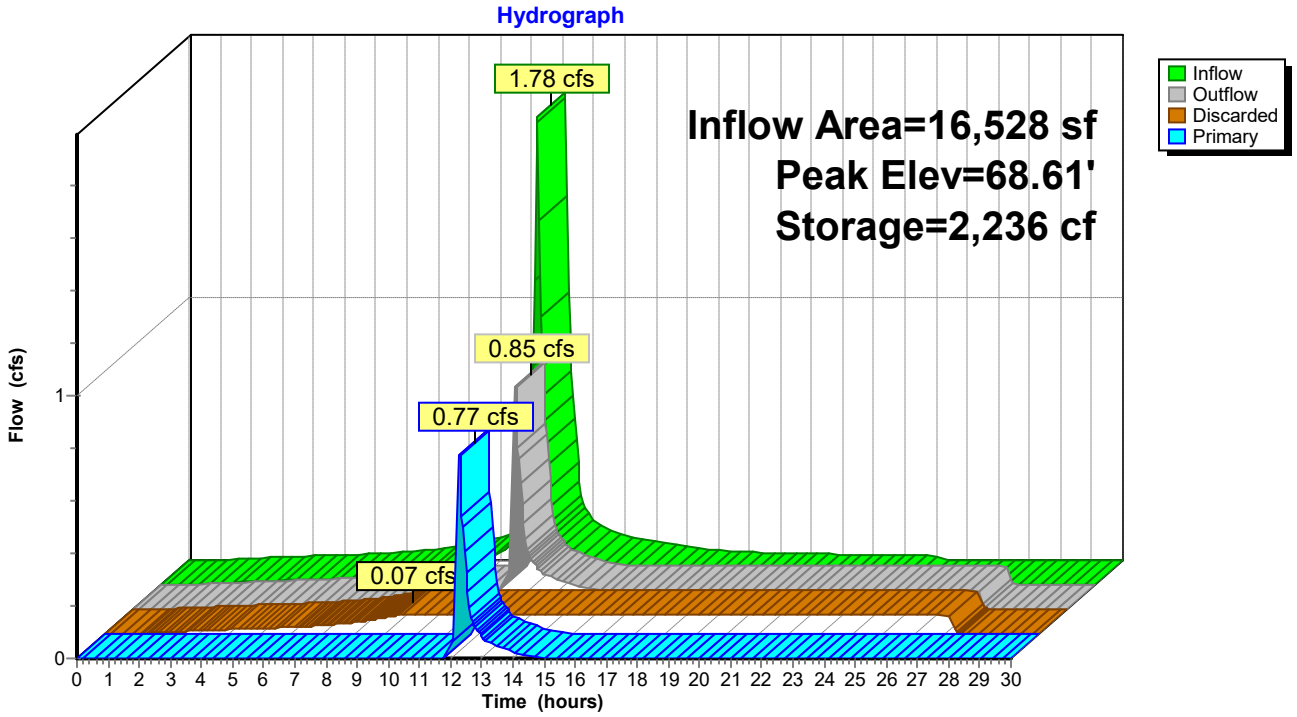
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	54	0	0
69.00	54	216	216

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Device 3	68.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	64.50'	**24.0" Round Culvert** L= 120.0' Ke= 0.900 Inlet / Outlet Invert= 64.50' / 60.00' S= 0.0375 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf

Discarded OutFlow Max=0.07 cfs @ 9.45 hrs HW=65.04' (Free Discharge)
↑└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.75 cfs @ 12.30 hrs HW=68.61' (Free Discharge)
↑└**3=Culvert** (Passes 0.75 cfs of 21.06 cfs potential flow)
↑└**2=Orifice/Grate** (Weir Controls 0.75 cfs @ 1.09 fps)

