STORMWATER MANAGEMENT REPORT

Commercial Site Development

AP 107SE LOT 103B
48 VALLEY ROAD
MIDDLETOWN, RI

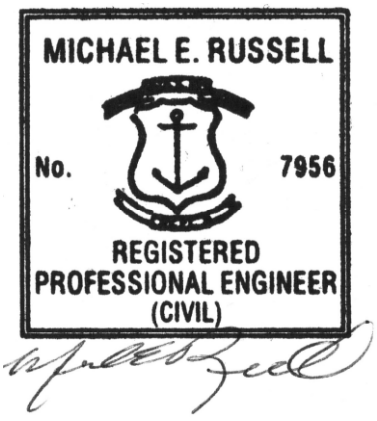
October, 2022
Revised: January 27, 2023

Prepared for:

GOLD'S WINE & SPIRITS, LLC.
1374 WEST MAIN ROAD
MIDDLETOWN, RI 02842

Prepared by:

Land Development Engineering & Consulting, LLC
207 High Point Avenue, Unit 6
Portsmouth, RI 02871



207 High Point Avenue, Unit #6
Portsmouth, RI 02871
T: 401-354-2050 | F: 401-369-9775
EMAIL: mrussell@sde-ldec.com

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207 High Point Avenue, Unit #6
Portsmouth, RI 02871
T: 401-354-2050 | F: 401-369-9775
EMAIL: mrussell@sde-ldec.com

INTRODUCTION

This report was prepared to address the Stormwater Management System (SMS) for the Commercial Site Development on AP 107SE Lot 103B, 48 Valley Road in Middletown. The Development will create a 6,814 sf commercial building with 21 parking spaces with associated landscaping, lighting, utilities & stormwater management system. This report will outline and summarize the current site as well as the proposed SMS for the new development. Said SMS is intended to control peak runoff & volume rates for the new impervious area(s). Additionally, the proposed SMS will provide, at minimum, the water quality & stormwater recharge volumes as required for new development projects. The SMS as proposed will comply with the Town of Middletown's & State of Rhode Island's Stormwater Management Policy (2018).

EXISTING CONDITIONS (SUMMARY)

The subject property is approximately 0.88 acres in area and fronts along Valley Road (Map 107SE, Lot 103B). The existing ground cover consists of woods across the entire lot. The site slopes generally towards the West (Valley Road). The elevation change across the site is approximately 14 feet. Currently, the Runoff from the site sheet flows across the site to Valley Road. summary of the Pre-Development Analysis is located in Appendix 1 of this report.

PROPOSED CONDITIONS (SUMMARY)

The Development will create a 6,814 sf commercial building with 21 parking spaces with associated landscaping, lighting, utilities & stormwater management system. Site grading will create the cuts & fills throughout the project limits to create the desired site layout and function and will maintain pre-development runoff patterns towards Valley Road. A stormwater collection system will be incorporated into the newly designed parking area to collect runoff from impervious surfaces and landscaped areas within the limit of disturbance. This system consists of a deep sump catch basin, sediment forebays, Stormceptor Units, underground storage chambers, underground infiltration chambers and an infiltration basin. The catch basin, Stormceptors and sediment forebays provide pre-treatment for the infiltration basin and infiltration chambers. The system will accommodate a 100-year storm event, handle the water quality volume (WQv) and provide for total suspended solids (TSS) removal. This overall system is designed to accommodate, at minimum, the water quality volume (WQv) and recharge volume (ReV) required for new development projects. Low impact development practices (LID) will be employed to the maximum extent practicable. Summary of the Post-Development Conditions Analysis is located in Appendix 1 of this report.

SITE SOIL & GROUNDWATER CONDITIONS

The underlying watershed soils within the developed area consist of the Pittstown series (Hydrologic Group C). Soil readings and groundwater determination was performed in October 2022. Soil textures below the fill consisted primarily of a sandy loam with groundwater elevation approximately 10 feet below original grade.

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METHODOLOGY

HydroCad® Stormwater Modeling System was used to quantify stormwater runoff generated by WQv, 1-year, 2-year, 10-year, 25-year, and 100-year design storms in pre and post development conditions. The calculations were performed using "Dynamic Storage-Indication" to also analyze the impact of the pipe size, material and slope selection in upstream structures. The HydroCad® program utilizes Natural Resource Conservation Service (NRCS) techniques (TR-20) to predict stormwater runoff for given design storms. The calculations performed by HydroCad® are based on the NRCS model return frequency Type III distribution and a user specified design storms. The calculation is also performed using the simple dynamic method which utilizes *Rawls Rate* for infiltration based on soil texture.

The analysis is performed by modeling the drainage area as subcatchments and ponds. A subcatchment is an area that produces runoff and drains into a pond. A pond can be a natural depression, wetland, or manmade structure that detains or retains stormwater runoff. The drainage network pipe design adequacy is evaluated by integrating it in the HydroCad® pond model for drainage structures. The pipes are modeled as the pond outlet-culvert type. Manning's Equation and/or Hazen-Williams hydraulic equations were also utilized to determine the required pipe sizes as well as minimum and maximum pipe slopes.

DRAINAGE SYSTEM MODEL

The proposed development is analyzed by creating an existing condition or pre-development model and a full build-out or post-development model. The models were created to compare the existing and post-development runoff to the abutting properties and existing SMS. The post-development analysis results are also utilized to adequately size the proposed practices. Analysis within the site was performed using WQv, 1, 2, 10, 25 and 100-year design storm projections. All excess stormwater runoff captured on site will be treated and retained/recharged on site. On site post-development runoff rates flowing overland toward abutting properties will not exceed pre-development runoff rates up to the 100-year event.

The pre-development HydroCad® model within the site consists of one subcatchment that flows West across the site to Valley Road. This was created to determine the existing stormwater runoff originating from the site.

Post-development subcatchment models were created for the site. Subcatchment models represent the drainage areas to each of the proposed reaches, drainage structures, or storage & treatment areas. Each of these areas provides elements of treatment, storage, and infiltration in order to effectively mitigate flows to the Point of Analysis in each analyzed storm event. See Post-Development output in Appendix B and summary at the end of this narrative.

The majority of the paved & landscaped areas for the developed area discharge into a stormceptor unit or forebay before entering an infiltration practice.

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STORMWATER TREATMENT

Stormwater runoff will be treated through the use of Best Management Practices (BMP's). The BMP's used within the proposed development include deep sump catch basin, sediment forebays, Stormceptor Units, underground storage chambers, underground infiltration chambers and an infiltration basin. These BMP's will aid in the removal of pollutants within the stormwater runoff as well as provide recharge to the groundwater aquifer.

This system will provide pollutant removal and treatment to the maximum extent practicable for the proposed redevelopment.

ANALYSIS DATA

The following information was used in performing the calculations for the drainage system.

RUNOFF SUMMARY AT ANALYSIS POINTS		
Cover Description		
Cover Type	Hydrologic condition	Curve Number (Class: A , B , C, D)
Landscaping, Lawns	Good	39 , 61 , 74 , 80
Woods	Good	30 , 55 , 70 , 77
Gravel	Good	76 , 85 , 89 , 91
Buildings	-	98
Pavement	-	98
Brick Walkways	-	98

Rainfall Data (Type III - 24 Hour Storm Duration*)

Storm Event	Rainfall
WQv	1.2 inches
1 - Year	2.8 inches
2 - Year	3.3 inches
10 - Year	4.9 inches
25 - Year	6.1 inches

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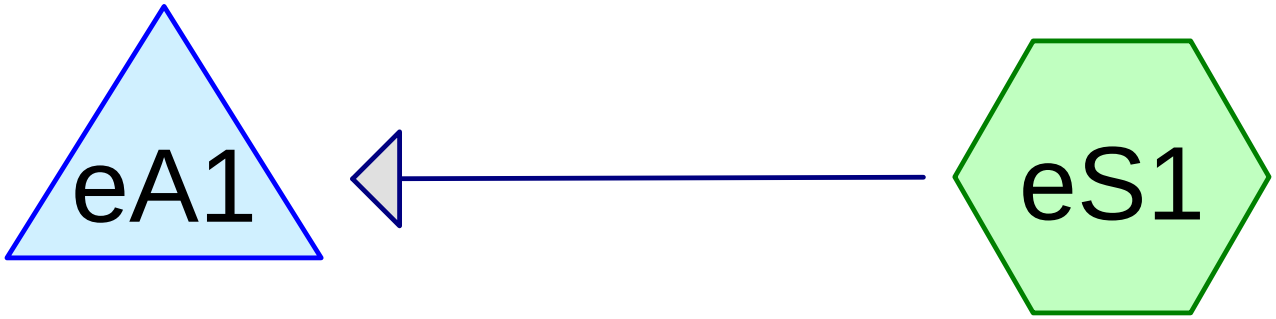


Pre - Analysis Point-1

Pre - Surface flow to Valley Road

Subcat Reach Pond Link

Routing Diagram for 22061 HydroCAD_v2 12-9-2022
Prepared by {enter your company name here}, Printed 1/12/2023

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
38,749	70	Woods, Good, HSG C (eS1)
38,749	**70**	**TOTAL AREA**

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond eA1: Pre - Analysis Point-1 Inflow=1.73 cfs 6,337 cf
Primary=1.73 cfs 6,337 cf

Subcatchment eS1: Pre - Surface flow to Valley Road Runoff Area=38,749 sf 0.00% Impervious Runoff Depth=1.96"
Flow Length=243' Tc=10.1 min CN=70/0 Runoff=1.73 cfs 6,337 cf

Total Runoff Area = 38,749 sf Runoff Volume = 6,337 cf Average Runoff Depth = 1.96"
100.00% Pervious = 38,749 sf 0.00% Impervious = 0 sf

Summary for Pond eA1: Pre - Analysis Point-1

Inflow Area = 38,749 sf, 0.00% Impervious, Inflow Depth = 1.96" for 10-Year event
Inflow = 1.73 cfs @ 12.15 hrs, Volume= 6,337 cf
Primary = 1.73 cfs @ 12.15 hrs, Volume= 6,337 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Summary for Subcatchment eS1: Pre - Surface flow to Valley Road

Runoff = 1.73 cfs @ 12.15 hrs, Volume= 6,337 cf, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
38,749	70	Woods, Good, HSG C
38,749	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond eA1: Pre - Analysis Point-1 Inflow=2.58 cfs 9,315 cf
Primary=2.58 cfs 9,315 cf

Subcatchment eS1: Pre - Surface flow to Valley Road Runoff Area=38,749 sf 0.00% Impervious Runoff Depth=2.88"
Flow Length=243' Tc=10.1 min CN=70/0 Runoff=2.58 cfs 9,315 cf

Total Runoff Area = 38,749 sf Runoff Volume = 9,315 cf Average Runoff Depth = 2.88"
100.00% Pervious = 38,749 sf 0.00% Impervious = 0 sf

Summary for Pond eA1: Pre - Analysis Point-1

Inflow Area = 38,749 sf, 0.00% Impervious, Inflow Depth = 2.88" for 25-Year event
Inflow = 2.58 cfs @ 12.15 hrs, Volume= 9,315 cf
Primary = 2.58 cfs @ 12.15 hrs, Volume= 9,315 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Summary for Subcatchment eS1: Pre - Surface flow to Valley Road

Runoff = 2.58 cfs @ 12.15 hrs, Volume= 9,315 cf, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

Area (sf)	CN	Description
38,749	70	Woods, Good, HSG C
38,749	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond eA1: Pre - Analysis Point-1 Inflow=4.48 cfs 16,094 cf
Primary=4.48 cfs 16,094 cf

Subcatchment eS1: Pre - Surface flow to Valley Road Runoff Area=38,749 sf 0.00% Impervious Runoff Depth=4.98"
Flow Length=243' Tc=10.1 min CN=70/0 Runoff=4.48 cfs 16,094 cf

Total Runoff Area = 38,749 sf Runoff Volume = 16,094 cf Average Runoff Depth = 4.98"
100.00% Pervious = 38,749 sf 0.00% Impervious = 0 sf

Summary for Pond eA1: Pre - Analysis Point-1

Inflow Area = 38,749 sf, 0.00% Impervious, Inflow Depth = 4.98" for 100-Year event
Inflow = 4.48 cfs @ 12.14 hrs, Volume= 16,094 cf
Primary = 4.48 cfs @ 12.14 hrs, Volume= 16,094 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Summary for Subcatchment eS1: Pre - Surface flow to Valley Road

Runoff = 4.48 cfs @ 12.14 hrs, Volume= 16,094 cf, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
38,749	70	Woods, Good, HSG C
38,749	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond eA1: Pre - Analysis Point-1 Inflow=0.00 cfs 82 cf
Primary=0.00 cfs 82 cf

Subcatchment eS1: Pre - Surface flow to Valley Road Runoff Area=38,749 sf 0.00% Impervious Runoff Depth=0.03"
Flow Length=243' Tc=10.1 min CN=70/0 Runoff=0.00 cfs 82 cf

Total Runoff Area = 38,749 sf Runoff Volume = 82 cf Average Runoff Depth = 0.03"
100.00% Pervious = 38,749 sf 0.00% Impervious = 0 sf

Summary for Pond eA1: Pre - Analysis Point-1

Inflow Area = 38,749 sf, 0.00% Impervious, Inflow Depth = 0.03" for WQv event
Inflow = 0.00 cfs @ 14.93 hrs, Volume= 82 cf
Primary = 0.00 cfs @ 14.93 hrs, Volume= 82 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

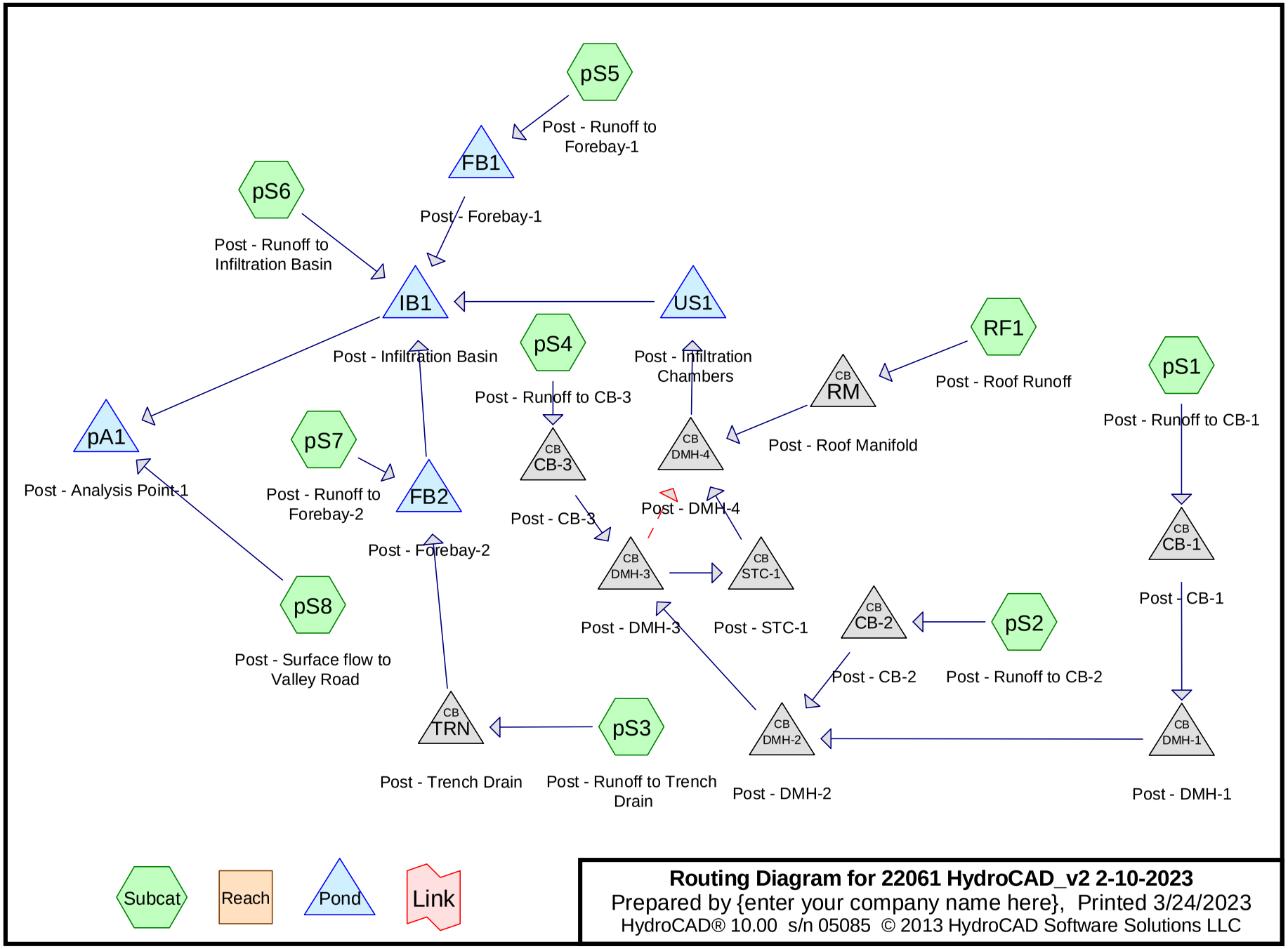
Summary for Subcatchment eS1: Pre - Surface flow to Valley Road

Runoff = 0.00 cfs @ 14.93 hrs, Volume= 82 cf, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
38,749	70	Woods, Good, HSG C
38,749	70	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			


pS5
Post - Runoff to Forebay-1
FB1
Post - Forebay-1
pS6
Post - Runoff to Infiltration Basin
IB1
US1
Post - Infiltration Basin
Post - Infiltration Chambers
pS4
Post - Runoff to CB-3
RF1
Post - Roof Runoff
CB RM
Post - Roof Manifold
pS1
Post - Runoff to CB-1
pA1
Post - Analysis Point-1
pS7
Post - Runoff to Forebay-2
FB2
Post - Forebay-2
CB CB-3
CB DMH-4
Post - CB-3
Post - DMH-4
CB CB-1
Post - CB-1
CB DMH-3
CB STC-1
Post - DMH-3
Post - STC-1
CB CB-2
pS2
Post - CB-2
Post - Runoff to CB-2
pS8
Post - Surface flow to Valley Road
CB TRN
pS3
Post - Trench Drain
Post - Runoff to Trench Drain
CB DMH-2
CB DMH-1
Post - DMH-2
Post - DMH-1
Subcat
Reach
Pond
Link
Routing Diagram for 22061 HydroCAD_v2 2-10-2023
Prepared by {enter your company name here}, Printed 3/24/2023
HydroCAD® 10.00 s/n 05085 © 2013 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
13,891	74	>75% Grass cover, Good, HSG C (pS1, pS2, pS3, pS4, pS5, pS6, pS7, pS8)
820	98	Curbing & Walls (pS1, pS2, pS3, pS4, pS5, pS6, pS7, pS8)
110	98	Dumpster Pad (pS1)
989	98	New Walkways (pS1, pS2, pS4, pS5)
15,869	98	Paved parking, HSG C (pS1, pS2, pS3, pS4, pS5, pS8)
6,814	98	Roofs, HSG C (RF1)
256	98	Utility Pads (pS5)
38,749	**89**	**TOTAL AREA**

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond CB-1: Post - CB-1 Peak Elev=76.96' Inflow=0.51 cfs 1,707 cf
12.0" Round Culvert n=0.013 L=75.0' S=0.0100 '/' Outflow=0.51 cfs 1,707 cf

Pond CB-2: Post - CB-2 Peak Elev=74.30' Inflow=0.24 cfs 815 cf
8.0" Round Culvert n=0.013 L=10.0' S=0.0100 '/' Outflow=0.24 cfs 815 cf

Pond CB-3: Post - CB-3 Peak Elev=74.09' Inflow=0.31 cfs 1,064 cf
8.0" Round Culvert n=0.013 L=25.4' S=0.0098 '/' Outflow=0.31 cfs 1,064 cf

Pond DMH-1: Post - DMH-1 Peak Elev=76.11' Inflow=0.51 cfs 1,707 cf
12.0" Round Culvert n=0.013 L=123.0' S=0.0159 '/' Outflow=0.51 cfs 1,707 cf

Pond DMH-2: Post - DMH-2 Peak Elev=74.24' Inflow=0.75 cfs 2,522 cf
12.0" Round Culvert n=0.013 L=14.3' S=0.0105 '/' Outflow=0.75 cfs 2,522 cf

Pond DMH-3: Post - DMH-3 Peak Elev=73.75' Inflow=1.06 cfs 3,586 cf
Primary=0.56 cfs 3,256 cf Secondary=0.52 cfs 330 cf Outflow=1.06 cfs 3,586 cf

Pond DMH-4: Post - DMH-4 Peak Elev=73.19' Inflow=1.82 cfs 6,234 cf
12.0" Round Culvert x 2.00 n=0.013 L=6.0' S=0.0183 '/' Outflow=1.82 cfs 6,234 cf

Pond FB1: Post - Forebay-1 Peak Elev=73.73' Storage=201 cf Inflow=1.12 cfs 3,740 cf
Outflow=1.12 cfs 3,582 cf

