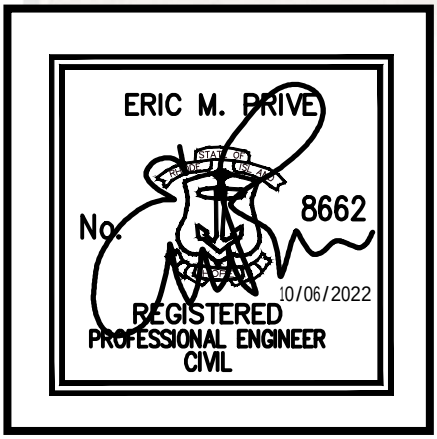
DiPrete Engineering

Stormwater Management Report



Fieldstone Farms

Located in South Kingstown, RI

Applicant: Old North Land Investments, LLC

4-08-2022

Revised: 9-02-2022

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Executive Summary

On behalf of Old North Land Investments, LLC, we are submitting drainage calculations for the proposed development located at the intersection of Old North Road and Stony Fort Road in South Kingstown, RI. The site is located on Assessors' Plat 16-4 Lot 9. The site has a total area of 118.60 acres, contains a 56.7 acres of wetland area and is covered by woods. Old North Land Investments, LLC is proposing the construction of 39 residential lots to be serviced by public water and private OWTS. The residential development includes sixteen (16) residential homes with frontage on Old North Road and Stony Fort Road. The remaining twenty three (23) lots will have access off of a new proposed roadway that will intersect with Stony Fort Road.

The development site is located within the Saugatucket Watershed and has a very large wetland complex that discharges to a stream system that ultimately discharges into the Saugatucket Pond which is located south of the development and south of Saugatucket Road. Post development storm water from the site will be treated for water quality using Best Management Practices (BMPs). The site has been designed to meet the Rhode Island Storm Water Design and Installation Manual (RISDISM). The groundwater table through the site ranges from 18"-24" and careful consideration was taken when the site was designed. The sixteen (16) residential homes with frontage on Old North Road and Stony Fort Road are designed with bio-retention areas to treat storm water and promote infiltration. Bio-retention systems promote pollutant removal of phosphorus, nitrogen, pathogens, and other metal removal such as Cadmium, Copper, Lead, and Zinc. Storm water runoff from the proposed roadway will be directed through a closed drainage network to a drainage area that includes a sediment forebay, sand filter, and detention basin. Fifteen (15) of the sixteen (16) homes with frontage along Old North Road and Stony Fort Road are proposed with private OWTS bottomless sand filter systems. The remaining twenty three (23) homes will be connected through a low pressure sewer service to a community OWTS system. All of the proposed OWTS systems are located greater than 150 feet from any wetland edge and they are also all proposed as denitrifying systems as required by RIDEM.

This report details how the proposed development will show no net increase in stormwater runoff from pre development to post development conditions, provide water quality treatment for stormwater runoff, as well as providing provisions for erosion control on site.

Pre development Conditions versus Post Development Conditions for each watershed are summarized below:

Watershed #1: (DP-1)

Conditions	1-Year	10-Year	100-Year
Pre Dev Summation	17.23 cfs	93.13 cfs	275.04 cfs
Post Dev Summation	18.08 cfs	91.73 cfs	267.35 cfs
Net Change	**+0.85 cfs**	**-1.4 cfs**	**-7.69 cfs**

(cfs = cubic feet per second)

Watershed #2: (DL-2)

Conditions	1-Year	10-Year	100-Year
Pre Dev Summation	0.28 cfs	4.90 cfs	19.97 cfs
Post Dev Summation	0.41 cfs	4.28 cfs	15.49 cfs
Net Change	**+0.13 cfs**	**-0.62 cfs**	**-4.48 cfs**

(cfs = cubic feet per second)

There is a minor increase in storm water flows for the 1-yr storm event due to uncontrolled areas within each watershed. These areas include impervious roof and driveway areas directed towards QPAs and lawn areas that cannot be controlled. There is insignificant discharge from the detention basin during the 1-yr storm event, which meets all channel protection volume requirements, and the storm water flow increase is due to the change in ground cover type in uncontrolled areas.

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

Fieldstone Farms	(RIDEM USE ONLY)
South Kingstown	STW/WQC File #:
39 Residential Subdivision with public water and private OWTS	Date Received:

Stormwater Management Plan (SMP) Elements – Minimum Standards

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

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

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)

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

SITE INFORMATION

☒ Vicinity Map

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

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

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

☐ Groundwater or Disconnected Wetland	☐ SRWP		
☐ Waterbody Name: Mitchell Brook/Unnamed	☒ Coldwater	☐ Warmwater	☐ Unassessed
☐ Waterbody ID: RI0010045R-03A/RI0010045R-054A	☐ 4th order stream of pond 50 acres or more		
☐ TMDL for: Fecal Coliform	☐ Watershed of flood prone river (e.g., Pocasset River)		
☐ Contributes to a priority outfall listed in the TMDL	☐ Contributes stormwater to a public beach		
☐ 303(d) list – Impairment(s) for: Fecal Coliform	☐ Contributes to shellfishing grounds		

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

PROJECT HISTORY		
☐ RIDEM Pre- Application Meeting	Meeting Date:	☐ Minutes Attached
☐ Municipal Master Plan Approval	Approval Date:	☐ Minutes Attached
☒ Subdivision Suitability Required	Approval #:32-209	
☐ Previous Enforcement Action has been taken on the property	Enforcement #:	

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

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

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

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

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

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)
This section may be deleted if not required.

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

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

A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS	
☒ Sensitive resource areas and site constraints are identified (required) ☒ Local development regulations have been reviewed (required) ☒ All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction ☐ Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. **Note:** If Conservation Development has been used, check box and skip to Subpart C ☒ As much natural vegetation and pre-development hydrology as possible has been maintained	

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

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

PART 3. SUMMARY OF REMAINING STANDARDS

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

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

Design Point	**Impervious Area Treated (sq ft)**	**Total Re_v Required (cu ft)**	**LID Stormwater Credits (see RISDISM Section 4.6.1)** **Portion of Re_v directed to a QPA (cu ft)**	**Recharge Required by Remaining BMPs (cu ft)**	**Recharge Provided by BMPs (cu ft)**
DP-1:	195,715	5,710		5,710	13,155
DP-2:	8,145	240		240	0
TOTALS:	203,860	5,950		5,950	13,155

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

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.): Section 3.2 of the Stormwater Report

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

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

Design Point and WB ID	Impervious area treated (sq ft)	Total WQ_v Required (cu ft)	LID Stormwater Credits (see RICR 8.18) WQv directed to a QPA (cu ft)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
DP-1:	195,715	16,310	3,155	13,155	13,155
DP-2:	8,145	678	678	0	0
TOTALS:	203,860	16,988	3,833	13,155	13,155

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

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

☒ Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):
Stormwater Report section 3.3 and HydroCAD print outs Section A3.3

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

TABLE 4-1: Summary of Channel Protection Volumes (see RICR 8.10)					
Design Point	**Receiving Water Body Name**	**Coldwater Fishery? (Y/N)**	**Total CPv Required (cu ft)**	**Total CPv Provided (cu ft)**	**Average Release Rate Modeled in the 1-yr storm (cfs)**
DP-1:	Mitchell Brook	Y	19,282	27,018	0.21
DP-2:	Unnammed Tributary to Saugatucket River	Y	0	0	N/A
TOTALS:			19,282	27,018	0.21
Note: The Channel Protection Volume Standard must be met in each waterbody ID.					
☒ YES ☐ NO	The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM).				
☐ YES ☒ NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; If "Yes," please indicate restrictions and solutions below. System fully infiltrates the CPv volume additional volume above the CPv is also released at a uniform rate. The site meets the requirements of CPv and requirements for a cold water fisheries.				
☐ Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).					

OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5			
YES	**NO**		
☐	☒	Is this standard waived? If yes, please indicate one or more of the reasons below:	
		☐	The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters.
		☐	A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks).
☐	☒	Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows:	
		☐	RIDOT
		☐	Other (specify):
Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be **less** than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4.			
		Indicate below which model was used for your analysis. ☐ TR-55 ☐ TR-20 ☒ HydroCAD ☐ Bentley/Haestad ☐ Intellisolve ☐ Other (Specify):	
YES	**NO**		
☒	☐	Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If "No," please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.):	
☐	☒	Do off-site areas contribute to the sub-watersheds and design points? If "Yes,"	
☐	☒	Are the areas modeled as "present condition" for both pre- and post-development analysis?	
☒	☐	Are the off-site areas shown on the subwatershed maps?	
☒	☐	Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff?	
☐	☒	Is a Downstream Analysis required (see RICR 8.11.E.1)?	
☐	☐	Calculate the following:	
		☒	Area of disturbance within the sub-watershed (areas) 24.49
		☒	Impervious cover (%) 23%
☐	☒	Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)?	
☒	☐	Does this project meet the overbank flood protection standard?	

Table 5-1 Hydraulic Analysis Summary								
Subwatershed (Design Point)	**1.2" Peak Flow** (cfs) **		**1-yr Peak Flow** (cfs)		**10-yr Peak Flow** (cfs)		**100-yr Peak Flow** (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
DP-1:	0.59	0.87	17.23	18.08	93.13	91.73	275.04	267.35
DP-2:	0.00	0.15	0.28	0.41	4.90	4.28	19.97	15.79
TOTALS:	0.59	1.02	17.51	18.49	98.03	96.01	295.01	283.14

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

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

Indicate as follows where the pertinent calculations and/or information for the items above are provided	**Name of report/document, page numbers, appendices, etc.**
Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations.	Section A3.5.4.x SWMR and Watershed Maps
Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations.	Section A3.5.4.x SWMR and Watershed Maps
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.	Section A3.5.4.x SWMR and Watershed Maps
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).	Section A3.5.4.x SWMR and Watershed Maps

Table 5-2 Summary of Best Management Practices											
BMP ID	**DP #**	**BMP Type** (e.g., bioretention, tree filter)	**BMP Functions**					**Bypass Type**	**Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4**		
			Pre-Treatment (Y/N/NA)	Re_v	WQ_v	CP_v (Y/N/NA)	Overbank Flood Reduction (Y/N/NA)	External (E) Internal (I) or NA	Yes /No	Technical Justification (Design Report page number)	Distance Provided
Sand Filter	1	Sand filter	Y	Y	Y	Y	NA	E	Y		
Basin 1	1	Detention Basin	N/A	N/A	N/A	CPv	Y	N/A	Y		
L1&2	1	Bioretention	Y	Y	Y	N/A	Y	N/A	Y		
L1&2	1	Stone Trench	N/A	Y	Y	N/A	Y	N/A	Y		
L3	1	Bioretention	Y	Y	Y	N/A	Y	N/A	Y		
L3	1	Stone Trench	N/A	Y	Y	N/A	Y	N/A	Y		
L4&5	1	Bioretention	Y	Y	Y	N/A	Y	N/A	Y		
L6&7	1	Bioretention	Y	Y	Y	N/A	Y	N/A	Y		
L8&9	1	Bioretention	Y	Y	Y	N/A	Y	N/A	Y		
L8	1	Drywell	N/A	Y	Y	N/A	Y	N/A	Y		
L10&L11	1	Bioretention	Y	Y	Y	N/A	Y	N/A	Y		

Table 5-2 Summary of Best Management Practices											
BMP ID	**DP #**	**BMP Type** (e.g., bioretention, tree filter)	**BMP Functions**					**Bypass Type**	**Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4**		
			Pre-Treatment (Y/N/NA)	Re_v	WQ_v	CP_v (Y/N/NA)	Overbank Flood Reduction (Y/N/NA)	External (E) Internal (I) or NA	Yes /No	Technical Justification (Design Report page number)	Distance Provided
L10&L11	1	Stone Trench	N/A	Y	Y	N/A	Y	N/A	Y		
L12&L13	1	Bioretention	Y	Y	Y	N/A	Y	N/A	Y		
L12&L13	1	Stone Trench	N/A	Y	Y	N/A	Y	N/A	Y		
L13	1	Drywell	N/A	Y	Y	N/A	Y	N/A	Y		
L14	1	Stone Trench	N/A	Y	Y	N/A	Y	N/A	Y		
L14	1	Drywell	N/A	Y	Y	N/A	Y	N/A	Y		
L15	1	Drywell	N/A	Y	Y	N/A	Y	N/A	Y		
L16	1	Stone Trench	N/A	Y	Y	N/A	Y	N/A	Y		
L16	1	Drywell	N/A	Y	Y	N/A	Y	N/A	Y		

Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	BMP ID	BMP Type (e.g., bioretention, tree filter)	Soils Analysis for Each BMP						
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	Exfiltration Rate Applied (in/hr)
			Primary	Secondary					
1	Sand Filter	Sand filter	#1B	#1A	230	233	3	B	1.02
1	Basin 1	Detention Basin	#1B	#1A	230	230	0	B	N/A
1	L1&2	Bioretention	07-4	07-11	232.25	235.75	3.5	B	1.02
1	L1	Stone Trench	1-2	1-1	238.50	239.50	1.0**	B	1.02
1	L3	Bioretention	14-1	14-2	239	242.50	3.5	B	1.02
1	L3	Stone Trench	14-1	14-2	240.5	241.5	1.0**	B	1.02
1	L4&5	Bioretention	2012-1	2012-5	244.3	248.0	3.7	B	1.02
1	L6&7	Bioretention	2012-10	2012-32	248.83	253.50	4.6	B	1.02
1	L8&9	Bioretention	2012-17	2012-16	253.33	257.00	3.6	B	1.02
1	L8	Drywell	2012-17	2012-16	249.75	251.75	2.0	B	1.02
1	L10&L11	Bioretention	2012-29	2012-30	257.41	261.75	4.34	B	1.02
1	L10&L11	Stone Trench	2012-24	2012-25	257.25	259.25	2.0	B	1.02
1	L12&L13	Bioretention	28-4	28-3	260.5	264.75	4.25	B	1.02
1	L12&L13	Stone Trench	28-1	28-2	260.25	263.00	2.75	B	1.02
1	L13	Drywell	28-4	28-3	255.5	260.0	4.5	B	1.02
1	L14	Stone Trench	OS-1	29-1	263.5	265.5	2.0	B	1.02
1	L14	Drywell	OS-1	29-1	263.5	265.5	2.0	B	1.02
1	L15	Drywell	29-1	29-2	258.0	261.0	3.0	B	1.02
1	L16	Stone Trench	29-1	29-2	256.5	257.5	2.0	B	1.02
1	L16	Drywell	29-1	29-2	256.0	258.0	2	B	1.02
		TOTALS:							

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

** See Section 3.3 in the stormwater report for stone infiltration trench gwt separation explanation.

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	**NO**	**N/A**	
☐	☐	☒	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
☐	☐	☒	Are these activities already covered under an MSGP? If "No," please explain if you have applied for an MSGP or intend to do so?
☐	☐	☒	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, "Acceptable BMPs for Use at LUHPPLs." Please list BMPs:

☐	☐	☒	Additional BMPs, or additional pretreatment BMP's if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

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

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

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9

Operation and Maintenance Section		
YES	**NO**	
☒	☐	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
☒	☐	Have you provided a **separately-bound** Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
☒	☐	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not?
☒	☐	Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's? If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.).
☐	☒	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If "Yes," have you obtained them? Or please explain your plan to obtain them:
☐	☒	Is stormwater being directed from public areas to private property? If "Yes," note the following: Note: This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.
Pollution Prevention Section		
☒	☐	Designated snow stockpile locations?
☒	☐	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
☒	☐	Asphalt-only based sealants?
☐	☒	Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
☒	☐	Regular sweeping? Please describe: Part of O&M
☒	☐	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
☒	☐	A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)		
YES	**NO**	
☒	☐	Existing and proposed drainage area delineations
☒	☐	Locations of all streams and drainage swales
☒	☐	Drainage flow paths, mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in RISDISM Appendix K)
☒	☐	Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable
☒	☐	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report
☒	☐	Mapped seasonal high-water-table test pit locations
☒	☐	Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs

☒	☐	Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans	
☒	☐	Mapped bedrock outcrops adjacent to any infiltration BMP	
☒	☐	Soils were logged by a:	
		☒	DEM-licensed Class IV soil evaluator Name: Chris Sutter (D-4077)
		☐	RI-registered P.E. Name:

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	**First Receiving Water ID or MS4**	**Area Disturbed (acres)**	**Existing Impervious (acres)**	**Proposed Impervious (units)**
DP-1:	Mitchell Brook (RI0010045R-03A)	19.12	0.00	5.40
DP-2:	Unnamed Stream (RI0010045R-054A)	5.37	0.00	0.19
TOTALS:		24.49	0.00	5.59

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

1.0 Project Description

The purpose of this report is to specify a "Storm Water Management System" and a "Soil Erosion and Sediment Control Plan" to be implemented in the construction and maintenance of Fieldstone Farms Subdivision located at the intersection of Old North Road and Stony Fort Road in South Kingstown, Rhode Island.

The major subdivision is located on South Kingstown Assessors Plat 16-4 Lot 9. The owner and applicant of the residential development is Old North Land Investments, LLC. The site has a total area of 118.60 acres and contains a 56.7 acres of wetland area. The property is zoned residential R-40 and is surrounded by R-30 and Government and Institutional Zoning. The surrounding areas are serviced by wells, public water, private OWTS, and above ground utilities. The site is entirely wooded with a large wetland complex located through the central area of the site. The wetland edges were delineated by Natural Resource Services, Inc. and field located by DiPrete Engineering. The wetland edges were verified by RIDEM under application #06-0374. The site is located in FEMA flood zone X and this zone is where minimal flooding occurs. The site has a mixture soil types which are classified as B & D soils. All of the proposed development is located within the area of B Soils. These B soils include Scio soils and Narragansett soils which both are suitable for development.

The proposed development includes a total of thirty nine (39) residential lots and is designed as a flexible design residential project. Sixteen (16) residential homes are proposed with frontage on Old North Road and Stony Fort Road. The remaining twenty three (23) lots will have access off of a new proposed roadway that will intersect with Stony Fort Road. The storm water quality will be improved by utilizing Best Management Practices (BMPs) as established by the RISDISM for the treatment of storm water runoff from the proposed development. Storm water from the residential homes and driveways with frontage on Old North Road and Stony Fort Road are designed with bio-retention areas to treat storm water and promote infiltration. Storm water runoff from the proposed roadway will be directed through a closed drainage network to a drainage area that includes a sediment forebay, sand filter, and detention basin. The system has been designed to meet the RIDEM Stormwater Design and Installations Standards Manual November 2018.

2.0 Site Conditions

2.1 SOILS

The following are soil types identified within the analyzed area of the Site as mapped by the NRCS USDA Soil Conservation service:

Soil Symbol	Description	Hydrologic Group
NbB	Narragansett very stony silt loam, 0 to 8% slopes	B
Rf	Ridgebury, Whitman, and Leicester extremely stony fine sandy loams	D

ScA	Scio silt loam, 0 to 3 percent slopes	B
SdB	Scio very stony silt loam, 0 to 8 percent slopes	B

Site specific soil evaluations can be found in Appendix A2.1.

2.2 EXISTING SITE CONDITIONS

The development is located on South Kingstown Assessors Plat 16-4 Lot 9. The site has a total area of 118.60 acres, contains 56.7 acres of wetland area. The site is located within the Saugatucket River Watershed. The property is zoned residential R-40 and is surrounded by R-30 and Government and Institutional Zoning. The surrounding areas are serviced by wells, public water, private OWTS, and above ground utilities. The site is entirely wooded with a large wetland complex located through the central area of the site. The wetland edges were delineated by Natural Resource Services, Inc. and field located by DiPrete Engineering. The wetland edges were verified by RIDEM under application #06-0374. The site is located in FEMA flood zone X and this zone is where minimal flooding occurs. The site has a mixture soil types which are classified as B & D soils. All of the proposed development is located within the area of B Soils. These B soils include Scio soils and Narragansett soils which both are suitable for development.