Pond 9P: Cultec Units



Stage-Area-Storage for Pond 9P: Cultec Units

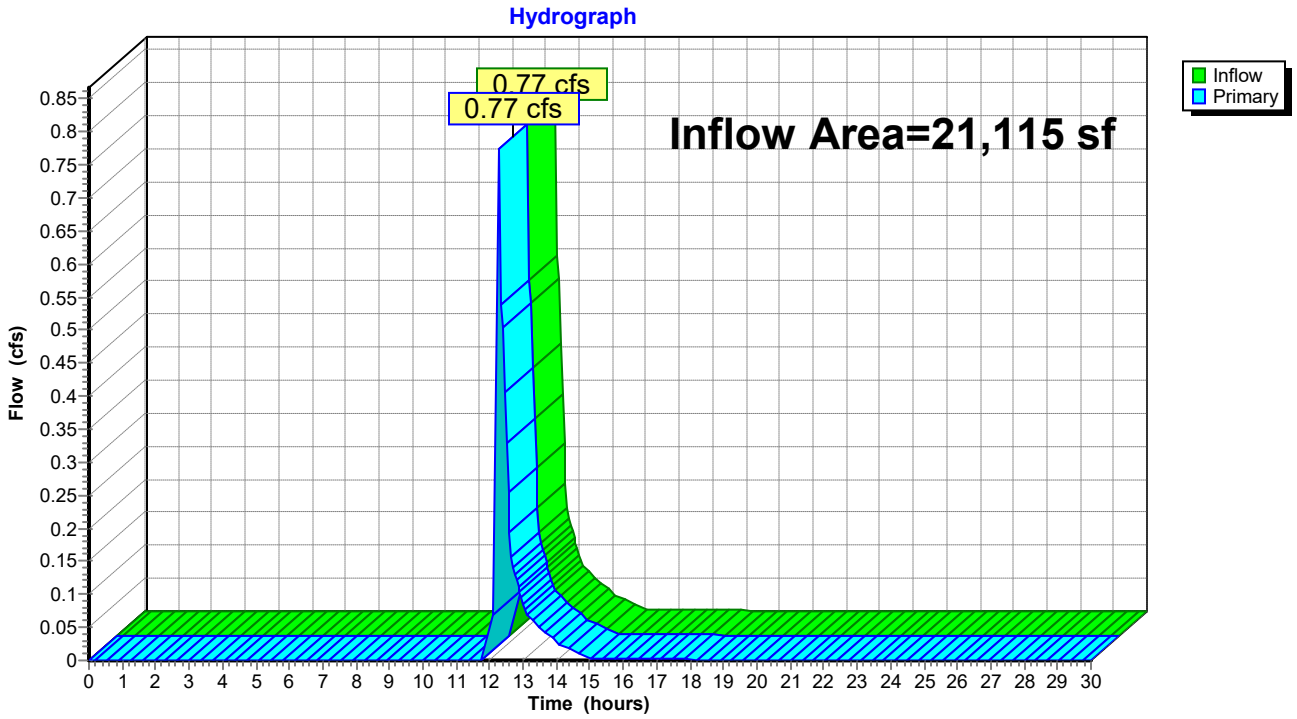
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
65.00	**1,296**	0
65.05	1,296	21
65.10	1,296	43
65.15	1,296	64
65.20	1,296	86
65.25	1,296	107
65.30	1,296	128
65.35	1,296	150
65.40	1,296	171
65.45	1,296	192
65.50	1,296	214
65.55	1,296	235
65.60	1,296	257
65.65	1,296	278
65.70	1,296	299
65.75	1,296	321
65.80	1,296	342
65.85	1,296	364
65.90	1,296	385
65.95	1,296	406
66.00	1,296	428
66.05	1,296	471
66.10	1,296	514
66.15	1,296	557
66.20	1,296	600
66.25	1,296	643
66.30	1,296	685
66.35	1,296	727
66.40	1,296	770
66.45	1,296	812
66.50	1,296	854
66.55	1,296	896
66.60	1,296	937
66.65	1,296	978
66.70	1,296	1,019
66.75	1,296	1,060
66.80	1,296	1,101
66.85	1,296	1,141
66.90	1,296	1,181
66.95	1,296	1,221
67.00	1,296	1,261
67.05	1,296	1,301
67.10	1,296	1,340
67.15	1,296	1,380
67.20	1,296	1,418
67.25	1,296	1,457
67.30	1,296	1,495
67.35	1,296	1,532
67.40	1,296	1,570
67.45	1,296	1,606
67.50	1,296	1,643
67.55	1,296	1,678
67.60	1,296	1,714
67.65	1,296	1,748
67.70	1,296	1,782
67.75	1,296	1,816
67.80	1,296	1,848
67.85	1,296	1,880
67.90	1,296	1,910
67.95	1,296	1,939
68.00	1,296	1,967
68.05	1,296	1,992
68.10	1,296	2,016
68.15	1,296	2,039
68.20	1,296	2,060
68.25	1,296	2,082
68.30	1,296	2,103
68.35	1,296	2,124
68.40	1,296	2,146
68.45	1,296	2,167
68.50	1,296	2,188
68.55	1,296	2,210
68.60	1,296	2,231
68.65	1,296	2,253
68.70	1,296	2,274
68.75	1,296	2,295
68.80	1,296	2,317
68.85	1,296	2,338
68.90	1,296	2,360
68.95	1,296	2,381
69.00	1,296	**2,402**