Pond FB2: Post - Forebay-2 Peak Elev=73.20' Storage=69 cf Inflow=0.31 cfs 1,079 cf
Outflow=0.31 cfs 1,020 cf

Pond IB1: Post - Infiltration Basin Peak Elev=72.96' Storage=1,373 cf Inflow=1.56 cfs 5,448 cf
Discarded=0.03 cfs 2,299 cf Primary=1.37 cfs 3,149 cf Outflow=1.39 cfs 5,448 cf

Pond pA1: Post - Analysis Point-1 Inflow=1.60 cfs 4,032 cf
Primary=1.60 cfs 4,032 cf

Subcatchment pS1: Post - Runoff to CB-1 Runoff Area=5,413 sf 63.01% Impervious Runoff Depth=3.78"
Tc=5.0 min CN=74/98 Runoff=0.51 cfs 1,707 cf

Subcatchment pS2: Post - Runoff to CB-2 Runoff Area=2,196 sf 91.26% Impervious Runoff Depth=4.46"
Tc=5.0 min CN=74/98 Runoff=0.24 cfs 815 cf

Subcatchment pS3: Post - Runoff to Trench Drain Runoff Area=2,740 sf 94.64% Impervious Runoff Depth=4.54"
Tc=5.0 min CN=74/98 Runoff=0.30 cfs 1,036 cf

Subcatchment pS4: Post - Runoff to CB-3 Runoff Area=2,914 sf 88.19% Impervious Runoff Depth=4.38"
Tc=5.0 min CN=74/98 Runoff=0.31 cfs 1,064 cf

Subcatchment pS5: Post - Runoff to Forebay-1 Runoff Area=12,482 sf 55.13% Impervious Runoff Depth=3.60"
Tc=5.0 min CN=74/98 Runoff=1.12 cfs 3,740 cf

Subcatchment pS6: Post - Runoff to Infiltration Basin Runoff Area=1,922 sf 0.57% Impervious Runoff Depth=2.30"
Tc=5.0 min CN=74/98 Runoff=0.12 cfs 368 cf

Subcatchment pS7: Post - Runoff to Forebay-2 Runoff Area=220 sf 4.09% Impervious Runoff Depth=2.38"
Tc=5.0 min CN=74/98 Runoff=0.01 cfs 44 cf

Subcatchment pS8: Post - Surface flow to Valley Road Runoff Area=4,048 sf 13.96% Impervious Runoff Depth=2.62"
Flow Length=243' Tc=10.1 min CN=74/98 Runoff=0.24 cfs 883 cf

Subcatchment RF1: Post - Roof Runoff Runoff Area=6,814 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=0/98 Runoff=0.77 cfs 2,648 cf

Pond RM: Post - Roof Manifold Peak Elev=74.29' Inflow=0.77 cfs 2,648 cf
8.0" Round Culvert n=0.013 L=26.0' S=0.0192 '/' Outflow=0.77 cfs 2,648 cf

Pond STC-1: Post - STC-1 Peak Elev=73.48' Inflow=0.56 cfs 3,256 cf
6.0" Round Culvert n=0.013 L=4.0' S=0.0125 '/' Outflow=0.56 cfs 3,256 cf

Pond TRN: Post - Trench Drain Peak Elev=73.61' Inflow=0.30 cfs 1,036 cf
8.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.30 cfs 1,036 cf

Pond US1: Post - Infiltration Chambers

Peak Elev=73.01' Storage=3,095 cf Inflow=1.82 cfs 6,234 cf
Discarded=0.06 cfs 5,756 cf Primary=0.06 cfs 478 cf Outflow=0.12 cfs 6,234 cf

Total Runoff Area = 38,749 sf Runoff Volume = 12,305 cf Average Runoff Depth = 3.81"
35.85% Pervious = 13,891 sf 64.15% Impervious = 24,858 sf

Summary for Pond CB-1: Post - CB-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 0.51 cfs @ 12.07 hrs, Volume= 1,707 cf
Outflow = 0.51 cfs @ 12.07 hrs, Volume= 1,707 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.51 cfs @ 12.07 hrs, Volume= 1,707 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 76.96' @ 12.07 hrs
Flood Elev= 79.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	76.60'	**12.0" Round Culvert** L= 75.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 76.60' / 75.85' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 12.07 hrs HW=76.95' TW=76.10' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 0.50 cfs @ 3.00 fps)

Summary for Pond CB-2: Post - CB-2

Inflow Area = 2,196 sf, 91.26% Impervious, Inflow Depth = 4.46" for 10-Year event
Inflow = 0.24 cfs @ 12.07 hrs, Volume= 815 cf
Outflow = 0.24 cfs @ 12.07 hrs, Volume= 815 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 12.07 hrs, Volume= 815 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.30' @ 12.10 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.90'	**8.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.90' / 73.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.19 cfs @ 12.07 hrs HW=74.28' TW=74.23' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.19 cfs @ 1.28 fps)

Summary for Pond CB-3: Post - CB-3

Inflow Area = 2,914 sf, 88.19% Impervious, Inflow Depth = 4.38" for 10-Year event
Inflow = 0.31 cfs @ 12.07 hrs, Volume= 1,064 cf
Outflow = 0.31 cfs @ 12.07 hrs, Volume= 1,064 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.07 hrs, Volume= 1,064 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.09' @ 12.07 hrs
Flood Elev= 75.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 25.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.50' S= 0.0098 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.30 cfs @ 12.07 hrs HW=74.08' TW=73.74' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.30 cfs @ 2.55 fps)

Summary for Pond DMH-1: Post - DMH-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 3.78" for 10-Year event
Inflow = 0.51 cfs @ 12.07 hrs, Volume= 1,707 cf
Outflow = 0.51 cfs @ 12.07 hrs, Volume= 1,707 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.51 cfs @ 12.07 hrs, Volume= 1,707 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 76.11' @ 12.07 hrs
Flood Elev= 80.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	75.75'	**12.0" Round Culvert** L= 123.0' RCP, sq.cut end projecting, Ke= 0.500

Inlet / Outlet Invert= 75.75' / 73.80' S= 0.0159 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 12.07 hrs HW=76.10' TW=74.23' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.50 cfs @ 2.02 fps)

Summary for Pond DMH-2: Post - DMH-2

Inflow Area = 7,609 sf, 71.17% Impervious, Inflow Depth = 3.98" for 10-Year event
Inflow = 0.75 cfs @ 12.07 hrs, Volume= 2,522 cf
Outflow = 0.75 cfs @ 12.07 hrs, Volume= 2,522 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.75 cfs @ 12.07 hrs, Volume= 2,522 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.24' @ 12.07 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**12.0" Round Culvert** L= 14.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.60' S= 0.0105 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=0.73 cfs @ 12.07 hrs HW=74.23' TW=73.74' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.73 cfs @ 2.87 fps)

Summary for Pond DMH-3: Post - DMH-3

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 4.09" for 10-Year event
Inflow = 1.06 cfs @ 12.07 hrs, Volume= 3,586 cf
Outflow = 1.06 cfs @ 12.07 hrs, Volume= 3,586 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.05 hrs, Volume= 3,256 cf
Secondary = 0.52 cfs @ 12.08 hrs, Volume= 330 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Peak Elev= 73.75' @ 12.08 hrs
Flood Elev= 76.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.05'	**6.0" Round Culvert** L= 2.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.05' / 73.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 3	73.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	73.35'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.35' / 73.25' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.49 cfs @ 12.05 hrs HW=73.71' TW=73.44' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.49 cfs @ 2.48 fps)

Secondary OutFlow Max=0.51 cfs @ 12.08 hrs HW=73.74' TW=73.19' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 0.51 cfs @ 2.65 fps)
└**2=Broad-Crested Rectangular Weir** (Passes 0.51 cfs of 1.36 cfs potential flow)

Summary for Pond DMH-4: Post - DMH-4

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 4.32" for 10-Year event
Inflow = 1.82 cfs @ 12.07 hrs, Volume= 6,234 cf
Outflow = 1.82 cfs @ 12.07 hrs, Volume= 6,234 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.82 cfs @ 12.07 hrs, Volume= 6,234 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.19' @ 12.07 hrs
Flood Elev= 76.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.65'	**12.0" Round Culvert X 2.00** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.65' / 72.54' S= 0.0183 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.79 cfs @ 12.07 hrs HW=73.19' TW=72.15' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.79 cfs @ 3.02 fps)

Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,482 sf, 55.13% Impervious, Inflow Depth = 3.60" for 10-Year event
Inflow = 1.12 cfs @ 12.07 hrs, Volume= 3,740 cf
Outflow = 1.12 cfs @ 12.08 hrs, Volume= 3,582 cf, Atten= 0%, Lag= 0.5 min
Primary = 1.12 cfs @ 12.08 hrs, Volume= 3,582 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.73' @ 12.08 hrs Surf.Area= 197 sf Storage= 201 cf
Flood Elev= 74.00' Surf.Area= 225 sf Storage= 258 cf

Plug-Flow detention time= 47.3 min calculated for 3,582 cf (96% of inflow)
Center-of-Mass det. time= 22.3 min (795.4 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	49	0	0
73.00	121	85	85
74.00	225	173	258

Device	Routing	Invert	Outlet Devices
#1	Primary	73.50'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.11 cfs @ 12.08 hrs HW=73.73' TW=72.94' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 1.11 cfs @ 1.22 fps)

Summary for Pond FB2: Post - Forebay-2

Inflow Area = 2,960 sf, 87.91% Impervious, Inflow Depth = 4.38" for 10-Year event
Inflow = 0.31 cfs @ 12.07 hrs, Volume= 1,079 cf
Outflow = 0.31 cfs @ 12.08 hrs, Volume= 1,020 cf, Atten= 0%, Lag= 0.4 min
Primary = 0.31 cfs @ 12.08 hrs, Volume= 1,020 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.20' @ 12.08 hrs Surf.Area= 103 sf Storage= 69 cf
Flood Elev= 74.00' Surf.Area= 169 sf Storage= 179 cf

Plug-Flow detention time= 59.1 min calculated for 1,019 cf (94% of inflow)
Center-of-Mass det. time= 27.6 min (780.7 - 753.1)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	179 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	14	0	0
73.00	87	51	51
74.00	169	128	179

Device	Routing	Invert	Outlet Devices
#1	Primary	73.10'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.31 cfs @ 12.08 hrs HW=73.20' TW=72.94' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.31 cfs @ 0.80 fps)

Summary for Pond IB1: Post - Infiltration Basin

Inflow Area = 34,701 sf, 70.01% Impervious, Inflow Depth = 1.88" for 10-Year event
Inflow = 1.56 cfs @ 12.08 hrs, Volume= 5,448 cf
Outflow = 1.39 cfs @ 12.12 hrs, Volume= 5,448 cf, Atten= 10%, Lag= 2.5 min
Discarded = 0.03 cfs @ 12.12 hrs, Volume= 2,299 cf
Primary = 1.37 cfs @ 12.12 hrs, Volume= 3,149 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 72.96' @ 12.12 hrs Surf.Area= 1,168 sf Storage= 1,373 cf
Flood Elev= 74.00' Surf.Area= 1,688 sf Storage= 2,857 cf

Plug-Flow detention time= 249.1 min calculated for 5,448 cf (100% of inflow)
Center-of-Mass det. time= 249.1 min (1,049.6 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	2,857 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	307	0	0
72.00	671	489	489
73.00	1,188	930	1,419
74.00	1,688	1,438	2,857

Device	Routing	Invert	Outlet Devices
#1	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	72.70'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.03 cfs @ 12.12 hrs HW=72.96' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.36 cfs @ 12.12 hrs HW=72.96' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.36 cfs @ 1.31 fps)

Summary for Pond pA1: Post - Analysis Point-1

Inflow Area = 38,749 sf, 64.15% Impervious, Inflow Depth = 1.25" for 10-Year event
Inflow = 1.60 cfs @ 12.12 hrs, Volume= 4,032 cf
Primary = 1.60 cfs @ 12.12 hrs, Volume= 4,032 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Summary for Subcatchment pS1: Post - Runoff to CB-1

Runoff = 0.51 cfs @ 12.07 hrs, Volume= 1,707 cf, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	3,012	98	Paved parking, HSG C
	2,002	74	>75% Grass cover, Good, HSG C
*	124	98	New Walkways
*	165	98	Curbing & Walls
*	110	98	Dumpster Pad
	5,413	89	Weighted Average
	2,002	74	36.99% Pervious Area
	3,411	98	63.01% Impervious Area

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

Summary for Subcatchment pS2: Post - Runoff to CB-2

Runoff = 0.24 cfs @ 12.07 hrs, Volume= 815 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	1,482	98	Paved parking, HSG C
	192	74	>75% Grass cover, Good, HSG C
*	446	98	New Walkways
*	76	98	Curbing & Walls
	2,196	96	Weighted Average
	192	74	8.74% Pervious Area
	2,004	98	91.26% Impervious Area

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

Summary for Subcatchment pS3: Post - Runoff to Trench Drain

Runoff = 0.30 cfs @ 12.07 hrs, Volume= 1,036 cf, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	2,509	98	Paved parking, HSG C
	147	74	>75% Grass cover, Good, HSG C
*	0	98	New Walkways
*	84	98	Curbing & Walls
	2,740	97	Weighted Average
	147	74	5.36% Pervious Area
	2,593	98	94.64% Impervious Area

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

Summary for Subcatchment pS4: Post - Runoff to CB-3

Runoff = 0.31 cfs @ 12.07 hrs, Volume= 1,064 cf, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	2,243	98	Paved parking, HSG C
	344	74	>75% Grass cover, Good, HSG C
*	236	98	New Walkways
*	91	98	Curbing & Walls
	2,914	95	Weighted Average
	344	74	11.81% Pervious Area
	2,570	98	88.19% Impervious Area

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

Summary for Subcatchment pS5: Post - Runoff to Forebay-1

Runoff = 1.12 cfs @ 12.07 hrs, Volume= 3,740 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	6,072	98	Paved parking, HSG C
	5,601	74	>75% Grass cover, Good, HSG C
*	183	98	New Walkways
*	370	98	Curbing & Walls
*	256	98	Utility Pads
	12,482	87	Weighted Average
	5,601	74	44.87% Pervious Area
	6,881	98	55.13% Impervious Area

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

Summary for Subcatchment pS6: Post - Runoff to Infiltration Basin

Runoff = 0.12 cfs @ 12.08 hrs, Volume= 368 cf, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	1,911	74	>75% Grass cover, Good, HSG C
*	11	98	Curbing & Walls
	1,922	74	Weighted Average
	1,911	74	99.43% Pervious Area
	11	98	0.57% Impervious Area

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

Summary for Subcatchment pS7: Post - Runoff to Forebay-2

Runoff = 0.01 cfs @ 12.08 hrs, Volume= 44 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	211	74	>75% Grass cover, Good, HSG C
*	9	98	Curbing & Walls
	220	75	Weighted Average
	211	74	95.91% Pervious Area
	9	98	4.09% Impervious Area

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

Summary for Subcatchment pS8: Post - Surface flow to Valley Road

Runoff = 0.24 cfs @ 12.14 hrs, Volume= 883 cf, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

	Area (sf)	CN	Description
	3,483	74	>75% Grass cover, Good, HSG C
	551	98	Paved parking, HSG C
*	14	98	Curbing & Walls
	4,048	77	Weighted Average
	3,483	74	86.04% Pervious Area
	565	98	13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			

Summary for Subcatchment RF1: Post - Roof Runoff

Runoff = 0.77 cfs @ 12.07 hrs, Volume= 2,648 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
6,814	98	Roofs, HSG C
6,814	98	100.00% Impervious Area

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

Summary for Pond RM: Post - Roof Manifold

Inflow Area = 6,814 sf,100.00% Impervious, Inflow Depth = 4.66" for 10-Year event
Inflow = 0.77 cfs @ 12.07 hrs, Volume= 2,648 cf
Outflow = 0.77 cfs @ 12.07 hrs, Volume= 2,648 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.07 hrs, Volume= 2,648 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.29' @ 12.07 hrs
Flood Elev= 78.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.25' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.75 cfs @ 12.07 hrs HW=74.29' TW=73.19' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.75 cfs @ 2.50 fps)

Summary for Pond STC-1: Post - STC-1

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 3.71" for 10-Year event
Inflow = 0.56 cfs @ 12.05 hrs, Volume= 3,256 cf
Outflow = 0.56 cfs @ 12.05 hrs, Volume= 3,256 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.05 hrs, Volume= 3,256 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.48' @ 12.08 hrs
Flood Elev= 76.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.75'	**6.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.75' / 72.70' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.49 cfs @ 12.05 hrs HW=73.44' TW=73.17' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.49 cfs @ 2.50 fps)

Summary for Pond TRN: Post - Trench Drain

Inflow Area = 2,740 sf, 94.64% Impervious, Inflow Depth = 4.54" for 10-Year event
Inflow = 0.30 cfs @ 12.07 hrs, Volume= 1,036 cf
Outflow = 0.30 cfs @ 12.07 hrs, Volume= 1,036 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.30 cfs @ 12.07 hrs, Volume= 1,036 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.61' @ 12.07 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.25'	**8.0" Round Culvert** L= 5.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.25' / 73.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.30 cfs @ 12.07 hrs HW=73.61' TW=73.20' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.30 cfs @ 2.22 fps)

Summary for Pond US1: Post - Infiltration Chambers

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 4.32" for 10-Year event
Inflow = 1.82 cfs @ 12.07 hrs, Volume= 6,234 cf
Outflow = 0.12 cfs @ 13.57 hrs, Volume= 6,234 cf, Atten= 94%, Lag= 89.6 min
Discarded = 0.06 cfs @ 9.60 hrs, Volume= 5,756 cf
Primary = 0.06 cfs @ 13.57 hrs, Volume= 478 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.01' @ 13.57 hrs Surf.Area= 2,346 sf Storage= 3,095 cf
Flood Elev= 74.50' Surf.Area= 2,346 sf Storage= 4,695 cf

Plug-Flow detention time= 432.8 min calculated for 6,230 cf (100% of inflow)
Center-of-Mass det. time= 433.0 min (1,187.4 - 754.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	71.00'	1,732 cf	**39.50'W x 59.40'L x 3.50'H Field A** 8,212 cf Overall - 2,963 cf Embedded = 5,249 cf x 33.0% Voids
#2A	71.50'	2,963 cf	**ADS_StormTech SC-740** x 64 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 8 rows
		4,695 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	72.88'	**8.0" Round Culvert** L= 14.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.88' / 72.70' S= 0.0129 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.06 cfs @ 9.60 hrs HW=71.04' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.06 cfs @ 13.57 hrs HW=73.01' TW=72.76' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.06 cfs @ 1.79 fps)

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond CB-1: Post - CB-1 Peak Elev=77.01' Inflow=0.66 cfs 2,212 cf
12.0" Round Culvert n=0.013 L=75.0' S=0.0100 '/' Outflow=0.66 cfs 2,212 cf

Pond CB-2: Post - CB-2 Peak Elev=74.37' Inflow=0.30 cfs 1,031 cf
8.0" Round Culvert n=0.013 L=10.0' S=0.0100 '/' Outflow=0.30 cfs 1,031 cf

Pond CB-3: Post - CB-3 Peak Elev=74.14' Inflow=0.39 cfs 1,349 cf
8.0" Round Culvert n=0.013 L=25.4' S=0.0098 '/' Outflow=0.39 cfs 1,349 cf

Pond DMH-1: Post - DMH-1 Peak Elev=76.16' Inflow=0.66 cfs 2,212 cf
12.0" Round Culvert n=0.013 L=123.0' S=0.0159 '/' Outflow=0.66 cfs 2,212 cf

Pond DMH-2: Post - DMH-2 Peak Elev=74.31' Inflow=0.96 cfs 3,243 cf
12.0" Round Culvert n=0.013 L=14.3' S=0.0105 '/' Outflow=0.96 cfs 3,243 cf

Pond DMH-3: Post - DMH-3 Peak Elev=73.86' Inflow=1.35 cfs 4,592 cf
Primary=0.59 cfs 3,992 cf Secondary=0.81 cfs 600 cf Outflow=1.35 cfs 4,592 cf

Pond DMH-4: Post - DMH-4 Peak Elev=73.28' Inflow=2.30 cfs 7,920 cf
12.0" Round Culvert x 2.00 n=0.013 L=6.0' S=0.0183 '/' Outflow=2.30 cfs 7,920 cf

Pond FB1: Post - Forebay-1 Peak Elev=73.77' Storage=210 cf Inflow=1.47 cfs 4,887 cf
Outflow=1.47 cfs 4,729 cf

Pond FB2: Post - Forebay-2 Peak Elev=73.22' Storage=71 cf Inflow=0.40 cfs 1,369 cf
Outflow=0.40 cfs 1,309 cf

Pond IB1: Post - Infiltration Basin Peak Elev=73.02' Storage=1,437 cf Inflow=2.04 cfs 8,359 cf
Discarded=0.03 cfs 2,433 cf Primary=1.83 cfs 5,926 cf Outflow=1.86 cfs 8,359 cf

Pond pA1: Post - Analysis Point-1 Inflow=2.16 cfs 7,151 cf
Primary=2.16 cfs 7,151 cf