2.3 POST SITE CONDITIONS

The proposed drainage analysis uses stormwater management systems to control and treat runoff from the proposed development. All of the homes with frontage on Old North Road will have bio-retention areas to treat and control storm water runoff from proposed house roofs and driveways to the maximum extent practicalbe. Stone trenches, drywells, and QPAs have also been proposed on these lots to capture the remaining impervious area runoff that could not be directed to the bioretention areas. Storm water runoff from the proposed roadway and remaining homes will be conveyed by a closed drainage network to a sediment forebay, sand filter, and detention basin. All storm water runoff is directed to an existing wetland that is great than 50 acres in size and the length of the system conveying the water is approximately 3,000 linear feet.

The following BMP's are used on site and have been designed to include the following elements:

- Bio Retention Areas
    - Equipped with grass filter strip for pretreatment
    - 2.75' of bioretention soil under bioretention areas for stormwater filtration with 3" of mulch.
    - Stores 75% of WQv
    - Maximum 9" of Ponding
    - Emergency overflow weir
- Drywells

    - Treatment of roof runoff only so no pretreatment required
    - Fully infiltrate the water quality storm
- Stone Infiltration Trench
    - Provides water quality treatment
- QPA's
    - Provides water quality treatment
    - 5% slope maximum
    - Sized per RISDISM
- Open Channels (Swales)
    - Provide conveyance of stormwater
    - Pretreatment when travel time is greater than 4 minutes
- Sand Filter
    - Equipped with sediment forebay for pretreatment
    - 2.5' of filter media which shall be ASTM C-33 sand for sand filters with 6" of Loam and Seed.
    - Stores 75% of WQv
    - Safely convey the 100 year storm.
- Extended Detention Basin
    - All stormwater is treated before entering the stormwater basin
    - Stores Channel Protection Volume (CPv)
    - Provided Overbank Flood Protection (Qp) for the 2-100 year storm events

The above elements will be used to meet the design standards of the Rhode Island Stormwater Design and Installation Standard.

The primary goal of increasing water quality treatment is accomplished by providing water quality BMPs. Stormwater runoff mitigation is provided through the use of bio retention areas, stone infiltration trenches, drywells, sediment forebay, sand filter and a detention pond. By reducing post development stormwater flow rate to a level no greater than the pre development rate for all storm events besides the 1-yr storm, the second goal of the proposed drainage system is achieved. Any potential impact from the proposed development on the abutting properties and wetlands has been mitigated.

There is a minor increase in storm water flows for the 1-yr storm event due to uncontrolled areas within each watershed. These areas include impervious areas directed to QPAs and lawn areas that cannot be controlled. There is insignificant discharge from the detention basin during the 1-yr storm event, which meets all channel protection volume requirements, and the storm water flow increase is due to the change in ground cover type in uncontrolled areas. The wetland on site has a total area of 56.7 acres and there is 0.227 af of volume increase which will result in an additional 0.06" over the entire wetland area which is negligible.

3.0 Minimum Standards

The site has been designed to meet the minimum standards as outlined in the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM) dated November 2018. The following sections outline how the site meets and exceeds the minimum required standards.

3.1 Minimum Standard 1: LID Site Planning and Design Strategies

See Section "Appendix A: Stormwater Management Checklist" from the RISDISM

3.2 Minimum Standard 2: Groundwater Recharge

Groundwater is to be recharged per watershed based impervious area coverage in accordance with section 3.2.2 of the RISDISM.

Groundwater recharge is determined from the following equation:
Re_v=1"*F*I/12

Where:

Re_v=Groundwater Recharge Volume (ac-ft)

F=Recharge Factor based on Hydrologic Soil Groups (HSG) (see table below)

I=Impervious Area (acres)

HSG	Recharge Factor (F)
A	0.60
B	0.35
C	0.25
D	0.10

Watershed	HSG	F	I (Acres)	Re_v	Re_v Provided
1	B	0.35	4.493	0.131	0.316
2	B	0.35	0.187	0.005	0.000

Recharge volume for watershed 1 is provided through the use of bio-retention areas, drywells, stone trenches, and a sand filter. Recharge volume is not met within watershed 2 because it is an uncontrolled watershed that contains a small amount of proposed roadway, proposed homes, lawn areas, and driveways. We have provided more than double the required recharge volume for watershed 1. Watershed 1 and watershed 2 although analyzed separately ultimate discharge to the same watershed, the Saugatucket River Watershed.

The required recharge volume is based on all impervious area, not just areas which are captured in the proposed BMPs.

See Appendix A3.2 for the water quality storm HydroCAD analysis. The water quality storm is calculated in HydroCAD using the 'calculate separate Pervious/Impervious runoff' option.

3.3 Minimum Standard 3: Water Quality

All stormwater is treated through an approved BMP before being discharged. This site has been designed to use drywells, QPAs, stone infiltration trenches, grass filters strips, bio-retention areas, sediment forebays, and a sand filter to treat stormwater before being discharged to the wetland area. Bio-retention areas are proposed for all the residential lots on Old North Road and drywells, QPA's and stone infiltration trenches are proposed when necessary. Each of these bio-retention areas will have grass filter strips providing pre-treatment to storm water prior to entering the bio-retention area. See bio retention and sand filter design sheets for water quality requirements. Stormwater for the remainder of the residential development will be directed to the proposed roadway and then conveyed by a closed drainage network to a sediment forebay and sand filter that will provide pre-treatment prior to entering the detention basin. The backs of the residential homes including the lawn areas will receive pre-treatment through the existing wooded areas that are considered qualified pervious areas and are well oversized per RIDEM sizing requirements. The site has two design points. The design points discharge to Mitchell Brook and an unnamed stream. Both streams eventually combine with the Saugatucket River. Mitchell Brook and the Saugatucket River are both impaired for Fecal Coliform. The water quality BMPs have been designed to filter and infiltrate the water quality storm to eliminate Fecal Coliform runoff from the proposed development.

Sand Filter Calculations

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Sand Filter Sizing

Name of Sand Filter: Sand Filter

Sand Filter Parameters		
At,Total Area to Sand Filter	10.100	(Acres)
Impervious Area To Sand Filter	2.269	(Acres)
d_f, Filter Bed Depth	2.50	(feet)
k, Coefficient of Permeability	3.5	(ft/day)
h_f, Average Height of Water	0.25	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	6	(in)
Loam Depth	6	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 8,236 (Cubic Feet)

Minimum Size of Sand Filter Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 1,070 (Square Feet) Where A_f is the required filter bed area

Provided Af= 2,990 (Square Feet)

Sand Filter Pre Treatment

Type of Pre Treatment: Sediment Forebay

As=5,750*Q Q=%WQv/86,400 %WQv=25%

Required As= 137 (Square Feet), where As is the required forebay Area

Provided As= 710 (Square Feet)

25% of Water Quality Volume must be provided in Forebay

Required Volume= 2,059 (Cubic Feet)

Provided Volume= 2,132 (Cubic Feet)

Required Water Quality Volume

75% of the WQv must be held within system (including forebay)

Required WQ_v 6,177 (Cubic Feet)

Volume of Loam	493 (Cubic Feet)
Volume of Forebay	2,132 (Cubic Feet)
Volume of Ponding	1,583 (Cubic Feet)
Volume of Voids in Filter Bed	2,467 (Cubic Feet)
Total	**6,675 (Cubic Feet)**

Bio Retention Calculations

Bio-retention calculations were completed for proposed residential lots 1-16. Each of the proposed lots and bio retention areas were sized per RISDISM and modeled in HydroCAD to ensure a maximum of 9 inches of ponding and 6 inches of freeboard. When possible, the front of the proposed homes and a portion of the proposed driveways will be directed to these bio retention areas. The house foot prints and driveway's locations are subject to change at time of construction and bioretention areas must be resized if necessary.

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Bioretention Sizing

Name of Bioretention: L1&2

Bioretention Parameters		
At,Total Area to Bioretention	0.973	(Acres)
Impervious Area To Bioretention	0.317	(Acres)
d_f, Filter Bed Depth	2.75	(feet)
k, Coefficient of Permeability	1.0	(ft/day)
h_f, Average Height of Water	0.38	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	9	(in)
Mulch Depth	3	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 1,151 (Cubic Feet)

Minimum Size of Bioretention Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 506 (Square Feet) Where A_f is the required filter bed area

Provided Af= 1,245 (Square Feet)

Bioretention Pre Treatment

Type of Pre Treatment: Grass Filter Strip

The pretreatment for the Bioretention is provided through a grass filter strip designed per section 6.3 of the RISDISM

Required Water Quality Volume

75% of the WQv must be held within system

Required WQ_v 863 (Cubic Feet)

Volume of Mulch	103 (Cubic Feet)
Volume of Ponding	1,517 (Cubic Feet)
Volume of Voids in Filter Bed	1,130 (Cubic Feet)
Total	**2,749 (Cubic Feet)**

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Bioretention Sizing

Name of Bioretention: L3

Bioretention Parameters		
At,Total Area to Bioretention	0.147	(Acres)
Impervious Area To Bioretention	0.089	(Acres)
d_f, Filter Bed Depth	2.75	(feet)
k, Coefficient of Permeability	1.0	(ft/day)
h_f, Average Height of Water	0.38	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	9	(in)
Mulch Depth	3	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 323 (Cubic Feet)

Minimum Size of Bioretention Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 142 (Square Feet) Where A_f is the required filter bed area

Provided Af= 431 (Square Feet)

Bioretention Pre Treatment

Type of Pre Treatment: Grass Filter Strip

The pretreatment for the Bioretention is provided through a grass filter strip designed per section 6.3 of the RISDISM

Required Water Quality Volume

75% of the WQv must be held within system

Required WQ_v 242 (Cubic Feet)

Volume of Mulch	36 (Cubic Feet)
Volume of Ponding	353 (Cubic Feet)
Volume of Voids in Filter Bed	391 (Cubic Feet)
Total	**779 (Cubic Feet)**

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Bioretention Sizing

Name of Bioretention: L4&5

Bioretention Parameters		
At,Total Area to Bioretention	0.423	(Acres)
Impervious Area To Bioretention	0.234	(Acres)
d_f, Filter Bed Depth	2.75	(feet)
k, Coefficient of Permeability	1.0	(ft/day)
h_f, Average Height of Water	0.38	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	9	(in)
Mulch Depth	3	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 849 (Cubic Feet)

Minimum Size of Bioretention Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 374 (Square Feet) Where A_f is the required filter bed area

Provided Af= 1,362 (Square Feet)

Bioretention Pre Treatment

Type of Pre Treatment: Grass Filter Strip

The pretreatment for the Bioretention is provided through a grass filter strip designed per section 6.3 of the RISDISM

Required Water Quality Volume

75% of the WQv must be held within system

Required WQ_v 637 (Cubic Feet)

Volume of Mulch	112 (Cubic Feet)
Volume of Ponding	1,144 (Cubic Feet)
Volume of Voids in Filter Bed	1,236 (Cubic Feet)
Total	**2,492 (Cubic Feet)**

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Bioretention Sizing

Name of Bioretention: L6&7

Bioretention Parameters		
At,Total Area to Bioretention	0.340	(Acres)
Impervious Area To Bioretention	0.187	(Acres)
d_f, Filter Bed Depth	2.75	(feet)
k, Coefficient of Permeability	1.0	(ft/day)
h_f, Average Height of Water	0.38	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	9	(in)
Mulch Depth	3	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 679 (Cubic Feet)

Minimum Size of Bioretention Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 299 (Square Feet) Where A_f is the required filter bed area

Provided Af= 2,274 (Square Feet)

Bioretention Pre Treatment

Type of Pre Treatment: Grass Filter Strip

The pretreatment for the Bioretention is provided through a grass filter strip designed per section 6.3 of the RISDISM

Required Water Quality Volume

75% of the WQv must be held within system

Required WQ_v 509 (Cubic Feet)

Volume of Mulch	188 (Cubic Feet)
Volume of Ponding	1,972 (Cubic Feet)
Volume of Voids in Filter Bed	2,064 (Cubic Feet)
Total	**4,223 (Cubic Feet)**

Bioretention Sizing

Name of Bioretention: L8&9

Bioretention Parameters		
At,Total Area to Bioretention	0.318	(Acres)
Impervious Area To Bioretention	0.176	(Acres)
d_f, Filter Bed Depth	2.75	(feet)
k, Coefficient of Permeability	1.0	(ft/day)
h_f, Average Height of Water	0.38	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	9	(in)
Mulch Depth	3	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 639 (Cubic Feet)

Minimum Size of Bioretention Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 281 (Square Feet) Where A_f is the required filter bed area

Provided Af= 1,490 (Square Feet)

Bioretention Pre Treatment

Type of Pre Treatment: Grass Filter Strip

The pretreatment for the Bioretention is provided through a grass filter strip designed per section 6.3 of the RISDISM

Required Water Quality Volume

75% of the WQv must be held within system

Required WQ_v 479 (Cubic Feet)

Volume of Mulch	123 (Cubic Feet)
Volume of Ponding	1,294 (Cubic Feet)
Volume of Voids in Filter Bed	1,352 (Cubic Feet)
Total	**2,769 (Cubic Feet)**

Bioretention Sizing

Name of Bioretention: L10&11

Bioretention Parameters		
At,Total Area to Bioretention	0.340	(Acres)
Impervious Area To Bioretention	0.187	(Acres)
d_f, Filter Bed Depth	2.75	(feet)
k, Coefficient of Permeability	1.0	(ft/day)
h_f, Average Height of Water	0.38	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	9	(in)
Mulch Depth	3	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 679 (Cubic Feet)

Minimum Size of Bioretention Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 299 (Square Feet) Where A_f is the required filter bed area

Provided Af= 2,274 (Square Feet)

Bioretention Pre Treatment

Type of Pre Treatment: Grass Filter Strip

The pretreatment for the Bioretention is provided through a grass filter strip designed per section 6.3 of the RISDISM

Required Water Quality Volume

75% of the WQv must be held within system

Required WQ_v 509 (Cubic Feet)

Volume of Mulch	188 (Cubic Feet)
Volume of Ponding	1,972 (Cubic Feet)
Volume of Voids in Filter Bed	2,064 (Cubic Feet)
Total	**4,223 (Cubic Feet)**

Bioretention Sizing

Name of Bioretention: L12&13

Bioretention Parameters		
At,Total Area to Bioretention	0.297	(Acres)
Impervious Area To Bioretention	0.177	(Acres)
d_f, Filter Bed Depth	2.75	(feet)
k, Coefficient of Permeability	1.0	(ft/day)
h_f, Average Height of Water	0.38	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	9	(in)
Mulch Depth	3	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 643 (Cubic Feet)

Minimum Size of Bioretention Filter Area

$A_f=(WQ_v)x(d_f)/[(k)x(h_f+d_f)(t_f)]$

Required Af= 283 (Square Feet) Where A_f is the required filter bed area

Provided Af= 1,820 (Square Feet)

Bioretention Pre Treatment

Type of Pre Treatment: Grass Filter Strip

The pretreatment for the Bioretention is provided through a grass filter strip designed per section 6.3 of the RISDISM

Required Water Quality Volume

75% of the WQv must be held within system

Required WQ_v 482 (Cubic Feet)

Volume of Mulch	150 (Cubic Feet)
Volume of Ponding	1,497 (Cubic Feet)
Volume of Voids in Filter Bed	1,652 (Cubic Feet)
Total	**3,299 (Cubic Feet)**

Drywells

Drywells are proposed for roof areas that could not be captured by bioretention areas nor QPAs. Drywells have been sized in HydroCAD to fully infiltrate the water quality storm. Elevations of the drywells have been provided on the plans but are subject to change based on individual lot grading.

Drywell Lot	Depth	Length x Width
8	0.5 FT	10 FT X 9 FT
13	0.5 FT	10 FT X 9 FT
14	0.5 FT	13 FT X 13 FT
15	1 FT	8 FT X 8 FT
16	3 SF	7 FT X 7 FT

QPA's

QPA's were designed per RIDEM stormwater manual, section 4.6.1.1 to treat the rear half of roof areas and some driveways to the maximum extent practicable. The area of proposed impervious was used as the minimum area of proposed QPAs. QPAs that deviate from RIDEM requirements are due to space constraints. Where possible, QPAs are larger than required.

QPA	Proposed Impervious Area	Minimum Length Required	Minimum Width Required	Provided QPA Surface Area	Slope
1A	445 SF	33.46 FT	28 FT	952 SF	-4.69%
1B	755 SF	56.77 FT	50 FT	2,860 SF	-4.41%
2A	755 SF	56.77 FT	50 FT	2,860 SF	-4.29%
2B	445 SF	33.46 FT	28 FT	1,416 SF	-4.15%
3A	445 SF	33.46 FT	28 FT	1,313 SF	-2.80%
3B	755 SF	56.77 FT	50 FT	2,860 SF	-2.53%
4A	445 SF	33.46 FT	28 FT	2,012 SF	-1.87%
4B	755 SF	56.77 FT	50 FT	2,860 SF	-2.53%
5A	755 SF	56.77 FT	50 FT	2,860 SF	-1.68%
5B	445 SF	33.46 FT	28 FT	2,012 SF	-3.33%
6A	445 SF	33.46 FT	28 FT	1,670 SF	-2.57%
6B	755 SF	56.77 FT	50 FT	2,860 SF	-2.34%
6C	755 SF	70.00 FT	20 FT	2,075 SF	-2.34%
7A	755 SF	56.77 FT	50 FT	2,860 SF	-2.26%
7B	445 SF	33.46 FT	28 FT	1,670 SF	-2.26%
8A	755 SF	56.77 FT	50 FT	2,860 SF	-2.26%
8B	1,817 SF	113.77 SF	20 FT	2,508 SF	-1.61%
9A	755 SF	56.77 FT	50 FT	2,860 SF	-2.13%
9B	445 SF	33.46 FT	28 FT	1,670 SF	-2.84%
10A	445 SF	33.46 FT	28 FT	1,670 SF	-2.13%
10B	755 SF	56.77 FT	50 FT	2,860 SF	-2.02%
11A	755 SF	56.77 FT	50 FT	2,860 SF	-2.09%

11B	445 SF	33.46 FT	28 FT	1,670 SF	-2.52%
12A	445 SF	33.46 FT	28 FT	1,670 SF	-2.85%
12B	755 SF	56.77 FT	50 FT	2,860 SF	-2.71%
13	445 SF	33.46 FT	28 FT	1,670 SF	-1.87%
14	770 SF	57.89 FT	70 FT	4,192 SF	-3.12%
15A	794 SF	59.70 FT	70 FT	5,777 SF	-2.20%
15B	2,575 SF	171,70 FT	16 FT	7,149 SF	-1.99%
16	794 SF	59.70 FT	70 FT	6,929 SF	-1.15%

Stone Infiltration Trench

Stone trenches are proposed for driveway areas that could not be captured by bioretention areas nor QPAs. Stone trenches have been sized in HydroCAD to fully infiltrate the water quality storm. Stone trenches are to be 5 feet wide and along the length of driveway that is to be captured. See plans for depths, lengths, and locations. Due to 18" groundwater tables throughout the site, it was not possible to maintain 2 feet of separation for the total length of the stone trenches. Rather than ending the stone trench at the 2 feet of separation, we proposed stone trenches along the total length of the driveway in order to provide treatment to the maximum extent practicable.

3.4 Minimum Standard 4: Conveyance and Natural Channel Protection

Drainage Network Design Parameters:

A. PIPES

- All drainage pipes are RCP or equivalent unless otherwise noted.
- Manning's coefficient = 0.013
- Diameters & lengths as specified
- The 25-year design storm is utilized for the drainage pipe design to ensure that the drainage system contains and channels water to the BMP areas as shown on the plans.
- The rational method has been used for the closed drainage system.

B. STRUCTURES

- Catch basins – Pre-cast concrete with 4' sump unless otherwise noted and inverts as specified
- Manholes – Pre-cast concrete with inverts as specified.