Summary for Link 10L: Proposed Runoff

Inflow Area = 21,115 sf, 78.28% Impervious, Inflow Depth = 0.61" for 10-Year event
Inflow = 0.77 cfs @ 12.30 hrs, Volume= 1,068 cf
Primary = 0.77 cfs @ 12.30 hrs, Volume= 1,068 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 10L: Proposed Runoff



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 7S: Proposed (Controlled) Runoff Area=16,528 sf 100.00% Impervious Runoff Depth=8.46"
Tc=6.0 min CN=98 Runoff=3.17 cfs 11,652 cf

Subcatchment 8S: Proposed (Uncontrolled) Runoff Area=4,587 sf 0.00% Impervious Runoff Depth=1.46"
Tc=6.0 min CN=39 Runoff=0.13 cfs 559 cf

Pond 9P: Cultec Units Peak Elev=68.78' Storage=2,309 cf Inflow=3.17 cfs 11,652 cf
Discarded=0.07 cfs 6,662 cf Primary=3.09 cfs 4,990 cf Outflow=3.16 cfs 11,652 cf

Link 10L: Proposed Runoff Inflow=3.21 cfs 5,550 cf
Primary=3.21 cfs 5,550 cf

Total Runoff Area = 21,115 sf Runoff Volume = 12,211 cf Average Runoff Depth = 6.94"
21.72% Pervious = 4,587 sf 78.28% Impervious = 16,528 sf

Summary for Subcatchment 7S: Proposed (Controlled)

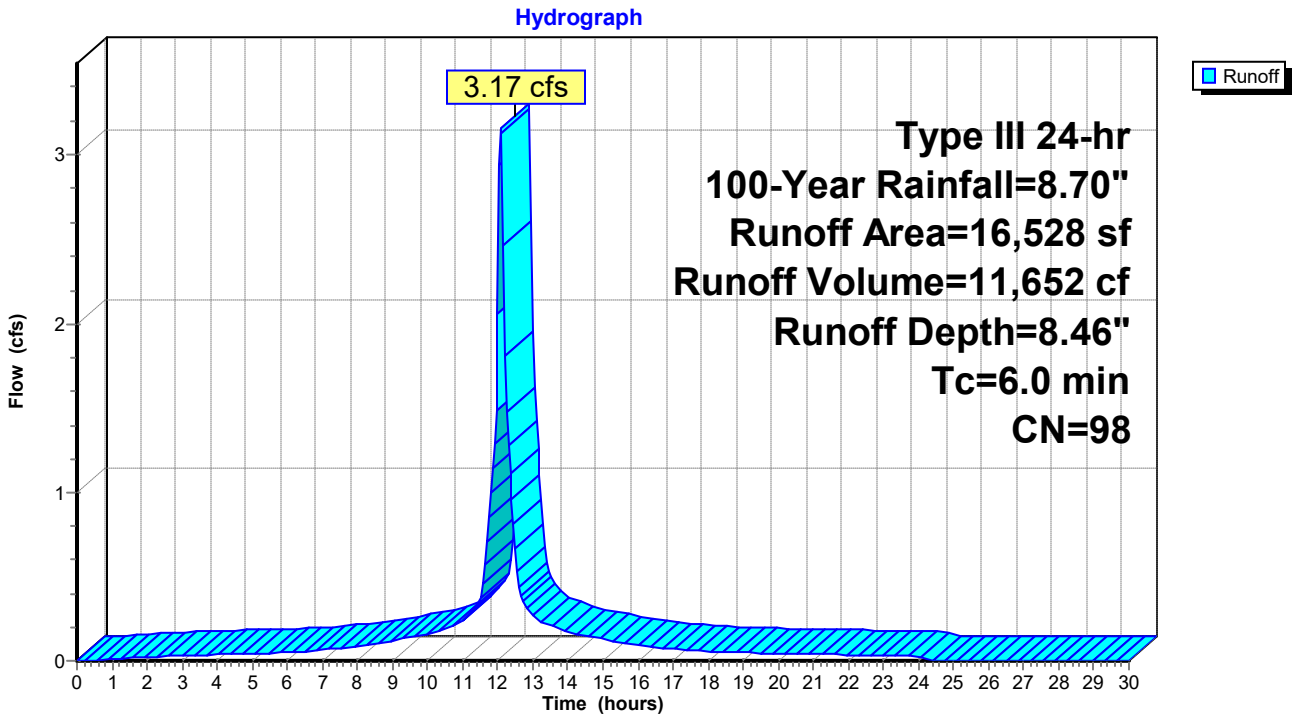
Runoff = 3.17 cfs @ 12.09 hrs, Volume= 11,652 cf, Depth= 8.46"
Routed to Pond 9P : Cultec Units