Subcatchment pS1: Post - Runoff to CB-1 Runoff Area=5,413 sf 63.01% Impervious Runoff Depth=4.90"
Tc=5.0 min CN=74/98 Runoff=0.66 cfs 2,212 cf

Subcatchment pS2: Post - Runoff to CB-2 Runoff Area=2,196 sf 91.26% Impervious Runoff Depth=5.64"
Tc=5.0 min CN=74/98 Runoff=0.30 cfs 1,031 cf

Subcatchment pS3: Post - Runoff to Trench Drain Runoff Area=2,740 sf 94.64% Impervious Runoff Depth=5.72"
Tc=5.0 min CN=74/98 Runoff=0.38 cfs 1,307 cf

Subcatchment pS4: Post - Runoff to CB-3 Runoff Area=2,914 sf 88.19% Impervious Runoff Depth=5.56"
Tc=5.0 min CN=74/98 Runoff=0.39 cfs 1,349 cf

Subcatchment pS5: Post - Runoff to Forebay-1 Runoff Area=12,482 sf 55.13% Impervious Runoff Depth=4.70"
Tc=5.0 min CN=74/98 Runoff=1.47 cfs 4,887 cf

Subcatchment pS6: Post - Runoff to Infiltration Basin Runoff Area=1,922 sf 0.57% Impervious Runoff Depth=3.28"
Tc=5.0 min CN=74/98 Runoff=0.17 cfs 526 cf

Subcatchment pS7: Post - Runoff to Forebay-2 Runoff Area=220 sf 4.09% Impervious Runoff Depth=3.38"
Tc=5.0 min CN=74/98 Runoff=0.02 cfs 62 cf

Subcatchment pS8: Post - Surface flow to Valley Road Runoff Area=4,048 sf 13.96% Impervious Runoff Depth=3.63"
Flow Length=243' Tc=10.1 min CN=74/98 Runoff=0.33 cfs 1,225 cf

Subcatchment RF1: Post - Roof Runoff Runoff Area=6,814 sf 100.00% Impervious Runoff Depth=5.86"
Tc=5.0 min CN=0/98 Runoff=0.95 cfs 3,328 cf

Pond RM: Post - Roof Manifold Peak Elev=74.40' Inflow=0.95 cfs 3,328 cf
8.0" Round Culvert n=0.013 L=26.0' S=0.0192 '/' Outflow=0.95 cfs 3,328 cf

Pond STC-1: Post - STC-1 Peak Elev=73.57' Inflow=0.59 cfs 3,992 cf
6.0" Round Culvert n=0.013 L=4.0' S=0.0125 '/' Outflow=0.59 cfs 3,992 cf

Pond TRN: Post - Trench Drain Peak Elev=73.67' Inflow=0.38 cfs 1,307 cf
8.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.38 cfs 1,307 cf

Pond US1: Post - Infiltration Chambers

Peak Elev=73.27' Storage=3,486 cf Inflow=2.30 cfs 7,920 cf
Discarded=0.06 cfs 6,125 cf Primary=0.41 cfs 1,795 cf Outflow=0.47 cfs 7,920 cf

Total Runoff Area = 38,749 sf Runoff Volume = 15,927 cf Average Runoff Depth = 4.93"
35.85% Pervious = 13,891 sf 64.15% Impervious = 24,858 sf

Summary for Pond CB-1: Post - CB-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 4.90" for 25-Year event
Inflow = 0.66 cfs @ 12.07 hrs, Volume= 2,212 cf
Outflow = 0.66 cfs @ 12.07 hrs, Volume= 2,212 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.66 cfs @ 12.07 hrs, Volume= 2,212 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 77.01' @ 12.07 hrs
Flood Elev= 79.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	76.60'	**12.0" Round Culvert** L= 75.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 76.60' / 75.85' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.65 cfs @ 12.07 hrs HW=77.01' TW=76.16' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.65 cfs @ 3.20 fps)

Summary for Pond CB-2: Post - CB-2

Inflow Area = 2,196 sf, 91.26% Impervious, Inflow Depth = 5.64" for 25-Year event
Inflow = 0.30 cfs @ 12.07 hrs, Volume= 1,031 cf
Outflow = 0.30 cfs @ 12.07 hrs, Volume= 1,031 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.30 cfs @ 12.07 hrs, Volume= 1,031 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.37' @ 12.10 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.90'	**8.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.90' / 73.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.22 cfs @ 12.07 hrs HW=74.35' TW=74.31' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.22 cfs @ 1.23 fps)

Summary for Pond CB-3: Post - CB-3

Inflow Area = 2,914 sf, 88.19% Impervious, Inflow Depth = 5.56" for 25-Year event
Inflow = 0.39 cfs @ 12.07 hrs, Volume= 1,349 cf
Outflow = 0.39 cfs @ 12.07 hrs, Volume= 1,349 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.07 hrs, Volume= 1,349 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.14' @ 12.09 hrs
Flood Elev= 75.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 25.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.50' S= 0.0098 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.35 cfs @ 12.07 hrs HW=74.13' TW=73.85' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.35 cfs @ 2.43 fps)

Summary for Pond DMH-1: Post - DMH-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 4.90" for 25-Year event
Inflow = 0.66 cfs @ 12.07 hrs, Volume= 2,212 cf
Outflow = 0.66 cfs @ 12.07 hrs, Volume= 2,212 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.66 cfs @ 12.07 hrs, Volume= 2,212 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 76.16' @ 12.07 hrs
Flood Elev= 80.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	75.75'	**12.0" Round Culvert** L= 123.0' RCP, sq.cut end projecting, Ke= 0.500

Inlet / Outlet Invert= 75.75' / 73.80' S= 0.0159 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.65 cfs @ 12.07 hrs HW=76.16' TW=74.31' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.65 cfs @ 2.17 fps)

Summary for Pond DMH-2: Post - DMH-2

Inflow Area = 7,609 sf, 71.17% Impervious, Inflow Depth = 5.11" for 25-Year event
Inflow = 0.96 cfs @ 12.07 hrs, Volume= 3,243 cf
Outflow = 0.96 cfs @ 12.07 hrs, Volume= 3,243 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.07 hrs, Volume= 3,243 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.31' @ 12.07 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**12.0" Round Culvert** L= 14.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.60' S= 0.0105 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=0.94 cfs @ 12.07 hrs HW=74.31' TW=73.85' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.94 cfs @ 3.03 fps)

Summary for Pond DMH-3: Post - DMH-3

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 5.24" for 25-Year event
Inflow = 1.35 cfs @ 12.07 hrs, Volume= 4,592 cf
Outflow = 1.35 cfs @ 12.07 hrs, Volume= 4,592 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.59 cfs @ 12.04 hrs, Volume= 3,992 cf
Secondary = 0.81 cfs @ 12.08 hrs, Volume= 600 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Peak Elev= 73.86' @ 12.08 hrs
Flood Elev= 76.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.05'	**6.0" Round Culvert** L= 2.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.05' / 73.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 3	73.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	73.35'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.35' / 73.25' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.04 hrs HW=73.79' TW=73.54' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.48 cfs @ 2.44 fps)

Secondary OutFlow Max=0.80 cfs @ 12.08 hrs HW=73.86' TW=73.27' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 0.80 cfs @ 2.90 fps)
└**2=Broad-Crested Rectangular Weir** (Passes 0.80 cfs of 2.51 cfs potential flow)

Summary for Pond DMH-4: Post - DMH-4

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 5.48" for 25-Year event
Inflow = 2.30 cfs @ 12.07 hrs, Volume= 7,920 cf
Outflow = 2.30 cfs @ 12.07 hrs, Volume= 7,920 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.30 cfs @ 12.07 hrs, Volume= 7,920 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.28' @ 12.51 hrs
Flood Elev= 76.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.65'	**12.0" Round Culvert X 2.00** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.65' / 72.54' S= 0.0183 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.26 cfs @ 12.07 hrs HW=73.27' TW=72.51' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 2.26 cfs @ 3.17 fps)

Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,482 sf, 55.13% Impervious, Inflow Depth = 4.70" for 25-Year event
Inflow = 1.47 cfs @ 12.07 hrs, Volume= 4,887 cf
Outflow = 1.47 cfs @ 12.08 hrs, Volume= 4,729 cf, Atten= 0%, Lag= 0.4 min
Primary = 1.47 cfs @ 12.08 hrs, Volume= 4,729 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.77' @ 12.08 hrs Surf.Area= 201 sf Storage= 210 cf
Flood Elev= 74.00' Surf.Area= 225 sf Storage= 258 cf

Plug-Flow detention time= 38.3 min calculated for 4,729 cf (97% of inflow)
Center-of-Mass det. time= 18.5 min (788.5 - 769.9)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	49	0	0
73.00	121	85	85
74.00	225	173	258

Device	Routing	Invert	Outlet Devices
#1	Primary	73.50'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.46 cfs @ 12.08 hrs HW=73.77' TW=73.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.46 cfs @ 1.34 fps)

Summary for Pond FB2: Post - Forebay-2

Inflow Area = 2,960 sf, 87.91% Impervious, Inflow Depth = 5.55" for 25-Year event
Inflow = 0.40 cfs @ 12.07 hrs, Volume= 1,369 cf
Outflow = 0.40 cfs @ 12.08 hrs, Volume= 1,309 cf, Atten= 0%, Lag= 0.4 min
Primary = 0.40 cfs @ 12.08 hrs, Volume= 1,309 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.22' @ 12.08 hrs Surf.Area= 105 sf Storage= 71 cf
Flood Elev= 74.00' Surf.Area= 169 sf Storage= 179 cf

Plug-Flow detention time= 49.7 min calculated for 1,309 cf (96% of inflow)
Center-of-Mass det. time= 23.7 min (773.6 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	179 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	14	0	0
73.00	87	51	51
74.00	169	128	179

Device	Routing	Invert	Outlet Devices
#1	Primary	73.10'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.40 cfs @ 12.08 hrs HW=73.21' TW=73.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.40 cfs @ 0.86 fps)

Summary for Pond IB1: Post - Infiltration Basin

Inflow Area = 34,701 sf, 70.01% Impervious, Inflow Depth = 2.89" for 25-Year event
Inflow = 2.04 cfs @ 12.08 hrs, Volume= 8,359 cf
Outflow = 1.86 cfs @ 12.12 hrs, Volume= 8,359 cf, Atten= 9%, Lag= 2.2 min
Discarded = 0.03 cfs @ 12.12 hrs, Volume= 2,433 cf
Primary = 1.83 cfs @ 12.12 hrs, Volume= 5,926 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.02' @ 12.12 hrs Surf.Area= 1,196 sf Storage= 1,437 cf
Flood Elev= 74.00' Surf.Area= 1,688 sf Storage= 2,857 cf

Plug-Flow detention time= 173.6 min calculated for 8,353 cf (100% of inflow)
Center-of-Mass det. time= 174.3 min (967.1 - 792.9)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	2,857 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	307	0	0
72.00	671	489	489
73.00	1,188	930	1,419
74.00	1,688	1,438	2,857

Device	Routing	Invert	Outlet Devices
#1	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	72.70'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.03 cfs @ 12.12 hrs HW=73.01' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.82 cfs @ 12.12 hrs HW=73.01' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.82 cfs @ 1.45 fps)

Summary for Pond pA1: Post - Analysis Point-1

Inflow Area = 38,749 sf, 64.15% Impervious, Inflow Depth = 2.21" for 25-Year event
Inflow = 2.16 cfs @ 12.12 hrs, Volume= 7,151 cf
Primary = 2.16 cfs @ 12.12 hrs, Volume= 7,151 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Summary for Subcatchment pS1: Post - Runoff to CB-1

Runoff = 0.66 cfs @ 12.07 hrs, Volume= 2,212 cf, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	3,012	98	Paved parking, HSG C
	2,002	74	>75% Grass cover, Good, HSG C
*	124	98	New Walkways
*	165	98	Curbing & Walls
*	110	98	Dumpster Pad
	5,413	89	Weighted Average
	2,002	74	36.99% Pervious Area
	3,411	98	63.01% Impervious Area

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

Summary for Subcatchment pS2: Post - Runoff to CB-2

Runoff = 0.30 cfs @ 12.07 hrs, Volume= 1,031 cf, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	1,482	98	Paved parking, HSG C
	192	74	>75% Grass cover, Good, HSG C
*	446	98	New Walkways
*	76	98	Curbing & Walls
	2,196	96	Weighted Average
	192	74	8.74% Pervious Area
	2,004	98	91.26% Impervious Area

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

Summary for Subcatchment pS3: Post - Runoff to Trench Drain

Runoff = 0.38 cfs @ 12.07 hrs, Volume= 1,307 cf, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	2,509	98	Paved parking, HSG C
	147	74	>75% Grass cover, Good, HSG C
*	0	98	New Walkways
*	84	98	Curbing & Walls
	2,740	97	Weighted Average
	147	74	5.36% Pervious Area
	2,593	98	94.64% Impervious Area

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

Summary for Subcatchment pS4: Post - Runoff to CB-3

Runoff = 0.39 cfs @ 12.07 hrs, Volume= 1,349 cf, Depth= 5.56"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	2,243	98	Paved parking, HSG C
	344	74	>75% Grass cover, Good, HSG C
*	236	98	New Walkways
*	91	98	Curbing & Walls
	2,914	95	Weighted Average
	344	74	11.81% Pervious Area
	2,570	98	88.19% Impervious Area

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

Summary for Subcatchment pS5: Post - Runoff to Forebay-1

Runoff = 1.47 cfs @ 12.07 hrs, Volume= 4,887 cf, Depth= 4.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	6,072	98	Paved parking, HSG C
	5,601	74	>75% Grass cover, Good, HSG C
*	183	98	New Walkways
*	370	98	Curbing & Walls
*	256	98	Utility Pads
	12,482	87	Weighted Average
	5,601	74	44.87% Pervious Area
	6,881	98	55.13% Impervious Area

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

Summary for Subcatchment pS6: Post - Runoff to Infiltration Basin

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 526 cf, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	1,911	74	>75% Grass cover, Good, HSG C
*	11	98	Curbing & Walls
	1,922	74	Weighted Average
	1,911	74	99.43% Pervious Area
	11	98	0.57% Impervious Area

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

Summary for Subcatchment pS7: Post - Runoff to Forebay-2

Runoff = 0.02 cfs @ 12.08 hrs, Volume= 62 cf, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	211	74	>75% Grass cover, Good, HSG C
*	9	98	Curbing & Walls
	220	75	Weighted Average
	211	74	95.91% Pervious Area
	9	98	4.09% Impervious Area

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

Summary for Subcatchment pS8: Post - Surface flow to Valley Road

Runoff = 0.33 cfs @ 12.14 hrs, Volume= 1,225 cf, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

	Area (sf)	CN	Description
	3,483	74	>75% Grass cover, Good, HSG C
	551	98	Paved parking, HSG C
*	14	98	Curbing & Walls
	4,048	77	Weighted Average
	3,483	74	86.04% Pervious Area
	565	98	13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			

Summary for Subcatchment RF1: Post - Roof Runoff

Runoff = 0.95 cfs @ 12.07 hrs, Volume= 3,328 cf, Depth= 5.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=6.10"

Area (sf)	CN	Description
6,814	98	Roofs, HSG C
6,814	98	100.00% Impervious Area

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

Summary for Pond RM: Post - Roof Manifold

Inflow Area = 6,814 sf,100.00% Impervious, Inflow Depth = 5.86" for 25-Year event
Inflow = 0.95 cfs @ 12.07 hrs, Volume= 3,328 cf
Outflow = 0.95 cfs @ 12.07 hrs, Volume= 3,328 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.95 cfs @ 12.07 hrs, Volume= 3,328 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.40' @ 12.07 hrs
Flood Elev= 78.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.25' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.94 cfs @ 12.07 hrs HW=74.39' TW=73.27' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.94 cfs @ 2.73 fps)

Summary for Pond STC-1: Post - STC-1

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 4.55" for 25-Year event
Inflow = 0.59 cfs @ 12.04 hrs, Volume= 3,992 cf
Outflow = 0.59 cfs @ 12.04 hrs, Volume= 3,992 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.59 cfs @ 12.04 hrs, Volume= 3,992 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.57' @ 12.07 hrs
Flood Elev= 76.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.75'	**6.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.75' / 72.70' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.51 cfs @ 12.04 hrs HW=73.54' TW=73.24' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.51 cfs @ 2.62 fps)

Summary for Pond TRN: Post - Trench Drain

Inflow Area = 2,740 sf, 94.64% Impervious, Inflow Depth = 5.72" for 25-Year event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,307 cf
Outflow = 0.38 cfs @ 12.07 hrs, Volume= 1,307 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.07 hrs, Volume= 1,307 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.67' @ 12.07 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.25'	**8.0" Round Culvert** L= 5.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.25' / 73.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.37 cfs @ 12.07 hrs HW=73.66' TW=73.21' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.37 cfs @ 2.34 fps)

Summary for Pond US1: Post - Infiltration Chambers

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 5.48" for 25-Year event
Inflow = 2.30 cfs @ 12.07 hrs, Volume= 7,920 cf
Outflow = 0.47 cfs @ 12.49 hrs, Volume= 7,920 cf, Atten= 80%, Lag= 24.9 min
Discarded = 0.06 cfs @ 8.92 hrs, Volume= 6,125 cf
Primary = 0.41 cfs @ 12.49 hrs, Volume= 1,795 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.27' @ 12.49 hrs Surf.Area= 2,346 sf Storage= 3,486 cf
Flood Elev= 74.50' Surf.Area= 2,346 sf Storage= 4,695 cf

Plug-Flow detention time= 373.6 min calculated for 7,915 cf (100% of inflow)
Center-of-Mass det. time= 373.8 min (1,125.0 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	71.00'	1,732 cf	**39.50'W x 59.40'L x 3.50'H Field A** 8,212 cf Overall - 2,963 cf Embedded = 5,249 cf x 33.0% Voids
#2A	71.50'	2,963 cf	**ADS_StormTech SC-740** x 64 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 8 rows
		4,695 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	72.88'	**8.0" Round Culvert** L= 14.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.88' / 72.70' S= 0.0129 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.06 cfs @ 8.92 hrs HW=71.04' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.41 cfs @ 12.49 hrs HW=73.27' TW=72.90' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.41 cfs @ 2.77 fps)

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond CB-1: Post - CB-1 Peak Elev=77.11' Inflow=0.97 cfs 3,288 cf
12.0" Round Culvert n=0.013 L=75.0' S=0.0100 '/' Outflow=0.97 cfs 3,288 cf

Pond CB-2: Post - CB-2 Peak Elev=74.52' Inflow=0.43 cfs 1,484 cf
8.0" Round Culvert n=0.013 L=10.0' S=0.0100 '/' Outflow=0.43 cfs 1,484 cf

Pond CB-3: Post - CB-3 Peak Elev=74.28' Inflow=0.56 cfs 1,947 cf
8.0" Round Culvert n=0.013 L=25.4' S=0.0098 '/' Outflow=0.56 cfs 1,947 cf

Pond DMH-1: Post - DMH-1 Peak Elev=76.26' Inflow=0.97 cfs 3,288 cf
12.0" Round Culvert n=0.013 L=123.0' S=0.0159 '/' Outflow=0.97 cfs 3,288 cf

Pond DMH-2: Post - DMH-2 Peak Elev=74.46' Inflow=1.40 cfs 4,772 cf
12.0" Round Culvert n=0.013 L=14.3' S=0.0105 '/' Outflow=1.40 cfs 4,772 cf

Pond DMH-3: Post - DMH-3 Peak Elev=74.06' Inflow=1.96 cfs 6,719 cf
Primary=0.62 cfs 4,948 cf Secondary=1.39 cfs 1,771 cf Outflow=1.96 cfs 6,719 cf

Pond DMH-4: Post - DMH-4 Peak Elev=73.95' Inflow=3.31 cfs 11,466 cf
12.0" Round Culvert x 2.00 n=0.013 L=6.0' S=0.0183 '/' Outflow=3.31 cfs 11,466 cf

Pond FB1: Post - Forebay-1 Peak Elev=73.86' Storage=227 cf Inflow=2.20 cfs 7,345 cf
Outflow=2.20 cfs 7,186 cf

Pond FB2: Post - Forebay-2 Peak Elev=73.25' Storage=74 cf Inflow=0.57 cfs 1,976 cf
Outflow=0.57 cfs 1,916 cf

Pond IB1: Post - Infiltration Basin Peak Elev=73.19' Storage=1,654 cf Inflow=3.81 cfs 14,725 cf
Discarded=0.03 cfs 2,588 cf Primary=3.58 cfs 12,137 cf Outflow=3.61 cfs 14,725 cf

Pond pA1: Post - Analysis Point-1 Inflow=4.12 cfs 14,117 cf
Primary=4.12 cfs 14,117 cf

Subcatchment pS1: Post - Runoff to CB-1 Runoff Area=5,413 sf 63.01% Impervious Runoff Depth=7.29"
Tc=5.0 min CN=74/98 Runoff=0.97 cfs 3,288 cf

Subcatchment pS2: Post - Runoff to CB-2 Runoff Area=2,196 sf 91.26% Impervious Runoff Depth=8.11"
Tc=5.0 min CN=74/98 Runoff=0.43 cfs 1,484 cf

