STORMWATER ANALYSIS & CALCULATIONS

for

COUNCIL ON AGING COMMUNITY CENTER
8 ANDREW AVENUE
WAYLAND, MASSACHUSETTS

Prepared for:

Town of Wayland
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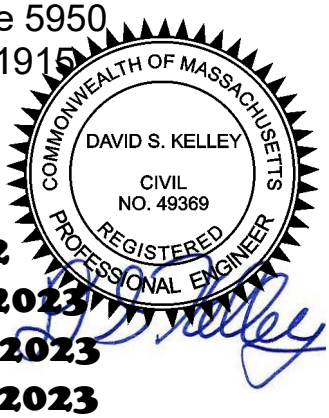

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MERIDIAN ASSOCIATES

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- TR 20 SCS Unit Hydrograph Procedure
- Runoff Curve Numbers
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SOURCE OF DATA

- Technical Report No. 20
- Technical Report No. 55
- Field Survey and Soil Testing by Meridian Associates
- Northeast Regional Climate Center
- Massachusetts Stormwater Management Handbook, February 2008

REPORT SUMMARY:

Calculation Objectives

The objective of these calculations is to document that the proposed project described in the Stormwater Management Report does not result in flooding down gradient of the site. The analysis is separated into existing and proposed conditions. Drainage plans have been incorporated into this report to depict pre and post development drainage conditions.

Selection of Storm Events

The storm events have been taken from Northeast Regional Climate Center "Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada". Rainfall frequency data has been provided as follows:

Frequency (Years)	Rainfall [24-Hour Event (inches)]
2	3.14
10	4.70
25	5.91
100	8.39

Classification of Soils

Based on soil maps provided by the Natural Resources Conservation Service the project site is mostly urban land with a small portion of saco mucky silt loam. Urban land doesn't have a hydrologic soil group rating but soil testing found that the soil is similar to a hydrologic soil group rating of B. Saco mucky silt loam has a hydrologic soil group rating of B. Refer to the hydrologic soil group report in the appendix.

Hydrologic soil groups are assigned to each soil type by the NRCS based on their potential rate of water infiltration when soils are not protected by vegetation, are thoroughly wet and receive precipitation from long duration storms.

Existing Conditions Overview

The former Raytheon facility in Wayland occupied approximately 83 acres of land at 430 Boston Post Road from circa 1955 through 1996. It was developed into the 'Wayland Town Center' between 2012 and 2015. The subject property is located at 8 Andrew Avenue and is located within the "Wayland Town Center'. The subject property includes four (4) individual parcels with a combined total area of approximately 4.16 acres The project site previously contained two buildings used for radar equipment testing. The buildings were demolished in 1999 and the current 12,759 sf building was constructed in 2000. The intention was to use this building as a daycare center for the tenants of Raytheon's former main building but the building was never completed or occupied. The

unoccupied building is connected to sanitary sewer, domestic and fire water services, natural gas, electric, telephone and data service connections.

The project site also includes several easements for existing sanitary sewer and stormwater drainage utilities. The western portion of the project site is adjacent to the Sudbury River and the one hundred (100) foot and two hundred (200) foot riverfront Riparian Zones extend onto the site. There are bordering vegetated wetlands downhill of the project site adjacent to the Sudbury River and there is a small area of bordering vegetated wetlands between the building and the Boston Post Road. A portion of the project site contains priority habitats of rare species as mapped by Natural Heritage and is partially located within the one hundred (100) year flood plain. Per the Town of Wayland Zoning Map, the project site is located within the Limited Commercial District Zoning District and the Aquifer Protection District (Zone IIs Wellhead Protection Area).

The topography on the eastern and northern portions of the project site gradually slopes towards the Sudbury River while the topography west of the building slopes more steeply towards the Sudbury River. The area surrounding the building and to the west towards the Sudbury River contains woods. The area on the eastern and northern portions of the project site is covered by grass. There is an existing drainage basin between the project site and the Boston Post Road that collects the stormwater runoff flowing from the Boston Post Road.

For the purpose of analyzing existing and proposed stormwater runoff, one design point has been designated for comparison.

Existing Design Points and Subcatchment Areas

Design Point #1 is located in the northwest portion of the property adjacent to the bordering vegetated wetlands and the Sudbury River. The subcatchment area includes the majority of the property and the uphill areas adjacent to Andrew Avenue and Lillian Way.

Proposed Conditions Overview

The Town of Wayland is proposing renovations and additions to the existing unoccupied building and other improvements including parking areas, sidewalks that connect to Andrew Avenue and Lillian Way, patios, stormwater management system, site grading, utility connections, stone dust walkways, landscaping, hardscaping and site lighting.

The project site utilizes several different stormwater management techniques. There are proposed deep sump hooded catch basins, proprietary filter media unit and subsurface infiltration facility that will be used for the treatment, recharge and mitigation of the stormwater runoff.

Proposed Stormwater Management Techniques

Subsurface Infiltration Facility:

A subsurface infiltration facility has been incorporated into this design to provide mitigation and recharge of the stormwater runoff from the proposed parking lots, sidewalks, patios, stone dust walkways, concrete pads, grassed and landscaped areas. The facility consists of plastic chambers with open bottoms placed on a bed of stone. The chambers are constructed to store the stormwater runoff temporarily to allow it to infiltrate into the underlying soil. During the larger storm events stormwater runoff does discharge from the facility. A TSS removal rate of 80% is achieved by this BMP.

Deep Sump Hooded Catchbasin:

Similar to an ordinary catchbasin but fitted with an outlet hood to separate floatables such as oil, grease, trash and debris. They also have four-foot deep sumps that promote settling of suspended solids. The catchbasins are pretreating the stormwater runoff from the paved impervious areas. A TSS removal rate of 25% is achieved by this BMP.

Filter Media Unit:

Media units are typically two-chambered underground concrete vaults designed to reduce both TSS and other pollutants. The first chamber is usually a pretreatment settling basin. The second chamber is a filler bed containing either sand or other filtering media or an array of media-containing cartridge filters. After larger particles settle out in the first chamber, stormwater flows through the specific filter media in the second chamber, and a portion of the target pollutants are sorbed to the filter media. The media unit is designed to remove 50% minimum total phosphorous and 44% minimum TSS from the stormwater runoff. See product descriptions in the Appendix of this report.

Proposed Design Points and Subcatchment Areas

Design Point #1 is located in the northwest portion of the property adjacent to the bordering vegetated wetlands and the Sudbury River. The subcatchment areas include the majority of the property and the uphill areas adjacent to Andrew Avenue and Lillian Way.

Proposed Storm Drain Line Analysis

The storm drain lines have been analyzed in HydroCAD and are sized and designed for the 25 year storm event, but they are capable of handling the flow and volumes of the 100 year storm event.

Summary of Flows at Design Point #1

A detailed analysis of the existing and proposed subcatchment areas reaches and ponds are included in the HydroCAD analysis section of this report.

Peak Flow Rates Design Point #1

Storm Event	Existing Conditions (Pre) Peak Flow (CFS)	Proposed Conditions (Post) Peak Flow (CFS)
1 Inch	0.0	0.0
2-Year (3.14 in/hr)	1.0	0.9
10-Year (4.70 in/hr)	4.1	3.1
25-Year (5.91 in/hr)	7.2	5.2
100-Year (8.39 in/hr)	14.7	11.9

Peak Volumes Design Point #1

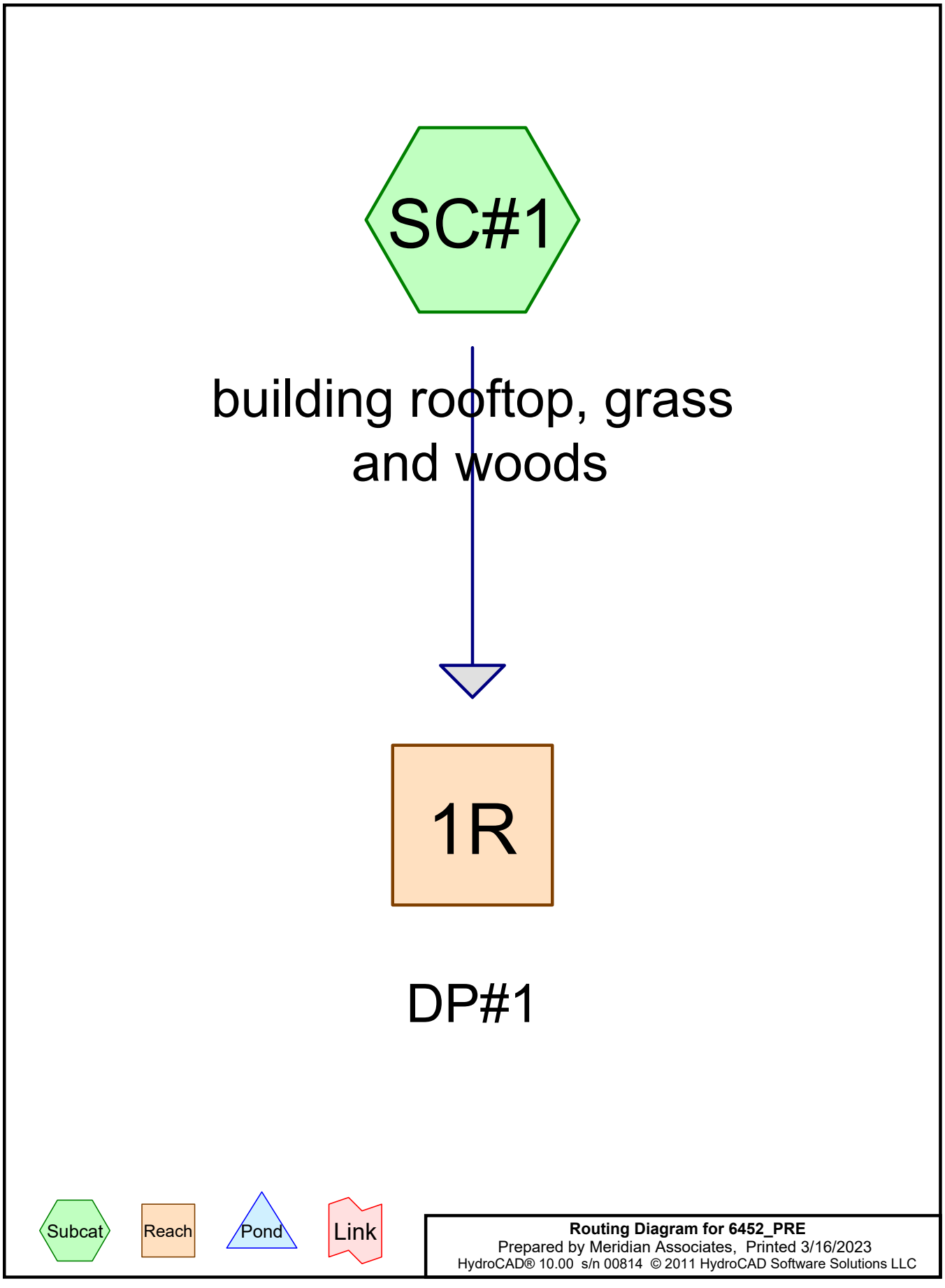
Storm Event	Existing Conditions (Pre) Peak Volume (Acre-feet)	Proposed Conditions (Post) Peak Volume (Acre-feet)
1 Inch	0.00	0.00
2-Year (3.14 in/hr)	0.15	0.10
10-Year (4.70 in/hr)	0.41	0.25
25-Year (5.91 in/hr)	0.68	0.43
100-Year (8.39 in/hr)	1.30	0.98

Conclusion

The peak stormwater runoff rates and volumes are matched or reduced for the design point. We can therefore anticipate no adverse impacts or downstream flooding with the completion of this project.