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
8,020	98	Roofs, HSG A
7,833	98	Paved parking, HSG A
675	98	Unconnected pavement, HSG A
16,528	98	Weighted Average
16,528	98	100.00% Impervious Area
675		4.08% Unconnected

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

Subcatchment 7S: Proposed (Controlled)



Summary for Subcatchment 8S: Proposed (Uncontrolled)

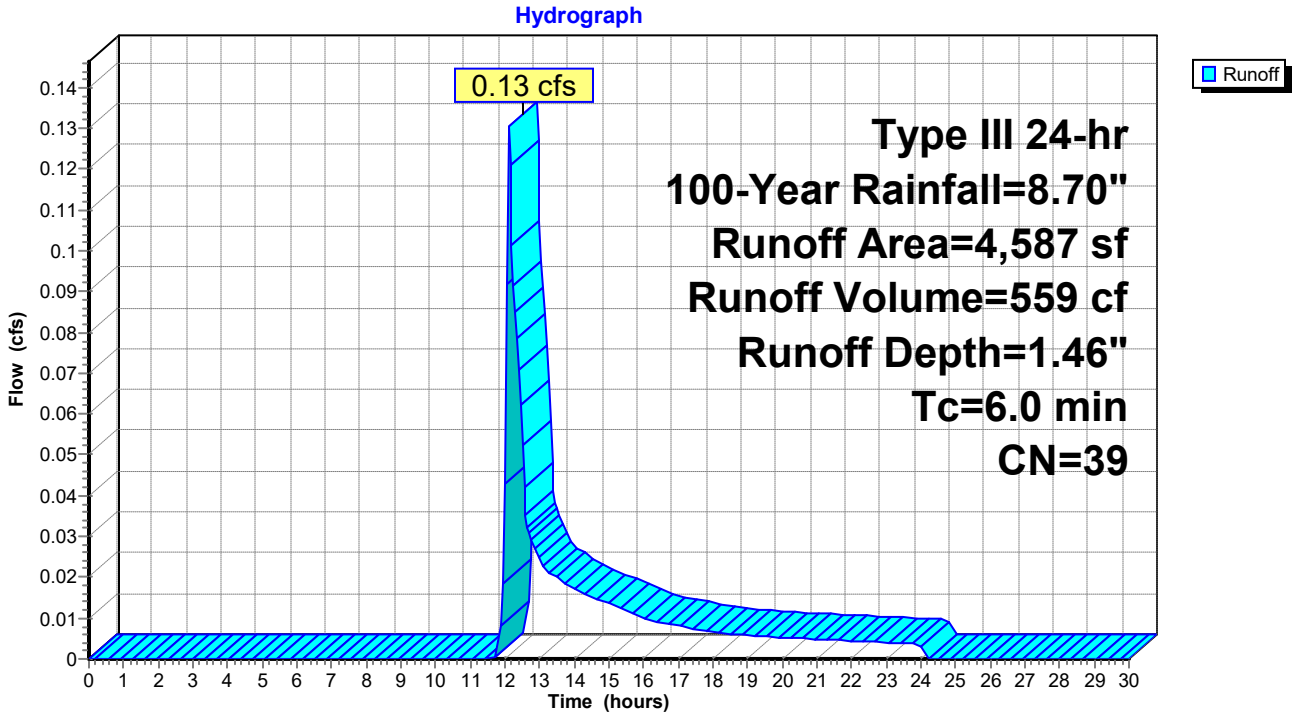
Runoff = 0.13 cfs @ 12.12 hrs, Volume= 559 cf, Depth= 1.46"
Routed to Link 10L : Proposed Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
4,587	39	>75% Grass cover, Good, HSG A
4,587	39	100.00% Pervious Area