Subcatchment pS3: Post - Runoff to Trench Drain Runoff Area=2,740 sf 94.64% Impervious Runoff Depth=8.20"
Tc=5.0 min CN=74/98 Runoff=0.54 cfs 1,873 cf

Subcatchment pS4: Post - Runoff to CB-3 Runoff Area=2,914 sf 88.19% Impervious Runoff Depth=8.02"
Tc=5.0 min CN=74/98 Runoff=0.56 cfs 1,947 cf

Subcatchment pS5: Post - Runoff to Forebay-1 Runoff Area=12,482 sf 55.13% Impervious Runoff Depth=7.06"
Tc=5.0 min CN=74/98 Runoff=2.20 cfs 7,345 cf

Subcatchment pS6: Post - Runoff to Infiltration Basin Runoff Area=1,922 sf 0.57% Impervious Runoff Depth=5.48"
Tc=5.0 min CN=74/98 Runoff=0.29 cfs 878 cf

Subcatchment pS7: Post - Runoff to Forebay-2 Runoff Area=220 sf 4.09% Impervious Runoff Depth=5.58"
Tc=5.0 min CN=74/98 Runoff=0.03 cfs 102 cf

Subcatchment pS8: Post - Surface flow to Valley Road Runoff Area=4,048 sf 13.96% Impervious Runoff Depth=5.87"
Flow Length=243' Tc=10.1 min CN=74/98 Runoff=0.54 cfs 1,980 cf

Subcatchment RF1: Post - Roof Runoff Runoff Area=6,814 sf 100.00% Impervious Runoff Depth=8.36"
Tc=5.0 min CN=0/98 Runoff=1.35 cfs 4,747 cf

Pond RM: Post - Roof Manifold Peak Elev=74.73' Inflow=1.35 cfs 4,747 cf
8.0" Round Culvert n=0.013 L=26.0' S=0.0192 '/' Outflow=1.35 cfs 4,747 cf

Pond STC-1: Post - STC-1 Peak Elev=73.98' Inflow=0.62 cfs 4,948 cf
6.0" Round Culvert n=0.013 L=4.0' S=0.0125 '/' Outflow=0.62 cfs 4,948 cf

Pond TRN: Post - Trench Drain Peak Elev=73.76' Inflow=0.54 cfs 1,873 cf
8.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.54 cfs 1,873 cf

Pond US1: Post - Infiltration Chambers

Peak Elev=73.92' Storage=4,244 cf Inflow=3.31 cfs 11,466 cf
Discarded=0.06 cfs 6,721 cf Primary=1.39 cfs 4,744 cf Outflow=1.44 cfs 11,466 cf

Total Runoff Area = 38,749 sf Runoff Volume = 23,644 cf Average Runoff Depth = 7.32"
35.85% Pervious = 13,891 sf 64.15% Impervious = 24,858 sf

Summary for Pond CB-1: Post - CB-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 7.29" for 100-Year event
Inflow = 0.97 cfs @ 12.07 hrs, Volume= 3,288 cf
Outflow = 0.97 cfs @ 12.07 hrs, Volume= 3,288 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.07 hrs, Volume= 3,288 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 77.11' @ 12.08 hrs
Flood Elev= 79.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	76.60'	**12.0" Round Culvert** L= 75.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 76.60' / 75.85' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.95 cfs @ 12.07 hrs HW=77.11' TW=76.25' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.95 cfs @ 3.47 fps)

Summary for Pond CB-2: Post - CB-2

Inflow Area = 2,196 sf, 91.26% Impervious, Inflow Depth = 8.11" for 100-Year event
Inflow = 0.43 cfs @ 12.07 hrs, Volume= 1,484 cf
Outflow = 0.43 cfs @ 12.07 hrs, Volume= 1,484 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.07 hrs, Volume= 1,484 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.52' @ 12.10 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.90'	**8.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.90' / 73.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.28 cfs @ 12.07 hrs HW=74.49' TW=74.45' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.28 cfs @ 1.15 fps)

Summary for Pond CB-3: Post - CB-3

Inflow Area = 2,914 sf, 88.19% Impervious, Inflow Depth = 8.02" for 100-Year event
Inflow = 0.56 cfs @ 12.07 hrs, Volume= 1,947 cf
Outflow = 0.56 cfs @ 12.07 hrs, Volume= 1,947 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.07 hrs, Volume= 1,947 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.28' @ 12.10 hrs
Flood Elev= 75.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 25.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.50' S= 0.0098 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.47 cfs @ 12.07 hrs HW=74.26' TW=74.05' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.47 cfs @ 2.25 fps)

Summary for Pond DMH-1: Post - DMH-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 7.29" for 100-Year event
Inflow = 0.97 cfs @ 12.07 hrs, Volume= 3,288 cf
Outflow = 0.97 cfs @ 12.07 hrs, Volume= 3,288 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.07 hrs, Volume= 3,288 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 76.26' @ 12.07 hrs
Flood Elev= 80.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	75.75'	**12.0" Round Culvert** L= 123.0' RCP, sq.cut end projecting, Ke= 0.500

Inlet / Outlet Invert= 75.75' / 73.80' S= 0.0159 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 12.07 hrs HW=76.25' TW=74.45' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.96 cfs @ 2.42 fps)

Summary for Pond DMH-2: Post - DMH-2

Inflow Area = 7,609 sf, 71.17% Impervious, Inflow Depth = 7.53" for 100-Year event
Inflow = 1.40 cfs @ 12.07 hrs, Volume= 4,772 cf
Outflow = 1.40 cfs @ 12.07 hrs, Volume= 4,772 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.40 cfs @ 12.07 hrs, Volume= 4,772 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.46' @ 12.07 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**12.0" Round Culvert** L= 14.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.60' S= 0.0105 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=1.38 cfs @ 12.07 hrs HW=74.45' TW=74.05' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.38 cfs @ 3.29 fps)

Summary for Pond DMH-3: Post - DMH-3

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 7.66" for 100-Year event
Inflow = 1.96 cfs @ 12.07 hrs, Volume= 6,719 cf
Outflow = 1.96 cfs @ 12.07 hrs, Volume= 6,719 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 12.03 hrs, Volume= 4,948 cf
Secondary = 1.39 cfs @ 12.08 hrs, Volume= 1,771 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Peak Elev= 74.06' @ 12.08 hrs
Flood Elev= 76.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.05'	**6.0" Round Culvert** L= 2.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.05' / 73.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 3	73.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	73.35'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.35' / 73.25' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.51 cfs @ 12.03 hrs HW=73.96' TW=73.68' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.51 cfs @ 2.58 fps)

Secondary OutFlow Max=1.39 cfs @ 12.08 hrs HW=74.06' TW=73.44' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 1.39 cfs @ 3.26 fps)
└**2=Broad-Crested Rectangular Weir** (Passes 1.39 cfs of 5.11 cfs potential flow)

Summary for Pond DMH-4: Post - DMH-4

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 7.94" for 100-Year event
Inflow = 3.31 cfs @ 12.07 hrs, Volume= 11,466 cf
Outflow = 3.31 cfs @ 12.07 hrs, Volume= 11,466 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.31 cfs @ 12.07 hrs, Volume= 11,466 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.95' @ 12.28 hrs
Flood Elev= 76.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.65'	**12.0" Round Culvert X 2.00** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.65' / 72.54' S= 0.0183 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.58 cfs @ 12.07 hrs HW=73.43' TW=73.36' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.58 cfs @ 1.66 fps)

Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,482 sf, 55.13% Impervious, Inflow Depth = 7.06" for 100-Year event
Inflow = 2.20 cfs @ 12.07 hrs, Volume= 7,345 cf
Outflow = 2.20 cfs @ 12.08 hrs, Volume= 7,186 cf, Atten= 0%, Lag= 0.4 min
Primary = 2.20 cfs @ 12.08 hrs, Volume= 7,186 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.86' @ 12.08 hrs Surf.Area= 210 sf Storage= 227 cf
Flood Elev= 74.00' Surf.Area= 225 sf Storage= 258 cf

Plug-Flow detention time= 27.4 min calculated for 7,186 cf (98% of inflow)
Center-of-Mass det. time= 13.8 min (778.5 - 764.8)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	49	0	0
73.00	121	85	85
74.00	225	173	258

Device	Routing	Invert	Outlet Devices
#1	Primary	73.50'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=2.20 cfs @ 12.08 hrs HW=73.86' TW=73.13' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 2.20 cfs @ 1.55 fps)

Summary for Pond FB2: Post - Forebay-2

Inflow Area = 2,960 sf, 87.91% Impervious, Inflow Depth = 8.01" for 100-Year event
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,976 cf
Outflow = 0.57 cfs @ 12.08 hrs, Volume= 1,916 cf, Atten= 0%, Lag= 0.3 min
Primary = 0.57 cfs @ 12.08 hrs, Volume= 1,916 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.25' @ 12.08 hrs Surf.Area= 107 sf Storage= 74 cf
Flood Elev= 74.00' Surf.Area= 169 sf Storage= 179 cf

Plug-Flow detention time= 37.2 min calculated for 1,916 cf (97% of inflow)
Center-of-Mass det. time= 18.2 min (763.6 - 745.4)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	179 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	14	0	0
73.00	87	51	51
74.00	169	128	179

Device	Routing	Invert	Outlet Devices
#1	Primary	73.10'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.55 cfs @ 12.08 hrs HW=73.25' TW=73.13' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.55 cfs @ 0.94 fps)

Summary for Pond IB1: Post - Infiltration Basin

Inflow Area = 34,701 sf, 70.01% Impervious, Inflow Depth = 5.09" for 100-Year event
Inflow = 3.81 cfs @ 12.10 hrs, Volume= 14,725 cf
Outflow = 3.61 cfs @ 12.14 hrs, Volume= 14,725 cf, Atten= 5%, Lag= 2.1 min
Discarded = 0.03 cfs @ 12.14 hrs, Volume= 2,588 cf
Primary = 3.58 cfs @ 12.14 hrs, Volume= 12,137 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.19' @ 12.14 hrs Surf.Area= 1,283 sf Storage= 1,654 cf
Flood Elev= 74.00' Surf.Area= 1,688 sf Storage= 2,857 cf

Plug-Flow detention time= 107.2 min calculated for 14,725 cf (100% of inflow)
Center-of-Mass det. time= 107.3 min (890.2 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	2,857 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	307	0	0
72.00	671	489	489
73.00	1,188	930	1,419
74.00	1,688	1,438	2,857

Device	Routing	Invert	Outlet Devices
#1	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	72.70'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.03 cfs @ 12.14 hrs HW=73.18' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=3.51 cfs @ 12.14 hrs HW=73.18' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 3.51 cfs @ 1.81 fps)

Summary for Pond pA1: Post - Analysis Point-1

Inflow Area = 38,749 sf, 64.15% Impervious, Inflow Depth = 4.37" for 100-Year event
Inflow = 4.12 cfs @ 12.14 hrs, Volume= 14,117 cf
Primary = 4.12 cfs @ 12.14 hrs, Volume= 14,117 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Summary for Subcatchment pS1: Post - Runoff to CB-1

Runoff = 0.97 cfs @ 12.07 hrs, Volume= 3,288 cf, Depth= 7.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	3,012	98	Paved parking, HSG C
	2,002	74	>75% Grass cover, Good, HSG C
*	124	98	New Walkways
*	165	98	Curbing & Walls
*	110	98	Dumpster Pad
	5,413	89	Weighted Average
	2,002	74	36.99% Pervious Area
	3,411	98	63.01% Impervious Area

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

Summary for Subcatchment pS2: Post - Runoff to CB-2

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 1,484 cf, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	1,482	98	Paved parking, HSG C
	192	74	>75% Grass cover, Good, HSG C
*	446	98	New Walkways
*	76	98	Curbing & Walls
	2,196	96	Weighted Average
	192	74	8.74% Pervious Area
	2,004	98	91.26% Impervious Area

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

Summary for Subcatchment pS3: Post - Runoff to Trench Drain

Runoff = 0.54 cfs @ 12.07 hrs, Volume= 1,873 cf, Depth= 8.20"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	2,509	98	Paved parking, HSG C
	147	74	>75% Grass cover, Good, HSG C
*	0	98	New Walkways
*	84	98	Curbing & Walls
	2,740	97	Weighted Average
	147	74	5.36% Pervious Area
	2,593	98	94.64% Impervious Area

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

Summary for Subcatchment pS4: Post - Runoff to CB-3

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 1,947 cf, Depth= 8.02"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	2,243	98	Paved parking, HSG C
	344	74	>75% Grass cover, Good, HSG C
*	236	98	New Walkways
*	91	98	Curbing & Walls
	2,914	95	Weighted Average
	344	74	11.81% Pervious Area
	2,570	98	88.19% Impervious Area

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

Summary for Subcatchment pS5: Post - Runoff to Forebay-1

Runoff = 2.20 cfs @ 12.07 hrs, Volume= 7,345 cf, Depth= 7.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	6,072	98	Paved parking, HSG C
	5,601	74	>75% Grass cover, Good, HSG C
*	183	98	New Walkways
*	370	98	Curbing & Walls
*	256	98	Utility Pads
	12,482	87	Weighted Average
	5,601	74	44.87% Pervious Area
	6,881	98	55.13% Impervious Area

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

Summary for Subcatchment pS6: Post - Runoff to Infiltration Basin

Runoff = 0.29 cfs @ 12.08 hrs, Volume= 878 cf, Depth= 5.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	1,911	74	>75% Grass cover, Good, HSG C
*	11	98	Curbing & Walls
	1,922	74	Weighted Average
	1,911	74	99.43% Pervious Area
	11	98	0.57% Impervious Area

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

Summary for Subcatchment pS7: Post - Runoff to Forebay-2

Runoff = 0.03 cfs @ 12.08 hrs, Volume= 102 cf, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	211	74	>75% Grass cover, Good, HSG C
*	9	98	Curbing & Walls
	220	75	Weighted Average
	211	74	95.91% Pervious Area
	9	98	4.09% Impervious Area

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

Summary for Subcatchment pS8: Post - Surface flow to Valley Road

Runoff = 0.54 cfs @ 12.14 hrs, Volume= 1,980 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

	Area (sf)	CN	Description
	3,483	74	>75% Grass cover, Good, HSG C
	551	98	Paved parking, HSG C
*	14	98	Curbing & Walls
	4,048	77	Weighted Average
	3,483	74	86.04% Pervious Area
	565	98	13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			

Summary for Subcatchment RF1: Post - Roof Runoff

Runoff = 1.35 cfs @ 12.07 hrs, Volume= 4,747 cf, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
6,814	98	Roofs, HSG C
6,814	98	100.00% Impervious Area

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

Summary for Pond RM: Post - Roof Manifold

Inflow Area = 6,814 sf,100.00% Impervious, Inflow Depth = 8.36" for 100-Year event
Inflow = 1.35 cfs @ 12.07 hrs, Volume= 4,747 cf
Outflow = 1.35 cfs @ 12.07 hrs, Volume= 4,747 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.35 cfs @ 12.07 hrs, Volume= 4,747 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.73' @ 12.07 hrs
Flood Elev= 78.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.25' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.33 cfs @ 12.07 hrs HW=74.71' TW=73.43' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.33 cfs @ 3.80 fps)

Summary for Pond STC-1: Post - STC-1

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 0.62 cfs @ 12.03 hrs, Volume= 4,948 cf
Outflow = 0.62 cfs @ 12.03 hrs, Volume= 4,948 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 12.03 hrs, Volume= 4,948 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.98' @ 12.30 hrs
Flood Elev= 76.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.75'	**6.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.75' / 72.70' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.52 cfs @ 12.03 hrs HW=73.68' TW=73.37' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.52 cfs @ 2.66 fps)

Summary for Pond TRN: Post - Trench Drain

Inflow Area = 2,740 sf, 94.64% Impervious, Inflow Depth = 8.20" for 100-Year event
Inflow = 0.54 cfs @ 12.07 hrs, Volume= 1,873 cf
Outflow = 0.54 cfs @ 12.07 hrs, Volume= 1,873 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.54 cfs @ 12.07 hrs, Volume= 1,873 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.76' @ 12.07 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.25'	**8.0" Round Culvert** L= 5.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.25' / 73.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.53 cfs @ 12.07 hrs HW=73.76' TW=73.24' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.53 cfs @ 2.56 fps)

Summary for Pond US1: Post - Infiltration Chambers

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 7.94" for 100-Year event
Inflow = 3.31 cfs @ 12.07 hrs, Volume= 11,466 cf
Outflow = 1.44 cfs @ 12.24 hrs, Volume= 11,466 cf, Atten= 56%, Lag= 10.3 min
Discarded = 0.06 cfs @ 7.68 hrs, Volume= 6,721 cf
Primary = 1.39 cfs @ 12.24 hrs, Volume= 4,744 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.92' @ 12.24 hrs Surf.Area= 2,346 sf Storage= 4,244 cf
Flood Elev= 74.50' Surf.Area= 2,346 sf Storage= 4,695 cf

Plug-Flow detention time= 296.3 min calculated for 11,466 cf (100% of inflow)
Center-of-Mass det. time= 296.3 min (1,043.0 - 746.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	71.00'	1,732 cf	**39.50'W x 59.40'L x 3.50'H Field A** 8,212 cf Overall - 2,963 cf Embedded = 5,249 cf x 33.0% Voids
#2A	71.50'	2,963 cf	**ADS_StormTech SC-740** x 64 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 8 rows
		4,695 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	72.88'	**8.0" Round Culvert** L= 14.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.88' / 72.70' S= 0.0129 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.06 cfs @ 7.68 hrs HW=71.04' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.39 cfs @ 12.24 hrs HW=73.92' TW=73.13' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.39 cfs @ 3.97 fps)

Time span=0.00-60.00 hrs, dt=0.04 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond CB-1: Post - CB-1 Peak Elev=76.75' Inflow=0.09 cfs 290 cf
12.0" Round Culvert n=0.013 L=75.0' S=0.0100 '/' Outflow=0.09 cfs 290 cf

Pond CB-2: Post - CB-2 Peak Elev=74.04' Inflow=0.05 cfs 166 cf
8.0" Round Culvert n=0.013 L=10.0' S=0.0100 '/' Outflow=0.05 cfs 166 cf

Pond CB-3: Post - CB-3 Peak Elev=73.90' Inflow=0.07 cfs 213 cf
8.0" Round Culvert n=0.013 L=25.4' S=0.0098 '/' Outflow=0.07 cfs 213 cf

Pond DMH-1: Post - DMH-1 Peak Elev=75.89' Inflow=0.09 cfs 290 cf
12.0" Round Culvert n=0.013 L=123.0' S=0.0159 '/' Outflow=0.09 cfs 290 cf

Pond DMH-2: Post - DMH-2 Peak Elev=73.94' Inflow=0.14 cfs 456 cf
12.0" Round Culvert n=0.013 L=14.3' S=0.0105 '/' Outflow=0.14 cfs 456 cf

Pond DMH-3: Post - DMH-3 Peak Elev=73.37' Inflow=0.21 cfs 669 cf
Primary=0.21 cfs 669 cf Secondary=0.00 cfs 0 cf Outflow=0.21 cfs 669 cf

Pond DMH-4: Post - DMH-4 Peak Elev=72.87' Inflow=0.38 cfs 1,229 cf
12.0" Round Culvert x 2.00 n=0.013 L=6.0' S=0.0183 '/' Outflow=0.38 cfs 1,229 cf

Pond FB1: Post - Forebay-1 Peak Elev=73.57' Storage=170 cf Inflow=0.18 cfs 594 cf
Outflow=0.17 cfs 435 cf

Pond FB2: Post - Forebay-2 Peak Elev=73.13' Storage=63 cf Inflow=0.07 cfs 216 cf
Outflow=0.07 cfs 156 cf

Pond IB1: Post - Infiltration Basin Peak Elev=71.70' Storage=301 cf Inflow=0.24 cfs 602 cf
Discarded=0.01 cfs 602 cf Primary=0.00 cfs 0 cf Outflow=0.01 cfs 602 cf

Pond pA1: Post - Analysis Point-1 Inflow=0.01 cfs 64 cf
Primary=0.01 cfs 64 cf

Subcatchment pS1: Post - Runoff to CB-1 Runoff Area=5,413 sf 63.01% Impervious Runoff Depth=0.64"
Tc=5.0 min CN=74/98 Runoff=0.09 cfs 290 cf

Subcatchment pS2: Post - Runoff to CB-2 Runoff Area=2,196 sf 91.26% Impervious Runoff Depth=0.90"
Tc=5.0 min CN=74/98 Runoff=0.05 cfs 166 cf

Subcatchment pS3: Post - Runoff to Trench Drain Runoff Area=2,740 sf 94.64% Impervious Runoff Depth=0.94"
Tc=5.0 min CN=74/98 Runoff=0.07 cfs 214 cf

Subcatchment pS4: Post - Runoff to CB-3 Runoff Area=2,914 sf 88.19% Impervious Runoff Depth=0.88"
Tc=5.0 min CN=74/98 Runoff=0.07 cfs 213 cf

Subcatchment pS5: Post - Runoff to Forebay-1 Runoff Area=12,482 sf 55.13% Impervious Runoff Depth=0.57"
Tc=5.0 min CN=74/98 Runoff=0.18 cfs 594 cf