STORMWATER ANALYSIS

EXISTING CONDITIONS
WATERSHED ROUTING DIAGRAM



Routing Diagram for 6452_PRE
Prepared by Meridian Associates, Printed 3/16/2023

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
81,112	55	Woods, Good, HSG B (SC#1)
89,447	61	>75% Grass cover, Good, HSG B (SC#1)
278	98	Concrete walkways & pads, HSG B (SC#1)
10,683	98	Roofs, HSG B (SC#1)
181,520	**61**	**TOTAL AREA**

EXISTING CONDITIONS
1-INCH STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
*	20,504	55	Woods, Good, HSG B
	181,520	61	Weighted Average
	170,559		93.96% Pervious Area
	10,961		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 6.04% Impervious, Inflow Depth = 0.00" for 1 inch storm event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
2-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 1.0 cfs @ 12.26 hrs, Volume= 6,349 cf, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
*	20,504	55	Woods, Good, HSG B
	181,520	61	Weighted Average
	170,559		93.96% Pervious Area
	10,961		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 6.04% Impervious, Inflow Depth = 0.42" for 2 year storm event
Inflow = 1.0 cfs @ 12.26 hrs, Volume= 6,349 cf
Outflow = 1.0 cfs @ 12.26 hrs, Volume= 6,349 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
10-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 4.1 cfs @ 12.19 hrs, Volume= 18,041 cf, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
*	20,504	55	Woods, Good, HSG B
	181,520	61	Weighted Average
	170,559		93.96% Pervious Area
	10,961		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 6.04% Impervious, Inflow Depth = 1.19" for 10 year storm event
Inflow = 4.1 cfs @ 12.19 hrs, Volume= 18,041 cf
Outflow = 4.1 cfs @ 12.19 hrs, Volume= 18,041 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
25-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 7.2 cfs @ 12.18 hrs, Volume= 29,429 cf, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
*	20,504	55	Woods, Good, HSG B
	181,520	61	Weighted Average
	170,559		93.96% Pervious Area
	10,961		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 6.04% Impervious, Inflow Depth = 1.95" for 25 year storm event
Inflow = 7.2 cfs @ 12.18 hrs, Volume= 29,429 cf
Outflow = 7.2 cfs @ 12.18 hrs, Volume= 29,429 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
100-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 14.7 cfs @ 12.17 hrs, Volume= 56,644 cf, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
*	20,504	55	Woods, Good, HSG B
	181,520	61	Weighted Average
	170,559		93.96% Pervious Area
	10,961		6.04% Impervious Area

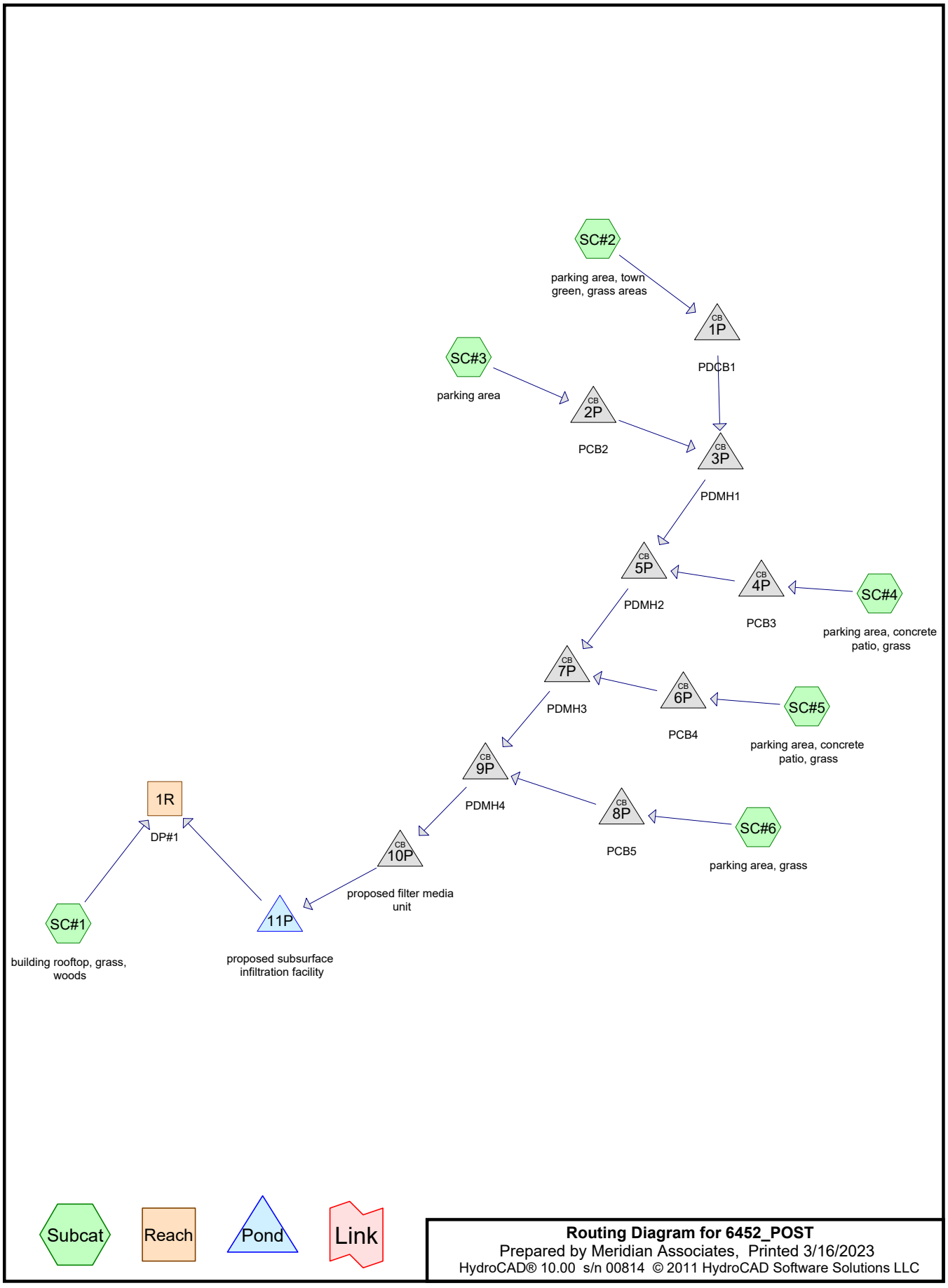
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 6.04% Impervious, Inflow Depth = 3.74" for 100 year storm event
Inflow = 14.7 cfs @ 12.17 hrs, Volume= 56,644 cf
Outflow = 14.7 cfs @ 12.17 hrs, Volume= 56,644 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

PROPOSED CONDITIONS
WATERSHED ROUTING DIAGRAM



Routing Diagram for 6452_POST
Prepared by Meridian Associates, Printed 3/16/2023

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
54,850	55	Woods, Good, HSG B (SC#1)
58,729	61	>75% Grass cover, Good, HSG B (SC#1, SC#2, SC#3, SC#4, SC#5, SC#6)
1,700	86	Geo-Grid Fire Road, HSG B (SC#1)
1,030	96	Pervious paver patio, HSG B (SC#1)
1,015	96	Stone dust walkway, HSG B (SC#1, SC#4)
225	98	Concrete equip. pads, HSG B (SC#1)
3,380	98	Concrete sidewalk, HSG B (SC#2, SC#3, SC#4, SC#5)
900	98	Future classroom, HSG B (SC#4)
46,350	98	Paved parking, HSG B (SC#2, SC#3, SC#4, SC#5, SC#6)
12,666	98	Roofs Proposed and Future, HSG B (SC#1)
675	98	Roofs, HSG B (SC#4, SC#5, SC#6)
181,520	**73**	**TOTAL AREA**

PROPOSED CONDITIONS
1-INCH STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
*	12,666	98	Roofs Proposed and Future, HSG B
*	225	98	Concrete equip. pads, HSG B
*	850	96	Stone dust walkway, HSG B
*	1,030	96	Pervious paver patio, HSG B
*	1,700	86	Geo-Grid Fire Road, HSG B
	24,214	61	>75% Grass cover, Good, HSG B
	54,850	55	Woods, Good, HSG B
	95,535	64	Weighted Average
	82,644		86.51% Pervious Area
	12,891		13.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods**
					Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, town green, grass areas

Runoff = 0.0 cfs @ 12.32 hrs, Volume= 249 cf, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	17,050	98	Paved parking, HSG B
*	975	98	Concrete sidewalk, HSG B
	17,795	61	>75% Grass cover, Good, HSG B
	35,820	80	Weighted Average
	17,795		49.68% Pervious Area
	18,025		50.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.3	50	0.0250	2.5		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
1.0	165	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	265	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 0.1 cfs @ 12.10 hrs, Volume= 231 cf, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	5,820	98	Paved parking, HSG B
*	405	98	Concrete sidewalk, HSG B
	1,495	61	>75% Grass cover, Good, HSG B
	7,720	91	Weighted Average
	1,495		19.37% Pervious Area
	6,225		80.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, concrete patio, grass

Runoff = 0.0 cfs @ 12.36 hrs, Volume= 145 cf, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	9,615	98	Paved parking, HSG B
*	1,425	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
*	900	98	Future classroom, HSG B
*	165	96	Stone dust walkway, HSG B
	12,460	61	>75% Grass cover, Good, HSG B
	24,830	79	Weighted Average
	12,625		50.85% Pervious Area
	12,205		49.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass**
					Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, concrete patio, grass

Runoff = 0.1 cfs @ 12.10 hrs, Volume= 235 cf, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	4,950	98	Paved parking, HSG B
*	575	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
	1,210	61	>75% Grass cover, Good, HSG B
	7,000	92	Weighted Average
	1,210		17.29% Pervious Area
	5,790		82.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area**
					Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 0.1 cfs @ 12.10 hrs, Volume= 398 cf, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

Area (sf)	CN	Description
8,915	98	Paved parking, HSG B
145	98	Roofs, HSG B
1,555	61	>75% Grass cover, Good, HSG B
10,615	93	Weighted Average
1,555		14.65% Pervious Area
9,060		85.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 35.37% Impervious, Inflow Depth = 0.00" for 1 inch storm event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 35,820 sf, 50.32% Impervious, Inflow Depth = 0.08" for 1 inch storm event
Inflow = 0.0 cfs @ 12.32 hrs, Volume= 249 cf
Outflow = 0.0 cfs @ 12.32 hrs, Volume= 249 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.32 hrs, Volume= 249 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.39' @ 12.32 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.30'	**15.0" Round drain line** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.30' / 121.90' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.0 cfs @ 12.32 hrs HW=122.39' TW=121.93' (Dynamic Tailwater)
↑**1=drain line** (Barrel Controls 0.0 cfs @ 1.1 fps)

Summary for Pond 2P: PCB2

Inflow Area = 7,720 sf, 80.63% Impervious, Inflow Depth = 0.36" for 1 inch storm event
Inflow = 0.1 cfs @ 12.10 hrs, Volume= 231 cf
Outflow = 0.1 cfs @ 12.10 hrs, Volume= 231 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.10 hrs, Volume= 231 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.14' @ 12.10 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.10 hrs HW=122.14' TW=121.94' (Dynamic Tailwater)
↑**1=drain line** (Barrel Controls 0.1 cfs @ 1.6 fps)

Summary for Pond 3P: PDMH1

Inflow Area = 43,540 sf, 55.70% Impervious, Inflow Depth = 0.13" for 1 inch storm event
Inflow = 0.1 cfs @ 12.12 hrs, Volume= 480 cf
Outflow = 0.1 cfs @ 12.12 hrs, Volume= 480 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.12 hrs, Volume= 480 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.95' @ 12.12 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.12 hrs HW=121.94' TW=121.24' (Dynamic Tailwater)
↑**1=drain line** (Outlet Controls 0.1 cfs @ 1.5 fps)

Summary for Pond 4P: PCB3

Inflow Area = 24,830 sf, 49.15% Impervious, Inflow Depth = 0.07" for 1 inch storm event
Inflow = 0.0 cfs @ 12.36 hrs, Volume= 145 cf
Outflow = 0.0 cfs @ 12.36 hrs, Volume= 145 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 12.36 hrs, Volume= 145 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.28' @ 12.34 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.36 hrs HW=121.28' TW=121.23' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 0.0 cfs @ 0.8 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 68,370 sf, 53.32% Impervious, Inflow Depth = 0.11" for 1 inch storm event
Inflow = 0.1 cfs @ 12.14 hrs, Volume= 625 cf
Outflow = 0.1 cfs @ 12.14 hrs, Volume= 625 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.14 hrs, Volume= 625 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.24' @ 12.14 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.10'	**18.0" Round drain line** L= 170.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.10' / 120.10' S= 0.0059 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.1 cfs @ 12.14 hrs HW=121.24' TW=120.19' (Dynamic Tailwater)
↑—**1=drain line** (Barrel Controls 0.1 cfs @ 1.6 fps)

Summary for Pond 6P: PCB4

Inflow Area = 7,000 sf, 82.71% Impervious, Inflow Depth = 0.40" for 1 inch storm event
Inflow = 0.1 cfs @ 12.10 hrs, Volume= 235 cf
Outflow = 0.1 cfs @ 12.10 hrs, Volume= 235 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.10 hrs, Volume= 235 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.34' @ 12.10 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.10 hrs HW=120.33' TW=120.19' (Dynamic Tailwater)
1=drain line (Barrel Controls 0.1 cfs @ 1.7 fps)