Channel Protection Volume:

The detention basins have been designed to release the 1 year storm volume over a 24 hour time span in accordance with Section 3.2.4 of the RISDISM and RISDISM Guidance for Natural Channel Protection dated June 14, 2017.

The Channel Protection Volume is determined from the following equation:

$CP_V=0.65V_r$

CP_V=required channel protection storage volume
V_r=runoff volume from the 1-year, 24-hour storm (obtained from HydroCAD)
Average release rate, $CP_{qavg}=0.65*V_r/T$

Max Release Rate=CP_{qmax}=2*CP_{qavg}
T=extended detention time (24 hours)

The orifice(s) has been sized using HydroCAD to have a max rate twice the average.

CPv Provided by BMP per Receiving Waterbody
Waterbody 1:

BMP / Subcatchment	V_r (cf) To BMPs	CP_v (cf) Required (0.65* V_r)	CP_v (cf) BMP Volume Infiltrated	CP_V (cf) Released by CP_V Orifice	CP_V (cf) Total	CP_V Storage Elev.	Required Max Release Rate (cfs)	Provided Max Release Rate (cfs)
1	29,664	19,282	20,255	6,763	27,018	231.50	0.45	0.21

Infiltration is provided within the bio retention areas and the sand filter. The WQ BMPs infiltrate the required CPv volume. Additional CPv is provided within the detention basin.

See Appendix A3.5.4.2 for the 1-year storm event HydroCAD analysis.

3.5 Minimum Standard 5: Overbank Flood Protection & Downstream Analysis

3.5.1 Method of Analysis

USDA Soil Conservation Service Method as defined by Technical Release No. 20 (TR-20) determines Stormwater runoff rate and volume. Type III rainfall distribution is utilized. Time of concentration is determined using Technical Release No 55 (TR-55) methodology, through the computer program *HydroCAD ver. 9.0* by Applied Microcomputer Systems.

The drainage system has been designed to mitigate all stormwater flows for the 10 and 100 year storm events. The emergency outlets have been sized to handle the 100 year storm event.

3.5.2 Design Storm

Analysis of 1-year, 10-year, and 100-year frequency storms are included. The following 24-hour rainfall intensities are obtained from the Rhode Island Stormwater Design and Installation Standards Manual November 2018,

Table 3-1 for Washington County.

1 year = 2.8 inches
10 year = 4.9 inches
100 year= 8.5 inches

3.5.3 Design Point Breakdown

The site is analyzed as two watersheds but ultimately all storm water from the development site discharges toward the same wetland complex. All discharge from the wetland complex flows south toward Mooresfield Road and ends up within the Saugatucket River. In the pre development state

there are two watershed areas with one watershed discharging to the wetland complex and the other watershed discharging east off site. In the post development stage the same watersheds are analyzed but there are two watersheds and 22 sub catchments areas. A description of each watershed and associated subcatchments are summarized as follows:

Design Point #1:

Watershed #1 flows to Design Point- 1 (DP-1). Design Point 1 is located at the site boundary where an existing unnamed stream continues off site. Watershed #1 contains sub catchment Pre-1(100) and the area that discharges to the unnamed stream contains existing homes, driveways, grass lawn areas, and a large majority of wooded areas. This watershed had a total area of 128.39 acres, a time of concentration of 49.9 minutes, and curve number of 64. This time of concentration could have been increased by starting the time of concentration closer to Old North Road. This was not analyzed this way because the post development time of concentration would have been increased and using the same time of concentration provides a conservative analysis.

In post development conditions there are 21 sub catchment areas that discharge to Design Point- 1 (DP-1).

Sub catchment Post-1 (101) contains all of the existing homes, driveways, lawn areas along Old North Road and it also includes all the new proposed homes, driveways, and lawn areas along Old North Road that are either undetained or treated for water quality with QPAs.

Sub catchment Post-2 (102) contains proposed homes along Stony Fort Road, approximately 1375 linear feet of proposed roadway, proposed homes, driveways, and lawn areas. All storm water runoff from the front of the proposed homes will be directed to the proposed roadway. The proposed roadway has a closed drainage network that will convey stormwater to a sediment forebay, sand filter, and detention basin. Post-102 has a total area of 10.1 acres, a curve number of 67, and a time of concentration of 23.9 minutes.

Lots 1 and 2 (109, 111, 112A) contain a bioretention area (112) that captures a portion of the driveway and the front halves of the lots' roofs. Pretreatment is by either a swale (110) or a grass filter strip. The remaining driveway area is treated by a stone trench (112B). The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lot 3 contains a bioretention area (114) that captures the driveway and the front halves of the lot's roof and a portion of the driveway. Pretreatment is by a grass filter strip. The remaining driveway area is treated by a stone trench (116). The remaining impervious area is treated by QPAs and the remining grass area is undetained.

Lots 4 and 5 (117, 119) contain a bioretention area (118) that captures the driveway and the front halves of the lots' roofs. Pretreatment is by either a swale (120) or a grass filter strip. The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lots 6 and 7 (121, 123) contain a bioretention area (122) that captures the driveway and the front halves of the lots' roofs. Pretreatment is by a grass filter strip. The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lots 8 and 9 (123, 125) contain a bioretention area (124) that captures the driveway and the front halves of the lots' roofs. Pretreatment is by grass filter strip. A portion of Lot 8's roof is treated by a drywell (126). The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lots 10 and 11 (127, 129) contain a bioretention area (128) that captures the driveway and the front halves of the lots' roofs. Pretreatment is by a grass filter strip. The remaining driveway area is treated by a stone trench (134). The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lots 12 and 13 (133, 135) contain a bioretention area (132) that captures the driveway and the front halves of the lots' roofs. Pretreatment is by a grass filter strip. A portion of Lot 8's roof is treated by a drywell (136). The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lot 14 (137, 139) contains a stone trench (138) that captures the driveway and a drywell that captures the front half of the roof (140). The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lot 15 (143) contains a a drywell that captures the front half of the roof (142). The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Lot 16 (143, 145) contains a stone trench (144) that captures the driveway and a drywell that captures the front half of the roof (146). The remaining impervious area is treated by QPAs and the remaining grass area is undetained.

Below is a summary of the hydrologic parameters for the pre and post development sub-areas in Design Point-1.

	Area (acres)	CN	Tc (min)
Pre-100 (100)	128.39	64	49.9
Post-101 (101)	118.471	65	49.9
Post-102 (102)	10.10	67	23.9
L1 & L2 (109)	0.212	85	6.0
L1 & L2 (111)	1.442	63	16.4
L1 & L2 (112A)	0.028	89	6.0
L3 (113)	0.147	83	6.0
L3 (115)	0.019	98	6.0
L4 & L5 (117)	0.331	83	6.0

L4 & L5 (119)	0.092	76	6.0
L6 & L7 (121)	0.357	81	6.0
L6 & L7 (123)	0.318	81	6.0
L8 (125)	0.010	98	6.0
L10 & L11 (121)	0.340	81	6.0
L10 & L11 (129)	0.039	90	6.0
L12 & L13 (131)	0.297	83	6.0
L12 & L13 (133)	0.050	90	6.0
L13 (135)	0.019	98	6.0
L14 (137)	0.054	98	6.0
L14 (139)	0.018	98	6.0
L15 (141)	0.018	98	6.0
L16 (143)	0.058	98	6.0
L16 (143)	0.020	98	6.0

Design Line #2:

Watershed #2 flows to Design Line- 2 (DL-2). Design line 2 is located along the northeast site boundary. In pre development conditions this entire watershed is wooded and storm water from the watershed is not directed toward the existing wetland on site. Storm water from this watershed does however eventually connect back to the wetland complex further south of the development. The area off site that this storm water is directed to contains an existing school and a large area of woods. Sub catchment Pre-2 (200) has a total area of 9.5 acres, a curve number of 55, and a time of concentration of 27.0 minutes. All storm water runoff from this watershed will have to travel through extensive wooded areas prior to entering the stream system so significant treatment will be provided.

In post development conditions there is one sub catchment area that discharges to design line 2 (DP-2). This sub catchment area contains a portion of proposed roadway, proposed homes, driveways, lawn areas, and existing wooded areas. Sub catchment Post-201 (201) has a total area of 5.51 acres, a curve number of 58, and a time of concentration of 18.0 minutes. Although there is an increase in impervious area and a reduction in time of concentration the overall reduction in area allows a reduction in stormwater flows.

	Area (acres)	CN	Tc (min)
Pre-2 (200)	9.50	55	27.0
Post-3 (201)	5.51	58	18.0

3.5.4 Q_p BMP Calculations

The section includes calculations for each Qp BMP for the site. Calculations include Rip Rap Aprons, Anti Seep Collars, and the Emergency Outlet Calculations.

The emergency overflow weir on the detention basin has been sized to safely pass the 100 year storm and beyond without erosion or excessive velocities. For this analysis, the detention basin was assumed to have all of the orifices clogged and only the emergency overflow weir functioning. Under normal conditions, no stormwater will flow over the emergency spillway and the basin will have a minimum of one foot of freeboard.

Basin	Q(cfs)	V (ft/s)	Top of Basin	Flood Elevation
Basin 1	29.26	2.42	235.00	234.81

The velocity over the spillway is less than 3 ft/s thus no erosion will take place on the embankment or downstream. The basin maintains freeboard even with all orifices clogged and the 100 year storm flowing over the embankment. See attached HydroCAD in Section A3.5.5

Outlet Protection

Rip rap aprons are designed at the drainage pipe discharges and detention basin outlets. The rip rap aprons are designed to prevent scour at the storm water outlet and to minimize the potential for downstream erosion by reducing the velocity of concentrated storm water flows.

Basin 1

$$La = \frac{1.7*Q}{Do^{3/2}} + 8*Do$$

La = length of apron
Do = diameter of outlet pipe
W = width of apron
d-50 = median stone diameter
TW = tailwater depth

For discharges where Tailwater < 0.5*Do

$$W = 3*Do + La$$

For discharges where Tailwater >= 0.5*Do

$$W = 3*Do + 0.4*La$$

d-50 is determined by the following formula

$$d\text{-}50 = \frac{0.02}{TW} * \frac{Q}{Do}^{4/3}$$

Outlet Protection Table (Sized for 100 Year Storm Event)

Outlet	Discharge (cfs)	Do (ft)	La (ft)	TW* (ft)	W (ft)	d-50 (in)	Riprap Class
FES 1	9.07	1.25	22	1.00	13.00	3	R-3
FES 2	33.56	2.00	37	1.00	21.00	10	R-6
FES 3	29.16	2.00	34	1.00	20.00	9	R-5

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Anti Seep Collars
Basin 1

The first step in designing the anti-seep collar is to determine the length of pipe within the saturationed zone of the embankment. This can be done by using the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end.

Ls = y (z + 4) (1 + (pipe slope/ (0.25 - pipe slope)))

y = 4.0 ft (maximum depth of water)
z = 3.0 (slope of upslope embankment ?:1)
slope = 0.0200 ft/ft (pipe slope)

Ls = 30.4 ft

The second step in the design process is to establish the number of collars to be used. The equation below can then be used to determine the collar projection beyond the outside wall of the pipe.

Using the equation:

$$\frac{0.15\ L}{2\ n} = V$$ (for a 15% increase in flow length)

Ls = 30.4 ft

n = 2

$$\frac{0.15 \times 30.4}{2 \times 2} = \mathbf{1.14}$$

V = 1.1 ft (projection of collar beyond pipe)

Overall Collar Dimensions

D = 2 ft (diameter of pipe)
V = 1.1 ft (projection)

OA = 5 ft (minimum overall dimension of collar)

3.5.5 Downstream Analysis

A downstream analysis is required under the following conditions:

Area of Disturbance (Acres)	Impervious Cover (%)
>5 to 10	>75
>10 to 25	>50
>25 to 50	>25
>50	All Projects

The proposed project disturbs 20.59 acres and is 5.59 acres of impervious. This is approximately 23% impervious cover. A downstream analysis is not required.

3.5.6 Overbank Flood Protection Conclusion

Pre development Conditions versus Post Development Conditions for each watershed are summarized below:

Watershed #1: (DP-1)

Conditions	1-Year	10-Year	100-Year
Pre Dev Summation	17.23 cfs	93.13 cfs	275.04 cfs
Post Dev Summation	18.08 cfs	91.73 cfs	267.35 cfs
Net Change	**+0.85 cfs**	**-1.4 cfs**	**-7.69 cfs**

(cfs = cubic feet per second)

Watershed #2: (DL-2)

Conditions	1-Year	10-Year	100-Year
Pre Dev Summation	0.28 cfs	4.90 cfs	19.97 cfs
Post Dev Summation	0.41 cfs	4.28 cfs	15.49 cfs
Net Change	**+0.13 cfs**	**-0.62 cfs**	**-4.48 cfs**

(cfs = cubic feet per second)

There is a minor increase in storm water flows for the 1-yr storm event due to uncontrolled areas within each watershed. These areas include back of homes and driveways that are treated for water quality by QPAs and lawn areas that cannot be controlled. There is insignificant discharge from the detention basin during the 1-yr storm event, which meets all channel protection volume requirements, and the storm water flow increase is due to the change in ground cover type in uncontrolled areas.

3.6 Minimum Standard 6: Redevelopment and Infill Projects.

The site is not classified as a redevelopment or infill project.

3.7 Minimum Standard 7: Pollution Prevention

A Soil Erosion and Sediment Control Plan (SESC) for this development can be found under a separate document. See the Soil Erosion and Sediment Control Plan for the development prepared by DiPrete Engineering. The SESC contains information for construction pollution prevention. For post construction pollution prevention see the Operations and Maintenance (O&M) document prepared for this development by DiPrete Engineering.

3.8 Minimum Standard 8: Land Uses with High Potential Pollutant Loads (LUHPPls)

The site is not considered LUHHPL.

3.9 Minimum Standard 9: Illicit Discharges

There are no proposed Illicit Discharges on site. The site will be serviced by public water and private OWTS.

3.10 Minimum Standard 10: Construction Erosion and Sedimentation Control

See the SESC for this development prepared by DiPrete Engineering.

3.11 Minimum Standard 11: Stormwater Management System Operation and Maintenance

See the O&M for this development prepared by DiPrete Engineering.

Appendix A

A2.1 Soil Evaluations

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: N/A

Property Owner: Picerne Real Estate Group

Property Location: Old North Rd AP 16/4 Lot 9 South Kingstown, RI

Date of Test Hole: October 22, 2007

Soil Evaluator: Chris Sutter License Number: D-4077

Weather: Clear, 70° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 07-1 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-8"	C	S	10YR 2/2					fsl	1-sbk	vfr	4
Bw	8-22"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	22-42"	C	W	2.5Y 6/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	42-96"			2.5Y 5/4					ls	0-m	fri	6

TH 07-2 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-6"	C	S	10YR 2/2					fsl	1-sbk	vfr	4
Bw	6-21"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	21-40"	C	W	2.5Y 6/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	40-96"			2.5Y 5/3					ls	0-m	fri	6

Soil Class: Compact Ablation Till

Depth to Groundwater Seepage: None

Estimated Seasonal High Water Table: 07-1=20" 07-2=20"

Total Depth of eachTest Hole: 07-1=96" 07-2=96"

Depth to Impervious or Limiting Layer: None

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: N/A

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 22, 2007
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 70° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 07-3 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-6"	C	S	10YR 3/3					fsl	1-sbk	vfr	4
Bw	6-21"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	21-38"	C	W	2.5Y 532	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	38-96"			2.5Y 5/4					ls	0-m	fri	6

TH 07-4 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-6"	C	S	10YR 3/3					fsl	1-sbk	vfr	4
Bw	6-20"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	20-40"	C	W	2.5Y 5/3	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	40-96"			2.5Y 5/3					ls	0-m	fri	6

Soil Class: Compact Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 07-3=18" 07-4=21"

Total Depth of each Test Hole: 07-3=96" 07-4=96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: N/A

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 22, 2007
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 70° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 07-9 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	10-18"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	18-36"	C	W	2.5Y 6/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	36-96"			2.5Y 5/3					ls	0-m	fri	6

TH 07-10 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	10-22"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	22-40"	C	W	2.5Y 6/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	40-96"			2.5Y 5/3					gls	0-m	fri	6

Soil Class: Compact Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 07-9=19" 07-10=20"

Total Depth of eachTest Hole: 07-9=96" 07-10=96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: N/A

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 22, 2007
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 70° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 07-11 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR 3/3			fsl	1-sbk	vfr	4
Bw	10-24"	C	W	10YR 4/6			fsl	1-sbk	fri	4
C	24-48"	C	W	2.5Y 6/2	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	48-96"			2.5Y 5/3			ls	0-m	fri	6

TH Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category

Soil Class: Compact Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 07-11=22"
Total Depth of each Test Hole: 07-11=96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: Picerne Real Estate Group

Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI

Date of Test Hole: October 1-6, 2009

Soil Evaluator: Chris Sutter License Number: D-4077

Weather: Mostly Clear, 65° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 29-1 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-9"	C	S	10YR 3/4			fsl	1-sbk	vfr	4
Bw	9-18"	C	W	10YR 4/6			fsl	1-sbk	fri	4
C	18-36"	C	W	2.5Y 5/2	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	36-96"			2.5Y 5/4			gls	0-m	fri	6

TH 29-2 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR 3/4			fsl	1-sbk	vfr	4
Bw	8-18"	C	W	10YR 4/6			fsl	1-sbk	fri	4
C	18-34"	C	W	2.5Y 5/2	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	34-96"			2.5Y 5/4			gls	0-m	fri	6

Soil Class: Eolian over Ablation Till

Depth to Groundwater Seepage: None

Estimated Seasonal High Water Table: 29-1=18" 29-2=18"

Total Depth of eachTest Hole: 96"

Depth to Impervious or Limiting Layer: None

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 1-6, 2009
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Mostly Clear, 65° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 1-1 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	8-18"	C	S	10YR 4/6 10YR 5/6					fsl	1-sbk	fri	4
C	18-46"	C	W	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	46-96"			2.5Y 5/3					gls	0-m	fri	6

TH 1-2 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	8-19"	C	S	10YR 4/6					fsl	1-sbk	fri	4
C	19-33"	C	W	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	33-96"			2.5Y 6/3					gls	0-m	fri	6

Soil Class: Eolian over Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 1-1=18" 1-2=18"
Total Depth of eachTest Hole: 96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 1-6, 2009
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Mostly Clear, 65° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 1-3 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR 3/2			fsl	1-sbk	vfr	4
Bw	8-19"	C	S	10YR 4/6 10YR 5/6			fsl	1-sbk	fri	4
C	19-30"	C	W	2.5Y 5/2	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	30-96"			2.5Y 5/3			gls	0-m	fri	6

TH Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category

Soil Class: Eolian over Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 1-3=19"
Total Depth of eachTest Hole: 96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 1-6, 2009
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Mostly Clear, 65° F Shaded: Yes ☐ No ☑ Time: 2:00 pm

TH 10-1 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR 3/2			fsl	1-sbk	vfr	4
Bw	10-20"	C	W	10YR 4/6			fsl	1-sbk	fri	4
C	20-37"	C	W	2.5Y 5/3	7.5YR 5/6	C 3 P	fsl	0-m	fri	7
2C	37-96"			2.5Y 6/3			gls/cos	0-m	fri	6

TH 10-2 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR 3/2			fsl	1-sbk	vfr	4
Bw	10-25"	C	W	10YR 4/6			fsl	1-sbk	fri	4
C	25-96"			2.5Y 6/3	7.5YR 5/8	C 3 P	gls	0-m	fri	6

Soil Class: Eolian over Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 10-1=18" 10-2=18"
Total Depth of eachTest Hole: 96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number SDW

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 1-6, 2009 License Number: D-4077
Soil Evaluator: Chris Sutter
Weather: Mostly Clear, 65° F Shaded: Yes☐ No☐ Time: 2:00 pm

TH 27-1 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-9"	C	S	10YR 3/2			fsl	1-sbk	vfr	4
Bw	9-20"	C	W	10YR 4/6			fsl	1-sbk	fri	4
C	20-33"	C	W	2.5Y 5/4	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	33-96"			2.5Y 6/3			gls	0-m	fri	6