Subcatchment pS6: Post - Runoff to Infiltration Basin Runoff Area=1,922 sf 0.57% Impervious Runoff Depth=0.07"
Tc=5.0 min CN=74/98 Runoff=0.00 cfs 11 cf

Subcatchment pS7: Post - Runoff to Forebay-2 Runoff Area=220 sf 4.09% Impervious Runoff Depth=0.10"
Tc=5.0 min CN=74/98 Runoff=0.00 cfs 2 cf

Subcatchment pS8: Post - Surface flow to Valley Road Runoff Area=4,048 sf 13.96% Impervious Runoff Depth=0.19"
Flow Length=243' Tc=10.1 min CN=74/98 Runoff=0.01 cfs 64 cf

Subcatchment RF1: Post - Roof Runoff Runoff Area=6,814 sf 100.00% Impervious Runoff Depth=0.99"
Tc=5.0 min CN=0/98 Runoff=0.17 cfs 560 cf

Pond RM: Post - Roof Manifold Peak Elev=73.98' Inflow=0.17 cfs 560 cf
8.0" Round Culvert n=0.013 L=26.0' S=0.0192 '/' Outflow=0.17 cfs 560 cf

Pond STC-1: Post - STC-1 Peak Elev=73.08' Inflow=0.21 cfs 669 cf
6.0" Round Culvert n=0.013 L=4.0' S=0.0125 '/' Outflow=0.21 cfs 669 cf

Pond TRN: Post - Trench Drain Peak Elev=73.41' Inflow=0.07 cfs 214 cf
8.0" Round Culvert n=0.013 L=5.0' S=0.0100 '/' Outflow=0.07 cfs 214 cf

Pond US1: Post - Infiltration Chambers

Peak Elev=71.46' Storage=359 cf Inflow=0.38 cfs 1,229 cf
Discarded=0.06 cfs 1,229 cf Primary=0.00 cfs 0 cf Outflow=0.06 cfs 1,229 cf

Total Runoff Area = 38,749 sf Runoff Volume = 2,113 cf Average Runoff Depth = 0.65"
35.85% Pervious = 13,891 sf 64.15% Impervious = 24,858 sf

Summary for Pond CB-1: Post - CB-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 0.64" for WQv event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 290 cf
Outflow = 0.09 cfs @ 12.07 hrs, Volume= 290 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 12.07 hrs, Volume= 290 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 76.75' @ 12.07 hrs
Flood Elev= 79.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	76.60'	**12.0" Round Culvert** L= 75.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 76.60' / 75.85' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.09 cfs @ 12.07 hrs HW=76.75' TW=75.89' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 0.09 cfs @ 1.86 fps)

Summary for Pond CB-2: Post - CB-2

Inflow Area = 2,196 sf, 91.26% Impervious, Inflow Depth = 0.90" for WQv event
Inflow = 0.05 cfs @ 12.07 hrs, Volume= 166 cf
Outflow = 0.05 cfs @ 12.07 hrs, Volume= 166 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.05 cfs @ 12.07 hrs, Volume= 166 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 74.04' @ 12.08 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.90'	**8.0" Round Culvert** L= 10.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.90' / 73.80' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.05 cfs @ 12.07 hrs HW=74.04' TW=73.94' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.05 cfs @ 1.37 fps)

Summary for Pond CB-3: Post - CB-3

Inflow Area = 2,914 sf, 88.19% Impervious, Inflow Depth = 0.88" for WQv event
Inflow = 0.07 cfs @ 12.07 hrs, Volume= 213 cf
Outflow = 0.07 cfs @ 12.07 hrs, Volume= 213 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.07 hrs, Volume= 213 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.90' @ 12.07 hrs
Flood Elev= 75.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 25.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.50' S= 0.0098 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.06 cfs @ 12.07 hrs HW=73.90' TW=73.37' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.06 cfs @ 1.74 fps)

Summary for Pond DMH-1: Post - DMH-1

Inflow Area = 5,413 sf, 63.01% Impervious, Inflow Depth = 0.64" for WQv event
Inflow = 0.09 cfs @ 12.07 hrs, Volume= 290 cf
Outflow = 0.09 cfs @ 12.07 hrs, Volume= 290 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 12.07 hrs, Volume= 290 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 75.89' @ 12.07 hrs
Flood Elev= 80.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	75.75'	**12.0" Round Culvert** L= 123.0' RCP, sq.cut end projecting, Ke= 0.500

Inlet / Outlet Invert= 75.75' / 73.80' S= 0.0159 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.09 cfs @ 12.07 hrs HW=75.89' TW=73.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.09 cfs @ 1.28 fps)

Summary for Pond DMH-2: Post - DMH-2

Inflow Area = 7,609 sf, 71.17% Impervious, Inflow Depth = 0.72" for WQv event
Inflow = 0.14 cfs @ 12.07 hrs, Volume= 456 cf
Outflow = 0.14 cfs @ 12.07 hrs, Volume= 456 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.07 hrs, Volume= 456 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.94' @ 12.07 hrs
Flood Elev= 76.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**12.0" Round Culvert** L= 14.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.60' S= 0.0105 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=0.14 cfs @ 12.07 hrs HW=73.94' TW=73.37' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.14 cfs @ 1.97 fps)

Summary for Pond DMH-3: Post - DMH-3

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 0.76" for WQv event
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 669 cf
Outflow = 0.21 cfs @ 12.07 hrs, Volume= 669 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.07 hrs, Volume= 669 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Peak Elev= 73.37' @ 12.07 hrs
Flood Elev= 76.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.05'	**6.0" Round Culvert** L= 2.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.05' / 73.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 3	73.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	73.35'	**12.0" Round Culvert** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.35' / 73.25' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.20 cfs @ 12.07 hrs HW=73.37' TW=73.07' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.20 cfs @ 2.21 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=73.05' TW=72.65' (Dynamic Tailwater)
└**3=Culvert** (Controls 0.00 cfs)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DMH-4: Post - DMH-4

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 0.85" for WQv event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,229 cf
Outflow = 0.38 cfs @ 12.07 hrs, Volume= 1,229 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.07 hrs, Volume= 1,229 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 72.87' @ 12.07 hrs
Flood Elev= 76.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.65'	**12.0" Round Culvert X 2.00** L= 6.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.65' / 72.54' S= 0.0183 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.37 cfs @ 12.07 hrs HW=72.87' TW=71.22' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.37 cfs @ 2.23 fps)

Summary for Pond FB1: Post - Forebay-1

Inflow Area = 12,482 sf, 55.13% Impervious, Inflow Depth = 0.57" for WQv event
Inflow = 0.18 cfs @ 12.07 hrs, Volume= 594 cf
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 435 cf, Atten= 1%, Lag= 0.8 min
Primary = 0.17 cfs @ 12.09 hrs, Volume= 435 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.57' @ 12.09 hrs Surf.Area= 180 sf Storage= 170 cf
Flood Elev= 74.00' Surf.Area= 225 sf Storage= 258 cf

Plug-Flow detention time= 155.7 min calculated for 435 cf (73% of inflow)
Center-of-Mass det. time= 64.1 min (855.2 - 791.1)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	258 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	49	0	0
73.00	121	85	85
74.00	225	173	258

Device	Routing	Invert	Outlet Devices
#1	Primary	73.50'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.17 cfs @ 12.09 hrs HW=73.57' TW=71.26' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.65 fps)

Summary for Pond FB2: Post - Forebay-2

Inflow Area = 2,960 sf, 87.91% Impervious, Inflow Depth = 0.87" for WQv event
Inflow = 0.07 cfs @ 12.07 hrs, Volume= 216 cf
Outflow = 0.07 cfs @ 12.08 hrs, Volume= 156 cf, Atten= 1%, Lag= 0.6 min
Primary = 0.07 cfs @ 12.08 hrs, Volume= 156 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.13' @ 12.08 hrs Surf.Area= 98 sf Storage= 63 cf
Flood Elev= 74.00' Surf.Area= 169 sf Storage= 179 cf

Plug-Flow detention time= 152.8 min calculated for 156 cf (72% of inflow)
Center-of-Mass det. time= 63.6 min (846.5 - 782.9)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	179 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	14	0	0
73.00	87	51	51
74.00	169	128	179

Device	Routing	Invert	Outlet Devices
#1	Primary	73.10'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.07 cfs @ 12.08 hrs HW=73.13' TW=71.26' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.07 cfs @ 0.47 fps)

Summary for Pond IB1: Post - Infiltration Basin

Inflow Area = 34,701 sf, 70.01% Impervious, Inflow Depth = 0.21" for WQv event
Inflow = 0.24 cfs @ 12.09 hrs, Volume= 602 cf
Outflow = 0.01 cfs @ 14.36 hrs, Volume= 602 cf, Atten= 95%, Lag= 136.5 min
Discarded = 0.01 cfs @ 14.36 hrs, Volume= 602 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 71.70' @ 14.36 hrs Surf.Area= 560 sf Storage= 301 cf
Flood Elev= 74.00' Surf.Area= 1,688 sf Storage= 2,857 cf

Plug-Flow detention time= 273.8 min calculated for 602 cf (100% of inflow)
Center-of-Mass det. time= 273.7 min (1,128.7 - 855.0)

Volume	Invert	Avail.Storage	Storage Description
#1	71.00'	2,857 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
71.00	307	0	0
72.00	671	489	489
73.00	1,188	930	1,419
74.00	1,688	1,438	2,857

Device	Routing	Invert	Outlet Devices
#1	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	72.70'	**4.0' long x 2.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.01 cfs @ 14.36 hrs HW=71.70' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=71.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond pA1: Post - Analysis Point-1

Inflow Area = 38,749 sf, 64.15% Impervious, Inflow Depth = 0.02" for WQv event
Inflow = 0.01 cfs @ 12.14 hrs, Volume= 64 cf
Primary = 0.01 cfs @ 12.14 hrs, Volume= 64 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs

Summary for Subcatchment pS1: Post - Runoff to CB-1

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 290 cf, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	3,012	98	Paved parking, HSG C
	2,002	74	>75% Grass cover, Good, HSG C
*	124	98	New Walkways
*	165	98	Curbing & Walls
*	110	98	Dumpster Pad
	5,413	89	Weighted Average
	2,002	74	36.99% Pervious Area
	3,411	98	63.01% Impervious Area

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

Summary for Subcatchment pS2: Post - Runoff to CB-2

Runoff = 0.05 cfs @ 12.07 hrs, Volume= 166 cf, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	1,482	98	Paved parking, HSG C
	192	74	>75% Grass cover, Good, HSG C
*	446	98	New Walkways
*	76	98	Curbing & Walls
	2,196	96	Weighted Average
	192	74	8.74% Pervious Area
	2,004	98	91.26% Impervious Area

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

Summary for Subcatchment pS3: Post - Runoff to Trench Drain

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 214 cf, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	2,509	98	Paved parking, HSG C
	147	74	>75% Grass cover, Good, HSG C
*	0	98	New Walkways
*	84	98	Curbing & Walls
	2,740	97	Weighted Average
	147	74	5.36% Pervious Area
	2,593	98	94.64% Impervious Area

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

Summary for Subcatchment pS4: Post - Runoff to CB-3

Runoff = 0.07 cfs @ 12.07 hrs, Volume= 213 cf, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	2,243	98	Paved parking, HSG C
	344	74	>75% Grass cover, Good, HSG C
*	236	98	New Walkways
*	91	98	Curbing & Walls
	2,914	95	Weighted Average
	344	74	11.81% Pervious Area
	2,570	98	88.19% Impervious Area

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

Summary for Subcatchment pS5: Post - Runoff to Forebay-1

Runoff = 0.18 cfs @ 12.07 hrs, Volume= 594 cf, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	6,072	98	Paved parking, HSG C
	5,601	74	>75% Grass cover, Good, HSG C
*	183	98	New Walkways
*	370	98	Curbing & Walls
*	256	98	Utility Pads
	12,482	87	Weighted Average
	5,601	74	44.87% Pervious Area
	6,881	98	55.13% Impervious Area

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

Summary for Subcatchment pS6: Post - Runoff to Infiltration Basin

Runoff = 0.00 cfs @ 12.39 hrs, Volume= 11 cf, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	1,911	74	>75% Grass cover, Good, HSG C
*	11	98	Curbing & Walls
	1,922	74	Weighted Average
	1,911	74	99.43% Pervious Area
	11	98	0.57% Impervious Area

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

Summary for Subcatchment pS7: Post - Runoff to Forebay-2

Runoff = 0.00 cfs @ 12.07 hrs, Volume= 2 cf, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	211	74	>75% Grass cover, Good, HSG C
*	9	98	Curbing & Walls
	220	75	Weighted Average
	211	74	95.91% Pervious Area
	9	98	4.09% Impervious Area

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

Summary for Subcatchment pS8: Post - Surface flow to Valley Road

Runoff = 0.01 cfs @ 12.14 hrs, Volume= 64 cf, Depth= 0.19"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

	Area (sf)	CN	Description
	3,483	74	>75% Grass cover, Good, HSG C
	551	98	Paved parking, HSG C
*	14	98	Curbing & Walls
	4,048	77	Weighted Average
	3,483	74	86.04% Pervious Area
	565	98	13.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow, AB**
					Grass: Bermuda n= 0.410 P2= 3.30"
2.1	193	0.0500	1.57		**Shallow Concentrated Flow, BC**
					Short Grass Pasture Kv= 7.0 fps
10.1	243	Total			

Summary for Subcatchment RF1: Post - Roof Runoff

Runoff = 0.17 cfs @ 12.07 hrs, Volume= 560 cf, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Type III 24-hr WQv Rainfall=1.20"

Area (sf)	CN	Description
6,814	98	Roofs, HSG C
6,814	98	100.00% Impervious Area

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

Summary for Pond RM: Post - Roof Manifold

Inflow Area = 6,814 sf,100.00% Impervious, Inflow Depth = 0.99" for WQv event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 560 cf
Outflow = 0.17 cfs @ 12.07 hrs, Volume= 560 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.17 cfs @ 12.07 hrs, Volume= 560 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.98' @ 12.07 hrs
Flood Elev= 78.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.75'	**8.0" Round Culvert** L= 26.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.75' / 73.25' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.17 cfs @ 12.07 hrs HW=73.98' TW=72.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.17 cfs @ 1.63 fps)

Summary for Pond STC-1: Post - STC-1

Inflow Area = 10,523 sf, 75.88% Impervious, Inflow Depth = 0.76" for WQv event
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 669 cf
Outflow = 0.21 cfs @ 12.07 hrs, Volume= 669 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.07 hrs, Volume= 669 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.08' @ 12.07 hrs
Flood Elev= 76.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	72.75'	**6.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.75' / 72.70' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.20 cfs @ 12.07 hrs HW=73.07' TW=72.87' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 0.20 cfs @ 2.15 fps)

Summary for Pond TRN: Post - Trench Drain

Inflow Area = 2,740 sf, 94.64% Impervious, Inflow Depth = 0.94" for WQv event
Inflow = 0.07 cfs @ 12.07 hrs, Volume= 214 cf
Outflow = 0.07 cfs @ 12.07 hrs, Volume= 214 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.07 hrs, Volume= 214 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 73.41' @ 12.07 hrs
Flood Elev= 74.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	73.25'	**8.0" Round Culvert** L= 5.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 73.25' / 73.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.07 cfs @ 12.07 hrs HW=73.41' TW=73.13' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.07 cfs @ 1.57 fps)

Summary for Pond US1: Post - Infiltration Chambers

Inflow Area = 17,337 sf, 85.36% Impervious, Inflow Depth = 0.85" for WQv event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,229 cf
Outflow = 0.06 cfs @ 11.84 hrs, Volume= 1,229 cf, Atten= 85%, Lag= 0.0 min
Discarded = 0.06 cfs @ 11.84 hrs, Volume= 1,229 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.04 hrs
Peak Elev= 71.46' @ 12.57 hrs Surf.Area= 2,346 sf Storage= 359 cf
Flood Elev= 74.50' Surf.Area= 2,346 sf Storage= 4,695 cf

Plug-Flow detention time= 40.1 min calculated for 1,229 cf (100% of inflow)
Center-of-Mass det. time= 40.1 min (823.4 - 783.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	71.00'	1,732 cf	**39.50'W x 59.40'L x 3.50'H Field A** 8,212 cf Overall - 2,963 cf Embedded = 5,249 cf x 33.0% Voids
#2A	71.50'	2,963 cf	**ADS_StormTech SC-740** x 64 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 8 rows
		4,695 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	72.88'	**8.0" Round Culvert** L= 14.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 72.88' / 72.70' S= 0.0129 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Discarded	71.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.06 cfs @ 11.84 hrs HW=71.05' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=71.00' TW=71.00' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)

Commercial Site Development

48 Valley Road - Middletown, RI

STORMWATER MANAGEMENT

STORMWATER RUNOFF VOLUME & FLOW RATES SUMMARY

SDE Job No.: 22061 Date: 10/20/2022 Revised: 1/27/2023

Prepared by: SJE Checked by: MER

PRE-DEVELOPMENT

Analysis Points	Storm Event											
	1.2 inch Storm		1-yr		2-yr		10-yr		25-yr		100-yr	
(Subcatchment/Pond)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)
eA1	**0.00**	82	**0.45**	1,957	**0.72**	2,864	**1.73**	6,337	**2.58**	9,315	**4.48**	16,094.0
Totals	**0.00**	82	**0.45**	1,957	**0.72**	2,864	**1.73**	6,337	**2.58**	9,315	**4.48**	16,094.0

POST-DEVELOPMENT

Analysis Points	Storm Event											
	1.2 inch Storm		1-yr		2-yr		10-yr		25-yr		100-yr	
(Subcatchment/Pond)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)	**Rate (cfs)**	Vol. (cf)
pA1	**0.01**	64	**0.18**	767	**0.46**	1,376	**1.60**	4,032	**2.16**	7,151	**4.12**	14,117
Totals	**0.01**	64	**0.18**	767	**0.46**	1,376	**1.60**	4,032	**2.16**	7,151	**4.12**	14,117

Notes:

Totals *are the summations of the Analysis points values (Overall combine values leaving the site).*

Analysis points ***eA1*** *&* ***pA1*** *are pre-development and post-development comparisons. (Site's runoff flow toward Valley Road)*

Refer to Hydrocad® calculations for additional information.

Commercial Site Development

48 Valley Road - Middletown, RI

STORMWATER MANAGEMENT

STORMWATER RECHARGE CALCULATION WORKSHEET

SDE Job No.: 22061 Date: 10/20/2022 Revised: 1/27/2023

Prepared by: SJE Checked by: MER

Hydrologic Group	A	B	C	D	ReV
Target Runoff Depth Factor (Inches of Runoff)	0.60	0.35	0.25	0.10	**(cf)**
Total Increase of Impervious Areas, (sf):					
Proposed Driveway & Parking			18,748		
Proposed Buildings			5,786		
X inches of runoff, (cf)	0	0	511	0	511
Total Recharge Volume Required = 1" x F x Ai / 12 , (ac-ft.)			**Total ReV (cf) =**		**511**

Structure	Infiltration Rate (inches / hour)	Recharged Volume (cu.ft.)	ReV Volume Below Outlet Structure (cu.ft.)
Underground Infiltration System-1	0.50	3,334	2,879
Infiltration Basin-1	0.50	1,910	1,085
Total Recharge Volume Provided, (cf) =		**5,245**	**3,964**

Note:

1. System Infiltration rates are derived from the 1982 Rawls rates based on field observed soil texture (HSG C).
2. Recharged volume are calculated utilizing Simple Dynamic Method : Automated
3. Calculations are based on 1-Yr , 24-Hr storm event.

Commercial Site Development

48 Valley Road - Middletown, RI

STORMWATER MANAGEMENT

WATER QUALITY TREATMENT VOLUME CALCULATION WORKSHEET

SDE Job No.: 22061 Date: 10/20/2022 Revised: 1/27/2023

Prepared by: SJE Checked by: MER

Impervious Area	**Area sf**		**X in. of runoff 1.0 cf**		**1.2 inch rainfall cf**
Total Impervious Area Excluding Roof	*18,748*		*1,562*		
Building Roof Area	*6,814*		*568*		
1.2 inch rainfall total runoff					
Total Water Quality Volume , (cf) =			***2,130***		**0**
System Water Quality Volume **(volumes below lowest outlet device)**	*Impervious Area to BMP*	WQv	Treatment Required (cf)	Pretreatment Provided (cf)	Extended Treatment (cf)
(FB1) Forebay-1 =	*6881*	573	25% = 143	159	
(IB1) Infiltration Basin-1 =			75% = 430		1,085
	2602	217	75% = 163		
(FB2) Forebay-2 =			25% = 54	60	
(STC1) Stormceptor-1 =	*7985*	665	25% = 166	166	
(US1) Underground Infiltration System-1 =			75% = 499		2,879
	6814 (roof)	568	100% = 568		
Total =	24,282			385	3,964
Total Water Quality Volume Available , (cf) =			**4,349**		

Note:

1. Total water quality volume (WQV) in the 1.2 inch rainfall event is the inflow volume flowing toward the drainage system.
2. Recharged volume are calculated utilizing Simple Dynamic Method : Automated
3. Refer to HydroCAD report for additional information.