Summary for Pond 7P: PDMH3

Inflow Area = 75,370 sf, 56.05% Impervious, Inflow Depth = 0.14" for 1 inch storm event
Inflow = 0.2 cfs @ 12.11 hrs, Volume= 860 cf
Outflow = 0.2 cfs @ 12.11 hrs, Volume= 860 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.2 cfs @ 12.11 hrs, Volume= 860 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.19' @ 12.12 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=0.2 cfs @ 12.11 hrs HW=120.19' TW=120.01' (Dynamic Tailwater)
1=drain line (Outlet Controls 0.2 cfs @ 1.6 fps)

Summary for Pond 8P: PCB5

Inflow Area = 10,615 sf, 85.35% Impervious, Inflow Depth = 0.45" for 1 inch storm event
Inflow = 0.1 cfs @ 12.10 hrs, Volume= 398 cf
Outflow = 0.1 cfs @ 12.10 hrs, Volume= 398 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.10 hrs, Volume= 398 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.30' @ 12.10 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.10 hrs HW=120.29' TW=120.01' (Dynamic Tailwater)
1=drain line (Outlet Controls 0.1 cfs @ 1.7 fps)

Summary for Pond 9P: PDMH4

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 0.18" for 1 inch storm event
Inflow = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf
Outflow = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.02' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=0.3 cfs @ 12.11 hrs HW=120.01' TW=119.88' (Dynamic Tailwater)
1=drain line (Barrel Controls 0.3 cfs @ 1.8 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 0.18" for 1 inch storm event
Inflow = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf
Outflow = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 119.89' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=0.3 cfs @ 12.11 hrs HW=119.88' TW=119.00' (Dynamic Tailwater)
1=drain line (Barrel Controls 0.3 cfs @ 1.8 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 0.18" for 1 inch storm event
Inflow = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf
Outflow = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.3 cfs @ 12.11 hrs, Volume= 1,258 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 119.00' @ 0.00 hrs Surf.Area= 5,592 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (880.9 - 880.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.0 cfs @ 12.11 hrs HW=119.00' (Free Discharge)
↑—**3=Exfiltration** (Passes 0.0 cfs of 1.1 cfs potential flow)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
↑—**1=drain line** (Controls 0.0 cfs)
↑—**2=Orifice** (Controls 0.0 cfs)

PROPOSED CONDITIONS
2-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 0.9 cfs @ 12.14 hrs, Volume= 4,231 cf, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
*	12,666	98	Roofs Proposed and Future, HSG B
*	225	98	Concrete equip. pads, HSG B
*	850	96	Stone dust walkway, HSG B
*	1,030	96	Pervious paver patio, HSG B
*	1,700	86	Geo-Grid Fire Road, HSG B
	24,214	61	>75% Grass cover, Good, HSG B
	54,850	55	Woods, Good, HSG B
	95,535	64	Weighted Average
	82,644		86.51% Pervious Area
	12,891		13.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods**
					Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, town green, grass areas

Runoff = 1.3 cfs @ 12.10 hrs, Volume= 4,048 cf, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	17,050	98	Paved parking, HSG B
*	975	98	Concrete sidewalk, HSG B
	17,795	61	>75% Grass cover, Good, HSG B
	35,820	80	Weighted Average
	17,795		49.68% Pervious Area
	18,025		50.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.3	50	0.0250	2.5		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
1.0	165	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	265	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,417 cf, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	5,820	98	Paved parking, HSG B
*	405	98	Concrete sidewalk, HSG B
	1,495	61	>75% Grass cover, Good, HSG B
	7,720	91	Weighted Average
	1,495		19.37% Pervious Area
	6,225		80.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, concrete patio, grass

Runoff = 0.8 cfs @ 12.10 hrs, Volume= 2,673 cf, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	9,615	98	Paved parking, HSG B
*	1,425	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
*	900	98	Future classroom, HSG B
*	165	96	Stone dust walkway, HSG B
	12,460	61	>75% Grass cover, Good, HSG B
	24,830	79	Weighted Average
	12,625		50.85% Pervious Area
	12,205		49.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass**
					Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, concrete patio, grass

Runoff = 0.4 cfs @ 12.09 hrs, Volume= 1,338 cf, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	4,950	98	Paved parking, HSG B
*	575	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
	1,210	61	>75% Grass cover, Good, HSG B
	7,000	92	Weighted Average
	1,210		17.29% Pervious Area
	5,790		82.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area**
					Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 0.6 cfs @ 12.09 hrs, Volume= 2,113 cf, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

Area (sf)	CN	Description
8,915	98	Paved parking, HSG B
145	98	Roofs, HSG B
1,555	61	>75% Grass cover, Good, HSG B
10,615	93	Weighted Average
1,555		14.65% Pervious Area
9,060		85.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 35.37% Impervious, Inflow Depth = 0.28" for 2 year storm event
Inflow = 0.9 cfs @ 12.14 hrs, Volume= 4,231 cf
Outflow = 0.9 cfs @ 12.14 hrs, Volume= 4,231 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 35,820 sf, 50.32% Impervious, Inflow Depth = 1.36" for 2 year storm event
Inflow = 1.3 cfs @ 12.10 hrs, Volume= 4,048 cf
Outflow = 1.3 cfs @ 12.10 hrs, Volume= 4,048 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.10 hrs, Volume= 4,048 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.92' @ 12.11 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.30'	**15.0" Round drain line** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.30' / 121.90' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.2 cfs @ 12.10 hrs HW=122.92' TW=122.49' (Dynamic Tailwater)
1=drain line (Outlet Controls 1.2 cfs @ 2.8 fps)

Summary for Pond 2P: PCB2

Inflow Area = 7,720 sf, 80.63% Impervious, Inflow Depth = 2.20" for 2 year storm event
Inflow = 0.4 cfs @ 12.09 hrs, Volume= 1,417 cf
Outflow = 0.4 cfs @ 12.09 hrs, Volume= 1,417 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.09 hrs, Volume= 1,417 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.54' @ 12.14 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.09 hrs HW=122.48' TW=122.48' (Dynamic Tailwater)
1=drain line (Outlet Controls 0.1 cfs @ 0.4 fps)

Summary for Pond 3P: PDMH1

Inflow Area = 43,540 sf, 55.70% Impervious, Inflow Depth = 1.51" for 2 year storm event
Inflow = 1.7 cfs @ 12.09 hrs, Volume= 5,464 cf
Outflow = 1.7 cfs @ 12.09 hrs, Volume= 5,464 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.09 hrs, Volume= 5,464 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.49' @ 12.11 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=1.6 cfs @ 12.09 hrs HW=122.49' TW=121.89' (Dynamic Tailwater)
1=drain line (Outlet Controls 1.6 cfs @ 2.9 fps)

Summary for Pond 4P: PCB3

Inflow Area = 24,830 sf, 49.15% Impervious, Inflow Depth = 1.29" for 2 year storm event
Inflow = 0.8 cfs @ 12.10 hrs, Volume= 2,673 cf
Outflow = 0.8 cfs @ 12.10 hrs, Volume= 2,673 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.10 hrs, Volume= 2,673 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.96' @ 12.14 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.4 cfs @ 12.10 hrs HW=121.92' TW=121.90' (Dynamic Tailwater)
1=drain line (Outlet Controls 0.4 cfs @ 0.9 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 68,370 sf, 53.32% Impervious, Inflow Depth = 1.43" for 2 year storm event
Inflow = 2.5 cfs @ 12.10 hrs, Volume= 8,137 cf
Outflow = 2.5 cfs @ 12.10 hrs, Volume= 8,137 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.10 hrs, Volume= 8,137 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.90' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.10'	**18.0" Round drain line** L= 170.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.10' / 120.10' S= 0.0059 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=2.4 cfs @ 12.10 hrs HW=121.89' TW=120.94' (Dynamic Tailwater)
1=drain line (Outlet Controls 2.4 cfs @ 3.6 fps)

Summary for Pond 6P: PCB4

Inflow Area = 7,000 sf, 82.71% Impervious, Inflow Depth = 2.29" for 2 year storm event
Inflow = 0.4 cfs @ 12.09 hrs, Volume= 1,338 cf
Outflow = 0.4 cfs @ 12.09 hrs, Volume= 1,338 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.09 hrs, Volume= 1,338 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.98' @ 12.18 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=120.82' TW=120.92' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 75,370 sf, 56.05% Impervious, Inflow Depth = 1.51" for 2 year storm event
Inflow = 3.0 cfs @ 12.09 hrs, Volume= 9,475 cf
Outflow = 3.0 cfs @ 12.09 hrs, Volume= 9,475 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.0 cfs @ 12.09 hrs, Volume= 9,475 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.97' @ 12.14 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=2.2 cfs @ 12.09 hrs HW=120.93' TW=120.79' (Dynamic Tailwater)
1=drain line (Outlet Controls 2.2 cfs @ 2.2 fps)

Summary for Pond 8P: PCB5

Inflow Area = 10,615 sf, 85.35% Impervious, Inflow Depth = 2.39" for 2 year storm event
Inflow = 0.6 cfs @ 12.09 hrs, Volume= 2,113 cf
Outflow = 0.6 cfs @ 12.09 hrs, Volume= 2,113 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.09 hrs, Volume= 2,113 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.85' @ 12.16 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=120.76' TW=120.78' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 1.62" for 2 year storm event
Inflow = 3.6 cfs @ 12.09 hrs, Volume= 11,588 cf
Outflow = 3.6 cfs @ 12.09 hrs, Volume= 11,588 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.09 hrs, Volume= 11,588 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.81' @ 12.12 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=3.0 cfs @ 12.09 hrs HW=120.79' TW=120.61' (Dynamic Tailwater)
1=drain line (Outlet Controls 3.0 cfs @ 2.7 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 1.62" for 2 year storm event
Inflow = 3.6 cfs @ 12.09 hrs, Volume= 11,588 cf
Outflow = 3.6 cfs @ 12.09 hrs, Volume= 11,588 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.09 hrs, Volume= 11,588 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.62' @ 12.09 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=3.5 cfs @ 12.09 hrs HW=120.61' TW=119.38' (Dynamic Tailwater)
1=drain line (Barrel Controls 3.5 cfs @ 3.4 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 1.62" for 2 year storm event
Inflow = 3.6 cfs @ 12.09 hrs, Volume= 11,588 cf
Outflow = 1.1 cfs @ 12.00 hrs, Volume= 11,594 cf, Atten= 70%, Lag= 0.0 min
Discarded = 1.1 cfs @ 12.00 hrs, Volume= 11,594 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 119.68' @ 12.45 hrs Surf.Area= 5,592 sf Storage= 2,012 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.2 min (834.3 - 825.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 12.00 hrs HW=119.09' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
↑—**1=drain line** (Controls 0.0 cfs)
↑—**2=Orifice** (Controls 0.0 cfs)

PROPOSED CONDITIONS
10-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 3.1 cfs @ 12.12 hrs, Volume= 11,060 cf, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
*	12,666	98	Roofs Proposed and Future, HSG B
*	225	98	Concrete equip. pads, HSG B
*	850	96	Stone dust walkway, HSG B
*	1,030	96	Pervious paver patio, HSG B
*	1,700	86	Geo-Grid Fire Road, HSG B
	24,214	61	>75% Grass cover, Good, HSG B
	54,850	55	Woods, Good, HSG B
	95,535	64	Weighted Average
	82,644		86.51% Pervious Area
	12,891		13.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods**
					Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, town green, grass areas

Runoff = 2.5 cfs @ 12.09 hrs, Volume= 7,859 cf, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	17,050	98	Paved parking, HSG B
*	975	98	Concrete sidewalk, HSG B
	17,795	61	>75% Grass cover, Good, HSG B
	35,820	80	Weighted Average
	17,795		49.68% Pervious Area
	18,025		50.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.3	50	0.0250	2.5		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
1.0	165	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	265	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 0.7 cfs @ 12.09 hrs, Volume= 2,375 cf, Depth= 3.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	5,820	98	Paved parking, HSG B
*	405	98	Concrete sidewalk, HSG B
	1,495	61	>75% Grass cover, Good, HSG B
	7,720	91	Weighted Average
	1,495		19.37% Pervious Area
	6,225		80.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, concrete patio, grass

Runoff = 1.7 cfs @ 12.09 hrs, Volume= 5,266 cf, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	9,615	98	Paved parking, HSG B
*	1,425	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
*	900	98	Future classroom, HSG B
*	165	96	Stone dust walkway, HSG B
	12,460	61	>75% Grass cover, Good, HSG B
	24,830	79	Weighted Average
	12,625		50.85% Pervious Area
	12,205		49.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass**
					Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, concrete patio, grass