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

Subcatchment 8S: Proposed (Uncontrolled)



Summary for Pond 9P: Cultec Units

Inflow Area = 16,528 sf,100.00% Impervious, Inflow Depth = 8.46" for 100-Year event
Inflow = 3.17 cfs @ 12.09 hrs, Volume= 11,652 cf
Outflow = 3.16 cfs @ 12.09 hrs, Volume= 11,652 cf, Atten= 0%, Lag= 0.5 min
Discarded = 0.07 cfs @ 7.50 hrs, Volume= 6,662 cf
Primary = 3.09 cfs @ 12.09 hrs, Volume= 4,990 cf
Routed to Link 10L : Proposed Runoff

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 68.78' @ 12.09 hrs Surf.Area= 1,296 sf Storage= 2,309 cf

Plug-Flow detention time= 158.1 min calculated for 11,633 cf (100% of inflow)
Center-of-Mass det. time= 158.4 min (898.6 - 740.2)

Volume	Invert	Avail.Storage	Storage Description
#1	66.00'	1,032 cf	**Cultec R-280HD** x 24 Inside #2 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 2 rows
#2	65.00'	1,370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) x 24 5,184 cf Overall - 1,032 cf Embedded = 4,152 cf x 33.0% Voids
		2,402 cf	Total Available Storage

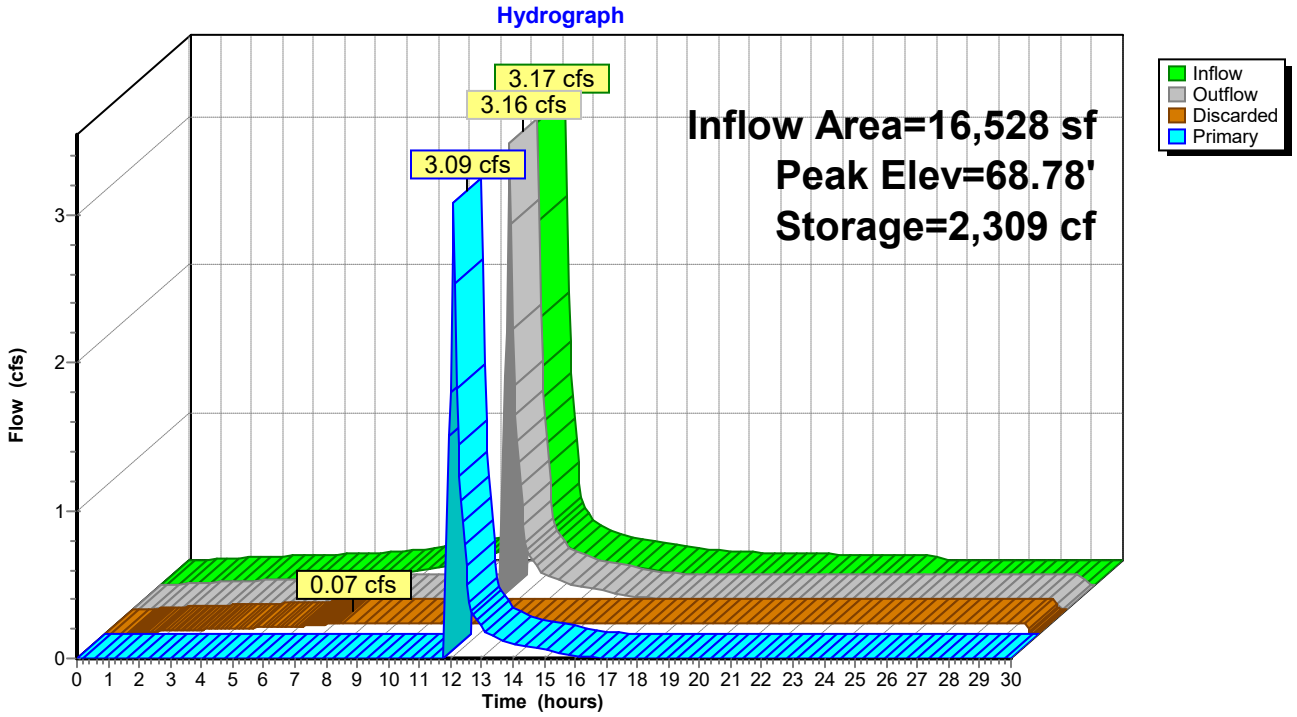
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
65.00	54	0	0
69.00	54	216	216