Commercial Site Development

48 Valley Road - Middletown, RI

STORMWATER MANAGEMENT

TSS REMOVAL CALCULATION WORKSHEET

SDE Job No.: 22061 | Date: 10/20/2022 | Revised: 1/27/2023

Prepared by: SJE | Checked by: MER

Design Point PA1

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
Stormceptor	25.0%	1.000	0.250	0.750
Underground Infiltration System	90.0%	0.750	0.675	0.075
		0.075	0.000	0.075
		Total TSS Removal =	**92.5%**	

Design Point PA1

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
Forebay	25.0%	1.000	0.250	0.750
Infiltration Basin	90.0%	0.750	0.675	0.075
		0.075	0.000	0.075
		Total TSS Removal =	**92.5%**	

Commercial Site Development

48 Valley Road - Middletown, RI

STORMWATER MANAGEMENT

REQUIRED RECHARGE VOLUME DRAWDOWN TIME CALCULATION WORKSHEET

SDE Job No.: 22061 Date: 10/20/2022 Revised: 1/27/2023

Prepared by: SJE Checked by: MER

Infiltration Basin

Parameters	Infiltration Basin			
Required Recharge Volume , ***ReV (cf)***	1,085			
Infiltration BMP Bottom Area , ***BA (sf)***	671			
Sat. Hydraulic Conductivity , ***K (in./hr)***	0.50			
Drawdown Time , T (hrs.) =	38.8	> 72 hours		

T = ***Rev / (K*** x ***BA)***

Infiltration Chambers

Parameters	Infiltration Chambers			
Required Recharge Volume , ***ReV (cf)***	2,879			
Infiltration BMP Bottom Area , ***BA (sf)***	2,346			
Sat. Hydraulic Conductivity , ***K (in./hr)***	0.50			
Drawdown Time , T (hrs.) =	29.5	> 72 hours		

T = ***Rev / (K*** x ***BA)***

Note:

1. Volume are calculated utilizing Simple Dynamic Method : Automated
2. Required drawdown volume is based on storage volume below outlet pipe.
3. Calculations are based on 1-Yr , 24-Hr storm event.
4. System Infiltration rates are derived from the 1982 Rawls rates based on field observed soil texture (HSG C).
5. Refer to HydroCAD report for additional information.

SIEVE ANALYSIS
USING MECHANICAL AND HYDROMETER METHODS

GENERAL DATA			
Project:	48 Valley Road	USDA Description:	Sandy Loam
Location:	Middletown, RI	Test Pit Number	TP-1
Date:	11/2/2022	Sample Number:	
		Tested By:	JC

MECHANICAL ANALYSIS I			
Container Number:	56	Container Mass, g:	100.32
Container & Wet Soil, g:	1959.11	Dry Soil Mass, g:	1735.00
Container & Dry Soil, g:	1835.32	Moisture Content, %:	7.1%
Mass of Water, g:	123.79	Control Sieve:	#270

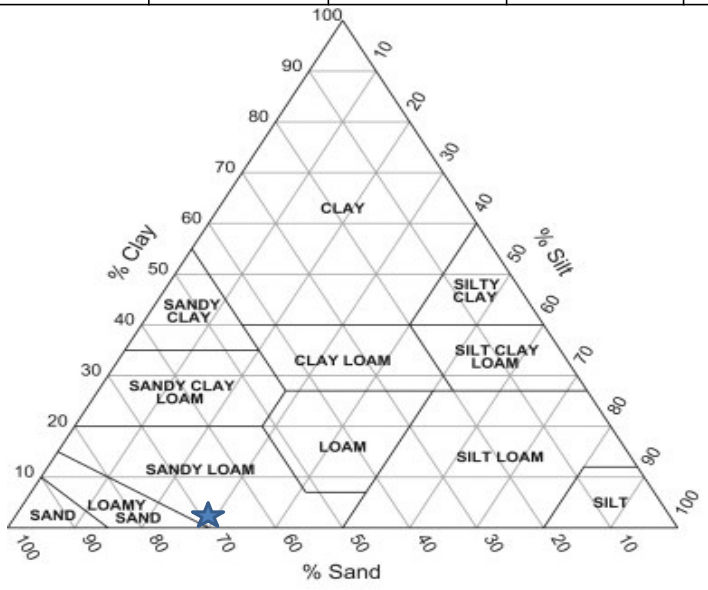
Sieve	Opening (mm)	Log Opening	Weight Retain (g)	Percent Retained	Total Percent Finer by Mass	Total Percent Finer by Mass (-#10 Sieve)
1"	25.400	1.405	161.42	9.30%	90.70%	100.00%
3/4"	19.100	1.281	199.74	11.51%	88.49%	100.00%
1/2"	12.700	1.104	281.97	16.25%	83.75%	100.00%
3/8"	9.525	0.979	317.33	18.29%	81.71%	100.00%
#4	4.760	0.678	430.51	24.81%	75.19%	100.00%
#10	2.000	0.301	553.11	31.88%	68.12%	100.00%
#20	0.840	-0.076	694.26	40.01%	59.99%	88.06%
#40	0.420	-0.377	848.26	48.89%	51.11%	75.03%
#60	0.250	-0.602	990.82	57.11%	42.89%	62.97%
#100	0.149	-0.827	1164.04	67.09%	32.91%	48.31%
#200	0.074	-1.131	1339.69	77.22%	22.78%	33.45%
#270	0.053	-1.276	1368.43	78.87%	21.13%	31.02%
PAN	0	----	1735.00	100.00%	0.00%	0.00%

HYDROMETER ANALYSIS			
Hydrometer Type:	152H	Dispersing Agent:	Sodium Hexametaphosphate
Zero Correction:	6	Amount:	125 ml at 4 Percent Concentration
Meniscus:	1	Specific Gravity of Solids:	2.65 (Assumed)
Dry Mass of Sample, g:	28.30	Specific Gravity Correction Factor, a:	1
		Hygroscopic Correction Factor:	1

Date	Time of Reading	Time (min)	Temp (C)	Act Hyd	Cor Hyd	Act % Finer	Adj % Finer	Min Cor	L	L/t	A	Diameter (mm)	Total % Finer
2-Nov	8:47:00 AM	0	20.4										
2-Nov	8:47:30 AM	0.5	20.4	31.5	25.75	90.99%	30.43%	32.5	10.97	21.934	0.01358	0.0636	30.43%
2-Nov	8:48:00 AM	1	20.4	30.5	24.75	87.46%	29.25%	31.5	11.13	11.131	0.01358	0.0453	29.25%
2-Nov	8:49:00 AM	2	20.4	27.5	21.75	76.86%	25.71%	28.5	11.62	5.812	0.01358	0.0327	25.71%
2-Nov	8:51:00 AM	4	20.4	24.0	18.25	64.49%	21.57%	25.0	12.20	3.049	0.01358	0.0237	21.57%
2-Nov	8:55:00 AM	8	20.5	20.5	14.78	52.21%	17.46%	21.5	12.77	1.596	0.01356	0.0171	17.46%
2-Nov	9:02:00 AM	15	20.5	18.0	12.28	43.37%	14.51%	19.0	13.18	0.879	0.01356	0.0127	14.51%
2-Nov	9:17:00 AM	30	20.5	15.0	9.28	32.77%	10.96%	16.0	13.67	0.456	0.01356	0.0092	10.96%
2-Nov	9:47:00 AM	60	20.7	13.0	7.33	25.88%	8.66%	14.0	14.00	0.233	0.01353	0.0065	8.66%
2-Nov	10:47:00 AM	120	21.0	11.0	5.40	19.08%	6.38%	12.0	14.33	0.119	0.01348	0.0047	6.38%
2-Nov	12:47:00 PM	240	21.5	9.0	3.53	12.46%	4.17%	10.0	14.66	0.061	0.01340	0.0033	4.17%
2-Nov	4:59:00 PM	480	22.2	8.0	2.70	9.54%	3.19%	9.0	14.82	0.031	0.01329	0.0023	3.19%
3-Nov	8:47:00 AM	1440	19.7	7.5	1.58	5.57%	1.86%	8.5	14.91	0.010	0.01369	0.0014	1.86%

GRAINSIZE SUMMARY — From Split Sample - Percent Passing #10 Sieve

	Percent Gravel	Percent Sand	Percent Silt	Percent Clay	
Total		69.0%	27.8%	3.2%	



SIEVE ANALYSIS
USING MECHANICAL AND HYDROMETER METHODS

GENERAL DATA			
Project:	48 Valley Road	USDA Description:	Sandy Loam
Location:	Middletown, RI	Test Pit Number	TP-2
Date:	10/31/2022	Sample Number:	
		Tested By:	JC

MECHANICAL ANALYSIS I			
Container Number:	59	Container Mass, g:	101.95
Container & Wet Soil, g:	1976.22	Dry Soil Mass, g:	1742.16
Container & Dry Soil, g:	1844.11	Moisture Content, %:	7.6%
Mass of Water, g:	132.11	Control Sieve:	#270

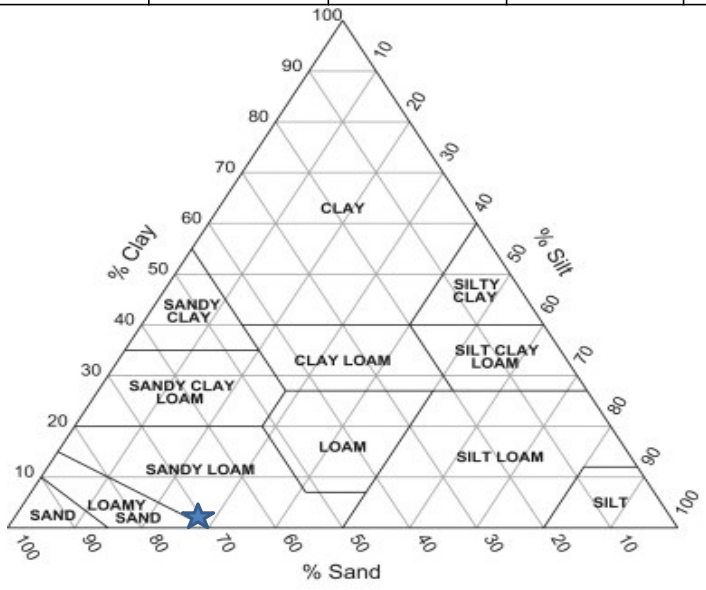
Sieve	Opening (mm)	Log Opening	Weight Retain (g)	Percent Retained	Total Percent Finer by Mass	Total Percent Finer by Mass (-#10 Sieve)
1"	25.400	1.405	67.83	3.89%	96.11%	100.00%
3/4"	19.100	1.281	90.36	5.19%	94.81%	100.00%
1/2"	12.700	1.104	158.57	9.10%	90.90%	100.00%
3/8"	9.525	0.979	236.02	13.55%	86.45%	100.00%
#4	4.760	0.678	366.70	21.05%	78.95%	100.00%
#10	2.000	0.301	490.02	28.13%	71.87%	100.00%
#20	0.840	-0.076	616.42	35.38%	64.62%	89.91%
#40	0.420	-0.377	744.63	42.74%	57.26%	79.67%
#60	0.250	-0.602	903.40	51.86%	48.14%	66.99%
#100	0.149	-0.827	1124.22	64.53%	35.47%	49.35%
#200	0.074	-1.131	1342.55	77.06%	22.94%	31.91%
#270	0.053	-1.276	1389.53	79.76%	20.24%	28.16%
PAN	0	----	1742.16	100.00%	0.00%	0.00%

HYDROMETER ANALYSIS			
Hydrometer Type:	152H	Dispersing Agent:	Sodium Hexametaphosphate
Zero Correction:	7	Amount:	125 ml at 4 Percent Concentration
Meniscus:	1	Specific Gravity of Solids:	2.65 (Assumed)
Dry Mass of Sample, g:	50.00	Specific Gravity Correction Factor, a:	1
		Hygroscopic Correction Factor:	1

Date	Time of Reading	Time (min)	Temp (C)	Act Hyd	Cor Hyd	Act % Finer	Adj % Finer	Min Cor	L	L/t	A	Diameter (mm)	Total % Finer
31-Oct	8:59:00 AM	0											
31-Oct	8:59:30 AM	0.5	20.2	46.0	39.20	78.40%	25.02%	47.0	8.59	17.175	0.01361	0.0564	25.02%
31-Oct	9:00:00 AM	1	20.2	44.0	37.20	74.40%	23.74%	45.0	8.92	8.916	0.01361	0.0406	23.74%
31-Oct	9:01:00 AM	2	20.2	41.5	34.70	69.40%	22.15%	42.5	9.33	4.663	0.01361	0.0294	22.15%
31-Oct	9:03:00 AM	4	20.2	37.5	30.70	61.40%	19.60%	38.5	9.98	2.496	0.01361	0.0215	19.60%
31-Oct	9:07:00 AM	8	20.2	33.0	26.20	52.40%	16.72%	34.0	10.72	1.340	0.01361	0.0158	16.72%
31-Oct	9:14:00 AM	15	20.5	29.0	22.28	44.55%	14.22%	30.0	11.38	0.758	0.01356	0.0118	14.22%
31-Oct	9:29:00 AM	30	20.6	24.0	17.30	34.60%	11.04%	25.0	12.20	0.407	0.01354	0.0086	11.04%
31-Oct	9:59:00 AM	60	20.9	19.0	12.38	24.75%	7.90%	20.0	13.02	0.217	0.01350	0.0063	7.90%
31-Oct	10:59:00 AM	120	21.2	16.0	9.45	18.90%	6.03%	17.0	13.51	0.113	0.01346	0.0045	6.03%
31-Oct	12:59:00 PM	240	22.1	13.0	6.68	13.35%	4.26%	14.0	14.00	0.058	0.01330	0.0032	4.26%
31-Oct	4:59:00 PM	480	22.8	11.0	4.85	9.70%	3.10%	12.0	14.33	0.030	0.01319	0.0023	3.10%
1-Nov	8:59:00 AM	1440	23.0	9.0	2.90	5.80%	1.85%	10.0	14.66	0.010	0.01316	0.0013	1.85%

GRAINSIZE SUMMARY — From Split Sample - Percent Passing #10 Sieve

	Percent Gravel	Percent Sand	Percent Silt	Percent Clay	
Total		71.8%	25.1%	3.1%	



SIEVE ANALYSIS
USING MECHANICAL AND HYDROMETER METHODS

GENERAL DATA			
Project:	48 Valley Road	USDA Description:	Sand
Location:	Middletown, RI	Test Pit Number	TP-3
Date:	11/1/2022	Sample Number:	
		Tested By:	JC

MECHANICAL ANALYSIS I

Container Number:	46	Container Mass, g:	101.91
Container & Wet Soil, g:	1963.77	Dry Soil Mass, g:	1757.50
Container & Dry Soil, g:	1859.41	Moisture Content, %:	5.9%
Mass of Water, g:	104.36	Control Sieve:	#270

Sieve	Opening (mm)	Log Opening	Weight Retain (g)	Percent Retained	Total Percent Finer by Mass	Total Percent Finer by Mass (-#10 Sieve)
1"	25.400	1.405	0.00	0.00%	100.00%	100.00%
3/4"	19.100	1.281	0.00	0.00%	100.00%	100.00%
1/2"	12.700	1.104	0.00	0.00%	100.00%	100.00%
3/8"	9.525	0.979	25.19	1.43%	98.57%	100.00%
#4	4.760	0.678	78.75	4.48%	95.52%	100.00%
#10	2.000	0.301	161.10	9.17%	90.83%	100.00%
#20	0.840	-0.076	271.74	15.46%	84.54%	93.07%
#40	0.420	-0.377	512.57	29.16%	70.84%	77.98%
#60	0.250	-0.602	858.11	48.83%	51.17%	56.34%
#100	0.149	-0.827	1123.58	63.93%	36.07%	39.71%
#200	0.074	-1.131	1570.32	89.35%	10.65%	11.73%
#270	0.053	-1.276	1635.56	93.06%	6.94%	7.64%
PAN	0	----	1757.50	100.00%	0.00%	0.00%

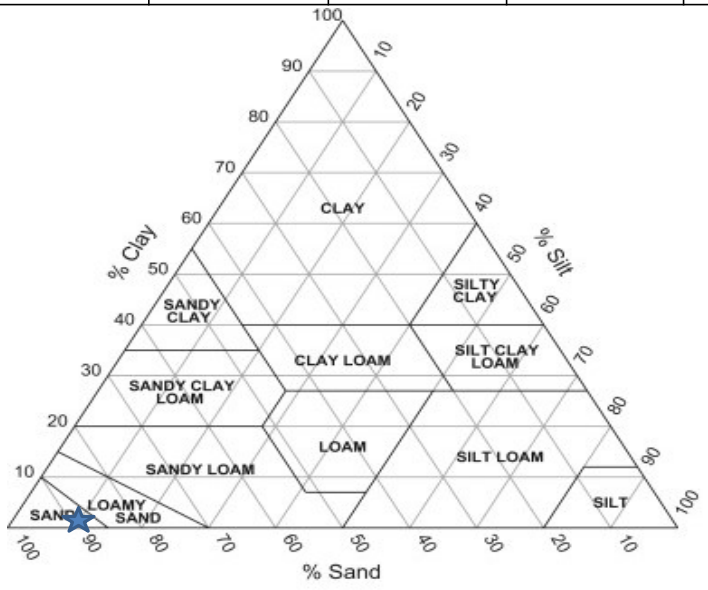
HYDROMETER ANALYSIS

Hydrometer Type:	152H	Dispersing Agent:	Sodium Hexametaphosphate
Zero Correction:	5.5	Amount:	125 ml at 4 Percent Concentration
Meniscus:	0.5	Specific Gravity of Solids:	2.65 (Assumed)
Dry Mass of Sample, g:	50.00	Specific Gravity Correction Factor, a:	1
		Hygroscopic Correction Factor:	1

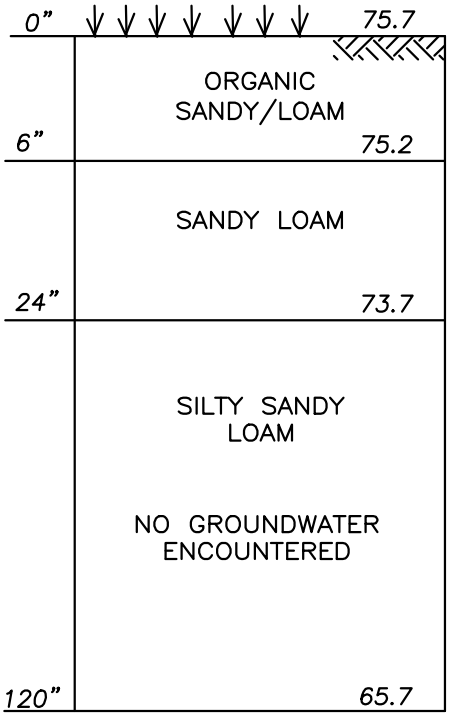
Date	Time of Reading	Time (min)	Temp (C)	Act Hyd	Cor Hyd	Act % Finer	Adj % Finer	Min Cor	L	L/t	A	Diameter (mm)	Total % Finer
1-Nov	8:53:00 AM	0											
1-Nov	8:53:30 AM	0.5	23.0	49.0	44.40	88.80%	10.41%	49.5	8.18	16.354	0.01316	0.0532	10.41%
1-Nov	8:54:00 AM	1	23.0	45.5	40.90	81.80%	9.59%	46.0	8.75	8.751	0.01316	0.0389	9.59%
1-Nov	8:55:00 AM	2	23.0	37.0	32.40	64.80%	7.60%	37.5	10.15	5.073	0.01316	0.0296	7.60%
1-Nov	8:57:00 AM	4	23.0	28.0	23.40	46.80%	5.49%	28.5	11.62	2.906	0.01316	0.0224	5.49%
1-Nov	9:01:00 AM	8	23.0	21.0	16.40	32.80%	3.85%	21.5	12.77	1.596	0.01316	0.0166	3.85%
1-Nov	9:08:00 AM	15	23.0	16.5	11.90	23.80%	2.79%	17.0	13.51	0.901	0.01316	0.0125	2.79%
1-Nov	9:23:00 AM	30	22.9	13.0	8.38	16.75%	1.96%	13.5	14.08	0.469	0.01318	0.0090	1.96%
1-Nov	9:53:00 AM	60	22.9	11.0	6.38	12.75%	1.49%	11.5	14.41	0.240	0.01318	0.0065	1.49%
1-Nov	10:53:00 AM	120	22.8	9.0	4.35	8.70%	1.02%	9.5	14.74	0.123	0.01319	0.0046	1.02%
1-Nov	12:53:00 PM	240	22.6	8.5	3.80	7.60%	0.89%	9.0	14.82	0.062	0.01322	0.0033	0.89%
1-Nov	4:53:00 PM	480	22.4	7.5	2.75	5.50%	0.64%	8.0	14.99	0.031	0.01326	0.0023	0.64%
2-Nov	8:53:00 AM	1440	20.5	7.5	2.28	4.55%	0.53%	8.0	14.99	0.010	0.01356	0.0014	0.53%