Runoff = 0.7 cfs @ 12.09 hrs, Volume= 2,215 cf, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	4,950	98	Paved parking, HSG B
*	575	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
	1,210	61	>75% Grass cover, Good, HSG B
	7,000	92	Weighted Average
	1,210		17.29% Pervious Area
	5,790		82.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area**
					Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 1.0 cfs @ 12.09 hrs, Volume= 3,453 cf, Depth= 3.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

Area (sf)	CN	Description
8,915	98	Paved parking, HSG B
145	98	Roofs, HSG B
1,555	61	>75% Grass cover, Good, HSG B
10,615	93	Weighted Average
1,555		14.65% Pervious Area
9,060		85.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 35.37% Impervious, Inflow Depth = 0.73" for 10 year storm event
Inflow = 3.1 cfs @ 12.12 hrs, Volume= 11,060 cf
Outflow = 3.1 cfs @ 12.12 hrs, Volume= 11,060 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 35,820 sf, 50.32% Impervious, Inflow Depth = 2.63" for 10 year storm event
Inflow = 2.5 cfs @ 12.09 hrs, Volume= 7,859 cf
Outflow = 2.5 cfs @ 12.09 hrs, Volume= 7,859 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.5 cfs @ 12.09 hrs, Volume= 7,859 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.25' @ 12.11 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.30'	**15.0" Round drain line** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.30' / 121.90' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.1 cfs @ 12.09 hrs HW=123.23' TW=122.82' (Dynamic Tailwater)
1=drain line (Outlet Controls 2.1 cfs @ 3.0 fps)

Summary for Pond 2P: PCB2

Inflow Area = 7,720 sf, 80.63% Impervious, Inflow Depth = 3.69" for 10 year storm event
Inflow = 0.7 cfs @ 12.09 hrs, Volume= 2,375 cf
Outflow = 0.7 cfs @ 12.09 hrs, Volume= 2,375 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.09 hrs, Volume= 2,375 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.87' @ 12.16 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=122.75' TW=122.81' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 3P: PDMH1

Inflow Area = 43,540 sf, 55.70% Impervious, Inflow Depth = 2.82" for 10 year storm event
Inflow = 3.2 cfs @ 12.09 hrs, Volume= 10,234 cf
Outflow = 3.2 cfs @ 12.09 hrs, Volume= 10,234 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.2 cfs @ 12.09 hrs, Volume= 10,234 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.84' @ 12.11 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=2.8 cfs @ 12.09 hrs HW=122.82' TW=122.29' (Dynamic Tailwater)
1=drain line (Outlet Controls 2.8 cfs @ 3.1 fps)

Summary for Pond 4P: PCB3

Inflow Area = 24,830 sf, 49.15% Impervious, Inflow Depth = 2.55" for 10 year storm event
Inflow = 1.7 cfs @ 12.09 hrs, Volume= 5,266 cf
Outflow = 1.7 cfs @ 12.09 hrs, Volume= 5,266 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.7 cfs @ 12.09 hrs, Volume= 5,266 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.44' @ 12.14 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.9 cfs @ 12.09 hrs HW=122.35' TW=122.29' (Dynamic Tailwater)
1=drain line (Inlet Controls 0.9 cfs @ 1.1 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 68,370 sf, 53.32% Impervious, Inflow Depth = 2.72" for 10 year storm event
Inflow = 4.9 cfs @ 12.09 hrs, Volume= 15,500 cf
Outflow = 4.9 cfs @ 12.09 hrs, Volume= 15,500 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.9 cfs @ 12.09 hrs, Volume= 15,500 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.31' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.10'	**18.0" Round drain line** L= 170.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.10' / 120.10' S= 0.0059 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=4.4 cfs @ 12.09 hrs HW=122.29' TW=121.35' (Dynamic Tailwater)
1=drain line (Outlet Controls 4.4 cfs @ 4.0 fps)

Summary for Pond 6P: PCB4

Inflow Area = 7,000 sf, 82.71% Impervious, Inflow Depth = 3.80" for 10 year storm event
Inflow = 0.7 cfs @ 12.09 hrs, Volume= 2,215 cf
Outflow = 0.7 cfs @ 12.09 hrs, Volume= 2,215 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.09 hrs, Volume= 2,215 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.45' @ 12.19 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.17' TW=121.34' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 75,370 sf, 56.05% Impervious, Inflow Depth = 2.82" for 10 year storm event
Inflow = 5.5 cfs @ 12.09 hrs, Volume= 17,715 cf
Outflow = 5.5 cfs @ 12.09 hrs, Volume= 17,715 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.5 cfs @ 12.09 hrs, Volume= 17,715 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.44' @ 12.14 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=3.4 cfs @ 12.09 hrs HW=121.35' TW=121.22' (Dynamic Tailwater)
1=drain line (Outlet Controls 3.4 cfs @ 2.2 fps)

Summary for Pond 8P: PCB5

Inflow Area = 10,615 sf, 85.35% Impervious, Inflow Depth = 3.90" for 10 year storm event
Inflow = 1.0 cfs @ 12.09 hrs, Volume= 3,453 cf
Outflow = 1.0 cfs @ 12.09 hrs, Volume= 3,453 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.0 cfs @ 12.09 hrs, Volume= 3,453 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.30' @ 12.16 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.10' TW=121.21' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 2.95" for 10 year storm event
Inflow = 6.6 cfs @ 12.09 hrs, Volume= 21,168 cf
Outflow = 6.6 cfs @ 12.09 hrs, Volume= 21,168 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.6 cfs @ 12.09 hrs, Volume= 21,168 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.27' @ 12.12 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=5.3 cfs @ 12.09 hrs HW=121.22' TW=121.00' (Dynamic Tailwater)
↑**1=drain line** (Outlet Controls 5.3 cfs @ 3.0 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 2.95" for 10 year storm event
Inflow = 6.6 cfs @ 12.09 hrs, Volume= 21,168 cf
Outflow = 6.6 cfs @ 12.09 hrs, Volume= 21,168 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.6 cfs @ 12.09 hrs, Volume= 21,168 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.02' @ 12.09 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=6.4 cfs @ 12.09 hrs HW=121.00' TW=119.81' (Dynamic Tailwater)
↑**1=drain line** (Barrel Controls 6.4 cfs @ 3.9 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 2.95" for 10 year storm event
Inflow = 6.6 cfs @ 12.09 hrs, Volume= 21,168 cf
Outflow = 1.1 cfs @ 11.80 hrs, Volume= 21,223 cf, Atten= 84%, Lag= 0.0 min
Discarded = 1.1 cfs @ 11.80 hrs, Volume= 21,223 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.53' @ 12.59 hrs Surf.Area= 5,592 sf Storage= 6,016 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.5 min (845.3 - 809.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 11.80 hrs HW=119.07' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
↑—**1=drain line** (Controls 0.0 cfs)
↑—**2=Orifice** (Controls 0.0 cfs)

PROPOSED CONDITIONS
25-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 5.2 cfs @ 12.11 hrs, Volume= 17,510 cf, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
*	12,666	98	Roofs Proposed and Future, HSG B
*	225	98	Concrete equip. pads, HSG B
*	850	96	Stone dust walkway, HSG B
*	1,030	96	Pervious paver patio, HSG B
*	1,700	86	Geo-Grid Fire Road, HSG B
	24,214	61	>75% Grass cover, Good, HSG B
	54,850	55	Woods, Good, HSG B
	95,535	64	Weighted Average
	82,644		86.51% Pervious Area
	12,891		13.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods**
					Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, town green, grass areas

Runoff = 3.5 cfs @ 12.09 hrs, Volume= 11,045 cf, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	17,050	98	Paved parking, HSG B
*	975	98	Concrete sidewalk, HSG B
	17,795	61	>75% Grass cover, Good, HSG B
	35,820	80	Weighted Average
	17,795		49.68% Pervious Area
	18,025		50.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.3	50	0.0250	2.5		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
1.0	165	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	265	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 0.9 cfs @ 12.09 hrs, Volume= 3,132 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	5,820	98	Paved parking, HSG B
*	405	98	Concrete sidewalk, HSG B
	1,495	61	>75% Grass cover, Good, HSG B
	7,720	91	Weighted Average
	1,495		19.37% Pervious Area
	6,225		80.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, concrete patio, grass

Runoff = 2.4 cfs @ 12.09 hrs, Volume= 7,448 cf, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	9,615	98	Paved parking, HSG B
*	1,425	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
*	900	98	Future classroom, HSG B
*	165	96	Stone dust walkway, HSG B
	12,460	61	>75% Grass cover, Good, HSG B
	24,830	79	Weighted Average
	12,625		50.85% Pervious Area
	12,205		49.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass**
					Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, concrete patio, grass

Runoff = 0.9 cfs @ 12.09 hrs, Volume= 2,906 cf, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	4,950	98	Paved parking, HSG B
*	575	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
	1,210	61	>75% Grass cover, Good, HSG B
	7,000	92	Weighted Average
	1,210		17.29% Pervious Area
	5,790		82.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area**
					Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 1.3 cfs @ 12.09 hrs, Volume= 4,506 cf, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

Area (sf)	CN	Description
8,915	98	Paved parking, HSG B
145	98	Roofs, HSG B
1,555	61	>75% Grass cover, Good, HSG B
10,615	93	Weighted Average
1,555		14.65% Pervious Area
9,060		85.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 35.37% Impervious, Inflow Depth = 1.25" for 25 year storm event
Inflow = 5.2 cfs @ 12.11 hrs, Volume= 18,901 cf
Outflow = 5.2 cfs @ 12.11 hrs, Volume= 18,901 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 35,820 sf, 50.32% Impervious, Inflow Depth = 3.70" for 25 year storm event
Inflow = 3.5 cfs @ 12.09 hrs, Volume= 11,045 cf
Outflow = 3.5 cfs @ 12.09 hrs, Volume= 11,045 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.09 hrs, Volume= 11,045 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.51' @ 12.12 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.30'	**15.0" Round drain line** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.30' / 121.90' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.8 cfs @ 12.09 hrs HW=123.47' TW=123.07' (Dynamic Tailwater)
1=drain line (Outlet Controls 2.8 cfs @ 3.1 fps)

Summary for Pond 2P: PCB2

Inflow Area = 7,720 sf, 80.63% Impervious, Inflow Depth = 4.87" for 25 year storm event
Inflow = 0.9 cfs @ 12.09 hrs, Volume= 3,132 cf
Outflow = 0.9 cfs @ 12.09 hrs, Volume= 3,132 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.09 hrs, Volume= 3,132 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.15' @ 12.16 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=122.95' TW=123.06' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 3P: PDMH1

Inflow Area = 43,540 sf, 55.70% Impervious, Inflow Depth = 3.91" for 25 year storm event
Inflow = 4.4 cfs @ 12.09 hrs, Volume= 14,177 cf
Outflow = 4.4 cfs @ 12.09 hrs, Volume= 14,177 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.4 cfs @ 12.09 hrs, Volume= 14,177 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.12' @ 12.12 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.7 cfs @ 12.09 hrs HW=123.07' TW=122.60' (Dynamic Tailwater)
1=drain line (Outlet Controls 3.7 cfs @ 3.1 fps)

Summary for Pond 4P: PCB3

Inflow Area = 24,830 sf, 49.15% Impervious, Inflow Depth = 3.60" for 25 year storm event
Inflow = 2.4 cfs @ 12.09 hrs, Volume= 7,448 cf
Outflow = 2.4 cfs @ 12.09 hrs, Volume= 7,448 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.4 cfs @ 12.09 hrs, Volume= 7,448 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.90' @ 12.13 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.6 cfs @ 12.09 hrs HW=122.79' TW=122.61' (Dynamic Tailwater)
1=drain line (Inlet Controls 1.6 cfs @ 2.0 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 68,370 sf, 53.32% Impervious, Inflow Depth = 3.80" for 25 year storm event
Inflow = 6.8 cfs @ 12.09 hrs, Volume= 21,625 cf
Outflow = 6.8 cfs @ 12.09 hrs, Volume= 21,625 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.8 cfs @ 12.09 hrs, Volume= 21,625 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.64' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.10'	**18.0" Round drain line** L= 170.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.10' / 120.10' S= 0.0059 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=5.9 cfs @ 12.09 hrs HW=122.60' TW=121.65' (Dynamic Tailwater)
1=drain line (Outlet Controls 5.9 cfs @ 4.2 fps)