TH 27-2 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR 3/2			fsl	1-sbk	vfr	4
Bw	8-20"	C	W	10YR 5/6			fsl	1-sbk	fri	4
C	20-39"	C	W	2.5Y 5/3	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	39-96"			2.5Y 6/3			gls	0-m	fri	6

Soil Class: Eolian over Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 27-1=20" 27-2=20"
Total Depth of eachTest Hole: 96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: Picerne Real Estate Group

Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI

Date of Test Hole: October 1-6, 2009

Soil Evaluator: Chris Sutter License Number: D-4077

Weather: Mostly Clear, 65° F Shaded: Yes☐ No☐ Time: 2:00 pm

TH 27-3 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-7"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	7-19"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	19-36"	C	W	2.5Y 5/4	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	36-96"			2.5Y 6/3					gls	0-m	fri	6

TH 27-4 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	8-8"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	18-35"	C	W	2.5Y 5/3	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	35-96"			2.5Y 6/3					gls	0-m	fri	6

Soil Class: Eolian over Ablation Till Total Depth of eachTest Hole: 96"

Depth to Groundwater Seepage: None Depth to Impervious or Limiting Layer: None

Estimated Seasonal High Water Table: 27-3=18" 27-4=18" Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: Picerne Real Estate Group

Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI

Date of Test Hole: October 1-6, 2009

Soil Evaluator: Chris Sutter License Number: D-4077

Weather: Mostly Clear, 65° F Shaded: Yes☐ No☐ Time: 2:00 pm

TH 28-1 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	8-19"	C	W	10YR 4/6					fsl	1-sbk	fri	4
C	19-32"	C	W	2.5Y 5/4	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	32-96"			2.5Y 6/3					gls	0-m	fri	6

TH 28-2 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	8-9"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	19-38"	C	W	2.5Y 5/3	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	38-96"			2.5Y 6/3					gls	0-m	fri	6

Soil Class: Eolian over Ablation Till

Depth to Groundwater Seepage: None

Estimated Seasonal High Water Table: 28-1=18" 28-2=20"

Total Depth of eachTest Hole: 96"

Depth to Impervious or Limiting Layer: None

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 1-6, 2009
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Mostly Clear, 65° F Shaded: Yes☐ No☐ Time: 2:00 pm

TH 28-3 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-7"	C	S	10YR 3/2			fsl	1-sbk	vfr	4
Bw	7-19"	C	W	10YR 4/6			fsl	1-sbk	fri	4
C	19-33"	C	W	2.5Y 5/3	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	33-96"			2.5Y 5/4			gls	0-m	fri	6

TH 28-4 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR 3/2			fsl	1-sbk	vfr	4
Bw	8-9"	C	W	10YR 5/6			fsl	1-sbk	fri	4
C	19-38"	C	W	2.5Y 5/3	7.5YR 5/8	C 3 P	fsl	0-m	fri	7
2C	38-96"			2.5Y 5/4			gls	0-m	fri	6

Soil Class: Eolian over Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 28-3=18" 28-4=18"

Total Depth of eachTest Hole: 96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number SDW

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 1-6, 2009
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Mostly Clear, 65° F Shaded: Yes☐ No☐ Time: 2:00 pm

TH OS-1 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-6"	C	S	10YR 3/4					fsl	1-sbk	vfr	4
Bw	6-18"	C	W	10YR 4/6					fsl	1-sbk	fri	4
C	18-34"	C	W	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	34-96"			2.5Y 5/4					gls	0-m	fri	6

TH OS-2 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-7"	C	S	10YR 3/4					fsl	1-sbk	vfr	4
Bw	7-20"	C	W	10YR 4/6					fsl	1-sbk	fri	4
C	20-34"	C	W	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	34-96"			2.5Y 5/4					gls	0-m	fri	6

Soil Class: Eolian over Ablation Till Total Depth of eachTest Hole: 96"
Depth to Groundwater Seepage: None Depth to Impervious or Limiting Layer: None
Estimated Seasonal High Water Table: OS-1=18" OS-2=18" Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-32 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR3/2			fsL	1-sbk	fri	4
Bw	10-20"	C	S	10YR4/6			fsL	1-sbk	fri	4
BC	20-31"	C	W	5Y5/4	7.5YR5/8	C 2 D	fsl/ vfsL	0-m	fri	7
C	31-44"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsL	0-m	fri	7
2C	44-96"			2.5Y5/4			gLS	0-m	fri	6

TH 2012-33 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-9"	C	S	10YR3/2			fsL	1-sbk	fri	4
Bw	9-21"	C	S	10YR4/6			fsL	1-sbk	fri	4
BC	21-35"	C	W	5Y5/4	7.5YR5/6	C 2 D	fsL vfsL	0-m	fri	7
C	35-54"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsL	0-m	fri	4
2C	54-96"			2.5Y5/4			gLS	0-m	fri	6

Soil Class: FOLIAN OVER ABLATION TILL
Total Depth of each Test Hole: ~16"
Depth to Groundwater Seepage: NONE
Depth to Impervious or Limiting Layer: NONE
Estimated Seasonal High Water Table: 2012-32: 20" 2012-33: 21" Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number SDW

Property Owner: Picerne Real Estate Group
Property Location: Old North Rd. AP 16/4 Lot 9 South Kingstown, RI
Date of Test Hole: October 1-6, 2009
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Mostly Clear, 65° F Shaded: Yes☐ No☐ Time: 2:00 pm

TH 14-1 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	8-19"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	19-37"	C	W	2.5Y 5/3	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	37-96"			2.5Y 6/3					gls	0-m	fri	6

TH 14-2 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Ap	0-10"	C	S	10YR 3/2					fsl	1-sbk	vfr	4
Bw	10-18"	C	W	10YR 5/6					fsl	1-sbk	fri	4
C	18-35"	C	W	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
2C	35-96"			2.5Y 6/3					gls	0-m	fri	6

Soil Class: Eolian over Ablation Till
Depth to Groundwater Seepage: None
Estimated Seasonal High Water Table: 14-1=18" 14-2=18"
Total Depth of eachTest Hole: 96"
Depth to Impervious or Limiting Layer: None
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP 16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☒ Time: 12:00 PM

TH 2012-1 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR3/1			fsl	1-sbk	vfr	4
Bw	8-20"	C	S	10YR4/6			fsl	1-sbk	fri	4
C	20-40"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	ufsl	0-m	fri	7
2C	40-96"			2.5Y5/4			gls	0-m	fri	6

TH 2012-2 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-7"	C	S	10YR3/2			fsl	1-sbk	vfr	4
Bw	7-19"	C	S	10YR4/6			fsl	1-sbk	fri	4
C	19-36"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	ufsl	0-m	fri	7
2C	36-96"			2.5Y5/4			gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-1 = 20" 2012-2 = 19"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER
License Number: D-4077
Weather: CLEAR, 75°F
Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH2012-3 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-7"	C	S	10YR3/2			fSL	1-sbk	vfr	4
Bw	7-20"	C	S	10YR4/6	7.5YR5/6 @ 18"	F 2 P	fSL	1-sbk	fri	4
C	20-37"	C	W	2.5Y5/3	7.5YR5/8	C 3 P	vfSL	0-m	fri	1
2C	37-96"			2.5Y5/4			gLS	0-m	fri	6

TH2012-4 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-8"	C	S	10YR3/2			fsl	1-sbk	vfr	4
Bw	8-20"	C	S	10YR5/4	7.5YR5/6 @ 19"	F 2 P	fsl	1-sbk	fri	4
C	20-39"	C	W	2.5Y5/3	7.5YR5/8	C 3 P	vfSL	0-m	fri	1
2C	39-96"			2.5Y5/4			gLS	0-m	fri	6

Soil Class: FOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-3 = 18" 2012-4 = 19"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD MP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-5 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-9"	C	S	10YR3/2					fsl	1-sbk	vfr	4
Bw	9-21"	C	S	10YR4/6					fsl	1-sbk	fri	4
BC	21-26"	C	W	2.5Y5/4	7.5YR5/6	C	2	P	sl/vfsl	0-m	fri	7
C	26-40"	C	W	2.5Y5/3	7.5YR5/8	C	3	P	vfsl	0-m	fri	7
2C	40-96"			2.5Y5/4					gls	0-m	fri	6

TH 2012-6 Horizon	Depth	Horizon Boundaries Dist	Topo	Soil Colors Matrix	Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR3/2					fsl	1-sbk	vfr	4
Bw	8-21"	C	S	10YR4/6					fsl	1-sbk	fri	4
BC	21-28"	C	W	2.5Y5/4	7.5YR5/6	C	2	P	sl/vfsl	0-m	fri	7
C	28-40"	C	W	2.5Y5/3	7.5YR5/8	C	3	P	vfsl	0-m	fri	7
2C	40-96"			2.5Y5/4					gls	0-m	fri	6

Soil Class: FOLAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-5-20" 2012-6-19"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP 16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH2012-7 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
AP	0-8"	C	S	10YR 3/1					fSL	1-Sbk	vfr	4
Bw1	8-20"	C	S	10YR 5/6					fSL	1-Sbk	fri	4
Bw2	20-25"	C	S	2.5Y 5/6	10YR 5/8 @ 21"	F	2	F	fSL	1-Sbk	fri	4
C	25-48"	C	W	2.5Y 5/2	7.5YR 5/8	C	3	P	vfSL	0-m	fri	7
2C	48-96"			2.5Y 5/4					gLS	0-m	fri	6

TH2012-8 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
AP	0-10"	C	S	10YR 3/1					fSL	1-Sbk	vfr	4
Bw1	10-19"	C	S	10YR 5/6					fSL	1-Sbk	fri	4
Bw2	19-29"	C	W	2.5Y 5/6	10YR 5/8 @ 19"	F	2	F	fSL	1-Sbk	fri	4
C	29-46"	C	W	2.5Y 5/2	7.5YR 5/8	C	3	P	vfSL	0-m	fri	7
2C	46-96"			2.5Y 5/4					gLS	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-7=21" 2012-8=19"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER
License Number: D-4077
Weather: CLEAR, 75°F
Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH2012-9 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
A	0-6"	C	S	10YR3/2			fsl	1-sbk	fri	4
Bw1	6-19"	C	S	10YR5/6			fsl	1-sbk	fri	4
Bw2	19-26"	C	W	10YR5/4	7.5YR5/8	C 2 P	fsl	1-sbk	fri	4
C	26-44"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	44-96"			2.5Y 5/4			gls	0-m	fri	6

TH2012-10 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR3/2			fsl	1-sbk	fri	4
Bw	8-21"	C	S	10YR4/6			fsl	1-sbk	fri	4
BC	21-28"	C	W	10YR5/6	7.5YR5/6	C 2 P	fsl	0-m	fri	7
C	28-40"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	40-96"			7.5YR5/8			gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-9=19" 2012-10=21"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9. SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
License Number: D-4077
Soil Evaluator: CHRIS SUTTER
Shaded: Yes ☐ No ☑ Time: 12:00 PM
Weather: CLEAR, 75°F

TH 2012-11 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
A	0-10"	C	S	10YR3/2					fsl	1-sbk	fri	4
Bw1	10-18"	C	S	10YR5/6					fsl	1-sbk	fri	4
Bw2	18-27"	C	W	2.5Y5/6	7.5YR5/6	C	2	D	fsl	1-sbk	fri	4
C	27-41"	C	W	2.5Y5/2	7.5YR5/8	C	3	P	vfsl	0-m	fri	7
2C	111-96"			2.5Y5/4					gls	0-m	fri	6

TH 2012-12 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR3/2					fsl	1-sbk	fri	4
Bw	10-19"	C	S	10YR4/6					fsl	1-sbk	fri	4
C	19-46"	C	W	2.5Y5/2	7.5YR5/8	C	3	P	vfsl	0-m	fri	7
2C	46-96"			2.5Y5/4					gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-11=18" 2012-12=18"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP 16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-13 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
A	0-8"	C	S	10YR3/2					fsl	1-sbk	fri	4
Bw1	8-18"	C	S	10YR5/6					fsl	1-sbk	fri	4
Bw2	18-24"	C	S	10YR5/6	7.5YR5/1	C	2	D	fsl	1-sbk	fri	4
C	24-38"	C	W	2.5Y5/2	7.5YR3/8	C	3	P	vfsl	0-m	fri	7
2C	38-96"			2.5Y5/4					gls	0-m	fri	6

TH 2012-14 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	S.	Con.	Texture	Structure	Consistence	Soil Category
A	0-10"	C	S	10YR3/2					fsl	1-sbk	fri	4
Bw	10-20"	C	S	10YR5/6					fsl	1-sbk	fri	4
C	20-35"	C	W	2.5Y5/2	2.5YR5/8	C	3	P	vfsl	0-m	fri	7
2C	35-96"			2.5Y5/4					gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-13 = 18" 2012-14 = 19"
Total Depth of each Test Hole:
Depth to Impervious or Limiting Layer:
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP 16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-16 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR3/2					fsl	1-sbk	fri	4
Bw	8-22"	C	S	10YR5/6					fsl	1-sbk	fri	4
BC	22-30"	C	W	2.5Y5/6	7.5YR5/6	C	2	P	fsl	1-sbk	fri	4
C	30-45"	C	W	2.5Y5/2	7.5YR5/8	C	3	P	vfsl	0-m	fri	7
2C	45-96"			2.5Y5/4					gls	0-m	fri	6

TH 2012-17 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR3/2					fsl	1-sbk	fri	4
Bw	10-19"	C	S	10YR5/6					fsl	1-sbk	fri	4
C	19-30"	C	W	2.5Y5/2	7.5YR5/8	C	3	P	vfsl	0-m	fri	7
2C	30-96"			2.5Y5/4					gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-16=21" 2012-17=19"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-18 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-10"	C	S	10YR3/2			fsl	1-sbk	vfr	4
Bw1	10-20"	C	S	10YR4/6			fsl	1-sbk	fri	4
Bw2	20-26"	C	W	10YR5/6	2.5YR5/6	C 2 D	fsl	1-sbk	fri	4
C	26-50"	C	W	2.5Y5/2	2.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	50-96"			2.5Y5/4			gls	0-m	fri	6

TH 2012-19 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
A	0-10"	C	S	10YR3/2			fsl	1-sbk	vfri	4
Bw	10-21"	C	S	10YR4/6			fsl	1-sbk	fri	4
C	21-45"	C	W	2.5Y5/2	2.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	45-96"			2.5Y5/4			gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-18 = 21" 2012-19 = 30"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☒ Time: 12:00 PM

TH2012-22 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-10"	C	S	10YR3/2			fsl	1-sbk	fri	4
Bw	10-21"	C	S	10YR5/6			fsl	1-sbk	fri	4
C	21-34"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	34-96"			2.5Y5/4			gls	0-m	fri	6

TH2012-23 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
Ap	0-8"	C	S	10YR3/2			fsl	1-sbk	fri	4
Bw	8-20"	C	S	10YR5/6			fsl	1-sbk	fri	4
C	20-40"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	40-96"			2.5Y5/4			gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Total Depth of each Test Hole: 96"
Depth to Groundwater Seepage: NONE
Depth to Impervious or Limiting Layer: NONE
Estimated Seasonal High Water Table: 2012-22 = 20" 2012-23 = 20"
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP 16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-24 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
AP	0-9"	C	S	10YR3/2					fsL	1-sbk	fri	4
Bw	9-20"	C	S	10YR5/6					fsL	1-sbk	fri	4
C	20-32"	C	W	2.5Y5/2	7.5YR5/8	C	3	P	vfsL	0-m	fri	7
2C	32-96"			2.5Y5/4					gLS	0-m	fri	6

TH 2012-25 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
AP	0-8"	C	S	10YR3/2					fsL	1-sbk	fri	4
Bw	8-22"	C	S	10YR5/6					fsL	1-sbk	fri	4
C	22-40"	C	W	2.5Y5/2	7.5YR5/8	C	3	P	vfsL	0-m	fri	7
2C	40-96"			2.5Y5/4					gLS	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-24=20" 2012-25=20"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-26 Horizon	Depth	Horizon Boundaries: Dist	Horizon Boundaries: Topo	Soil Colors: Matrix	Soil Colors: Re-Dox Features	Re-Dox Description: Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-9"	C	S	10YR3/2			fsL	1-sbk	fri	4
Bw1	9-18"	C	S	2.5Y5/6 / 2.5Y5/4*			fsL	1-sbk	fri	4
Bw2	18-22"	C	W	2.5Y5/4	7.5YR5/6	C 2 D	fsL	1-sbk	fri	4
C	22-40"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	40-96"			2.5Y5/4			gLS	0-m	fri	6

TH 2012-27 Horizon	Depth	Horizon Boundaries: Dist	Horizon Boundaries: Topo	Soil Colors: Matrix	Soil Colors: Re-Dox Features	Re-Dox Description: Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-8"	C	S	10YR3/2			fsL	1-sbk	fri	4
Bw	8-19"	C	S	10YR5/6			fsL	1-sbk	fri	4
BC	19-28"	C	S	10YR5/6 / 2.5Y5/4	7.5YR5/6	C 2 D	fsL	1-sbk	fri	4
C	28-44"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsL	0-m	fri	7
2C	44-96"			2.5Y5/4			gLS	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-26 = 18" 2012-27 = 19"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

* 2 MATRIX COLORS IN Bw1 - 2.5Y5/6 (DOMINANT) W/ INCLUSIONS OF 2.5Y 5/4

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP 16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-28 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-10"	C	S	10YR3/2			fsl	1-sbk	fri	4
Bw1	10-20"	C	S	10YR4/6			fsl	1-sbk	fri	4
Bw2	20-26"	C	W	10YR5/6	7.5YR5/8	C 2 R	fsl	1-sbk	fri	4
C	26-36"	C	W	2.5Y5/2	7.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	36-96"			2.5Y5/4			gls	0-m	fri	6

TH 2012-29 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-10"	C	S	10YR3/2			fsl	1-sbk	fri	4
Bw	10-20"	C	W	10YR5/6			fsl	1-sbk	fri	4
C	20-40"	C	W	2.5Y5/3	7.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	40-96"			2.5Y5/4			gls	0-m	fri	6

Soil Class: EOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-28 = 20" 2012-29 = 19"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources

Site Evaluation Form
Part A - Soil Profile Description

Application Number: SDW

Property Owner: OLD NORTH LAND INVESTMENTS, LLC
Property Location: OLD NORTH RD AP16-4 LOT 9 SOUTH KINGSTOWN, RI
Date of Test Hole: SEPTEMBER 12, 2012
Soil Evaluator: CHRIS SUTTER License Number: D-4077
Weather: CLEAR, 75°F Shaded: Yes ☐ No ☑ Time: 12:00 PM

TH 2012-30 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category
AP	0-8"	C	S	10YR3/2			fsl	1-sbk	fri	4
Bw1	8-20"	C	S	10YR5/6			fsl	1-sbk	fri	4
Bw2	20-30"	C	W	2.5Y5/6	2.5YR5/6	C 2 D	fsl	1-sbk	fri	4
C	30-40"	C	W	2.5Y5/2	2.5YR5/8	C 3 P	vfsl	0-m	fri	7
2C	40-96"			2.5Y5/4			gls	0-m	fri	6

TH Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab. S. Con.	Texture	Structure	Consistence	Soil Category

Soil Class: FOLIAN OVER ABLATION TILL
Depth to Groundwater Seepage: NONE
Estimated Seasonal High Water Table: 2012-30 = 20"
Total Depth of each Test Hole: 96"
Depth to Impervious or Limiting Layer: NONE
Comments:

A3.2 Water Quality HydroCAD 1.2” Storm Analysis

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100: Subcat 100 Ex Runoff Area=128.390 ac 0.95% Impervious Runoff Depth=0.01"
Flow Length=3,830' Tc=49.9 min CN=63/98 Runoff=0.59 cfs 0.101 af

Subcatchment 200: Subcat 200 Ex Runoff Area=9.500 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=911' Slope=0.0200 '/' Tc=27.0 min CN=55/0 Runoff=0.00 cfs 0.000 af