Device	Routing	Invert	Outlet Devices
#1	Discarded	65.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Device 3	68.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	64.50'	**24.0" Round Culvert** L= 120.0' Ke= 0.900 Inlet / Outlet Invert= 64.50' / 60.00' S= 0.0375 '/' Cc= 0.900 n= 0.011, Flow Area= 3.14 sf

Discarded OutFlow Max=0.07 cfs @ 7.50 hrs HW=65.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=3.04 cfs @ 12.09 hrs HW=68.78' (Free Discharge)
↑**3=Culvert** (Passes 3.04 cfs of 21.63 cfs potential flow)
↑**2=Orifice/Grate** (Weir Controls 3.04 cfs @ 1.73 fps)

Pond 9P: Cultec Units



Stage-Area-Storage for Pond 9P: Cultec Units

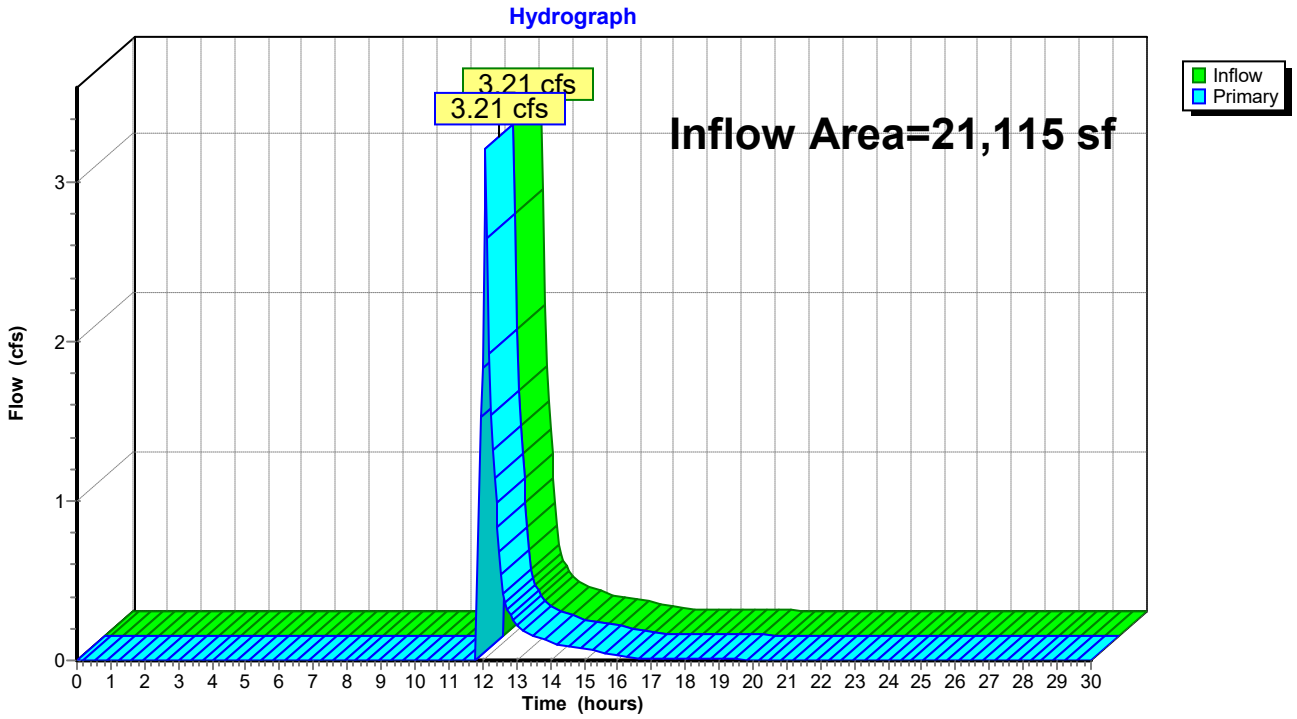
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
65.00	**1,296**	0
65.05	1,296	21
65.10	1,296	43
65.15	1,296	64
65.20	1,296	86
65.25	1,296	107
65.30	1,296	128
65.35	1,296	150
65.40	1,296	171
65.45	1,296	192
65.50	1,296	214
65.55	1,296	235
65.60	1,296	257
65.65	1,296	278
65.70	1,296	299
65.75	1,296	321
65.80	1,296	342
65.85	1,296	364
65.90	1,296	385
65.95	1,296	406
66.00	1,296	428
66.05	1,296	471
66.10	1,296	514
66.15	1,296	557
66.20	1,296	600
66.25	1,296	643
66.30	1,296	685
66.35	1,296	727
66.40	1,296	770
66.45	1,296	812
66.50	1,296	854
66.55	1,296	896
66.60	1,296	937
66.65	1,296	978
66.70	1,296	1,019
66.75	1,296	1,060
66.80	1,296	1,101
66.85	1,296	1,141
66.90	1,296	1,181
66.95	1,296	1,221
67.00	1,296	1,261
67.05	1,296	1,301
67.10	1,296	1,340
67.15	1,296	1,380
67.20	1,296	1,418
67.25	1,296	1,457
67.30	1,296	1,495
67.35	1,296	1,532
67.40	1,296	1,570
67.45	1,296	1,606
67.50	1,296	1,643
67.55	1,296	1,678
67.60	1,296	1,714
67.65	1,296	1,748
67.70	1,296	1,782
67.75	1,296	1,816
67.80	1,296	1,848
67.85	1,296	1,880
67.90	1,296	1,910
67.95	1,296	1,939
68.00	1,296	1,967
68.05	1,296	1,992
68.10	1,296	2,016
68.15	1,296	2,039
68.20	1,296	2,060
68.25	1,296	2,082
68.30	1,296	2,103
68.35	1,296	2,124
68.40	1,296	2,146
68.45	1,296	2,167
68.50	1,296	2,188
68.55	1,296	2,210
68.60	1,296	2,231
68.65	1,296	2,253
68.70	1,296	2,274
68.75	1,296	2,295
68.80	1,296	2,317
68.85	1,296	2,338
68.90	1,296	2,360
68.95	1,296	2,381
69.00	1,296	**2,402**