Summary for Pond 6P: PCB4

Inflow Area = 7,000 sf, 82.71% Impervious, Inflow Depth = 4.98" for 25 year storm event
Inflow = 0.9 cfs @ 12.09 hrs, Volume= 2,906 cf
Outflow = 0.9 cfs @ 12.09 hrs, Volume= 2,906 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.09 hrs, Volume= 2,906 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.80' @ 12.20 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.43' TW=121.63' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 75,370 sf, 56.05% Impervious, Inflow Depth = 3.91" for 25 year storm event
Inflow = 7.6 cfs @ 12.09 hrs, Volume= 24,531 cf
Outflow = 7.6 cfs @ 12.09 hrs, Volume= 24,531 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.6 cfs @ 12.09 hrs, Volume= 24,531 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.78' @ 12.15 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=4.1 cfs @ 12.09 hrs HW=121.64' TW=121.54' (Dynamic Tailwater)
1=drain line (Outlet Controls 4.1 cfs @ 2.0 fps)

Summary for Pond 8P: PCB5

Inflow Area = 10,615 sf, 85.35% Impervious, Inflow Depth = 5.09" for 25 year storm event
Inflow = 1.3 cfs @ 12.09 hrs, Volume= 4,506 cf
Outflow = 1.3 cfs @ 12.09 hrs, Volume= 4,506 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.09 hrs, Volume= 4,506 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.67' @ 12.16 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.38' TW=121.52' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 4.05" for 25 year storm event
Inflow = 8.9 cfs @ 12.09 hrs, Volume= 29,037 cf
Outflow = 8.9 cfs @ 12.09 hrs, Volume= 29,037 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.9 cfs @ 12.09 hrs, Volume= 29,037 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.60' @ 12.12 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=7.2 cfs @ 12.09 hrs HW=121.53' TW=121.27' (Dynamic Tailwater)
1=drain line (Inlet Controls 7.2 cfs @ 2.5 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 4.05" for 25 year storm event
Inflow = 8.9 cfs @ 12.09 hrs, Volume= 29,037 cf
Outflow = 8.9 cfs @ 12.09 hrs, Volume= 29,037 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.9 cfs @ 12.09 hrs, Volume= 29,037 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.30' @ 12.09 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=8.7 cfs @ 12.09 hrs HW=121.27' TW=120.16' (Dynamic Tailwater)
1=drain line (Barrel Controls 8.7 cfs @ 4.3 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 4.05" for 25 year storm event
Inflow = 8.9 cfs @ 12.09 hrs, Volume= 29,037 cf
Outflow = 1.8 cfs @ 12.53 hrs, Volume= 29,101 cf, Atten= 80%, Lag= 26.3 min
Discarded = 1.1 cfs @ 11.70 hrs, Volume= 27,711 cf
Primary = 0.7 cfs @ 12.53 hrs, Volume= 1,390 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.24' @ 12.53 hrs Surf.Area= 5,592 sf Storage= 9,000 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 52.0 min (853.7 - 801.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 11.70 hrs HW=119.05' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.7 cfs @ 12.53 hrs HW=121.24' TW=0.00' (Dynamic Tailwater)
↑—**1=drain line** (Barrel Controls 0.7 cfs @ 2.8 fps)
↑—**2=Orifice** (Passes 0.7 cfs of 1.4 cfs potential flow)

PROPOSED CONDITIONS
100-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 9.9 cfs @ 12.11 hrs, Volume= 32,599 cf, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
*	12,666	98	Roofs Proposed and Future, HSG B
*	225	98	Concrete equip. pads, HSG B
*	850	96	Stone dust walkway, HSG B
*	1,030	96	Pervious paver patio, HSG B
*	1,700	86	Geo-Grid Fire Road, HSG B
	24,214	61	>75% Grass cover, Good, HSG B
	54,850	55	Woods, Good, HSG B
	95,535	64	Weighted Average
	82,644		86.51% Pervious Area
	12,891		13.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods**
					Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, town green, grass areas

Runoff = 5.5 cfs @ 12.09 hrs, Volume= 17,885 cf, Depth= 5.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	17,050	98	Paved parking, HSG B
*	975	98	Concrete sidewalk, HSG B
	17,795	61	>75% Grass cover, Good, HSG B
	35,820	80	Weighted Average
	17,795		49.68% Pervious Area
	18,025		50.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.3	50	0.0250	2.5		**Shallow Concentrated Flow, grass** Unpaved Kv= 16.1 fps
1.0	165	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	265	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 1.4 cfs @ 12.09 hrs, Volume= 4,703 cf, Depth= 7.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	5,820	98	Paved parking, HSG B
*	405	98	Concrete sidewalk, HSG B
	1,495	61	>75% Grass cover, Good, HSG B
	7,720	91	Weighted Average
	1,495		19.37% Pervious Area
	6,225		80.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, concrete patio, grass

Runoff = 3.8 cfs @ 12.09 hrs, Volume= 12,150 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	9,615	98	Paved parking, HSG B
*	1,425	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
*	900	98	Future classroom, HSG B
*	165	96	Stone dust walkway, HSG B
	12,460	61	>75% Grass cover, Good, HSG B
	24,830	79	Weighted Average
	12,625		50.85% Pervious Area
	12,205		49.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass**
					Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, concrete patio, grass

Runoff = 1.3 cfs @ 12.09 hrs, Volume= 4,334 cf, Depth= 7.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	4,950	98	Paved parking, HSG B
*	575	98	Concrete sidewalk, HSG B
	265	98	Roofs, HSG B
	1,210	61	>75% Grass cover, Good, HSG B
	7,000	92	Weighted Average
	1,210		17.29% Pervious Area
	5,790		82.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area**
					Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area**
					Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 1.9 cfs @ 12.09 hrs, Volume= 6,678 cf, Depth= 7.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

Area (sf)	CN	Description
8,915	98	Paved parking, HSG B
145	98	Roofs, HSG B
1,555	61	>75% Grass cover, Good, HSG B
10,615	93	Weighted Average
1,555		14.65% Pervious Area
9,060		85.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 181,520 sf, 35.37% Impervious, Inflow Depth = 2.81" for 100 year storm event
Inflow = 11.9 cfs @ 12.25 hrs, Volume= 42,579 cf
Outflow = 11.9 cfs @ 12.25 hrs, Volume= 42,579 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 35,820 sf, 50.32% Impervious, Inflow Depth = 5.99" for 100 year storm event
Inflow = 5.5 cfs @ 12.09 hrs, Volume= 17,885 cf
Outflow = 5.5 cfs @ 12.09 hrs, Volume= 17,885 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.5 cfs @ 12.09 hrs, Volume= 17,885 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 125.16' @ 12.19 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.30'	**15.0" Round drain line** L= 74.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.30' / 121.90' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.1 cfs @ 12.09 hrs HW=124.23' TW=124.19' (Dynamic Tailwater)
1=drain line (Outlet Controls 1.1 cfs @ 0.9 fps)

Summary for Pond 2P: PCB2

Inflow Area = 7,720 sf, 80.63% Impervious, Inflow Depth = 7.31" for 100 year storm event
Inflow = 1.4 cfs @ 12.09 hrs, Volume= 4,703 cf
Outflow = 1.4 cfs @ 12.09 hrs, Volume= 4,703 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.09 hrs, Volume= 4,703 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.85' @ 12.20 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=123.44' TW=124.14' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 3P: PDMH1

Inflow Area = 43,540 sf, 55.70% Impervious, Inflow Depth = 6.23" for 100 year storm event
Inflow = 6.9 cfs @ 12.09 hrs, Volume= 22,587 cf
Outflow = 6.9 cfs @ 12.09 hrs, Volume= 22,587 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.9 cfs @ 12.09 hrs, Volume= 22,587 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.80' @ 12.15 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=1.9 cfs @ 12.09 hrs HW=124.18' TW=124.12' (Dynamic Tailwater)
1=drain line (Outlet Controls 1.9 cfs @ 1.0 fps)

Summary for Pond 4P: PCB3

Inflow Area = 24,830 sf, 49.15% Impervious, Inflow Depth = 5.87" for 100 year storm event
Inflow = 3.8 cfs @ 12.09 hrs, Volume= 12,150 cf
Outflow = 3.8 cfs @ 12.09 hrs, Volume= 12,150 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.09 hrs, Volume= 12,150 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.91' @ 12.15 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.7 cfs @ 12.09 hrs HW=124.33' TW=124.13' (Dynamic Tailwater)
↑—**1=drain line** (Inlet Controls 1.7 cfs @ 2.1 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 68,370 sf, 53.32% Impervious, Inflow Depth = 6.10" for 100 year storm event
Inflow = 10.7 cfs @ 12.09 hrs, Volume= 34,738 cf
Outflow = 10.7 cfs @ 12.09 hrs, Volume= 34,738 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.7 cfs @ 12.09 hrs, Volume= 34,738 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.31' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.10'	**18.0" Round drain line** L= 170.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.10' / 120.10' S= 0.0059 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=9.0 cfs @ 12.09 hrs HW=124.13' TW=122.46' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 9.0 cfs @ 5.1 fps)

Summary for Pond 6P: PCB4

Inflow Area = 7,000 sf, 82.71% Impervious, Inflow Depth = 7.43" for 100 year storm event
Inflow = 1.3 cfs @ 12.09 hrs, Volume= 4,334 cf
Outflow = 1.3 cfs @ 12.09 hrs, Volume= 4,334 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.09 hrs, Volume= 4,334 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.13' @ 12.45 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 8.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.96' TW=122.43' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 75,370 sf, 56.05% Impervious, Inflow Depth = 6.22" for 100 year storm event
Inflow = 12.0 cfs @ 12.09 hrs, Volume= 39,072 cf
Outflow = 12.0 cfs @ 12.09 hrs, Volume= 39,072 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.0 cfs @ 12.09 hrs, Volume= 39,072 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.12' @ 12.40 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=2.7 cfs @ 12.09 hrs HW=122.45' TW=122.42' (Dynamic Tailwater)
1=drain line (Inlet Controls 2.7 cfs @ 0.9 fps)

Summary for Pond 8P: PCB5

Inflow Area = 10,615 sf, 85.35% Impervious, Inflow Depth = 7.55" for 100 year storm event
Inflow = 1.9 cfs @ 12.09 hrs, Volume= 6,678 cf
Outflow = 1.9 cfs @ 12.09 hrs, Volume= 6,678 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.9 cfs @ 12.09 hrs, Volume= 6,678 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.08' @ 12.40 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=122.07' TW=122.40' (Dynamic Tailwater)
1=drain line (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 6.38" for 100 year storm event
Inflow = 13.9 cfs @ 12.09 hrs, Volume= 45,750 cf
Outflow = 13.9 cfs @ 12.09 hrs, Volume= 45,750 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.9 cfs @ 12.09 hrs, Volume= 45,750 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.06' @ 12.35 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=11.8 cfs @ 12.09 hrs HW=122.42' TW=121.81' (Dynamic Tailwater)
1=drain line (Inlet Controls 11.8 cfs @ 3.8 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 6.38" for 100 year storm event
Inflow = 13.9 cfs @ 12.09 hrs, Volume= 45,750 cf
Outflow = 13.9 cfs @ 12.09 hrs, Volume= 45,750 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.9 cfs @ 12.09 hrs, Volume= 45,750 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.94' @ 12.30 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 4.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0075 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=13.2 cfs @ 12.09 hrs HW=121.81' TW=121.05' (Dynamic Tailwater)
1=drain line (Inlet Controls 13.2 cfs @ 4.2 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 85,985 sf, 59.67% Impervious, Inflow Depth = 6.38" for 100 year storm event
Inflow = 13.9 cfs @ 12.09 hrs, Volume= 45,750 cf
Outflow = 7.1 cfs @ 12.25 hrs, Volume= 45,814 cf, Atten= 49%, Lag= 9.8 min
Discarded = 1.1 cfs @ 11.45 hrs, Volume= 35,833 cf
Primary = 6.1 cfs @ 12.25 hrs, Volume= 9,981 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.80' @ 12.25 hrs Surf.Area= 5,592 sf Storage= 11,504 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 46.9 min (837.0 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 67.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