Reach DL-2.: Design Line 2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach DP-1.: Design Line 1 Inflow=0.59 cfs 0.101 af
Outflow=0.59 cfs 0.101 af

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: Subcat 101 Pr Runoff Area=118.471 ac 1.52% Impervious Runoff Depth=0.02"
Flow Length=3,830' Tc=49.9 min CN=64/98 Runoff=0.87 cfs 0.157 af

Subcatchment 102: Subcat 102 Pr Runoff Area=10.042 ac 22.02% Impervious Runoff Depth=0.22"
Flow Length=1,646' Tc=23.9 min CN=58/98 Runoff=1.53 cfs 0.182 af

Subcatchment 109: L1 & L2 Runoff Area=0.212 ac 65.09% Impervious Runoff Depth=0.64"
Tc=6.0 min CN=61/98 Runoff=0.15 cfs 0.011 af

Subcatchment 111: L1 & L2 Runoff Area=1.442 ac 12.27% Impervious Runoff Depth=0.12"
Flow Length=283' Tc=16.4 min CN=58/98 Runoff=0.14 cfs 0.015 af

Subcatchment 112A: L1 & L2 Runoff Area=0.028 ac 75.00% Impervious Runoff Depth=0.74"
Tc=6.0 min CN=61/98 Runoff=0.02 cfs 0.002 af

Subcatchment 113: L3 Runoff Area=0.147 ac 59.86% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=61/98 Runoff=0.10 cfs 0.007 af

Subcatchment 115: L3 Runoff Area=0.019 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.02 cfs 0.002 af

Subcatchment 117: L4 & L5 Runoff Area=0.331 ac 58.91% Impervious Runoff Depth=0.58"
Tc=6.0 min CN=61/98 Runoff=0.21 cfs 0.016 af

Subcatchment 119: L4 & L5 Runoff Area=0.092 ac 41.30% Impervious Runoff Depth=0.41"
Tc=6.0 min CN=61/98 Runoff=0.04 cfs 0.003 af

Subcatchment 121: L6 & L7 Runoff Area=0.357 ac 52.94% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=61/98 Runoff=0.21 cfs 0.016 af

Subcatchment 123: L8 & L9 Runoff Area=0.318 ac 55.03% Impervious Runoff Depth=0.54"
Tc=6.0 min CN=61/98 Runoff=0.19 cfs 0.014 af

Subcatchment 125: L8 Runoff Area=0.010 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.01 cfs 0.001 af

Subcatchment 127: L10 & L11 Runoff Area=0.340 ac 54.71% Impervious Runoff Depth=0.54"
Tc=6.0 min CN=61/98 Runoff=0.20 cfs 0.015 af

Subcatchment 129: L10 & L11 Runoff Area=0.039 ac 79.49% Impervious Runoff Depth=0.78"
Tc=6.0 min CN=61/98 Runoff=0.03 cfs 0.003 af

Subcatchment 131: L12 & L13 Runoff Area=0.297 ac 59.26% Impervious Runoff Depth=0.58"
Tc=6.0 min CN=61/98 Runoff=0.19 cfs 0.014 af

Subcatchment 133: L12 & L13 Runoff Area=0.050 ac 78.00% Impervious Runoff Depth=0.77"
Tc=6.0 min CN=61/98 Runoff=0.04 cfs 0.003 af

Subcatchment 135: L13 Runoff Area=0.017 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.02 cfs 0.001 af

Subcatchment 137: L14 Runoff Area=0.054 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.06 cfs 0.004 af

Subcatchment 139: L14 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.02 cfs 0.001 af

Subcatchment 141: L15 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.02 cfs 0.001 af

Subcatchment 143: L16 Runoff Area=0.058 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.06 cfs 0.005 af

Subcatchment 145: L16 Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.02 cfs 0.002 af

Subcatchment 201: Subcat 201 Pr Runoff Area=5.510 ac 3.39% Impervious Runoff Depth=0.03"
Flow Length=100' Slope=0.0300 '/' Tc=18.0 min CN=56/98 Runoff=0.15 cfs 0.015 af

Reach 107: Pond Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.400 L=1,214.0' S=0.0229 '/' Capacity=85.73 cfs Outflow=0.00 cfs 0.000 af

Reach 108: Stream Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=2,015.0' S=0.0129 '/' Capacity=90.16 cfs Outflow=0.00 cfs 0.000 af

Reach 110: Pre-Treatment Swale Avg. Flow Depth=0.11' Max Vel=0.90 fps Inflow=0.15 cfs 0.011 af
n=0.030 L=335.5' S=0.0089 '/' Capacity=2.63 cfs Outflow=0.13 cfs 0.011 af

Reach 120: Pre-Treatment Swale Avg. Flow Depth=0.06' Max Vel=0.59 fps Inflow=0.04 cfs 0.003 af
n=0.030 L=101.2' S=0.0079 '/' Capacity=2.47 cfs Outflow=0.04 cfs 0.003 af

Reach DL-2: Design Line 2 Inflow=0.15 cfs 0.015 af
Outflow=0.15 cfs 0.015 af

Reach DP-1: Design Point 1 Inflow=0.87 cfs 0.157 af
Outflow=0.87 cfs 0.157 af

Pond 103: Bypass U Peak Elev=233.62' Inflow=1.53 cfs 0.182 af
Primary=1.53 cfs 0.182 af Secondary=0.00 cfs 0.000 af Outflow=1.53 cfs 0.182 af

Pond 104: Forebay Peak Elev=233.37' Storage=2,663 cf Inflow=1.53 cfs 0.182 af
Outflow=1.50 cfs 0.182 af

Pond 105: Sand Filter Peak Elev=233.37' Storage=4,121 cf Inflow=1.50 cfs 0.182 af
Discarded=0.07 cfs 0.182 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.182 af

Pond 106: Basin 1 Peak Elev=230.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 112: Bio-Retention Area Peak Elev=233.78' Storage=422 cf Inflow=0.26 cfs 0.026 af
Discarded=0.03 cfs 0.026 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.026 af

Pond 112B: Stone Trench Peak Elev=239.61' Storage=0.000 af Inflow=0.02 cfs 0.002 af
Discarded=0.01 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.002 af

Pond 114: Bio-Retention Area Peak Elev=240.26' Storage=108 cf Inflow=0.10 cfs 0.007 af
Discarded=0.01 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af

Pond 116: Stone Trench Peak Elev=241.61' Storage=0.000 af Inflow=0.02 cfs 0.002 af
Discarded=0.01 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.002 af

Pond 118: Bio-Retention Area Peak Elev=245.59' Storage=265 cf Inflow=0.25 cfs 0.019 af
Discarded=0.03 cfs 0.019 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.019 af

Pond 122: Bio-Retention Area Peak Elev=249.59' Storage=177 cf Inflow=0.21 cfs 0.016 af
Discarded=0.04 cfs 0.016 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.016 af

Pond 124: Bio-Retention Area Peak Elev=254.33' Storage=164 cf Inflow=0.19 cfs 0.014 af
Discarded=0.04 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.014 af

Pond 126: Drywell Peak Elev=252.05' Storage=0.000 af Inflow=0.01 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond 128: Bio-Retention Area Peak Elev=257.67' Storage=131 cf Inflow=0.20 cfs 0.015 af
Discarded=0.05 cfs 0.015 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.015 af

Pond 130: Stone Trench Peak Elev=259.37' Storage=0.000 af Inflow=0.03 cfs 0.003 af
Discarded=0.01 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.003 af

Pond 132: Bio-Retention Area Peak Elev=261.99' Storage=143 cf Inflow=0.19 cfs 0.014 af
Discarded=0.04 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.014 af

Pond 134: Stone Trench Peak Elev=263.15' Storage=0.001 af Inflow=0.04 cfs 0.003 af
Discarded=0.01 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.003 af

Pond 136: Drywell Peak Elev=263.19' Storage=0.000 af Inflow=0.02 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond 138: Stone Trench Peak Elev=265.63' Storage=0.001 af Inflow=0.06 cfs 0.004 af
Discarded=0.02 cfs 0.004 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.004 af

Pond 140: Drywell Peak Elev=265.77' Storage=0.000 af Inflow=0.02 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond 142: Drywell Peak Elev=261.94' Storage=0.001 af Inflow=0.02 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Pond 144: Stone Trench Peak Elev=257.63' Storage=0.001 af Inflow=0.06 cfs 0.005 af
Discarded=0.02 cfs 0.005 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.005 af

Pond 146: Drywell Peak Elev=259.38' Storage=0.001 af Inflow=0.02 cfs 0.002 af
Discarded=0.00 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

A3.4.1 Channel Protection (CP_v) HydroCAD 1-Year Storm Analysis

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100: Subcat 100 Ex Runoff Area=128.390 ac 0.95% Impervious Runoff Depth=0.38"
Flow Length=3,830' Tc=49.9 min CN=64 Runoff=17.23 cfs 4.112 af

Subcatchment 200: Subcat 200 Ex Runoff Area=9.500 ac 0.00% Impervious Runoff Depth=0.14"
Flow Length=911' Slope=0.0200 '/' Tc=27.0 min CN=55 Runoff=0.28 cfs 0.115 af

Reach DL-2.: Design Line 2 Inflow=0.28 cfs 0.115 af
Outflow=0.28 cfs 0.115 af

Reach DP-1.: Design Line 1 Inflow=17.23 cfs 4.112 af
Outflow=17.23 cfs 4.112 af

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: Subcat 101 Pr Runoff Area=118.471 ac 1.52% Impervious Runoff Depth=0.42"
Flow Length=3,830' Tc=49.9 min CN=65 Runoff=18.07 cfs 4.124 af

Subcatchment 102: Subcat 102 Pr Runoff Area=10.042 ac 22.02% Impervious Runoff Depth=0.49"
Flow Length=1,646' Tc=23.9 min CN=67 Runoff=2.74 cfs 0.409 af

Subcatchment 109: L1 & L2 Runoff Area=0.212 ac 65.09% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=85 Runoff=0.35 cfs 0.025 af

Subcatchment 111: L1 & L2 Runoff Area=1.442 ac 12.27% Impervious Runoff Depth=0.35"
Flow Length=283' Tc=16.4 min CN=63 Runoff=0.26 cfs 0.042 af

Subcatchment 112A: L1 & L2 Runoff Area=0.028 ac 75.00% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=89 Runoff=0.06 cfs 0.004 af

Subcatchment 113: L3 Runoff Area=0.147 ac 59.86% Impervious Runoff Depth=1.29"
Tc=6.0 min CN=83 Runoff=0.22 cfs 0.016 af

Subcatchment 115: L3 Runoff Area=0.019 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 117: L4 & L5 Runoff Area=0.331 ac 58.91% Impervious Runoff Depth=1.29"
Tc=6.0 min CN=83 Runoff=0.50 cfs 0.036 af

Subcatchment 119: L4 & L5 Runoff Area=0.092 ac 41.30% Impervious Runoff Depth=0.88"
Tc=6.0 min CN=76 Runoff=0.09 cfs 0.007 af

Subcatchment 121: L6 & L7 Runoff Area=0.357 ac 52.94% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=81 Runoff=0.48 cfs 0.035 af

Subcatchment 123: L8 & L9 Runoff Area=0.318 ac 55.03% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=81 Runoff=0.43 cfs 0.031 af

Subcatchment 125: L8 Runoff Area=0.010 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.03 cfs 0.002 af

Subcatchment 127: L10 & L11 Runoff Area=0.340 ac 54.71% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=81 Runoff=0.46 cfs 0.033 af

Subcatchment 129: L10 & L11 Runoff Area=0.039 ac 79.49% Impervious Runoff Depth=1.80"
Tc=6.0 min CN=90 Runoff=0.08 cfs 0.006 af

Subcatchment 131: L12 & L13 Runoff Area=0.297 ac 59.26% Impervious Runoff Depth=1.29"
Tc=6.0 min CN=83 Runoff=0.45 cfs 0.032 af

Subcatchment 133: L12 & L13 Runoff Area=0.050 ac 78.00% Impervious Runoff Depth=1.80"
Tc=6.0 min CN=90 Runoff=0.11 cfs 0.008 af

Subcatchment 135: L13 Runoff Area=0.017 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 137: L14 Runoff Area=0.054 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment 139: L14 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 141: L15 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 143: L16 Runoff Area=0.058 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.012 af

Subcatchment 145: L16 Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 201: Subcat 201 Pr Runoff Area=5.510 ac 3.39% Impervious Runoff Depth=0.21"
Flow Length=100' Slope=0.0300 '/' Tc=18.0 min CN=58 Runoff=0.41 cfs 0.098 af

Reach 107: Pond Discharge Avg. Flow Depth=0.06' Max Vel=0.06 fps Inflow=0.21 cfs 0.214 af
n=0.400 L=1,214.0' S=0.0229 '/' Capacity=85.73 cfs Outflow=0.18 cfs 0.212 af

Reach 108: Stream Avg. Flow Depth=0.03' Max Vel=0.40 fps Inflow=0.18 cfs 0.212 af
n=0.030 L=2,015.0' S=0.0129 '/' Capacity=90.16 cfs Outflow=0.18 cfs 0.212 af

Reach 110: Pre-Treatment Swale Avg. Flow Depth=0.17' Max Vel=1.17 fps Inflow=0.35 cfs 0.025 af
n=0.030 L=335.5' S=0.0089 '/' Capacity=2.63 cfs Outflow=0.30 cfs 0.025 af

Reach 120: Pre-Treatment Swale Avg. Flow Depth=0.09' Max Vel=0.76 fps Inflow=0.09 cfs 0.007 af
n=0.030 L=101.2' S=0.0079 '/' Capacity=2.47 cfs Outflow=0.09 cfs 0.007 af

Reach DL-2: Design Line 2 Inflow=0.41 cfs 0.098 af
Outflow=0.41 cfs 0.098 af

Reach DP-1: Design Point 1 Inflow=18.08 cfs 4.339 af
Outflow=18.08 cfs 4.339 af

Pond 103: Bypass U Peak Elev=233.75' Inflow=2.74 cfs 0.409 af
Primary=2.15 cfs 0.391 af Secondary=0.58 cfs 0.017 af Outflow=2.74 cfs 0.409 af

Pond 104: Forebay Peak Elev=233.57' Storage=2,988 cf Inflow=2.15 cfs 0.391 af
Outflow=2.14 cfs 0.391 af

Pond 105: Sand Filter Peak Elev=233.57' Storage=4,782 cf Inflow=2.14 cfs 0.391 af
Discarded=0.07 cfs 0.195 af Primary=0.69 cfs 0.196 af Outflow=0.76 cfs 0.391 af

Pond 106: Basin 1 Peak Elev=230.79' Storage=3,329 cf Inflow=0.71 cfs 0.214 af
Primary=0.21 cfs 0.214 af Secondary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.214 af

Pond 112: Bio-Retention Area Peak Elev=236.07' Storage=1,655 cf Inflow=0.45 cfs 0.067 af
Discarded=0.03 cfs 0.067 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.067 af

Pond 112B: Stone Trench Peak Elev=240.00' Storage=0.001 af Inflow=0.06 cfs 0.004 af
Discarded=0.01 cfs 0.004 af Primary=0.01 cfs 0.000 af Outflow=0.01 cfs 0.004 af

Pond 114: Bio-Retention Area Peak Elev=242.02' Storage=358 cf Inflow=0.22 cfs 0.016 af
Discarded=0.01 cfs 0.016 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.016 af

Pond 116: Stone Trench Peak Elev=242.00' Storage=0.001 af Inflow=0.05 cfs 0.004 af
Discarded=0.01 cfs 0.004 af Primary=0.01 cfs 0.000 af Outflow=0.02 cfs 0.004 af

Pond 118: Bio-Retention Area Peak Elev=246.98' Storage=889 cf Inflow=0.58 cfs 0.042 af
Discarded=0.03 cfs 0.042 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.042 af

Pond 122: Bio-Retention Area Peak Elev=250.42' Storage=617 cf Inflow=0.48 cfs 0.035 af
Discarded=0.04 cfs 0.035 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.035 af

Pond 124: Bio-Retention Area Peak Elev=255.09' Storage=538 cf Inflow=0.43 cfs 0.031 af
Discarded=0.04 cfs 0.031 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.031 af

Pond 126: Drywell Peak Elev=253.45' Storage=0.001 af Inflow=0.03 cfs 0.002 af
Discarded=0.00 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.002 af

Pond 128: Bio-Retention Area Peak Elev=258.15' Storage=487 cf Inflow=0.46 cfs 0.033 af
Discarded=0.05 cfs 0.033 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.033 af

Pond 130: Stone Trench Peak Elev=259.79' Storage=0.002 af Inflow=0.08 cfs 0.006 af
Discarded=0.01 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.006 af

Pond 132: Bio-Retention Area Peak Elev=262.61' Storage=519 cf Inflow=0.45 cfs 0.032 af
Discarded=0.04 cfs 0.032 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.032 af

Pond 134: Stone Trench Peak Elev=263.66' Storage=0.003 af Inflow=0.11 cfs 0.008 af
Discarded=0.01 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Pond 136: Drywell Peak Elev=263.86' Storage=0.001 af Inflow=0.05 cfs 0.004 af
Discarded=0.00 cfs 0.003 af Primary=0.04 cfs 0.001 af Outflow=0.04 cfs 0.004 af

Pond 138: Stone Trench Peak Elev=266.00' Storage=0.003 af Inflow=0.15 cfs 0.012 af
Discarded=0.02 cfs 0.011 af Primary=0.04 cfs 0.001 af Outflow=0.06 cfs 0.012 af

Pond 140: Drywell Peak Elev=266.10' Storage=0.001 af Inflow=0.05 cfs 0.004 af
Discarded=0.00 cfs 0.003 af Primary=0.03 cfs 0.001 af Outflow=0.03 cfs 0.004 af

Pond 142: Drywell Peak Elev=263.09' Storage=0.001 af Inflow=0.05 cfs 0.004 af
Discarded=0.00 cfs 0.003 af Primary=0.02 cfs 0.001 af Outflow=0.02 cfs 0.004 af

Pond 144: Stone Trench Peak Elev=258.00' Storage=0.003 af Inflow=0.16 cfs 0.012 af
Discarded=0.02 cfs 0.012 af Primary=0.04 cfs 0.001 af Outflow=0.06 cfs 0.012 af

Pond 146: Drywell Peak Elev=261.50' Storage=0.003 af Inflow=0.05 cfs 0.004 af
Discarded=0.00 cfs 0.004 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.004 af