GRAINSIZE SUMMARY — From Split Sample - Percent Passing #10 Sieve

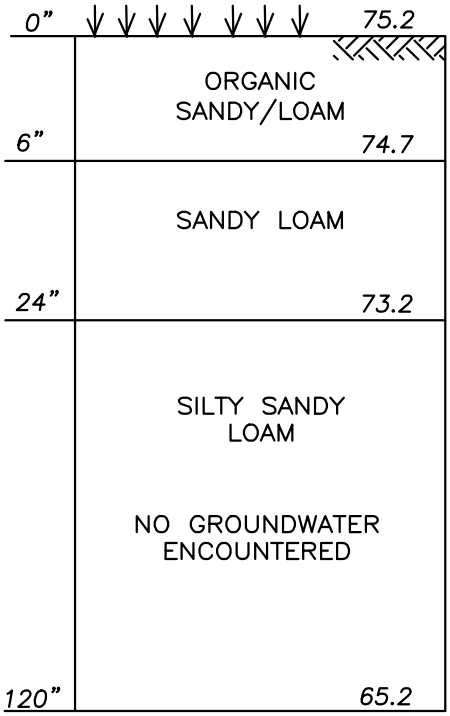
	Percent Gravel	Percent Sand	Percent Silt	Percent Clay	
Total		92.4%	7.0%	0.6%	



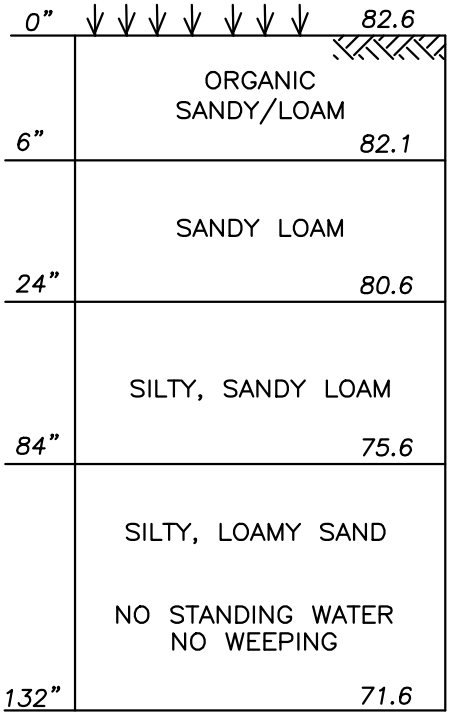
TP–1



TP–2



TP–3



SOIL NOTES

SOIL EVALUATION PERFORMED BT MICHAEL E. RUSSELL ON OCTOBER 26, 2022

LDEC
Land Development Engineering & Consulting, LLC
207 High Point Avenue, Unit 6
Portsmouth, RI 02871
T: 401-354-2050
F: 401-369-9775
WWW.SDE-LDEC.COM

SOIL LOGS

48 VALLEY ROAD
MIDDLETOWN, RHODE ISLAND

ASSESSORS MAP 107SE, PARCEL 103B

DATE: OCTOBER 26, 2022			REV. DATE:
PROJ.#: 22061	SCALE : NTS	DRAWN BY: SJE	CHECK BY: MER
ISSUED FOR : PERMITTING			
PREPARED FOR: GOLD'S WINE & SPIRITS			

APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

PROJECT NAME **48 Valley Road Commercial Development**	**(RIDEM USE ONLY)** **STW/WQC File #:** **Date Received:**
TOWN **Middletown**	
BRIEF PROJECT DESCRIPTION: Project proposes to create a 6,814 sf commercial structure for office and retail use.	

Stormwater Management Plan (SMP) Elements – Minimum Standards

When submitting a SMP,[1] submit four separately bound documents: Appendix A Checklist; Stormwater Site Planning, Analysis and Design Report with Plan Set/Drawings; Soil Erosion and Sediment Control (SESC) Plan, and Post Construction Operations and Maintenance (O&M) Plan. Please refer to Suggestions to Promote Brevity**.**

Note**: All stormwater construction projects must create a Stormwater Management Plan (SMP). However, not every element listed below is required per the** RIDEM Stormwater Rules **and the** RIPDES Construction General Permit (CGP)**. This checklist will help identify the required elements to be submitted with an Application for Stormwater Construction Permit & Water Quality Certification.**

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)

☐ Residential	☒ Commercial	☐ Federal	☐ Retrofit	☐ Restoration
☒ Road	☒ Utility	☐ Fill	☐ Dredge	☐ Mine
☐ Other (specify):				

SITE INFORMATION

☒ Vicinity Map

INITIAL DISCHARGE LOCATION(S): The WQv discharges to: (You may choose more than one answer if several discharge points are associated with the project.)

☒ **Groundwater**	☐ **Surface Water**	☐ **MS4**
☐ GAA	☐ Isolated Wetland	☐ RIDOT
☒ GA	☐ Named Waterbody	☐ RIDOT Alteration Permit is Approved
☐ GB	☐ Unnamed Waterbody Connected to Named Waterbody	☐ Town
		☐ Other (specify):

ULTIMATE RECEIVING WATERBODY LOCATION(S): Include pertinent information that applies to both WQ_v and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.

☒ Groundwater or Disconnected Wetland	☐ SRWP		
☒ Waterbody Name: Bailey Brook	☐ Coldwater	☒ Warmwater	☐ Unassessed
☒ Waterbody ID: RI0007035R-01	☐ 4th order stream of pond 50 acres or more		
☒ TMDL for: ENTEROCOCCUS	☐ Watershed of flood prone river (e.g., Pocasset River)		
☐ Contributes to a priority outfall listed in the TMDL	☐ Contributes stormwater to a public beach		
☒ 303(d) list – Impairment(s) for: ENTEROCOCCUS; PHOSPHORUS, TOTAL; LEAD	☐ Contributes to shellfishing grounds		

[1] Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

PROJECT HISTORY		
☐ RIDEM Pre- Application Meeting	Meeting Date:	☐ Minutes Attached
☐ Municipal Master Plan Approval	Approval Date:	☐ Minutes Attached
☐ Subdivision Suitability Required	Approval #:	
☐ Previous Enforcement Action has been taken on the property	Enforcement #:	

FLOODPLAIN & FLOODWAY See Guidance Pertaining to Floodplain and Floodways	
☐ Riverine 100-year floodplain: **FEMA FLOODPLAIN FIRMETTE** has been reviewed and the 100-year floodplain is on site	
☐ Delineated from FEMA Maps	
NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional	
☐ Calculated by Professional Engineer	
☐ Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain	Amount of Fill (CY):
	Amount of Cut (CY):
☐ Restrictions or modifications are proposed to the flow path or velocities in a floodway	
☐ Floodplain storage capacity is impacted	
☐ Project area is not within 100-year floodplain as defined by RIDEM	

CRMC JURISDICTION
☐ CRMC Assent required
☐ Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP:
☐ Sea level rise mitigation has been designed into this project

LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:			
1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)			
	☐ Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations))		**RIDEM CONTACT:**
	☐ Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials)		
	☐ This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities		**SITE ID#**:
		☐ CERCLIS/Superfund (NPL)	
		☐ State Hazardous Waste Site (SHWS)	
		☐ Environmental Land Usage Restriction (ELUR)	
		☐ Leaking Underground Storage Tank (LUST)	
		☐ Closed Landfill	
Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSMM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to "Red," "Yellow" or "Green" as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration**.**			
2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:			
	☐ Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php		
	☐ Auto Fueling Facility (e.g., gas station)		
	☐ Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area		

	☐ Road Salt Storage and Loading Areas (exposed to rainwater)	
	☐ Outdoor Storage and Loading/Unloading of Hazardous Substances	
3.	**STORMWATER INDUSTRIAL PERMITTING**	
	☐ The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C)	Activities: Sector:
	☐ Construction is proposed on a site that is subject to THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS.	MSGP permit #
	☐ Additional stormwater treatment is required by the MSGP Explain:	

REDEVELOPMENT STANDARD – MINIMUM STANDARD 6		
☐ Pre Construction Impervious Area		
	☐ Total Pre-Construction Impervious Area (**TIA**)	
	☐ Total Site Area (**TSA**)	
	☐ Jurisdictional Wetlands (**JW**)	
	☐ Conservation Land (**CL**)	
☐ Calculate the Site Size (defined as contiguous properties under same ownership)		
	☐ Site Size (**SS**) = (**TSA**) – (**JW**) – (**CL**)	
	☐ (**TIA**) / (**SS**) =	☐ (**TIA**) / (**SS**) >**0.4**?
☐ YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)

This section may be deleted if not required.

Note: A written description must be provided specifying why each method is not being used or is not applicable at the Site. Appropriate answers may include:

- Town requires … (state the specific local requirement)
- Meets Town's dimensional requirement of …
- Not practical for site because …
- Applying for waiver/variance to achieve this (pending/approved/denied)
- Applying for wavier/variance to seek relief from this (pending/approved/denied)

A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS	**IF NOT IMPLEMENTED, EXPLAIN HERE**
☒ Sensitive resource areas and site constraints are identified (required) ☒ Local development regulations have been reviewed (required) ☒ All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction ☐ Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. **Note:** If Conservation Development has been used, check box and skip to Subpart C ☒ As much natural vegetation and pre-development hydrology as possible has been maintained	

B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS ☒ Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies ☒ Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) ☐ Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) ☐ Development sites and building envelopes have been positioned outside of floodplains ☒ Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features ☒ Development sites and building envelopes have been located to minimize impacts to steep slopes (≥15%) ☐ Other (describe):	
C) MINIMIZE CLEARING AND GRADING ☐ Site clearing has been restricted to minimum area needed for building footprints, development activities, construction access, and safety. ☒ Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) ☐ Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s) ☐ Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent	
D) REDUCE IMPERVIOUS COVER ☒ Reduced roadway widths (≤22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) ☐ Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface) ☐ Reduced building footprint: Explain approach: ☐ Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) ☐ Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) ☐ Reduced parking lot area: Explain approach ☐ Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. ☒ Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) ☐ Other (describe):	
E) DISCONNECT IMPERVIOUS AREA ☐ Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible ☐ Residential street edges allow side-of-the-road drainage into vegetated open swales ☐ Parking lot landscaping breaks up impervious expanse AND accepts runoff ☐ Other (describe):	
F) MITIGATE RUNOFF AT THE POINT OF GENERATION ☐ Small-scale BMPs have been designated to treat runoff as close as possible to the source	

G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION ☐ Low-maintenance landscaping has been proposed using native species and cultivars ☐ Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan ☐ Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots	
H) RESTORE STREAMS/WETLANDS ☐ Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands ☐ Removal of invasive species ☐ Other	

PART 3. SUMMARY OF REMAINING STANDARDS

GROUNDWATER RECHARGE – MINIMUM STANDARD 2		
YES	**NO**	
☒	☐	The project has been designed to meet the groundwater recharge standard.
☐	☐	If "No," the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D);
☐	☐	Your waiver request has been explained in the Narrative, if applicable.
☐	☒	Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification?
☐	☐	If "Yes," has approval for infiltration by the OLRSMM Site Project Manager, per Part 1, Minimum Standard 8, been requested?

TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)
(Add or Subtract Rows as Necessary)

Design Point	**Impervious Area Treated (sq ft)**	**Total Re_v Required (cu ft)**	**LID Stormwater Credits (see RISDISM Section 4.6.1)**	**Recharge Required by Remaining BMPs (cu ft)**	**Recharge Provided by BMPs (cu ft)**
			Portion of Re_v directed to a QPA (cu ft)		
eA1/pA1	24,282 sf	511 cf	0	511 cf	5,245 cf
DP-2:					
DP-3:					
DP-4:					
TOTALS:					

Notes:
1. Only BMPs listed in RISDISM Table 3-5 "List of BMPs Acceptable for Recharge" may be used to meet the recharge requirement.
2. Recharge requirement must be satisfied for each waterbody ID.

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):

See Appendix 2 of the Stormwater Management Report

WATER QUALITY – MINIMUM STANDARD 3		
YES	**NO**	
☒	☐	Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)?
☒	☐	Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)?
☒	☐	If "Yes," either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or,
☒	☐	If "Yes," either TR-55 or TR-20 was used to calculate WQv; and,
☐	☐	If "No," the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area.
☐	☐	Not Applicable
☒	☐	Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)?
☒	☐	Does this project propose an increase of impervious cover to a receiving water body with impairments? If "Yes," please indicate below the method that was used to address the water quality requirements of no further degradation to a low-quality water. Fully infiltrates WQv storm event on site
☐	☒	RICR 8.36. A Pollutant Loading Analysis is needed and has been completed.
☒	☐	The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable.
☐	☒	BMPs are proposed that are on the approved technology list . If "Yes," please provide all required worksheets from the manufacturer.
☐	☒	Additional pollutant-specific requirements and/or pollutant removal efficiencies are applicable to the site as the result of a TMDL, SAMP, or other watershed-specific requirements. If "Yes," please describe:

TABLE 3-1: Summary of Water Quality (see RICR 8.9)

Design Point and WB ID	Impervious area treated (sq ft)	Total WQ_v Required (cu ft)	LID Stormwater Credits (see RICR 8.18) WQv directed to a QPA (cu ft)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
eA1/pA1	24,282 sf	2,023 cf		2,023 cf	4,394 cf
DP-2:					
DP-3:					
DP-4:					
TOTALS:					

Notes:
1. Only BMPs listed in RICR 8.20 and 8.25 or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.
2. For each Design Point, the Water Quality Volume Standard must be met for each Waterbody ID.

☒ YES ☐ NO	This project has met the setback requirements for each BMP. If "No," please explain:

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):

See Appendix 2 of the Stormwater Management Report

CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4			
YES	**NO**		
☒	☐	Is this standard waived? If "Yes," please indicate one or more of the reasons below:	
		☐	The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.
		☒	The project is a small facility with impervious cover of less than or equal to 1 acre.
		☐	The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (Note: LID design strategies can greatly reduce the peak discharge rate).
☐	☐	Conveyance and natural channel protection for the site have been met. If "No,' explain why:	

TABLE 4-1: Summary of Channel Protection Volumes (see RICR 8.10)					
Design Point	**Receiving Water Body Name**	**Coldwater Fishery? (Y/N)**	**Total CPv Required (cu ft)**	**Total CPv Provided (cu ft)**	**Average Release Rate Modeled in the 1-yr storm (cfs)**
DP-1:					
DP-2:					
DP-3:					
DP-4:					
TOTALS:					
Note: The Channel Protection Volume Standard must be met in each waterbody ID.					
☐ YES ☐ NO	The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM).				
☐ YES ☐ NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; If "Yes," please indicate restrictions and solutions below.				
☐ Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).					

OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5			
YES	**NO**		
☐	☒	Is this standard waived? If yes, please indicate one or more of the reasons below:	
		☐	The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.
		☐	A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks).
☐	☒	Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows:	
		☐	RIDOT
		☐	Other (specify):
Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be **less** than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4.			
		Indicate below which model was used for your analysis. ☐ TR-55 ☐ TR-20 ☒ HydroCAD ☐ Bentley/Haestad ☐ Intellisolve ☐ Other (Specify):	
YES	**NO**		
☒	☐	Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If "No," please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.):	
☐	☒	Do off-site areas contribute to the sub-watersheds and design points? If "Yes,"	
☐	☐	Are the areas modeled as "present condition" for both pre- and post-development analysis?	
☐	☐	Are the off-site areas shown on the subwatershed maps?	
☒	☐	Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff?	
☐	☒	Is a Downstream Analysis required (see RICR 8.11.E.1)?	
☒	☐	Calculate the following:	
		☒	Area of disturbance within the sub-watershed (areas) 38,749 sf
		☒	Impervious cover (%) 68%
☐	☒	Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)?	
☒	☐	Does this project meet the overbank flood protection standard?	

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Table 5-1 Hydraulic Analysis Summary								
Subwatershed (Design Point)	**1.2" Peak Flow** (cfs) **		**1-yr Peak Flow** (cfs)		**10-yr Peak Flow** (cfs)		**100-yr Peak Flow** (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
eA1/pA1	0.00	0.01	0.45	0.18	1.73	1.60	4.48	4.12
DP-2:								
DP-3:								
DP-4:								
TOTALS:								

** Utilize modified curve number method or split pervious /impervious method in HydroCAD.

Note: The hydraulic analysis must demonstrate no impact to each individual subwatershed DP unless each DP discharges to the same wetland or water resource.

Indicate as follows where the pertinent calculations and/or information for the items above are provided	**Name of report/document, page numbers, appendices, etc.**
Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations.	See Appendix 1 of the Stormwater Management Report
Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations.	See Appendix 1 of the Stormwater Management Report
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.	See Appendix 1 of the Stormwater Management Report
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).	See Appendix 1 of the Stormwater Management Report

Table 5-2 Summary of Best Management Practices											
BMP ID	**DP #**	**BMP Type** (e.g., bioretention, tree filter)	**BMP Functions**					**Bypass Type**	**Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4**		
			Pre-Treatment (Y/N/ NA)	Re_v	WQ_v	CP_v (Y/N/ NA)	Overbank Flood Reduction (Y/N/NA)	External (E) Internal (I) or NA	Yes/ No	Technical Justification (Design Report page number)	Distance Provided
pA1	STC1	Stormceptor	Y		166			Bypass in DMH upstream	Y	Sheet 4&5	
pA1	FB-1	Forebay	Y		159				Y	Sheet 4&5	
pA1	FB-2	Forebay	Y		60				Y	Sheet 4&5	
pA1	US1	Infiltration Chambers			2879				Y	Sheet 4&5	
pA1	IB1	Infiltration Basin			1085				Y	Sheet 4&5	
		TOTALS:									

Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	**BMP ID**	**BMP Type** (e.g., bioretention, tree filter)	**Soils Analysis for Each BMP**						
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	Exfiltration Rate Applied (in/hr)
			Primary	Secondary					
pA1	US1	Infiltration Chambers	TP-2	TP-1	66.5	71.00 (stone)	4.5’	C	1.02
pA1	IB1	Infiltration Basin	TP-2	TP-1	64.5	71.00	6.5’	C	1.02
		TOTALS:							

* For underground infiltration systems (UICs) bottom equals bottom of stone, for surface infiltration basins bottom equals bottom of basin, for filters bottom equals interface of storage and top of filter layer

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	**NO**	**N/A**	
☐	☐	☐	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
☐	☐	☐	Are these activities already covered under an MSGP? If “No,” please explain if you have applied for an MSGP or intend to do so?
☐	☐	☐	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, “Acceptable BMPs for Use at LUHPPLs.” Please list BMPs:
☐	☐	☐	Additional BMPs, or additional pretreatment BMP’s if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

ILLICIT DISCHARGES – MINIMUM STANDARD 9			
Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.			
YES	**NO**	**N/A**	
☒	☐	☐	Have you checked for illicit discharges?
☐	☒	☐	Have any been found and/or corrected? If “Yes,” please identify.
☐	☐	☒	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10				
YES	**NO**	**N/A**		
☒	☐	☐	Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?	
☒	☐	☐	Have you provided a **separately-bound** document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).	
			If "No," include a document with your submittal that addresses the following elements of an SESC Plan:	
			☐	Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
			☐	Provide Natural Buffers and Maintain Existing Vegetation
			☐	Minimize Area of Disturbance
			☐	Minimize the Disturbance of Steep Slopes
			☐	Preserve Topsoil
			☐	Stabilize Soils
			☐	Protect Storm Drain Inlets
			☐	Protect Storm Drain Outlets
			☐	Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
			☐	Establish Perimeter Controls and Sediment Barriers
			☐	Divert or Manage Run-On from Up-Gradient Areas
			☐	Properly Design Constructed Stormwater Conveyance Channels
			☐	Retain Sediment On-Site
			☐	Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
			☐	Apply Construction Activity Pollution Prevention Control Measures
			☐	Install, Inspect, and Maintain Control Measures and Take Corrective Actions
			☐	Qualified SESC Plan Preparer's Information and Certification
			☐	Operator's Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities
			☐	Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9		
Operation and Maintenance Section		
YES	**NO**	
☐	☐	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
☐	☐	Have you provided a **separately-bound** Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
☐	☐	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not?
☐	☐	Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's? If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.).
☐	☐	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If "Yes," have you obtained them? Or please explain your plan to obtain them:

☐	☐	Is stormwater being directed from public areas to private property? If "Yes," note the following: Note: This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.
Pollution Prevention Section		
☐	☒	Designated snow stockpile locations?
☐	☒	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
☐	☒	Asphalt-only based sealants?
☐	☒	Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
☐	☒	Regular sweeping? Please describe:
☐	☒	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
☐	☒	A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)			
YES	**NO**		
☒	☐		Existing and proposed drainage area delineations
☒	☐		Locations of all streams and drainage swales
☒	☐		Drainage flow paths, mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in RISDISM Appendix K)
☒	☐		Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable
☒	☐		Logs of borings and/or test pit investigations along with supporting soils/geotechnical report
☒	☐		Mapped seasonal high-water-table test pit locations
☒	☐		Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs
☒	☐		Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans
☒	☐		Mapped bedrock outcrops adjacent to any infiltration BMP
☒	☐		Soils were logged by a:
		☒	Laboratory Testing by Paul B. Aldinger and Associates, Inc.
		☒	RI-registered P.E. Name: Michael E. Russell, P.E.