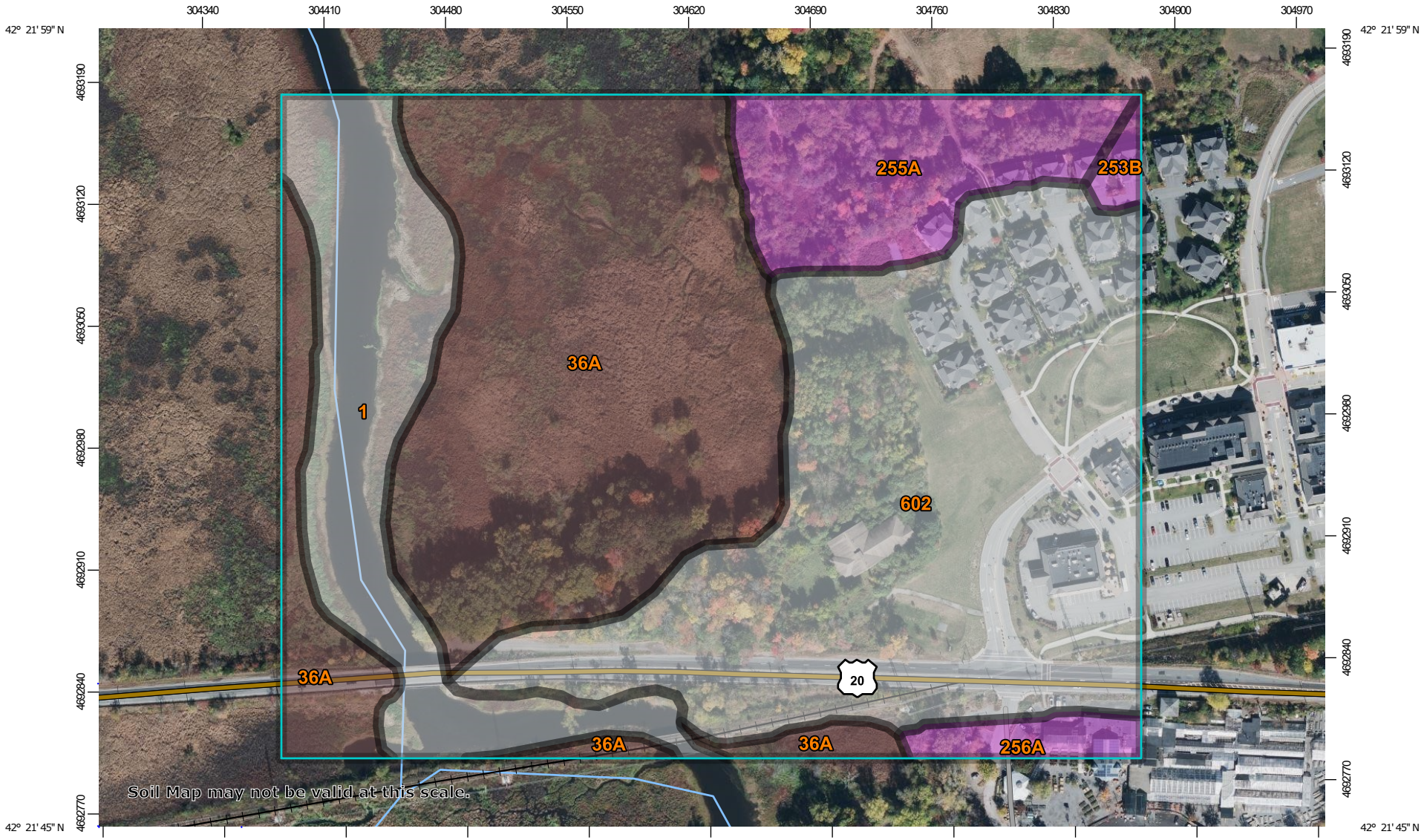
Discarded OutFlow Max=1.1 cfs @ 11.45 hrs HW=119.04' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=6.0 cfs @ 12.25 hrs HW=122.77' TW=0.00' (Dynamic Tailwater)
↑—**1=drain line** (Passes 6.0 cfs of 6.2 cfs potential flow)
↑—**2=Orifice** (Orifice Controls 6.0 cfs @ 6.1 fps)

APPENDIX

NRCS HYDROLOGIC SOIL GROUP REPORTS

Hydrologic Soil Group—Middlesex County, Massachusetts
(10 Andrew Avenue, Wayland)



Map Scale: 1:3,230 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

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

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Aug 31, 2020—Oct 22, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		6.7	14.2%
36A	Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded	B/D	17.4	37.1%
253B	Hinckley loamy sand, 3 to 8 percent slopes	A	0.3	0.7%
255A	Windsor loamy sand, 0 to 3 percent slopes	A	4.2	9.1%
256A	Deerfield loamy fine sand, 0 to 3 percent slopes	A	0.8	1.7%
602	Urban land		17.4	37.3%
Totals for Area of Interest			**46.8**	**100.0%**

Description

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

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

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

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

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

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

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

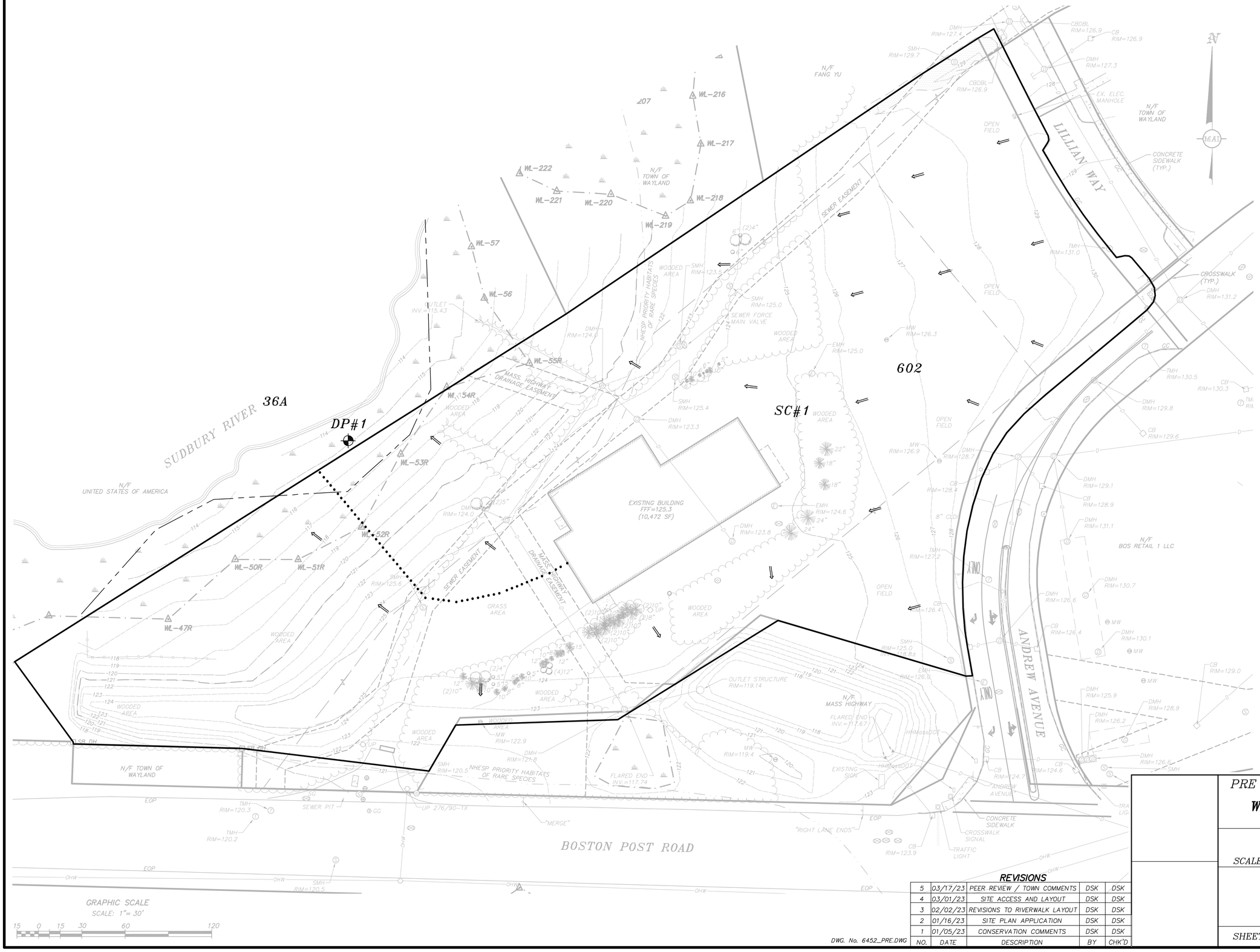
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

PRE-DEVELOPMENT DRAINAGE PLAN



GRAPHIC SCALE
SCALE: 1"= 30'
15 0 15 30 60 120

LEGEND

- SC#1 — SUBCATCHMENT AREA
- DP#1 — DESIGN POINT
- OVERLAND FLOW LINE
- OVERLAND FLOW DIRECTION
- 421D — SOIL TYPE DELINEATION
- LIMIT OF SOIL TYPE

SOIL NOTE

THE SOIL DESIGNATIONS SHOWN WITHIN THE LOCUS PROPERTY SUBCATCHMENT LIMITS HAVE BEEN DELINEATED BY USDA NATURAL RESOURCES CONSERVATION SERVICE. EACH SOIL TYPE HAS A HYDROLOGIC SOIL GROUP RATING (HSG) "A" THRU "D" AS SHOWN ON THE PLAN.

DWG. No. 6452_PRE.DWG

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D
5	03/17/23	PEER REVIEW / TOWN COMMENTS	DSK	DSK
4	03/01/23	SITE ACCESS AND LAYOUT	DSK	DSK
3	02/02/23	REVISIONS TO RIVERWALK LAYOUT	DSK	DSK
2	01/16/23	SITE PLAN APPLICATION	DSK	DSK
1	01/05/23	CONSERVATION COMMENTS	DSK	DSK

8 ANDREW AVENUE

PRE DEVELOPMENT DRAINAGE PLAN

LOCATED IN

WAYLAND, MASSACHUSETTS

(MIDDLESEX COUNTY)

PREPARED FOR

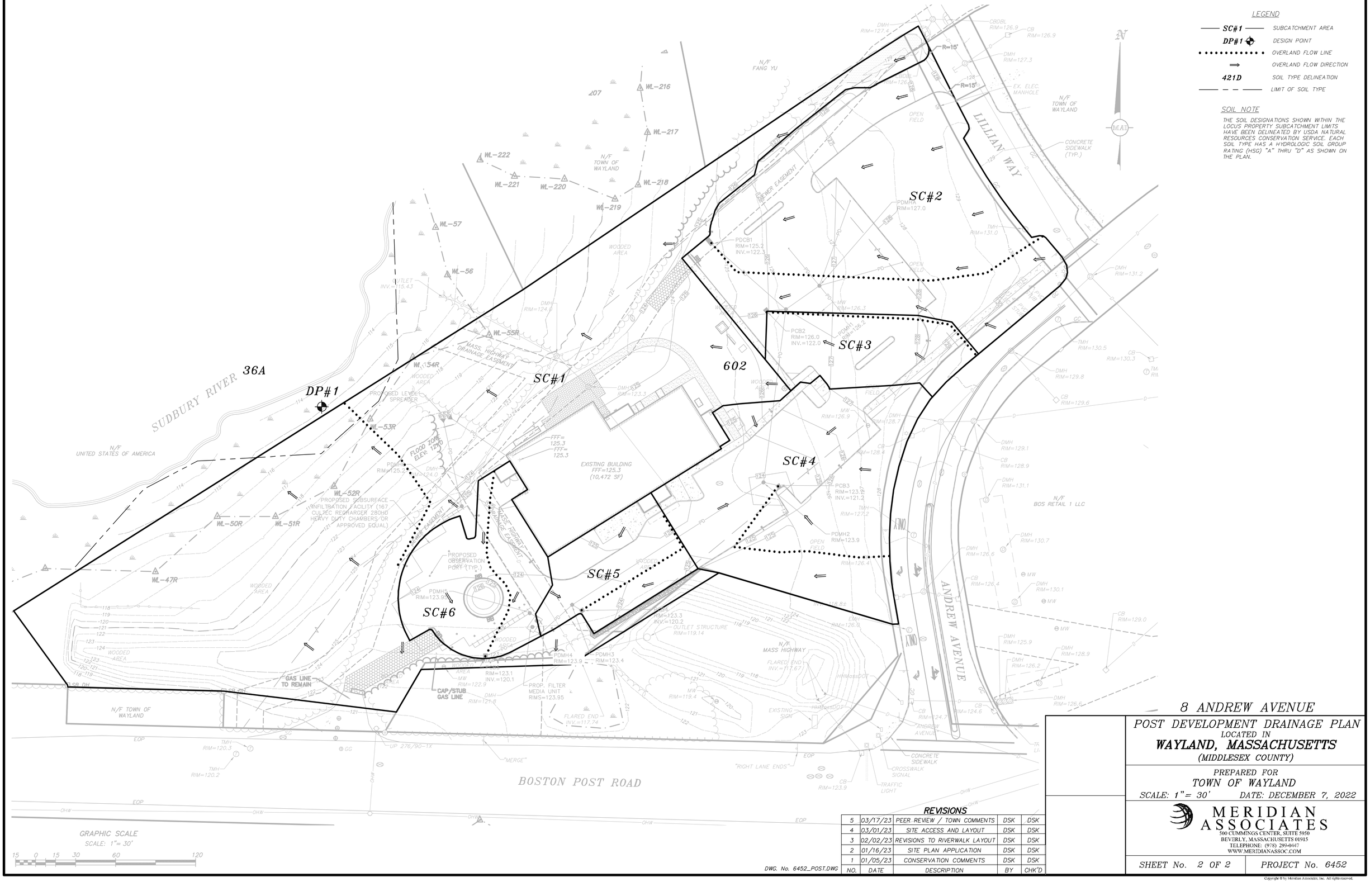
TOWN OF WAYLAND

SCALE: 1"= 30' DATE: DECEMBER 7, 2022

MERIDIAN ASSOCIATES
500 CUMMINGS CENTER, SUITE 5950
BEVERLY, MASSACHUSETTS 01915
TELEPHONE: (978) 299-0447
WWW.MERIDIANASSOC.COM