Summary for Link 10L: Proposed Runoff

Inflow Area = 21,115 sf, 78.28% Impervious, Inflow Depth = 3.15" for 100-Year event
Inflow = 3.21 cfs @ 12.10 hrs, Volume= 5,550 cf
Primary = 3.21 cfs @ 12.10 hrs, Volume= 5,550 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 10L: Proposed Runoff



APPENDIX B

Watershed Maps

PUBLIC STREET
(PUBLIC, TOWN)

SARATOGA STREET
(PUBLIC, TOWN)

DP-1
PROVIDENCE STORM SYSTEM

PRE-1
AREA= 21,115 SF
C_N= 80
T_C= 6.0 MIN.

AP 48 LOT 938
6,586 SF

AP 48 LOT 939
14,529 SF

AP 48 LOT 1156
N/F JOSE LUIS DASILVA
42 BALTIMORE STREET
LYNN, MA 01902

AP 48 LOT 1157
N/F JOSEPH S. ALCANTARA
14 SARATOGA STREET
PROVIDENCE, RI 02905

AP 48 LOT 7
N/F SOUTHSIDE GATEWAYS LIMITED
439 PINE STREET
PROVIDENCE, RI 02907

AP 48 LOT 941
N/F SOUTHSIDE GATEWAYS LIMITED
439 PINE STREET
PROVIDENCE, RI 02907

AP 48 LOT 8
N/F MARIO A. OSORIO GONZALEZ
319 PINE STREET
PROVIDENCE, RI 02905

EX. MULTI STORY BUILDING
#290

EX. DWELLING

EX. DWELLING

EX. DWELLING

GRASS AREA

BIT. CONCRETE PARKING AREA

BULKHEAD

EX. GRANITE CURB

EX. CONC. SIDEWALK

EX. EDGE OF PAVEMENT

EX. WOOD FENCE

EX. EDGE OF PAVEMENT

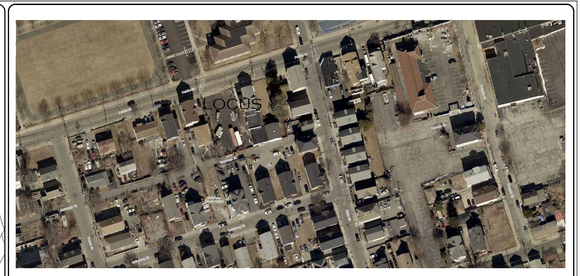
12"Ø VCP

12"Ø VCP

9.4'

0.3'