A3.4.2 Drainage Network Hydraulic Calculations

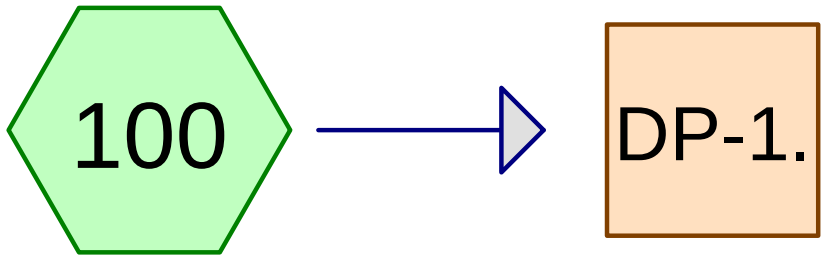
Pipes

Line No.	Line ID	Line Length (ft)	Line Size (in)	Line Slope (%)	Flow Rate (cfs)	Capac Full (cfs)	Cover Dn (ft)	Cover Up (ft)	Invert Dn (ft)	Invert Up (ft)	Vel Ave (ft/s)	HGL Dn (ft)	HGL Up (ft)	Rim-Hw (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	Q Byp (cfs)	Q Capt (cfs)	Q Carry (cfs)	Known Q (cfs)
1	DMH2-DMH3	9.235	24	0.97	13.76	24.19	-1.25	0.79	232.41	232.50	7.02	233.50	233.83	1.46	233.16	235.29	....	....	....	0.00
2	CB10-DMH2	153.000	24	0.94	13.92	23.77	0.79	1.57	232.50	233.94	6.23	233.83	235.28	2.23	235.29	237.51	0.00	4.02	0.00	0.00
3	CB9-CB10	20.000	24	1.00	11.76	24.50	1.57	1.37	233.94	234.14	5.52	235.28	235.37 j	2.14	237.51	237.51	0.00	0.80	0.00	0.00
4	CB8-CB9	80.047	24	1.00	11.40	24.50	1.37	2.03	234.14	234.94	5.68	235.37	236.15 j	2.05	237.51	238.97	0.00	0.33	0.00	0.00
5	CB6-CB8	255.000	24	1.05	10.37	25.12	1.53	2.83	235.44	238.12	6.57	236.34	239.27	3.68	238.97	242.95	0.00	2.56	0.00	0.00
6	CB4-CB5	299.749	18	1.75	7.84	15.06	2.83	3.02	238.62	243.87	7.17	239.39	244.95	3.44	242.95	248.39	0.00	2.44	0.00	0.00
7	DMH1-CB4	94.067	15	1.24	3.87	7.80	3.02	3.31	244.12	245.29	4.58	244.95	246.09 j	3.76	248.39	249.85	....	....	....	0.00
8	CB2-DMH1	205.000	15	1.25	3.96	7.82	3.31	3.03	245.29	247.85	4.78	246.09	248.65	3.48	249.85	252.13	0.00	1.49	0.00	0.00
9	CB1-CB2	20.000	15	1.00	3.09	7.00	3.03	2.83	247.85	248.05	4.01	248.65	248.76 j	3.37	252.13	252.13	0.00	3.09	0.00	0.00
10	CB3-CB4	20.000	15	1.00	2.70	7.00	3.02	2.82	244.12	244.32	3.61	244.95	244.98 j	3.41	248.39	248.39	0.00	2.70	0.00	0.00
11	CB5-CB6	20.000	15	4.00	2.26	13.99	2.83	2.03	238.87	239.67	5.26	239.27	240.27	2.68	242.95	242.95	0.00	2.26	0.00	0.00
12	CB7-CB8	20.000	15	1.00	2.04	7.00	3.06	2.86	234.66	234.86	1.67	236.92	236.93	1.99	238.97	238.97	0.00	2.04	0.00	0.00

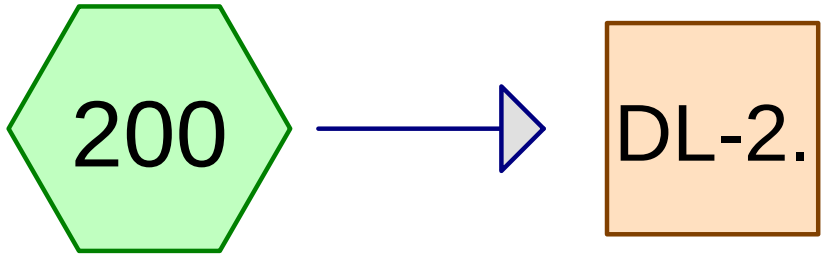
Project File: 0161-184-Drainage Pipe Analysis.stm | Number of lines: 12 | Date: 1/31/2013

NOTES: ** Critical depth

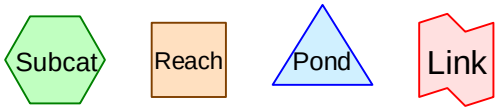
A3.5.4.1 HydroCAD Node Diagram



Subcat 100 Ex Design Line 1



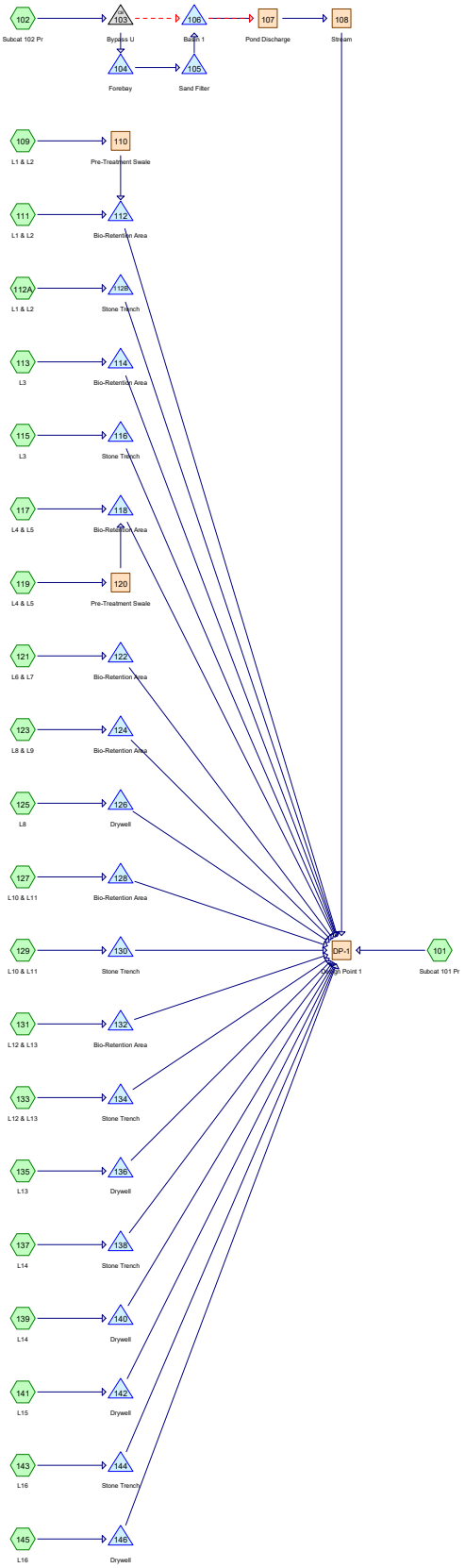
Subcat 200 Ex Design Line 2



Routing Diagram for 0161-184-ALLS-EPHCD-INHS
Prepared by DiPrete Engineering , Printed 4/25/2022

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.180	61	>75% Grass cover, Good, HSG B (100)
0.190	80	>75% Grass cover, Good, HSG D (100)
1.220	98	Impervious (100)
79.860	55	Woods, Good, HSG B (100, 200)
43.440	77	Woods, Good, HSG D (100)
137.890	**63**	**TOTAL AREA**



Routing Diagram for 0161-184-ALLS-EPHCD-INHS ked
Prepared by {enter your company name here}, Printed 9/1/2022
HydroCAD® 10.10-4b s/n 01125 © 2020 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.438	61	>75% Grass cover, Good, HSG B (102, 109, 111, 112A, 113, 117, 119, 121, 123, 127, 129, 131, 133, 201)
15.899	61	>75% Grass cover, Good, HSG B (0.44 to Bio) (101)
0.190	80	>75% Grass cover, Good, HSG D (101)
0.027	98	Driveway Lots 6 and 7 (101)
0.041	98	Driveway Lots 8 and 9 (101)
1.079	98	Driveways (109, 111, 112A, 113, 115, 117, 119, 121, 123, 127, 129, 131, 133, 137)
1.220	98	Existing Impervious Area (101)
0.447	98	Front of Large Homes (111, 113, 117, 121, 123, 127, 131)
0.206	98	Paved parking, HSG A (102, 201)
0.173	98	Paved parking, HSG B (101)
0.742	98	Proposed Driveways (102, 201)
0.680	98	Proposed Homes (102, 201)
0.336	98	Proposed Homes (0.52 to Bio) (101)
0.700	98	Proposed Road (102)
0.070	98	Roadway (201)
0.141	98	Roof (125, 135, 139, 141, 143, 145)
66.061	55	Woods, Good, HSG B (101, 102, 111, 201)
43.440	77	Woods, Good, HSG D (101)
137.890	**65**	**TOTAL AREA**

A3.5.4.2 HydroCAD 10-Year Storm Analysis

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100: Subcat 100 Ex Runoff Area=128.390 ac 0.95% Impervious Runoff Depth=1.52"
Flow Length=3,830' Tc=49.9 min CN=64 Runoff=93.13 cfs 16.220 af

Subcatchment 200: Subcat 200 Ex Runoff Area=9.500 ac 0.00% Impervious Runoff Depth=0.93"
Flow Length=911' Slope=0.0200 '/' Tc=27.0 min CN=55 Runoff=4.90 cfs 0.737 af

Reach DL-2.: Design Line 2 Inflow=4.90 cfs 0.737 af
Outflow=4.90 cfs 0.737 af

Reach DP-1.: Design Line 1 Inflow=93.13 cfs 16.220 af
Outflow=93.13 cfs 16.220 af

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: Subcat 101 Pr Runoff Area=118.471 ac 1.52% Impervious Runoff Depth=1.59"
Flow Length=3,830' Tc=49.9 min CN=65 Runoff=90.81 cfs 15.671 af

Subcatchment 102: Subcat 102 Pr Runoff Area=10.042 ac 22.02% Impervious Runoff Depth=1.73"
Flow Length=1,646' Tc=23.9 min CN=67 Runoff=12.24 cfs 1.451 af

Subcatchment 109: L1 & L2 Runoff Area=0.212 ac 65.09% Impervious Runoff Depth=3.28"
Tc=6.0 min CN=85 Runoff=0.81 cfs 0.058 af

Subcatchment 111: L1 & L2 Runoff Area=1.442 ac 12.27% Impervious Runoff Depth=1.45"
Flow Length=283' Tc=16.4 min CN=63 Runoff=1.64 cfs 0.174 af

Subcatchment 112A: L1 & L2 Runoff Area=0.028 ac 75.00% Impervious Runoff Depth=3.68"
Tc=6.0 min CN=89 Runoff=0.12 cfs 0.009 af

Subcatchment 113: L3 Runoff Area=0.147 ac 59.86% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=83 Runoff=0.53 cfs 0.038 af

Subcatchment 115: L3 Runoff Area=0.019 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 117: L4 & L5 Runoff Area=0.331 ac 58.91% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=83 Runoff=1.19 cfs 0.085 af

Subcatchment 119: L4 & L5 Runoff Area=0.092 ac 41.30% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=76 Runoff=0.26 cfs 0.019 af

Subcatchment 121: L6 & L7 Runoff Area=0.357 ac 52.94% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=81 Runoff=1.21 cfs 0.086 af

Subcatchment 123: L8 & L9 Runoff Area=0.318 ac 55.03% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=81 Runoff=1.08 cfs 0.077 af

Subcatchment 125: L8 Runoff Area=0.010 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.05 cfs 0.004 af

Subcatchment 127: L10 & L11 Runoff Area=0.340 ac 54.71% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=81 Runoff=1.15 cfs 0.082 af

Subcatchment 129: L10 & L11 Runoff Area=0.039 ac 79.49% Impervious Runoff Depth=3.78"
Tc=6.0 min CN=90 Runoff=0.17 cfs 0.012 af

Subcatchment 131: L12 & L13 Runoff Area=0.297 ac 59.26% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=83 Runoff=1.07 cfs 0.076 af

Subcatchment 133: L12 & L13 Runoff Area=0.050 ac 78.00% Impervious Runoff Depth=3.78"
Tc=6.0 min CN=90 Runoff=0.21 cfs 0.016 af

Subcatchment 135: L13 Runoff Area=0.017 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.08 cfs 0.007 af

Subcatchment 137: L14 Runoff Area=0.054 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.021 af

Subcatchment 139: L14 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 141: L15 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 143: L16 Runoff Area=0.058 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.28 cfs 0.023 af

Subcatchment 145: L16 Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment 201: Subcat 201 Pr Runoff Area=5.510 ac 3.39% Impervious Runoff Depth=1.11"
Flow Length=100' Slope=0.0300 '/' Tc=18.0 min CN=58 Runoff=4.28 cfs 0.512 af

Reach 107: Pond Discharge Avg. Flow Depth=0.17' Max Vel=0.13 fps Inflow=7.82 cfs 1.247 af
n=0.400 L=1,214.0' S=0.0229 '/' Capacity=85.73 cfs Outflow=1.81 cfs 1.245 af

Reach 108: Stream Avg. Flow Depth=0.08' Max Vel=0.80 fps Inflow=1.81 cfs 1.245 af
n=0.030 L=2,015.0' S=0.0129 '/' Capacity=90.16 cfs Outflow=1.70 cfs 1.244 af

Reach 110: Pre-Treatment Swale Avg. Flow Depth=0.27' Max Vel=1.49 fps Inflow=0.81 cfs 0.058 af
n=0.030 L=335.5' S=0.0089 '/' Capacity=2.63 cfs Outflow=0.73 cfs 0.058 af

Reach 120: Pre-Treatment Swale Avg. Flow Depth=0.16' Max Vel=1.07 fps Inflow=0.26 cfs 0.019 af
n=0.030 L=101.2' S=0.0079 '/' Capacity=2.47 cfs Outflow=0.26 cfs 0.019 af

Reach DL-2: Design Line 2 Inflow=4.28 cfs 0.512 af
Outflow=4.28 cfs 0.512 af

Reach DP-1: Design Point 1 Inflow=91.73 cfs 17.126 af
Outflow=91.73 cfs 17.126 af

Pond 103: Bypass U Peak Elev=234.21' Inflow=12.24 cfs 1.451 af
Primary=4.29 cfs 0.926 af Secondary=8.14 cfs 0.524 af Outflow=12.24 cfs 1.451 af

Pond 104: Forebay Peak Elev=233.74' Storage=3,270 cf Inflow=4.29 cfs 0.926 af
Outflow=3.79 cfs 0.926 af

Pond 105: Sand Filter Peak Elev=233.71' Storage=5,276 cf Inflow=3.79 cfs 0.926 af
Discarded=0.07 cfs 0.204 af Primary=3.63 cfs 0.723 af Outflow=3.70 cfs 0.926 af

Pond 106: Basin 1 Peak Elev=232.46' Storage=12,021 cf Inflow=11.51 cfs 1.247 af
Primary=7.82 cfs 1.247 af Secondary=0.00 cfs 0.000 af Outflow=7.82 cfs 1.247 af

Pond 112: Bio-Retention Area Peak Elev=236.37' Storage=2,079 cf Inflow=2.16 cfs 0.232 af
Discarded=0.03 cfs 0.080 af Primary=1.95 cfs 0.151 af Outflow=1.98 cfs 0.232 af

Pond 112B: Stone Trench Peak Elev=240.01' Storage=0.001 af Inflow=0.12 cfs 0.009 af
Discarded=0.01 cfs 0.006 af Primary=0.11 cfs 0.002 af Outflow=0.12 cfs 0.009 af

Pond 114: Bio-Retention Area Peak Elev=243.17' Storage=737 cf Inflow=0.53 cfs 0.038 af
Discarded=0.01 cfs 0.029 af Primary=0.15 cfs 0.009 af Outflow=0.16 cfs 0.038 af

Pond 116: Stone Trench Peak Elev=242.01' Storage=0.001 af Inflow=0.09 cfs 0.007 af
Discarded=0.01 cfs 0.006 af Primary=0.08 cfs 0.002 af Outflow=0.09 cfs 0.007 af

Pond 118: Bio-Retention Area Peak Elev=248.62' Storage=2,276 cf Inflow=1.44 cfs 0.104 af
Discarded=0.03 cfs 0.087 af Primary=0.13 cfs 0.017 af Outflow=0.16 cfs 0.104 af

Pond 122: Bio-Retention Area Peak Elev=252.63' Storage=2,229 cf Inflow=1.21 cfs 0.086 af
Discarded=0.04 cfs 0.086 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.086 af

Pond 124: Bio-Retention Area Peak Elev=257.31' Storage=1,954 cf Inflow=1.08 cfs 0.077 af
Discarded=0.04 cfs 0.077 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.077 af

Pond 126: Drywell Peak Elev=253.62' Storage=0.001 af Inflow=0.05 cfs 0.004 af
Discarded=0.00 cfs 0.003 af Primary=0.04 cfs 0.001 af Outflow=0.04 cfs 0.004 af

Pond 128: Bio-Retention Area Peak Elev=259.92' Storage=1,819 cf Inflow=1.15 cfs 0.082 af
Discarded=0.05 cfs 0.082 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.082 af

Pond 130: Stone Trench Peak Elev=260.01' Storage=0.003 af Inflow=0.17 cfs 0.012 af
Discarded=0.01 cfs 0.010 af Primary=0.14 cfs 0.003 af Outflow=0.15 cfs 0.012 af

Pond 132: Bio-Retention Area Peak Elev=264.72' Storage=1,785 cf Inflow=1.07 cfs 0.076 af
Discarded=0.04 cfs 0.076 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.076 af

Pond 134: Stone Trench Peak Elev=264.01' Storage=0.004 af Inflow=0.21 cfs 0.016 af
Discarded=0.01 cfs 0.013 af Primary=0.15 cfs 0.003 af Outflow=0.16 cfs 0.016 af

Pond 136: Drywell Peak Elev=263.92' Storage=0.001 af Inflow=0.08 cfs 0.007 af
Discarded=0.00 cfs 0.004 af Primary=0.08 cfs 0.003 af Outflow=0.08 cfs 0.007 af

Pond 138: Stone Trench Peak Elev=266.01' Storage=0.003 af Inflow=0.26 cfs 0.021 af
Discarded=0.02 cfs 0.016 af Primary=0.24 cfs 0.005 af Outflow=0.26 cfs 0.021 af

Pond 140: Drywell Peak Elev=266.17' Storage=0.001 af Inflow=0.09 cfs 0.007 af
Discarded=0.00 cfs 0.005 af Primary=0.08 cfs 0.002 af Outflow=0.09 cfs 0.007 af

Pond 142: Drywell Peak Elev=263.17' Storage=0.001 af Inflow=0.09 cfs 0.007 af
Discarded=0.00 cfs 0.004 af Primary=0.08 cfs 0.003 af Outflow=0.09 cfs 0.007 af

Pond 144: Stone Trench Peak Elev=258.01' Storage=0.003 af Inflow=0.28 cfs 0.023 af
Discarded=0.02 cfs 0.017 af Primary=0.26 cfs 0.005 af Outflow=0.28 cfs 0.023 af

Pond 146: Drywell Peak Elev=262.15' Storage=0.003 af Inflow=0.10 cfs 0.008 af
Discarded=0.00 cfs 0.005 af Primary=0.07 cfs 0.003 af Outflow=0.07 cfs 0.008 af

A3.5.4.3 HydroCAD 100-Year Storm Analysis

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 100: Subcat 100 Ex Runoff Area=128.390 ac 0.95% Impervious Runoff Depth=4.18"
Flow Length=3,830' Tc=49.9 min CN=64 Runoff=275.04 cfs 44.764 af

Subcatchment 200: Subcat 200 Ex Runoff Area=9.500 ac 0.00% Impervious Runoff Depth=3.13"
Flow Length=911' Slope=0.0200 '/' Tc=27.0 min CN=55 Runoff=19.97 cfs 2.479 af

Reach DL-2.: Design Line 2 Inflow=19.97 cfs 2.479 af
Outflow=19.97 cfs 2.479 af

Reach DP-1.: Design Line 1 Inflow=275.04 cfs 44.764 af
Outflow=275.04 cfs 44.764 af

Summary for Subcatchment 100: Subcat 100 Ex

Runoff = 275.04 cfs @ 12.70 hrs, Volume= 44.764 af, Depth= 4.18"
Routed to Reach DP-1. : Design Line 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	1.220	98	Impervious
	0.190	80	>75% Grass cover, Good, HSG D
	13.180	61	>75% Grass cover, Good, HSG B
	70.360	55	Woods, Good, HSG B
	43.440	77	Woods, Good, HSG D
	128.390	64	Weighted Average
	127.170	63	99.05% Pervious Area
	1.220	98	0.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.1	100	0.0200	0.08		**Sheet Flow, 1A - 1B** Woods: Light underbrush n= 0.400 P2= 3.30"
28.8	3,730	0.0180	2.16		**Shallow Concentrated Flow, 1B-1C** Unpaved Kv= 16.1 fps
49.9	3,830	Total			