SHEET No. 1 OF 2 PROJECT No. 6452

POST DEVELOPMENT DRAINAGE PLAN



REVISIONS				
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1	01/05/23	CONSERVATION COMMENTS	DSK	DSK
NO.	DATE	DESCRIPTION	BY	CHK'D

DWG. No. 6452_POST.DWG

8 ANDREW AVENUE

POST DEVELOPMENT DRAINAGE PLAN

LOCATED IN

WAYLAND, MASSACHUSETTS

(MIDDLESEX COUNTY)

PREPARED FOR

TOWN OF WAYLAND

SCALE: 1"= 30' DATE: DECEMBER 7, 2022

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SHEET No. 2 OF 2 PROJECT No. 6452

FILTER MEDIA DOCUMENTATION

BayFilter™

The Exact System Needed for Large & Small Sites

*The Most **Advanced** Name in Drainage Systems®*

ADS

ADS BAYFILTER™ STORMWATER FILTRATION SYSTEM

With over seven years in research and development, BayFilter is the most efficient, effective, economical, and easy-to use stormwater treatment filter on the market today. The BayFilter system utilizes well proven sand filter principles to remove pollutants such as sediments, oil, metals, organics and nutrients. The modular design allows the units to be sized based on site conditions providing the exact system needed for both large and small sites.

FILTER OPERATION:

The BayFilter system consists of modular cartridges placed in vaults for stormwater treatment. The cartridge consists of a spiral wound media filter cartridge utilizing a proprietary sand mix with over 43 square feet of active filtration area. During a storm event, water will begin to enter the vault at the inlet pipe and fill the structure where the filters are housed. When the water surface elevation reaches the operation level, water is forced through the cartridges via hydrostatic head. Water enters the cartridge through the inlet drainage material and is forced through the media filter into the outlet drainage material. Once operation level is reached the filtered stormwater exits the system via the center drain tube into the drainage manifold. During storm subsidence the filters still operate under siphon conditions until the siphon is released and backwash occurs. The remaining water in the vault is evacuated through filtered draindown modules located in the vault. The cartridge system operates in four phases of flow which are:

1. Vault Fill and Air Release

2. Uniform Bed load hydrodynamic filtration

3. Uniform Bed load siphon filtration

4. Siphon break and hydrodynamic backwash.

Due the backwash cycle of the treatment process, sediment is deposited on the vault floor. The back wash provides an additional level of filter cleaning not provided in other modular filter systems. This extends the life of the filter and reduces maintenance. In addition the filter retains some minor amount of sediment as well.

DESIGN

BayFilter systems are designed to be offline systems and can be designed for the water quality flow or volume. Each configuration should be evaluated to determine the best utilization.

When the water quality flow rate is used the treatment flows will be less than the peak discharge from the site. A bypass structure allows the filter system to be placed offline with lower flows routed to it while higher peak storms are bypassed around the system. Use of a BaySeparator as a pretreatment device can prevent the filters from treating many larger particles which are more easily removed by gravity separation. Use of pretreatment can extend the life of the more costly filter system.

In flow based design there is usually a higher flow rate treated per cartridge but reduced treated sediment load per cartridge. Flow based configurations are generally limited by flow capacity and not sediment loading.

It is advisable for these configurations to utilize a BaySeparator prior to the detention system as pretreatment. For volume-based systems the BayFilter is used on the outlet side of the detention system. This provides not only the detention for the site but the ability to route the water quality volume through the BayFilter. These types of designs are generally fewer cartridges with higher sediment loads.

The offline design of the systems provides for control of sediment scour and resuspension. The larger storms which could scour and remove sediment from the structure are routed around the structure and prevent introduction of flow which could deposit sediments downstream.

HOW MANY CARTRIDGES

Each BayFilter system relies on a collection of individual cartridges to achieve the desired removal efficiency so the correct number of cartridges is important. Too few cartridges will result in a system that does not meet performance or requires frequent maintenance while too many results in a system that is too large and overly expensive. To determine the number of cartridges three factors must be considered:

- The flow capacity of the system
- Treated sediment load
- Jurisdiction

In general BayFilter cartridges are designed to handle 30gpm (0.067cfs) per cartridge. When combined with treated sediment load and jurisdiction requirements the minimum number of cartridges necessary can be determined. More complete design parameters and guidelines are available upon request.

CONFIGURATION

There are several different options available for the BayFilter configurations but the most common are the Manhole filter, precast vault filter, and cast-in-place filter. The Manhole configuration is the most economical version of the system. Treatment Capacities are as follows:

Treatment Capacities	Manhole Size (inches)	Maximum Number of Filter Cartridges	Maximum Treatment Flow gpm (cfs)
	60	3	90 (0.20)
	72	4	120 (0.27)
	84	5	150 (0.037)
	96	7	210 (0.47)

Manhole BayFilters are ideal for installation on the downstream side of a detention system. Precast vaults are used on larger sites with more impervious area. The precast BayFilter system is larger than the manhole BayFilter. It has a treatment capacity as follows:

Treatment Capacities	Vault Size (ft x ft)	Maximum Number of Filter Cartridges	Maximum Treatment Flow gpm (cfs)
	8' x 10'	10	300 (0.67)
	8' x 12'	13	390 (0.87)
	8' x 14'	15	450 (1.00)
	8' x 16'	18	540 (1.20)
	10' x 16'	21	630 (1.40)
	10' x 20'	27	810 (1.80)
	10' x 26'	33	990 (2.21)
	10' x 32'	42	1260 (2.81)
	10' x 38'	51	1530 (3.41)
	10' x 40'	54	1620 (3.61)

Installations of Precast BayFilter systems can be used independently or in conjunction with a detention system. Pretreatment with a BaySeparator should be considered to extend the filter life.

The last option available is the cast-in-place BayFilters. On sites that require more the 54 cartridges or where the precast and manhole

system is not practical, a cast in place vault can provide the solution. High flow rates, shallow installations, very flat sites, and limited footprints can all be reasons for a cast in place system.

INSTALLATION:

Installation of the BayFilter system can be performed by the same contractor performing the installation of piping and underground utilities. The installation process is very simple and consistent whether installing the system in a manhole, precast vault, or cast in place vault. Once the containment system has been installed the filter system is placed inside the vault. The installation consists of the drainage manifold, energy dissipater/level spreader, and cartridges. Because the BayFilters are modular the system can be installed very quickly. The cartridges should be installed after the site has been stabilized to avoid unnecessary filter replacements from construction related activities.

MAINTENANCE:

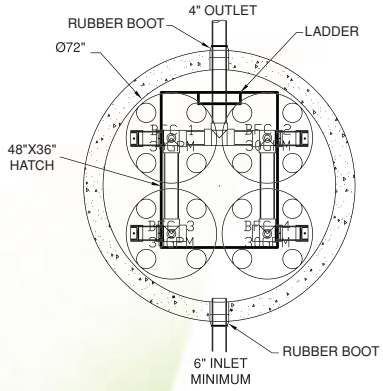
As with all stormwater treatment devices the BayFilter systems requires periodic maintenance to continue operating at the design flow rate and efficiency. Maintenance involves the removal and replacement of each cartridge and cleaning of the containment system with a vacuum truck. Maintenance should be performed by trained personnel.

The maintenance cycle of the system will be driven mostly by the actual solids load on the filter. The system should be monitored periodically to make certain that the system is operating correctly. Maintenance cycles can be variable depending on storm events and sediment loads. For complete maintenance instructions and guidelines contact your ADS representative.

SPECIFICATIONS

INTERNAL COMPONENTS

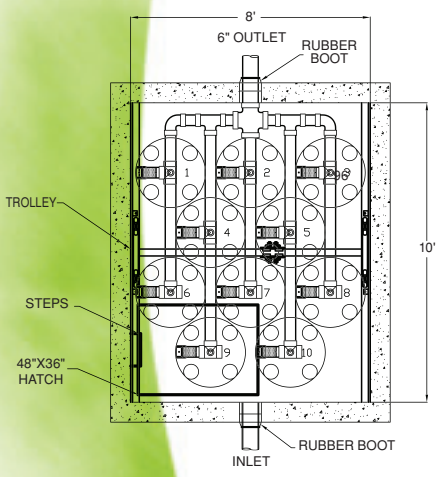
- Precast Concrete Vault: Shall be provided according to ASTM C478, C858, and C1433. Precast concrete vaults shall be provided by BaySaver Technologies, Inc.
- PVC Manifold Piping: All internal PVC pipe and fittings shall meet ASTM D1785. Manifold piping shall be provided to the contractor partially pre–cut and pre-assembled.
- Filter Cartridges: External shell of the filter cartridges shall be substantially constructed of polyethylene or equivalent material. Filtration media shall be arranged in a layered fashion to maximize available filtration area. An orifice plate shall be supplied with each cartridge to restrict flow rate to a maximum of 30 gpm.
- Filter Media: Filter media shall be by BaySaver Technologies Inc. Filter media shall consist of the following mix. Sand media shall have an effective particle size of not more than 0.49 mm, it shall have an angular grain shape, a hardness of 7, be 99% silica, and not leach nutrients. The media shall also include a blend of Perlite and Activated Alumina.
- Flow Spreader/Energy Dissipator: Shall be constructed of polyethylene or equivalent material.



Manhole Configuration

PERFORMANCE

- The stormwater filter system shall be an offline design capable of treating 100% of the required treatment flow at full sediment load conditions.
- The stormwater filter system's cartridge units shall have no moving parts.
- The stormwater treatment unit shall be designed to remove at least 85% of total suspended solids, 65% of total phosphorus, 65% of turbidity, 60% of total copper and 60% of total zinc based on field data collected in compliance with the Technology Acceptance Reciprocity Partnership Tier II test protocol.
- The stormwater filtration system shall reduce incoming turbidity (measured as NTUs) by 65% or more and shall not have any components that leach nitrates or phosphates.
- The stormwater filtration cartridge shall be equipped with a hydrodynamic backwash mechanism to extend the filter's life and optimize its performance. Inlet flow shall be upflow.
- The stormwater filtration system shall be designed to remove a minimum of 65% of the incoming Total Phosphorus (TP) load.
- The stormwater filtration system's cartridge units shall have the following minimum flow and sediment load capacities:



Vault Configuration

INSTALLATION

Design Flow per BFC—gmp Nominal	30	23	20	15
Treated Sediment Load for 80% Sediment Removal—lbs.	150	200	250	300

Installation of the BayFilter System(s) shall be performed per manufacturer's Installation Instructions.

For more information on BayFilter Stormwater Filtration System and other ADS products, please contact our Customer Service Representatives at 1–800–821–6710

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1–800–821–6710 www.ads–pipe.com

SECTION (_____)
JELLYFISH® MEMBRANE FILTRATION SYSTEM
STORMWATER QUALITY – MEMBRANE FILTRATION SYSTEM STANDARD SPECIFICATION

1. GENERAL

1.1. The Contractor shall furnish and install the Jellyfish, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents. The water quality treatment flow shall be as determined and approved by the Engineer of Record. The Jellyfish system removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2. The Jellyfish shall be of a type that has been installed and in use for a minimum of five (5) consecutive years preceding the date of installation of the system. The manufacturer shall have been, during the same consecutive five (5) year period, engaged in the engineering design and production of systems deployed for the treatment of storm water runoff and which have a history of successful production, acceptable to the Engineer of Record and/or the approving Jurisdiction. The manufacturer of the Jellyfish shall be, without exception:

Contech Engineered Solutions
9100 Centre Pointe Drive
West Chester, OH, 45069
Tel: 1 800 338 1122

1.3. Submittals: Shop drawings for the structure and performance are to be submitted with each order to the contractor. Contractor shall forward shop drawing submittal to the consulting engineer for approval. Shop drawings are to detail the structure precast concrete and call out or note the internals/components.