NAD83



LOCATION (NOT TO SCALE) MAP

GRAPHIC SCALE

10 0 5 10 20 40

1 INCH = 10 FEET

EXISTING WATERSHED MAP

PAUL D. CARLSON
No. 7142
REGISTERED PROFESSIONAL ENGINEER
CIVIL

PROFESSIONAL SEAL

290 PUBLIC STREET
PROVIDENCE, RHODE ISLAND 02905
ASSESSORS MAP 48 LOTS 938 & 949

APPLICANT: SWAP, INC.
439 PINE STREET - PROVIDENCE, RI 02907

JOB #	SCALE:	DRAWN BY:	DATE:
25-087	1" = 10'	JRM	SEPTEMBER 02, 2025

REVISED:

INSITE Engineering Services, LLC
PROFESSIONAL ENGINEERS | LAND SURVEYORS
Precision. Clarity. Certainty.

InSite Professional Complex, Suite 1
1539 Fall River Avenue Seekonk, MA 02771
Phone: (508) 336-4500 Fax: (508) 336-4558
Web Address: InsiteEngineers.com

PUBLIC STREET
(PUBLIC, TOWN)

EX. EDGE OF PAVEMENT

EX. CONC. SIDEWALK

EX. GRANITE CURB

DP-1
PROVIDENCE STORM SYSTEM

MA NAD83

POST-1
AREA= 16,528 SF
C_N= 98
T_C= 6.0 MIN.

POST-2
AREA= 4,587 SF
C_N= 39
T_C= 6.0 MIN.

GRASS AREA

AP 48 LOT 938
6,586 SF

AP 48 LOT 938
14,529 SF

AP 48 LOT 7
N/F SOUTHSIDE GATEWAYS LIMITED
439 PINE STREET
PROVIDENCE, RI 02907

AP 48 LOT 941
N/F SOUTHSIDE GATEWAYS LIMITED
439 PINE STREET
PROVIDENCE, RI 02907

AP 48 LOT 8
N/F MARIO A.
OSORIO GONZALEZ
319 PINE STREET
PROVIDENCE, RI
02905

AP 48 LOT 1156
N/F JOSE LUIS DASILVA
42 BALTIMORE STREET
LYNN, MA 01902

AP 48 LOT 1157
N/F JOSEPH S. ALCANTARA
14 SARATOGA STREET
PROVIDENCE, RI 02905

EX. DWELLING

EX. DWELLING

EX. DWELLING

EX. DWELLING

N 72°37'48" E 50.00'

N 72°37'48" E 112.00'

S 73°19'21" W 107.00'

S 73°19'21" W 60.00'

N 17°22'39" W 151.42'

S 16°40'39" E 141.42'

5.0'

7.0'

6.0'

9.4'

0.3'

11'

70.25 X

69.75 X

70'

69.25 X

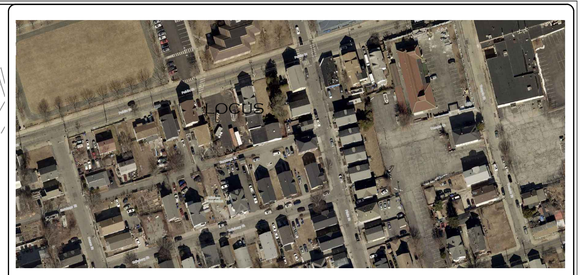
69.50 X

23% (MAX)

EX. WOOD FENCE

EX. EDGE OF PAVEMENT

SARATOGA STREET
(PUBLIC, TOWN)



Location (not to scale) Map

Graphic Scale

10 0 5 10 20 40

1 Inch = 10 Feet

Proposed Watershed Map

PAUL D. CARLSON
No. 7142
REGISTERED PROFESSIONAL ENGINEER
CIVIL
Professional Seal

290 Public Street
Providence, Rhode Island 02905
Assessors Map 48 Lots 938 & 949

Applicant: SWAP, Inc.
439 Pline Street - Providence, RI 02907

Job #	Scale:	Drawn By:	Date:
25-087	1" = 10'	JRM	September 02, 2025

Revised:

InSite Engineering Services, LLC
Professional Engineers | Land Surveyors
Precision. Clarity. Certainty.
InSite Professional Complex, Suite 1
1539 Fall River Avenue Seekonk, MA 02771
Phone: (508) 336-4500 Fax: (508) 336-4558
Web Address: InsiteEngineers.com