Summary for Subcatchment 200: Subcat 200 Ex

Runoff = 19.97 cfs @ 12.39 hrs, Volume= 2.479 af, Depth= 3.13"
Routed to Reach DL-2. : Design Line 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

Area (ac)	CN	Description
9.500	55	Woods, Good, HSG B
9.500	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.1	100	0.0200	0.08		**Sheet Flow, 2A - 2B** Woods: Light underbrush n= 0.400 P2= 3.30"
5.9	811	0.0200	2.28		**Shallow Concentrated Flow, 2B - 2C** Unpaved Kv= 16.1 fps
27.0	911	Total			

Summary for Reach DL-2.: Design Line 2

Inflow Area = 9.500 ac, 0.00% Impervious, Inflow Depth = 3.13" for 100-Year event
Inflow = 19.97 cfs @ 12.39 hrs, Volume= 2.479 af
Outflow = 19.97 cfs @ 12.39 hrs, Volume= 2.479 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1.: Design Line 1

Inflow Area = 128.390 ac, 0.95% Impervious, Inflow Depth = 4.18" for 100-Year event
Inflow = 275.04 cfs @ 12.70 hrs, Volume= 44.764 af
Outflow = 275.04 cfs @ 12.70 hrs, Volume= 44.764 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: Subcat 101 Pr Runoff Area=118.471 ac 1.52% Impervious Runoff Depth=4.30"
Flow Length=3,830' Tc=49.9 min CN=65 Runoff=261.38 cfs 42.474 af

Subcatchment 102: Subcat 102 Pr Runoff Area=10.042 ac 22.02% Impervious Runoff Depth=4.54"
Flow Length=1,646' Tc=23.9 min CN=67 Runoff=33.37 cfs 3.799 af

Subcatchment 109: L1 & L2 Runoff Area=0.212 ac 65.09% Impervious Runoff Depth=6.70"
Tc=6.0 min CN=85 Runoff=1.60 cfs 0.118 af

Subcatchment 111: L1 & L2 Runoff Area=1.442 ac 12.27% Impervious Runoff Depth=4.07"
Flow Length=283' Tc=16.4 min CN=63 Runoff=5.00 cfs 0.489 af

Subcatchment 112A: L1 & L2 Runoff Area=0.028 ac 75.00% Impervious Runoff Depth=7.18"
Tc=6.0 min CN=89 Runoff=0.22 cfs 0.017 af

Subcatchment 113: L3 Runoff Area=0.147 ac 59.86% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=83 Runoff=1.08 cfs 0.079 af

Subcatchment 115: L3 Runoff Area=0.019 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 117: L4 & L5 Runoff Area=0.331 ac 58.91% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=83 Runoff=2.43 cfs 0.178 af

Subcatchment 119: L4 & L5 Runoff Area=0.092 ac 41.30% Impervious Runoff Depth=5.61"
Tc=6.0 min CN=76 Runoff=0.60 cfs 0.043 af

Subcatchment 121: L6 & L7 Runoff Area=0.357 ac 52.94% Impervious Runoff Depth=6.22"
Tc=6.0 min CN=81 Runoff=2.54 cfs 0.185 af

Subcatchment 123: L8 & L9 Runoff Area=0.318 ac 55.03% Impervious Runoff Depth=6.22"
Tc=6.0 min CN=81 Runoff=2.27 cfs 0.165 af

Subcatchment 125: L8 Runoff Area=0.010 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.08 cfs 0.007 af

Subcatchment 127: L10 & L11 Runoff Area=0.340 ac 54.71% Impervious Runoff Depth=6.22"
Tc=6.0 min CN=81 Runoff=2.42 cfs 0.176 af

Subcatchment 129: L10 & L11 Runoff Area=0.039 ac 79.49% Impervious Runoff Depth=7.30"
Tc=6.0 min CN=90 Runoff=0.31 cfs 0.024 af

Subcatchment 131: L12 & L13 Runoff Area=0.297 ac 59.26% Impervious Runoff Depth=6.46"
Tc=6.0 min CN=83 Runoff=2.18 cfs 0.160 af

Subcatchment 133: L12 & L13 Runoff Area=0.050 ac 78.00% Impervious Runoff Depth=7.30"
Tc=6.0 min CN=90 Runoff=0.40 cfs 0.030 af

Subcatchment 135: L13 Runoff Area=0.017 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.14 cfs 0.012 af

Subcatchment 137: L14 Runoff Area=0.054 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.45 cfs 0.037 af

Subcatchment 139: L14 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment 141: L15 Runoff Area=0.018 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment 143: L16 Runoff Area=0.058 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.48 cfs 0.040 af

Subcatchment 145: L16 Runoff Area=0.020 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 201: Subcat 201 Pr Runoff Area=5.510 ac 3.39% Impervious Runoff Depth=3.48"
Flow Length=100' Slope=0.0300 '/' Tc=18.0 min CN=58 Runoff=15.49 cfs 1.597 af

Reach 107: Pond Discharge Avg. Flow Depth=0.37' Max Vel=0.22 fps Inflow=29.03 cfs 3.582 af
n=0.400 L=1,214.0' S=0.0229 '/' Capacity=85.73 cfs Outflow=10.10 cfs 3.579 af

Reach 108: Stream Avg. Flow Depth=0.17' Max Vel=1.33 fps Inflow=10.10 cfs 3.579 af
n=0.030 L=2,015.0' S=0.0129 '/' Capacity=90.16 cfs Outflow=9.06 cfs 3.578 af

Reach 110: Pre-Treatment Swale Avg. Flow Depth=0.38' Max Vel=1.81 fps Inflow=1.60 cfs 0.118 af
n=0.030 L=335.5' S=0.0089 '/' Capacity=2.63 cfs Outflow=1.47 cfs 0.118 af

Reach 120: Pre-Treatment Swale Avg. Flow Depth=0.25' Max Vel=1.35 fps Inflow=0.60 cfs 0.043 af
n=0.030 L=101.2' S=0.0079 '/' Capacity=2.47 cfs Outflow=0.59 cfs 0.043 af

Reach DL-2: Design Line 2 Inflow=15.49 cfs 1.597 af
Outflow=15.49 cfs 1.597 af

Reach DP-1: Design Point 1 Inflow=267.35 cfs 47.037 af
Outflow=267.35 cfs 47.037 af

Pond 103: Bypass U Peak Elev=236.28' Inflow=33.37 cfs 3.799 af
Primary=9.01 cfs 1.788 af Secondary=24.41 cfs 2.011 af Outflow=33.37 cfs 3.799 af

Pond 104: Forebay Peak Elev=234.01' Storage=3,771 cf Inflow=9.01 cfs 1.788 af
Outflow=8.63 cfs 1.788 af

Pond 105: Sand Filter Peak Elev=233.96' Storage=6,143 cf Inflow=8.63 cfs 1.788 af
Discarded=0.07 cfs 0.217 af Primary=7.76 cfs 1.571 af Outflow=7.83 cfs 1.788 af

Pond 106: Basin 1 Peak Elev=233.85' Storage=21,096 cf Inflow=32.06 cfs 3.582 af
Primary=29.03 cfs 3.582 af Secondary=0.00 cfs 0.000 af Outflow=29.03 cfs 3.582 af

Pond 112: Bio-Retention Area Peak Elev=236.50' Storage=2,275 cf Inflow=6.02 cfs 0.607 af
Discarded=0.03 cfs 0.086 af Primary=5.98 cfs 0.521 af Outflow=6.01 cfs 0.607 af

Pond 112B: Stone Trench Peak Elev=240.01' Storage=0.001 af Inflow=0.22 cfs 0.017 af
Discarded=0.01 cfs 0.009 af Primary=0.21 cfs 0.008 af Outflow=0.22 cfs 0.017 af

Pond 114: Bio-Retention Area Peak Elev=243.21' Storage=759 cf Inflow=1.08 cfs 0.079 af
Discarded=0.01 cfs 0.032 af Primary=1.07 cfs 0.047 af Outflow=1.08 cfs 0.079 af

Pond 116: Stone Trench Peak Elev=242.01' Storage=0.001 af Inflow=0.16 cfs 0.013 af
Discarded=0.01 cfs 0.008 af Primary=0.15 cfs 0.005 af Outflow=0.16 cfs 0.013 af

Pond 118: Bio-Retention Area Peak Elev=248.75' Storage=2,497 cf Inflow=3.01 cfs 0.221 af
Discarded=0.03 cfs 0.097 af Primary=2.90 cfs 0.124 af Outflow=2.94 cfs 0.221 af

Pond 122: Bio-Retention Area Peak Elev=252.98' Storage=2,879 cf Inflow=2.54 cfs 0.185 af
Discarded=0.04 cfs 0.112 af Primary=1.56 cfs 0.072 af Outflow=1.60 cfs 0.185 af

Pond 124: Bio-Retention Area Peak Elev=257.72' Storage=2,676 cf Inflow=2.27 cfs 0.165 af
Discarded=0.04 cfs 0.104 af Primary=1.20 cfs 0.060 af Outflow=1.23 cfs 0.165 af

Pond 126: Drywell Peak Elev=253.67' Storage=0.001 af Inflow=0.08 cfs 0.007 af
Discarded=0.00 cfs 0.004 af Primary=0.08 cfs 0.003 af Outflow=0.08 cfs 0.007 af

Pond 128: Bio-Retention Area Peak Elev=261.22' Storage=4,038 cf Inflow=2.42 cfs 0.176 af
Discarded=0.05 cfs 0.153 af Primary=0.18 cfs 0.023 af Outflow=0.24 cfs 0.176 af

Pond 130: Stone Trench Peak Elev=260.02' Storage=0.003 af Inflow=0.31 cfs 0.024 af
Discarded=0.01 cfs 0.013 af Primary=0.30 cfs 0.010 af Outflow=0.31 cfs 0.024 af

Pond 132: Bio-Retention Area Peak Elev=265.49' Storage=3,293 cf Inflow=2.18 cfs 0.160 af
Discarded=0.04 cfs 0.126 af Primary=0.50 cfs 0.034 af Outflow=0.55 cfs 0.160 af

Pond 134: Stone Trench Peak Elev=264.02' Storage=0.004 af Inflow=0.40 cfs 0.030 af
Discarded=0.01 cfs 0.017 af Primary=0.39 cfs 0.014 af Outflow=0.40 cfs 0.030 af

Pond 136: Drywell Peak Elev=263.98' Storage=0.001 af Inflow=0.14 cfs 0.012 af
Discarded=0.00 cfs 0.004 af Primary=0.14 cfs 0.007 af Outflow=0.14 cfs 0.012 af

Pond 138: Stone Trench Peak Elev=266.02' Storage=0.003 af Inflow=0.45 cfs 0.037 af
Discarded=0.02 cfs 0.022 af Primary=0.43 cfs 0.015 af Outflow=0.45 cfs 0.037 af

Pond 140: Drywell Peak Elev=266.23' Storage=0.001 af Inflow=0.15 cfs 0.012 af
Discarded=0.00 cfs 0.006 af Primary=0.15 cfs 0.006 af Outflow=0.15 cfs 0.012 af

Pond 142: Drywell Peak Elev=263.23' Storage=0.001 af Inflow=0.15 cfs 0.012 af
Discarded=0.00 cfs 0.004 af Primary=0.15 cfs 0.008 af Outflow=0.15 cfs 0.012 af

Pond 144: Stone Trench Peak Elev=258.02' Storage=0.004 af Inflow=0.48 cfs 0.040 af
Discarded=0.02 cfs 0.024 af Primary=0.46 cfs 0.016 af Outflow=0.48 cfs 0.040 af

Pond 146: Drywell Peak Elev=262.25' Storage=0.003 af Inflow=0.17 cfs 0.014 af
Discarded=0.00 cfs 0.005 af Primary=0.17 cfs 0.009 af Outflow=0.17 cfs 0.014 af

Summary for Subcatchment 101: Subcat 101 Pr

Runoff = 261.38 cfs @ 12.70 hrs, Volume= 42.474 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
	57.145	55	Woods, Good, HSG B
	43.440	77	Woods, Good, HSG D
*	0.336	98	Proposed Homes (0.52 to Bio)
*	15.899	61	>75% Grass cover, Good, HSG B (0.44 to Bio)
*	1.220	98	Existing Impervious Area
	0.190	80	>75% Grass cover, Good, HSG D
	0.173	98	Paved parking, HSG B
*	0.041	98	Driveway Lots 8 and 9
*	0.027	98	Driveway Lots 6 and 7
	118.471	65	Weighted Average
	116.674	64	98.48% Pervious Area
	1.797	98	1.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.1	100	0.0200	0.08		**Sheet Flow, 1A-1B** Woods: Light underbrush n= 0.400 P2= 3.30"
28.8	3,730	0.0180	2.16		**Shallow Concentrated Flow, 1B-1C** Unpaved Kv= 16.1 fps
49.9	3,830	Total			

Summary for Subcatchment 102: Subcat 102 Pr

[47] Hint: Peak is 125% of capacity of segment #3

Runoff = 33.37 cfs @ 12.34 hrs, Volume= 3.799 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
	4.024	55	Woods, Good, HSG B
	3.807	61	>75% Grass cover, Good, HSG B
*	0.660	98	Proposed Homes
*	0.700	98	Proposed Road
*	0.692	98	Proposed Driveways
	0.159	98	Paved parking, HSG A
	10.042	67	Weighted Average
	7.831	58	77.98% Pervious Area
	2.211	98	22.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0300	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.30"
3.9	539	0.0200	2.28		**Shallow Concentrated Flow, 2B-2C** Unpaved Kv= 16.1 fps
2.0	1,007	0.0100	8.51	26.74	**Pipe Channel, 2C-2D** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
23.9	1,646	Total			

Summary for Subcatchment 109: L1 & L2

Runoff = 1.60 cfs @ 12.08 hrs, Volume= 0.118 af, Depth= 6.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.138	98	Driveways
	0.074	61	>75% Grass cover, Good, HSG B
	0.212	85	Weighted Average
	0.074	61	34.91% Pervious Area
	0.138	98	65.09% Impervious Area

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

Summary for Subcatchment 111: L1 & L2

Runoff = 5.00 cfs @ 12.23 hrs, Volume= 0.489 af, Depth= 4.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.068	98	Front of Large Homes
*	0.109	98	Driveways
	0.584	61	>75% Grass cover, Good, HSG B
	0.681	55	Woods, Good, HSG B
	1.442	63	Weighted Average
	1.265	58	87.73% Pervious Area
	0.177	98	12.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0180	0.11		**Sheet Flow, A** Grass: Dense n= 0.240 P2= 3.30"
1.7	183	0.0123	1.79		**Shallow Concentrated Flow, B** Unpaved Kv= 16.1 fps
16.4	283	Total			

Summary for Subcatchment 112A: L1 & L2

Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.017 af, Depth= 7.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.021	98	Driveways
	0.007	61	>75% Grass cover, Good, HSG B
	0.028	89	Weighted Average
	0.007	61	25.00% Pervious Area
	0.021	98	75.00% Impervious Area

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

Summary for Subcatchment 113: L3

Runoff = 1.08 cfs @ 12.09 hrs, Volume= 0.079 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.034	98	Front of Large Homes
*	0.054	98	Driveways
	0.059	61	>75% Grass cover, Good, HSG B
	0.147	83	Weighted Average
	0.059	61	40.14% Pervious Area
	0.088	98	59.86% Impervious Area

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

Summary for Subcatchment 115: L3

Runoff = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.019	98	Driveways
	0.019	98	100.00% Impervious Area

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

Summary for Subcatchment 117: L4 & L5

Runoff = 2.43 cfs @ 12.09 hrs, Volume= 0.178 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.069	98	Front of Large Homes
*	0.126	98	Driveways
	0.136	61	>75% Grass cover, Good, HSG B
	0.331	83	Weighted Average
	0.136	61	41.09% Pervious Area
	0.195	98	58.91% Impervious Area

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

Summary for Subcatchment 119: L4 & L5

Runoff = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af, Depth= 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.038	98	Driveways
	0.054	61	>75% Grass cover, Good, HSG B
	0.092	76	Weighted Average
	0.054	61	58.70% Pervious Area
	0.038	98	41.30% Impervious Area

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

Summary for Subcatchment 121: L6 & L7

Runoff = 2.54 cfs @ 12.09 hrs, Volume= 0.185 af, Depth= 6.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.069	98	Front of Large Homes
*	0.120	98	Driveways
	0.168	61	>75% Grass cover, Good, HSG B
	0.357	81	Weighted Average
	0.168	61	47.06% Pervious Area
	0.189	98	52.94% Impervious Area

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

Summary for Subcatchment 123: L8 & L9

Runoff = 2.27 cfs @ 12.09 hrs, Volume= 0.165 af, Depth= 6.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.069	98	Front of Large Homes
*	0.106	98	Driveways
	0.143	61	>75% Grass cover, Good, HSG B
	0.318	81	Weighted Average
	0.143	61	44.97% Pervious Area
	0.175	98	55.03% Impervious Area

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

Summary for Subcatchment 125: L8

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 0.007 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.010	98	Roof
	0.010	98	100.00% Impervious Area

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

Summary for Subcatchment 127: L10 & L11

Runoff = 2.42 cfs @ 12.09 hrs, Volume= 0.176 af, Depth= 6.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.069	98	Front of Large Homes
*	0.117	98	Driveways
	0.154	61	>75% Grass cover, Good, HSG B
	0.340	81	Weighted Average
	0.154	61	45.29% Pervious Area
	0.186	98	54.71% Impervious Area

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

Summary for Subcatchment 129: L10 & L11

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 0.024 af, Depth= 7.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.031	98	Driveways
	0.008	61	>75% Grass cover, Good, HSG B
	0.039	90	Weighted Average
	0.008	61	20.51% Pervious Area
	0.031	98	79.49% Impervious Area

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

Summary for Subcatchment 131: L12 & L13

Runoff = 2.18 cfs @ 12.09 hrs, Volume= 0.160 af, Depth= 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.069	98	Front of Large Homes
*	0.107	98	Driveways
	0.121	61	>75% Grass cover, Good, HSG B
	0.297	83	Weighted Average
	0.121	61	40.74% Pervious Area
	0.176	98	59.26% Impervious Area

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

Summary for Subcatchment 133: L12 & L13

Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.030 af, Depth= 7.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.039	98	Driveways
	0.011	61	>75% Grass cover, Good, HSG B
	0.050	90	Weighted Average
	0.011	61	22.00% Pervious Area
	0.039	98	78.00% Impervious Area

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

Summary for Subcatchment 135: L13

Runoff = 0.14 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.017	98	Roof
	0.017	98	100.00% Impervious Area

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

Summary for Subcatchment 137: L14

Runoff = 0.45 cfs @ 12.08 hrs, Volume= 0.037 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.054	98	Driveways
	0.054	98	100.00% Impervious Area

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

Summary for Subcatchment 139: L14

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.018	98	Roof
	0.018	98	100.00% Impervious Area

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

Summary for Subcatchment 141: L15

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.018	98	Roof
	0.018	98	100.00% Impervious Area

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

Summary for Subcatchment 143: L16

Runoff = 0.48 cfs @ 12.08 hrs, Volume= 0.040 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.058	98	Roof
	0.058	98	100.00% Impervious Area

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

Summary for Subcatchment 145: L16

Runoff = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 8.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
*	0.020	98	Roof
	0.020	98	100.00% Impervious Area

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

Summary for Subcatchment 201: Subcat 201 Pr

Runoff = 15.49 cfs @ 12.26 hrs, Volume= 1.597 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
	4.211	55	Woods, Good, HSG B
*	0.020	98	Proposed Homes
*	0.050	98	Proposed Driveways
	1.112	61	>75% Grass cover, Good, HSG B
*	0.070	98	Roadway
	0.047	98	Paved parking, HSG A
	5.510	58	Weighted Average
	5.323	56	96.61% Pervious Area
	0.187	98	3.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0300	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.30"