1.4. Product Substitutions: Any proposed product substitution to this specifications must be submitted for review and approved 10 days prior to project bid date by the Engineer of Record. Review package should include third party reviewed performance data for both flow rate and pollutant removal. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

1.5. American Society for Testing and Materials (ASTM) Reference Specifications:

1.5.1. ASTM C891: Standard Specification for Installation of Underground Precast Concrete Utility Structures

1.5.2. ASTM C478: Standard Specification for Precast Reinforced Concrete Manhole Sections

1.5.3. ASTM C858: Standard Specification of Underground Precast Concrete Utility Structures

1.5.4. ASTM C857: Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

1.5.5. ASTM C990: Standard Specification for Joints for Concrete Manholes Using Preformed Flexible Joint Sealants

1.5.6. ASTM D4101: Standard Specification for Copolymer steps construction

1.5.7. ASTM D4097: Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant

2. MATERIALS

2.1. Precast Concrete Structure: The device shall be an all concrete structure (including risers), constructed from precast concrete riser and slab components or monolithic precast structure(s). Precast concrete vault shall be provided according to ASTM C857 and C858 and manholes shall be provided according to ASTM C478. Both structure types shall be installed to conform to ASTM C891 and to any required state highway, municipal or local specifications; whichever is more stringent. All precast concrete components shall be manufactured to a minimum live load of HS-20 truck loading or greater based on local regulatory specifications, unless otherwise modified or specified by the design engineer.

2.2. Gaskets: Gaskets and/or sealants shall be used to seal between concrete joints. Joints shall be sealed with preformed joint sealing compound conforming to ASTM C990.

2.3. Internal Components:

2.3.1. Cartridge Deck: The deck insert shall be bolted and sealed inside the precast concrete chamber. The insert shall serve as: (a) a horizontal divider between the lower treatment zone and the upper treated effluent zone; (b) a deck for attachment of filter cartridges such that the membrane filter elements of each cartridge extend into the lower treatment zone; (c) a platform for maintenance workers to service the filter cartridges; (c) a conduit for conveyance of treated water to the effluent pipe.

2.3.1.1. Fiberglass: In cylindrical configurations, the fiberglass portions of the filter device shall be constructed in accordance with the following standard: ASTM D4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

2.3.1.2. Aluminum: In rectangular configurations, the aluminum cartridge deck shall be ¼" thick, 5052-H32 Aluminum with all welds to be 100% continuous waterproof weld using 5356 filler.

2.3.2. Membrane Filter Cartridges: Filter cartridges shall be comprised of reusable cylindrical membrane filter elements connected to a perforated head plate. The number of membrane filter elements per cartridge shall be a minimum of eleven 2.75-inch (70-mm) or greater diameter elements. The length of each filter element

shall be a minimum 15 inches (381 mm). Each cartridge shall be fitted into the cartridge deck by insertion into a cartridge receptacle that is permanently mounted into the cartridge deck. Each cartridge shall be secured by a cartridge lid that is threaded onto the receptacle, or similar mechanism to secure the cartridge into the deck. The maximum treatment flow rate of a filter cartridge shall be controlled by an orifice in the cartridge lid, or on the individual cartridge itself, and based on a design flux rate (surface loading rate) determined by the maximum treatment flow rate per unit of filtration membrane surface area. The maximum design flux rate shall be 0.21 gpm/ft^2 (0.142 lps/m^2).

2.3.3. Each membrane filter cartridge shall allow for manual installation and removal. Each filter cartridge shall contain no less than 7 ft^2 of surface area per inch of length and have filtration membrane surface area and dry installation weight as follows (if length of filter cartridge is between those listed below, the surface area and weight shall be proportionate to the next length shorter and next length longer as shown below):

Filter Cartridge Length (in)	Minimum Filtration Membrane Surface Area (ft^2 / m^2)	Maximum Filter Cartridge Dry Weight (lbs / kg)
15 / 381	106 / 9.8	10.0 / 4.5
27 / 686	190 / 17.7	14.5 / 6.6
40 / 1016	282 / 26.2	19.5 / 8.9
54 / 1372	381 / 35.4	25.0 / 11.4

2.3.4. Backwashing Cartridges: The filter device shall have a weir extending above the cartridge deck, or other mechanism, that encloses the high flow rate filter cartridges when placed in their respective cartridge receptacles within the cartridge deck. The weir, or other mechanism, shall collect a pool of filtered water during inflow events that backwashes the high flow rate cartridges when the inflow event subsides. All filter cartridges and membranes shall be reusable and allow for the use of filtration membrane rinsing procedures to restore flow capacity and sediment capacity; extending cartridge service life.

2.3.5. Maintenance Access to Captured Pollutants: The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the deck. Access shall have a minimum clear height over all of the filter cartridges (length of cartridge + 6 inches), or be accessible by a hatch or other mechanism that provides vertical clear space over all of the filter cartridges such that the cartridges can be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

2.3.6. Baffle: The filter device shall provide a baffle that extends from the underside of the cartridge deck to a minimum length equal to the length of the membrane filter elements. The baffle shall serve to protect the membrane filter elements from

contamination by floatables and coarse sediment. The baffle shall be flexible and continuous in cylindrical configurations, and shall be a straight concrete or aluminum wall in rectangular configurations.

2.3.7. Sump: The device shall include a minimum 24 inches (610 mm) of sump below the bottom of the cartridges for sediment accumulation, unless otherwise specified by the design engineer. Depths less than 24 inches may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

2.3.8. Steps: Steps shall be constructed according to ASTM D4101 of copolymer polypropylene, and be driven into preformed or pre-drilled holes after the concrete has cured, installed to conform to applicable sections of state, provincial and municipal building codes, highway, municipal or local specifications for the construction of such devices.

2.3.9. Double-Wall Containment of Hydrocarbons: The cylindrical precast concrete device shall provide double-wall containment for hydrocarbon spill capture by a combined means of an inner wall of fiberglass, to a minimum depth of 12 inches (305 mm) below the cartridge deck, and the precast vessel wall.

2.4. Bend Structure: The device shall be able to be used as a bend structure with minimum angles between inlet and outlet pipes of 90-degrees or less in the stormwater conveyance system.

2.5. Frame and Cover: Frame and covers must be manufactured from cast-iron or other composite material tested to withstand H-20 or greater design loads, and as approved by the local regulatory body. Frames and covers must be embossed with the Contech or the Jellyfish brand name.

2.6. Doors and Hatches: If provided shall meet designated loading requirements or at a minimum for incidental vehicular traffic.

3. PERFORMANCE

3.1. Function: The Jellyfish filter shall function to remove pollutants by the following unit treatment processes; sedimentation, floatation, and membrane filtration.

3.2. Pollutants: The Jellyfish filter shall remove oil, debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.

3.3. Bypass: The Jellyfish filter shall typically utilize an external bypass to divert excessive flows. Where an internal bypass is utilized, systems shall be equipped with a floatables baffle, and bypass water shall not pass through the treatment sump or cartridge filtration zone.

3.4. Treatment Flux Rate (Surface Loading Rate): The Jellyfish filter shall treat 100% of the required water quality treatment flow based on a maximum design flux rate (surface

loading rate) across the membrane filter cartridges not to exceed 0.21 gpm/ft^2 (0.142 lps/m^2).

3.5. Field Testing: At a minimum, the Jellyfish filter shall have been field tested and verified with a minimum 25 qualifying storm events and field monitoring conducted according to the TARP Tier II or TAPE field test protocol, and have received NJCAT verification.

3.6. Suspended Solids Removal: The Jellyfish filter shall have demonstrated a minimum median TSS removal efficiency of 85% and a minimum median SSC removal efficiency of 95%.

3.7. Fine Particle Removal: The Jellyfish filter shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, an effluent d_{50} of 15 microns or lower for all monitored storm events, and an effluent turbidity of 15 NTUs or lower.

3.8. Nutrient (Total Phosphorus & Total Nitrogen) Removal: The Jellyfish filter shall have demonstrated a minimum median Total Phosphorus removal of 55%, and a minimum median Total Nitrogen removal of 50%.

3.9. Metals (Total Zinc & Total Copper) Removal: The Jellyfish filter shall have demonstrated a minimum median Total Zinc removal of 50%, and a minimum median Total Copper removal of 75%.

4. EXECUTION

4.1. Handling and Storage: Prevent damage to materials during storage and handling.

4.2. Precast Concrete Structure: The installation of the precast concrete device should conform to ASTM C891 and to any state highway, municipal or local specification for the installation of underground precast concrete structures, whichever is more stringent. Selected sections of a general specification that are applicable are summarized below.

4.2.1. The precast concrete device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber and cartridge deck riser section(s)
- bypass section
- connect inlet and outlet pipes
- concrete riser section(s) and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

4.2.2. The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with Contech's recommendations.

4.2.3. Adjustment of the Jellyfish filter can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary to restore original condition and seals. Once the Jellyfish filter has been constructed, any/all lift holes must be plugged with mortar or non-shrink grout.

4.3. Inlet and Outlet Pipes: Inlet and outlet pipes should be securely set into the device using approved pipe seals (flexible boot connections, where applicable), and such that any pipe intrusion into the device does not impact the device functionality.

4.4. Frame and Cover Installation: Adjustment units (e.g. grade rings) should be installed to set the frame and cover at the required elevation. The adjustment units should be laid in a full bed of mortar with successive units being joined using sealant recommended by Contech. Frames for the cover should be set in a full bed of mortar at the elevation specified.

4.5. In some instances the Maintenance Access Wall, if provided, shall require an extension attachment and sealing to the precast wall and cartridge deck at the job site, rather than at the precast facility. In this instance, installation of these components shall be performed according to instructions provided by Contech.

5. ACTIVATION, INSPECTION AND MAINTENANCE

5.1. Filter cartridges shall be installed in the cartridge deck in accordance with the manufacturer's guidelines and recommendations. Contractor to contact the manufacturer to schedule cartridge delivery and review procedures/requirements to be completed to the device prior to installation of the cartridges and activation of the system.

5.2. Manufacturer shall coordinate delivery of filter cartridges and other internal components with contractor. Filter cartridges shall be installed after site is stabilized and/or unit is isolated from construction influent and ready to accept cartridges. Unit is ready to accept cartridges after it has been cleaned out and any standing water, debris, and other materials have been removed. Contractor shall take appropriate action to protect the filter cartridge receptacles and filter cartridges from damage during construction, and in accordance with the manufacturer's recommendations and guidance. For systems with cartridges installed prior to full site stabilization, the contractor shall plug inlet and outlet pipes to prevent stormwater and other influent from entering the device. Plugs are to be removed once the site is stabilized and unit is ready to receive stormwater runoff.

5.3. Durability of membranes are subject to good handling practices during inspection and maintenance (removal, rinsing, and reinsertion) events, and site specific conditions that may have heavier or lighter loading onto the cartridges, and pollutant variability that may impact the membrane structural integrity. Membrane maintenance and replacement shall be in accordance with Contech's recommendations.

5.4. Inspection; which includes trash and floatables collection, sediment depth determination, and visible determination of backwash pool depth; shall be easily conducted from grade (outside the structure).

5.5. Manual rinsing of the reusable filter cartridges shall promote restoration of the flow capacity and sediment capacity of the filter cartridges, extending cartridge service life.

5.6. The filter device shall have a minimum 12 inches (610 mm) of sediment storage depth, and a minimum of 12 inches between the top of the sediment storage and bottom of the filter cartridge tentacles, unless otherwise specified by the design engineer. Variances may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

5.7. Sediment removal from the filter treatment device shall be able to be conducted using a standard maintenance truck and vacuum apparatus, and a minimum one point of entry to the sump that is unobstructed by filter cartridges.

5.8. Maintenance access shall have a minimum clear height over all of the filter cartridges (length of cartridge + 6 inches), or be accessible by a hatch or other mechanism that provides vertical clear space over all of the filter cartridges such that the cartridges can be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

5.9. After construction and installation, and during operation, the device shall be inspected and cleaned as necessary based on Contech's recommended inspection and maintenance guidelines and the local regulatory agency/body.

5.10. When replacement membrane filter elements and/or other parts are required, only membrane filter elements and parts approved by Contech for use with the Jellyfish filter shall be installed.

5.11. Filter cartridges shall be able to be maintained without the use of additional lifting equipment.

5.12. Contech shall provide an Owner's Manual upon request.

END OF SECTION