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	**First Receiving Water ID or MS4**	**Area Disturbed (units)**	**Existing Impervious (units)**	**Proposed Impervious (units)**
DP-1:	RI0007035R-01	38,749 sf	0 sf	24,282 sf
DP-2:				
DP-3:				
DP-4:				
TOTALS:				

Site Construction Plans (Indicate that the following applicable specifications are provided)		
YES	**NO**	
☒	☐	Existing and proposed plans (scale not greater than 1" = 40') with North arrow
☒	☐	Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas
☒	☐	Boundaries of existing predominant vegetation and proposed limits of clearing
☒	☐	Site Location clarification
☒	☐	Location and field-verified boundaries of resource protection areas such as: ▸ freshwater and coastal wetlands, including lakes and ponds ▸ coastal shoreline features Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs)
☒	☐	All required setbacks (e.g., buffers, water-supply wells, septic systems)
☒	☐	Representative cross-section and profile drawings, and notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include: ▸ Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to RISDISM Table 5-2; ▸ Design water surface elevations (applicable storms); ▸ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.; ▸ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.); ▸ Location of floodplain and, if applicable, floodway limits and relationship of site to upstream and downstream properties or drainage that could be affected by work in the floodplain; ▸ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting
☒	☐	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables
☒	☐	Mapping of any OLRSMM-approved remedial actions/systems (including ELURs)
☒	☐	Location of existing and proposed roads, buildings, and other structures including limits of disturbance; ▸ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements; ▸ Location of existing and proposed conveyance systems, such as grass channels, swales, and storm drains, and location(s) of final discharge point(s) (wetland, waterbody, etc.); ▸ Cross sections of roadways, with edge details such as curbs and sidewalks; ▸ Location and dimensions of channel modifications, such as bridge or culvert crossings
☒	☐	Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization

Detailed Stormceptor Sizing Report – 22061 Valley Road STC-1

Project Information & Location			
Project Name	Commercial Development	**Project Number**	22061
City	Middletown	**State/ Province**	Rhode Island
Country	United States of America	**Date**	10/20/2022
Designer Information		**EOR Information (optional)**	
Name	Sarah Earle	**Name**	
Company	LDEC	**Company**	
Phone #	774-226-5434	**Phone #**	
Email	searle@sde-ldec.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	22061 Valley Road STC-1
Recommended Stormceptor Model	STC 450i
Target TSS Removal (%)	25.0
TSS Removal (%) Provided	90
PSD	Fine Distribution
Rainfall Station	PROVIDENCE WSO AIRPORT

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	90
STC 900	94
STC 1200	94
STC 1800	95
STC 2400	96
STC 3600	96
STC 4800	97
STC 6000	97
STC 7200	98
STC 11000	99
STC 13000	99
STC 16000	99

Stormceptor

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for each rainfall event, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.
Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Design Methodology

Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:

- Site parameters
- Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
- Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
- TSS load
- Detention time of the system

Hydrology Analysis
PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour). Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station			
State/Province	Rhode Island	**Total Number of Rainfall Events**	7929
Rainfall Station Name	PROVIDENCE WSO AIRPORT	**Total Rainfall (in)**	2585.3
Station ID #	6698	**Average Annual Rainfall (in)**	44.6
Coordinates	41°43'19"N, 71°25'57"W	**Total Evaporation (in)**	164.0
Elevation (ft)	51	**Total Infiltration (in)**	608.4
Years of Rainfall Data	58	**Total Rainfall that is Runoff (in)**	1812.9

Notes
• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules. • Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed. • For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

Drainage Area	
Total Area (acres)	0.24
Imperviousness %	75.9

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Water Quality Objective	
TSS Removal (%)	25.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	0.62
Water Quality Flow Rate (CFS)	0.21

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Design Details	
Stormceptor Inlet Invert Elev (ft)	73.00
Stormceptor Outlet Invert Elev (ft)	72.75
Stormceptor Rim Elev (ft)	76.50
Normal Water Level Elevation (ft)	
Pipe Diameter (in)	6
Pipe Material	HDPE - plastic
Multiple Inlets (Y/N)	No
Grate Inlet (Y/N)	Yes

Particle Size Distribution (PSD)

Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design.

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Site Name	22061 Valley Road STC-1

Site Details

Drainage Area

Total Area (acres)	0.24
Imperviousness %	75.9

Surface Characteristics

Width (ft)	204.00
Slope %	2
Impervious Depression Storage (in)	0.02
Pervious Depression Storage (in)	0.2
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Maintenance Frequency

Maintenance Frequency (months) >	12

Infiltration Parameters

Horton's equation is used to estimate infiltration

Max. Infiltration Rate (in/hr)	2.44
Min. Infiltration Rate (in/hr)	0.4
Decay Rate (1/sec)	0.00055
Regeneration Rate (1/sec)	0.01

Evaporation

Daily Evaporation Rate (in/day)	0.1

Dry Weather Flow

Dry Weather Flow (cfs)	0

Winter Months

Winter Infiltration	0

TSS Loading Parameters

TSS Loading Function	

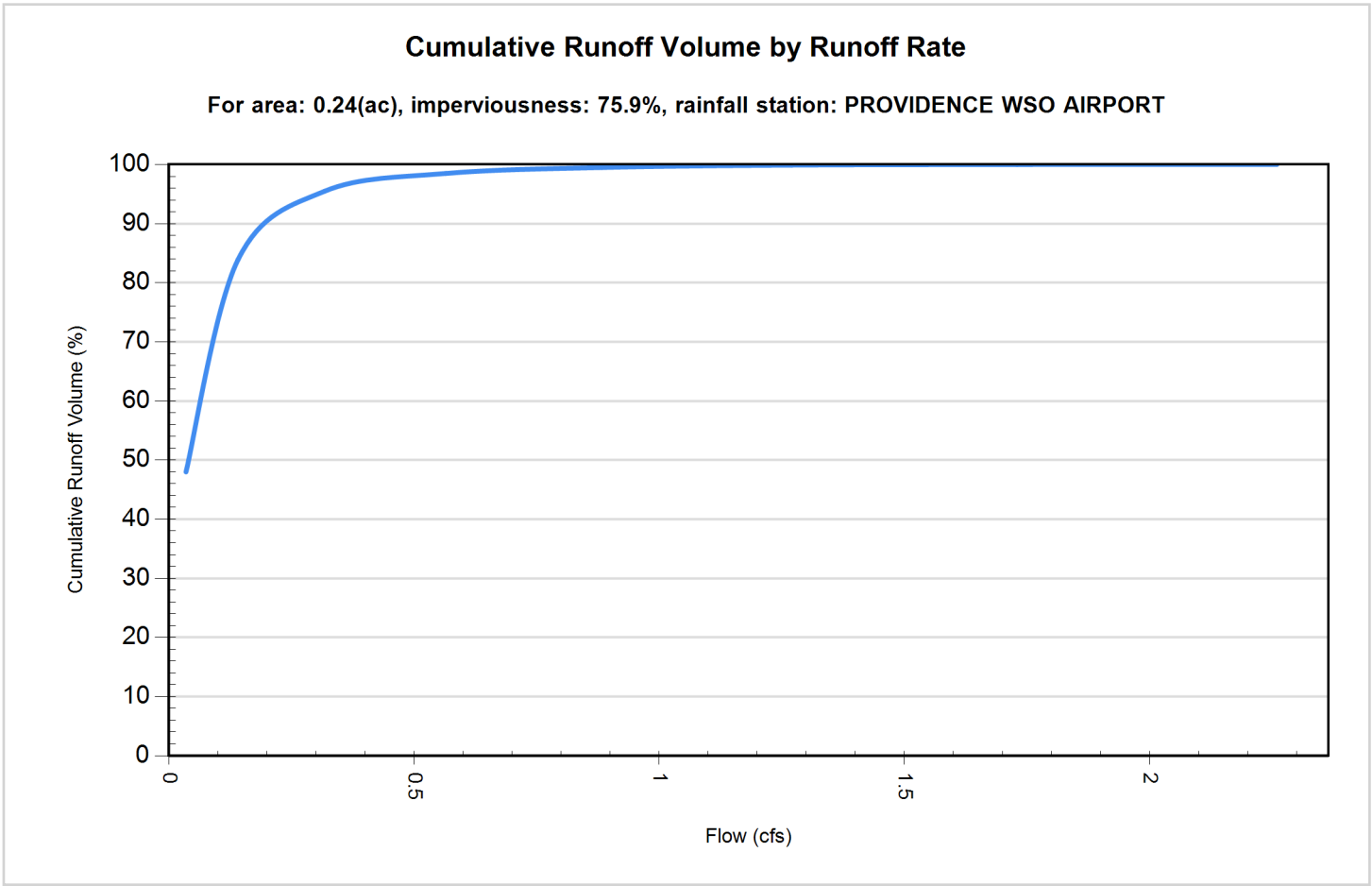
Buildup/Wash-off Parameters

Target Event Mean Conc. (EMC) mg/L	
Exponential Buildup Power	
Exponential Washoff Exponent	

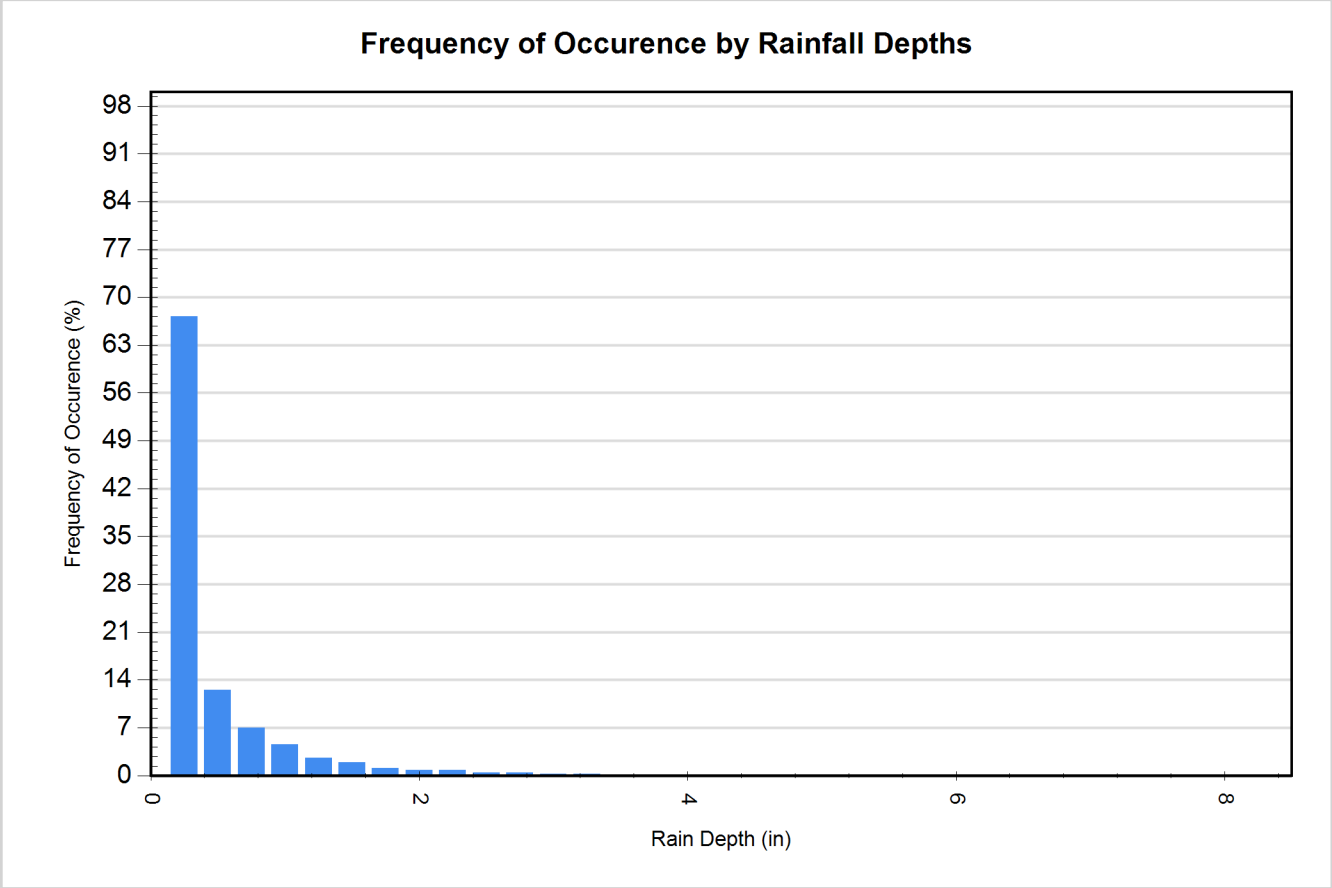
TSS Availability Parameters

Availability Constant A	
Availability Factor B	
Availability Exponent C	
Min. Particle Size Affected by Availability (micron)	

Cumulative Runoff Volume by Runoff Rate			
Runoff Rate (cfs)	**Runoff Volume (ft³)**	**Volume Over (ft³)**	**Cumulative Runoff Volume (%)**
0.035	788317	852420	48.0
0.141	1375975	264675	83.9
0.318	1566264	74392	95.5
0.565	1615736	24915	98.5
0.883	1632503	8148	99.5
1.271	1638196	2456	99.9
1.730	1640344	307	100.0
2.260	1640652	0	100.0



Rainfall Event Analysis				
Rainfall Depth (in)	**No. of Events**	**Percentage of Total Events (%)**	**Total Volume (in)**	**Percentage of Annual Volume (%)**
0.25	5329	67.2	356	13.8
0.50	990	12.5	359	13.9
0.75	553	7.0	344	13.3
1.00	362	4.6	319	12.4
1.25	207	2.6	232	9.0
1.50	151	1.9	208	8.0
1.75	91	1.1	148	5.7
2.00	64	0.8	120	4.6
2.25	60	0.8	128	4.9
2.50	29	0.4	69	2.7
2.75	34	0.4	89	3.5
3.00	16	0.2	46	1.8
3.25	15	0.2	47	1.8
3.50	9	0.1	30	1.2
3.75	4	0.1	14	0.6
4.00	1	0.0	4	0.2
4.25	4	0.1	17	0.6
4.50	3	0.0	13	0.5
4.75	0	0.0	0	0.0
5.00	3	0.0	15	0.6
5.25	1	0.0	5	0.2
5.50	0	0.0	0	0.0
5.75	0	0.0	0	0.0
6.00	0	0.0	0	0.0
6.25	0	0.0	0	0.0
6.50	0	0.0	0	0.0
6.75	1	0.0	7	0.3
7.00	0	0.0	0	0.0
7.25	0	0.0	0	0.0
7.50	1	0.0	7	0.3
7.75	0	0.0	0	0.0
8.00	0	0.0	0	0.0
8.25	1	0.0	8	0.3
8.25	0	0.0	0	0.0



For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

30 0 15 30 60

SCALE: 1 INCH = 30 FEET

WATERSHED LEGEND

A → B START → END — Tc–FLOWPATH PRE–DEVELOPMENT

PRE–DEVELOPMENT SUBCATCHMENT BOUNDARY

1 — SUBCATCHMENT AREA

1 — POND / STRUCTURE

1 — REACH / CHANNEL

RHODE ISLAND S.P.

N/F
SACHUEST HOLDINGS, LLC
MAP 107SE PARCEL 1030

BIT. CONC. PARKING LOT

EDGE OF PAVEMENT

N19°03'00"W
10.81'
TIE TO DH (Fnd)

TP–1

TP–2

eS1

eA1
Analysis Pt.

N/F
KVH INDUSTRIES, INC.
MAP 113 PARCEL 15F

N/F
MIDDLETOWN ASSOCIATES, LLC.
MAP 113 PARCEL 15A

VALLEY ROAD
(STATE HIGHWAY PLAT NO. 1176 & 2558)
(ROUTE 214)

CONCRETE SIDEWALK
CONCRETE CURB
CONCRETE SIDEWALK
CONCRETE CURB

BIT. CONC. DRIVEWAY

LANDSCAPE TIMBER CHECK DAM (TYP.)

EDGE OF PAVEMENT

EDGE OF PAVEMENT

BIT. CONC. PARKING LOT

0.60'
0.35'

DATE: OCTOBER 20, 2022
REV. DATE:
PROJ.#: 22061
SCALE : 1" = 30'
DRAWN BY: SJE
CHECK BY: MER
ISSUED FOR : PERMITTING
PREPARED FOR: GOLD'S WINE & SPIRITS, LLC.

PRE DEVELOPMENT WATERSHED PLAN

48 VALLEY ROAD
MIDDLETOWN, RHODE ISLAND

ASSESSORS MAP 107SE, PARCEL 103B

207 High Point Avenue, Unit 6
Portsmouth, RI 02871
T: 401-354-2050
F: 401-369-9775
WWW.SDE-LDEC.COM

LDEC
Land Development, Engineering & Consulting, LLC

30 0 15 30 60

SCALE: 1 INCH = 30 FEET

WATERSHED LEGEND

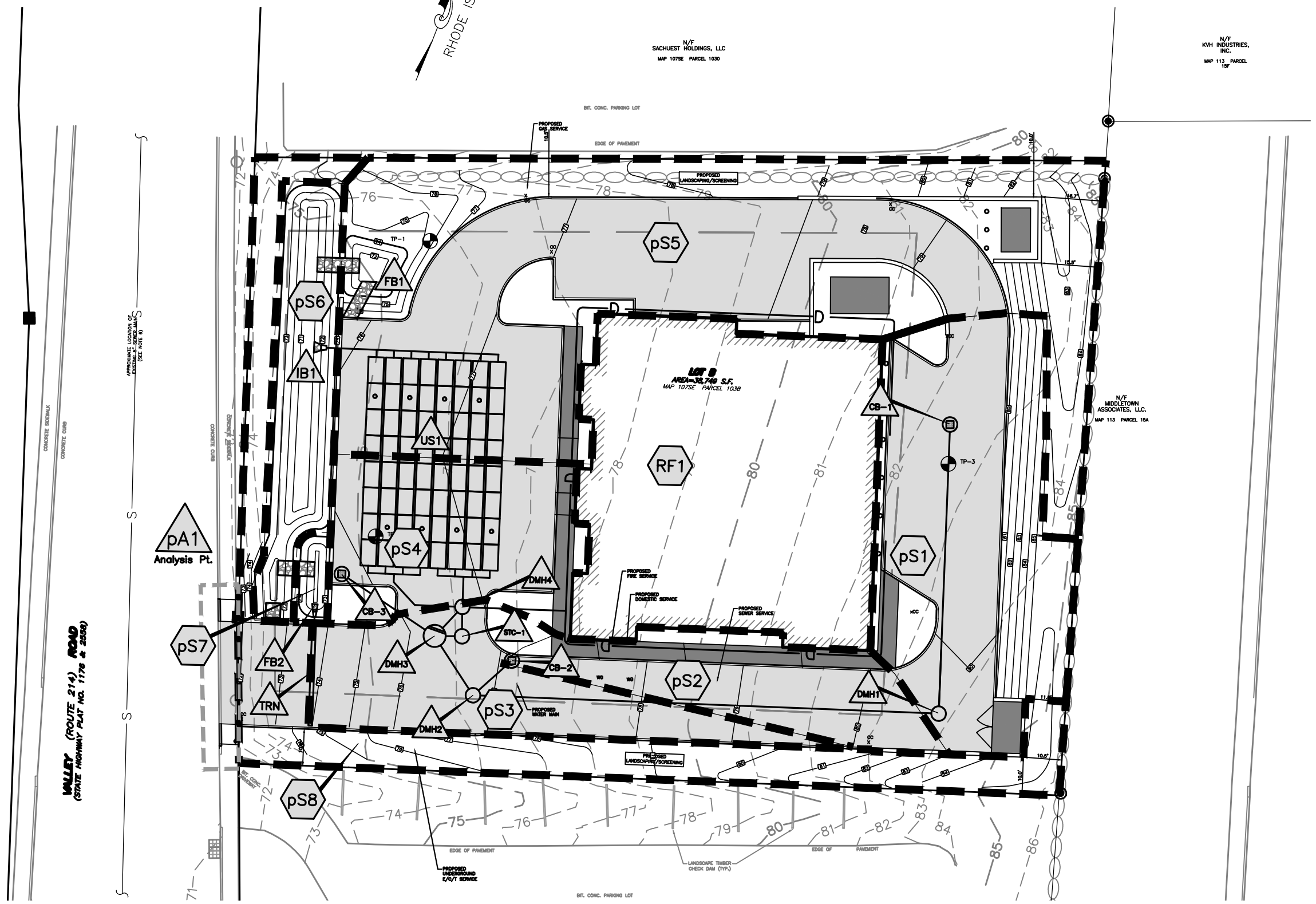
A START → B END — Tc–FLOWPATH POST–DEVELOPMENT

POSTE–DEVELOPMENT SUBCATCHMENT BOUNDARY

1 — SUBCATCHMENT AREA

1 — POND / STRUCTURE

1 — REACH / CHANNEL



DATE: OCTOBER 20, 2022 | REV. DATE:

PROJ.#: 22061 | SCALE : 1" = 30' | DRAWN BY: SJE | CHECK BY: MER

ISSUED FOR : PERMITTING

PREPARED FOR: GOLD'S WINE & SPIRITS, LLC.

POST DEVELOPMENT WATERSHED PLAN

48 VALLEY ROAD
MIDDLETOWN, RHODE ISLAND

ASSESSORS MAP 107SE, PARCEL 103B

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LDEC
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