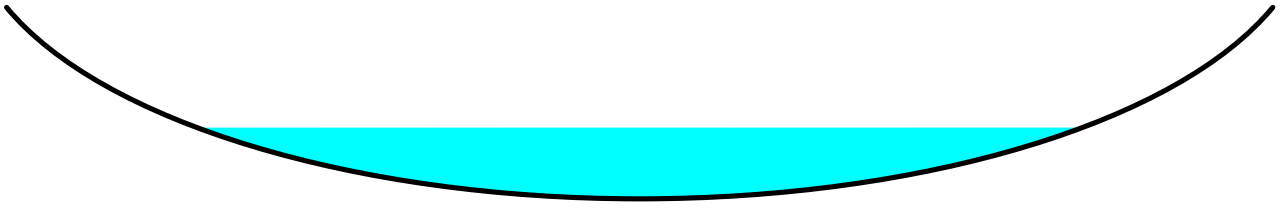
Summary for Reach 107: Pond Discharge

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 4.28" for 100-Year event
Inflow = 29.03 cfs @ 12.46 hrs, Volume= 3.582 af
Outflow = 10.10 cfs @ 13.08 hrs, Volume= 3.579 af, Atten= 65%, Lag= 36.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.22 fps, Min. Travel Time= 91.2 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 330.2 min

Peak Storage= 55,224 cf @ 13.08 hrs
Average Depth at Peak Storage= 0.37' , Surface Width= 183.12'
Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 85.73 cfs

300.00' x 1.00' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush
Length= 1,214.0' Slope= 0.0229 '/'
Inlet Invert= 228.75', Outlet Invert= 201.00'



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Summary for Reach 108: Stream

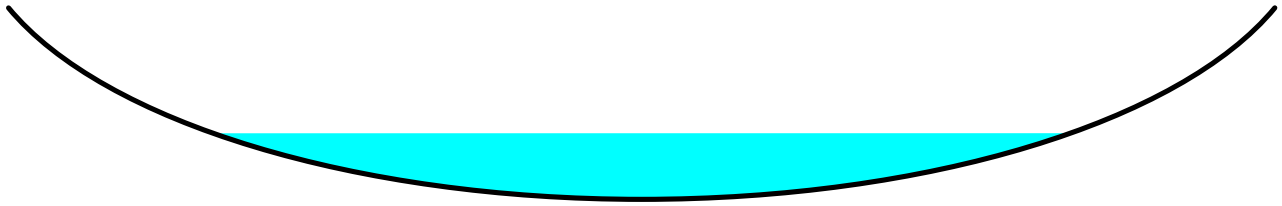
[61] Hint: Exceeded Reach 107 outlet invert by 0.17' @ 13.53 hrs

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth > 4.28" for 100-Year event
Inflow = 10.10 cfs @ 13.08 hrs, Volume= 3.579 af
Outflow = 9.06 cfs @ 13.53 hrs, Volume= 3.578 af, Atten= 10%, Lag= 27.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.33 fps, Min. Travel Time= 25.2 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 86.0 min

Peak Storage= 13,690 cf @ 13.53 hrs
Average Depth at Peak Storage= 0.17' , Surface Width= 58.85'
Bank-Full Depth= 0.50' Flow Area= 33.3 sf, Capacity= 90.16 cfs

100.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 2,015.0' Slope= 0.0129 '/'
Inlet Invert= 201.00', Outlet Invert= 175.00'



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Summary for Reach 110: Pre-Treatment Swale

Inflow Area = 0.212 ac, 65.09% Impervious, Inflow Depth = 6.70" for 100-Year event
Inflow = 1.60 cfs @ 12.08 hrs, Volume= 0.118 af
Outflow = 1.47 cfs @ 12.12 hrs, Volume= 0.118 af, Atten= 8%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.81 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.54 fps, Avg. Travel Time= 10.4 min

Peak Storage= 274 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 3.29'
Bank-Full Depth= 0.50' Flow Area= 1.3 sf, Capacity= 2.63 cfs

1.00' x 0.50' deep channel, n= 0.030
Side Slope Z-value= 3.0 '/' Top Width= 4.00'
Length= 335.5' Slope= 0.0089 '/'
Inlet Invert= 239.00', Outlet Invert= 236.00'

‡

Summary for Reach 120: Pre-Treatment Swale

Inflow Area = 0.092 ac, 41.30% Impervious, Inflow Depth = 5.61" for 100-Year event
Inflow = 0.60 cfs @ 12.09 hrs, Volume= 0.043 af
Outflow = 0.59 cfs @ 12.10 hrs, Volume= 0.043 af, Atten= 2%, Lag= 0.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.35 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.42 fps, Avg. Travel Time= 4.1 min

Peak Storage= 44 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.25' , Surface Width= 2.50'
Bank-Full Depth= 0.50' Flow Area= 1.3 sf, Capacity= 2.47 cfs

1.00' x 0.50' deep channel, n= 0.030
Side Slope Z-value= 3.0 '/' Top Width= 4.00'
Length= 101.2' Slope= 0.0079 '/'
Inlet Invert= 248.80', Outlet Invert= 248.00'

‡

Summary for Reach DL-2: Design Line 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.510 ac, 3.39% Impervious, Inflow Depth = 3.48" for 100-Year event
Inflow = 15.49 cfs @ 12.26 hrs, Volume= 1.597 af
Outflow = 15.49 cfs @ 12.26 hrs, Volume= 1.597 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Reach DP-1: Design Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 132.380 ac, 4.29% Impervious, Inflow Depth = 4.26" for 100-Year event
Inflow = 267.35 cfs @ 12.70 hrs, Volume= 47.037 af
Outflow = 267.35 cfs @ 12.70 hrs, Volume= 47.037 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Pond 103: Bypass U

[57] Hint: Peaked at 236.28' (Flood elevation advised)

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 4.54" for 100-Year event
Inflow = 33.37 cfs @ 12.34 hrs, Volume= 3.799 af
Outflow = 33.37 cfs @ 12.34 hrs, Volume= 3.799 af, Atten= 0%, Lag= 0.0 min
Primary = 9.01 cfs @ 12.35 hrs, Volume= 1.788 af
Secondary = 24.41 cfs @ 12.32 hrs, Volume= 2.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 236.28' @ 12.35 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	233.65'	**6.0' long Overflow Weir** 2 End Contraction(s)
#2	Primary	233.00'	**15.0" Round Culvert** L= 17.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 233.00' / 231.50' S= 0.0852 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 4	230.69'	**24.0" Round Culvert** L= 88.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 230.69' / 230.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#4	Secondary	230.25'	**24.0" Round Culvert** L= 50.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 230.25' / 230.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=8.99 cfs @ 12.35 hrs HW=236.28' TW=233.96' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 8.99 cfs @ 7.33 fps)

Secondary OutFlow Max=24.24 cfs @ 12.32 hrs HW=236.21' TW=233.64' (Dynamic Tailwater)
└**4=Culvert** (Controls 24.24 cfs)
└**3=Culvert** (Inlet Controls 24.24 cfs @ 7.72 fps)
└**1=Overflow Weir** (Passes 24.24 cfs of 73.36 cfs potential flow)

Summary for Pond 104: Forebay

[80] Warning: Exceeded Pond 103 by 3.23' @ 25.35 hrs (1.03 cfs 0.110 af)

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 2.14" for 100-Year event
Inflow = 9.01 cfs @ 12.35 hrs, Volume= 1.788 af
Outflow = 8.63 cfs @ 12.35 hrs, Volume= 1.788 af, Atten= 4%, Lag= 0.2 min
Primary = 8.63 cfs @ 12.35 hrs, Volume= 1.788 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Starting Elev= 233.00' Surf.Area= 1,422 sf Storage= 2,103 cf
Peak Elev= 234.01' @ 12.47 hrs Surf.Area= 1,870 sf Storage= 3,771 cf (1,668 cf above start)

Plug-Flow detention time= 37.3 min calculated for 1.739 af (97% of inflow)
Center-of-Mass det. time= 13.3 min (923.8 - 910.5)

Volume	Invert	Avail.Storage	Storage Description
#1	231.00'	5,857 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
231.00	710	0	0
232.00	1,037	874	874
233.00	1,422	1,230	2,103
234.00	1,863	1,643	3,746
235.00	2,360	2,112	5,857

Device	Routing	Invert	Outlet Devices
#1	Primary	233.00'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=8.27 cfs @ 12.35 hrs HW=233.96' TW=233.89' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 8.27 cfs @ 1.43 fps)

Summary for Pond 105: Sand Filter

[80] Warning: Exceeded Pond 104 by 0.01' @ 11.10 hrs (1.44 cfs 0.027 af)

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 2.14" for 100-Year event
Inflow = 8.63 cfs @ 12.35 hrs, Volume= 1.788 af
Outflow = 7.83 cfs @ 12.49 hrs, Volume= 1.788 af, Atten= 9%, Lag= 8.0 min
Discarded = 0.07 cfs @ 9.07 hrs, Volume= 0.217 af
Primary = 7.76 cfs @ 12.49 hrs, Volume= 1.571 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 233.96' @ 12.47 hrs Surf.Area= 2,990 sf Storage= 6,143 cf

Plug-Flow detention time= 94.8 min calculated for 1.787 af (100% of inflow)
Center-of-Mass det. time= 94.9 min (1,018.7 - 923.8)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	2,960 cf	**Sand Filter & Top Soil (Prismatic)** Listed below (Recalc) 8,970 cf Overall x 33.0% Voids
#2	233.00'	7,435 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		10,395 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
230.00	2,990	0	0
233.00	2,990	8,970	8,970

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
233.00	2,990	0	0
233.50	3,341	1,583	1,583
234.00	3,705	1,762	3,344
235.00	4,476	4,091	7,435

Device	Routing	Invert	Outlet Devices
#1	Discarded	230.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	233.50'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.07 cfs @ 9.07 hrs HW=230.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=7.85 cfs @ 12.49 hrs HW=233.96' TW=233.85' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 7.85 cfs @ 1.15 fps)

Summary for Pond 106: Basin 1

[44] Hint: Outlet device #3 is below defined storage

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 4.28" for 100-Year event
Inflow = 32.06 cfs @ 12.32 hrs, Volume= 3.582 af
Outflow = 29.03 cfs @ 12.46 hrs, Volume= 3.582 af, Atten= 9%, Lag= 8.3 min
Primary = 29.03 cfs @ 12.46 hrs, Volume= 3.582 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 233.85' @ 12.46 hrs Surf.Area= 7,151 sf Storage= 21,096 cf

Plug-Flow detention time= 56.8 min calculated for 3.582 af (100% of inflow)
Center-of-Mass det. time= 56.9 min (907.9 - 851.0)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	29,951 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
230.00	3,939	0	0
231.00	4,692	4,316	4,316
232.00	5,501	5,097	9,412
233.00	6,366	5,934	15,346
234.00	7,289	6,828	22,173
235.00	8,267	7,778	29,951

Device	Routing	Invert	Outlet Devices
#1	Device 2	229.00'	**24.0" Round Culvert** L= 27.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 229.00' / 228.86' S= 0.0052 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	228.86'	**24.0" Round Culvert** L= 22.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 228.86' / 228.75' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#3	Device 1	229.00'	**2.5" Vert. Low Flow (CPv)** C= 0.600 Limited to weir flow at low heads
#4	Secondary	234.00'	**15.0' long x 8.0' breadth Emergency Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

#5	Device 1	231.50'	**30.0" W x 27.0" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=29.02 cfs @ 12.46 hrs HW=233.85' TW=228.99' (Dynamic Tailwater)
- **2=Culvert** (Passes 29.02 cfs of 37.57 cfs potential flow)
  - **1=Culvert** (Passes 29.02 cfs of 36.32 cfs potential flow)
    - **3=Low Flow (CPv)** (Orifice Controls 0.36 cfs @ 10.49 fps)
    - **5=Orifice** (Orifice Controls 28.67 cfs @ 5.10 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=230.00' TW=228.75' (Dynamic Tailwater)
- **4=Emergency Weir** (Controls 0.00 cfs)

Summary for Pond 112: Bio-Retention Area

[62] Hint: Exceeded Reach 110 OUTLET depth by 0.24' @ 24.28 hrs

Inflow Area =	1.654 ac,	19.04% Impervious,	Inflow Depth =	4.40"	for 100-Year event
Inflow =	6.02 cfs @	12.21 hrs,	Volume=	0.607 af	
Outflow =	6.01 cfs @	12.22 hrs,	Volume=	0.607 af,	Atten= 0%, Lag= 0.7 min
Discarded =	0.03 cfs @	9.25 hrs,	Volume=	0.086 af	
Primary =	5.98 cfs @	12.22 hrs,	Volume=	0.521 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 236.50' @ 12.22 hrs Surf.Area= 1,245 sf Storage= 2,275 cf

Plug-Flow detention time= 98.6 min calculated for 0.607 af (100% of inflow)
Center-of-Mass det. time= 98.7 min (934.9 - 836.2)

Volume	Invert	Avail.Storage	Storage Description
#1	232.75'	1,233 cf	**Bio Media and Mulch (Prismatic)** Listed below (Recalc) 3,735 cf Overall x 33.0% Voids
#2	235.75'	1,886 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		3,118 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
232.75	1,245	0	0
235.75	1,245	3,735	3,735

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
235.75	1,245	0	0
236.00	1,345	324	324
236.25	1,450	349	673
237.00	1,783	1,212	1,886

Device	Routing	Invert	Outlet Devices
#1	Primary	236.25'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64

2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2 Discarded 232.75' **1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 9.25 hrs HW=232.79' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=5.98 cfs @ 12.22 hrs HW=236.50' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 5.98 cfs @ 1.22 fps)

Summary for Pond 112B: Stone Trench

Inflow Area = 0.028 ac, 75.00% Impervious, Inflow Depth = 7.18" for 100-Year event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 0.017 af
Outflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.01 cfs @ 10.07 hrs, Volume= 0.009 af
Primary = 0.21 cfs @ 12.09 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 240.01' @ 12.09 hrs Surf.Area= 0.007 ac Storage= 0.001 af

Plug-Flow detention time= 32.2 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 32.2 min (809.4 - 777.3)

Volume	Invert	Avail.Storage	Storage Description
#1	239.50'	0.001 af	**5.00'W x 65.00'L x 0.50'H Trench** 0.004 af Overall x 33.0% Voids
#2	240.00'	0.004 af	**5.00'W x 65.00'L x 0.50'H Above Trench** -Impervious
		0.005 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	239.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	240.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 10.07 hrs HW=239.52' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.21 cfs @ 12.09 hrs HW=240.01' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.21 cfs @ 0.32 fps)

Summary for Pond 114: Bio-Retention Area

Inflow Area = 0.147 ac, 59.86% Impervious, Inflow Depth = 6.46" for 100-Year event
Inflow = 1.08 cfs @ 12.09 hrs, Volume= 0.079 af
Outflow = 1.08 cfs @ 12.09 hrs, Volume= 0.079 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.01 cfs @ 8.35 hrs, Volume= 0.032 af
Primary = 1.07 cfs @ 12.09 hrs, Volume= 0.047 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Peak Elev= 243.21' @ 12.09 hrs Surf.Area= 431 sf Storage= 759 cf

Plug-Flow detention time= 291.2 min calculated for 0.079 af (100% of inflow)
Center-of-Mass det. time= 291.2 min (1,084.7 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1	239.50'	427 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,293 cf Overall x 33.0% Voids
#2	242.50'	830 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		1,257 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
239.50	431	0	0
242.50	431	1,293	1,293

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
242.50	431	0	0
243.25	509	353	353
244.00	764	477	830

Device	Routing	Invert	Outlet Devices
#1	Primary	243.15'	**29.7' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	239.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 8.35 hrs HW=239.55' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.07 cfs @ 12.09 hrs HW=243.21' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.07 cfs @ 0.60 fps)

Summary for Pond 116: Stone Trench

Inflow Area = 0.019 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 0.013 af
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.2 min
Discarded = 0.01 cfs @ 10.09 hrs, Volume= 0.008 af
Primary = 0.15 cfs @ 12.09 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 242.01' @ 12.09 hrs Surf.Area= 0.007 ac Storage= 0.001 af

Plug-Flow detention time= 31.8 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 31.8 min (772.2 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	241.50'	0.001 af	**5.00'W x 58.00'L x 0.50'H Trench**
			0.003 af Overall x 33.0% Voids
#2	242.00'	0.003 af	**5.00'W x 58.00'L x 0.50'H Above Trench** -Impervious
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	241.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	242.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 10.09 hrs HW=241.52' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.15 cfs @ 12.09 hrs HW=242.01' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.15 cfs @ 0.29 fps)

Summary for Pond 118: Bio-Retention Area

[62] Hint: Exceeded Reach 120 OUTLET depth by 0.58' @ 24.17 hrs

Inflow Area = 0.423 ac, 55.08% Impervious, Inflow Depth = 6.27" for 100-Year event
Inflow = 3.01 cfs @ 12.09 hrs, Volume= 0.221 af
Outflow = 2.94 cfs @ 12.11 hrs, Volume= 0.221 af, Atten= 2%, Lag= 1.1 min
Discarded = 0.03 cfs @ 8.67 hrs, Volume= 0.097 af
Primary = 2.90 cfs @ 12.11 hrs, Volume= 0.124 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 248.75' @ 12.11 hrs Surf.Area= 1,362 sf Storage= 2,497 cf

Plug-Flow detention time= 315.4 min calculated for 0.221 af (100% of inflow)
Center-of-Mass det. time= 315.4 min (1,112.5 - 797.1)

Volume	Invert	Avail.Storage	Storage Description
#1	245.00'	1,348 cf	**Bio Media and Mulch (Prismatic)** Listed below (Recalc)
			4,086 cf Overall x 33.0% Voids
#2	248.00'	2,047 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		3,395 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
245.00	1,362	0	0
248.00	1,362	4,086	4,086

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	1,362	0	0
248.75	1,688	1,144	1,144
249.25	1,923	903	2,047

Device	Routing	Invert	Outlet Devices
#1	Primary	248.60'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	245.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 8.67 hrs HW=245.04' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.90 cfs @ 12.11 hrs HW=248.75' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.90 cfs @ 0.95 fps)

Summary for Pond 122: Bio-Retention Area

Inflow Area = 0.357 ac, 52.94% Impervious, Inflow Depth = 6.22" for 100-Year event
Inflow = 2.54 cfs @ 12.09 hrs, Volume= 0.185 af
Outflow = 1.60 cfs @ 12.18 hrs, Volume= 0.185 af, Atten= 37%, Lag= 5.9 min
Discarded = 0.04 cfs @ 9.25 hrs, Volume= 0.112 af
Primary = 1.56 cfs @ 12.18 hrs, Volume= 0.072 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 252.98' @ 12.18 hrs Surf.Area= 1,599 sf Storage= 2,879 cf

Plug-Flow detention time= 441.8 min calculated for 0.185 af (100% of inflow)
Center-of-Mass det. time= 441.8 min (1,240.1 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	249.25'	1,583 cf	**Bio Media and Mulch (Prismatic)** Listed below (Recalc) 4,797 cf Overall x 33.0% Voids
#2	252.25'	2,376 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		3,959 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
249.25	1,599	0	0
252.25	1,599	4,797	4,797

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
252.25	1,599	0	0
253.00	1,957	1,334	1,334
253.50	2,214	1,043	2,376

Device	Routing	Invert	Outlet Devices
#1	Primary	252.90'	**28.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

#2 Discarded 249.25' **1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 9.25 hrs HW=249.29' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.56 cfs @ 12.18 hrs HW=252.98' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.56 cfs @ 0.69 fps)

Summary for Pond 124: Bio-Retention Area

Inflow Area = 0.318 ac, 55.03% Impervious, Inflow Depth = 6.22" for 100-Year event
Inflow = 2.27 cfs @ 12.09 hrs, Volume= 0.165 af
Outflow = 1.23 cfs @ 12.21 hrs, Volume= 0.165 af, Atten= 46%, Lag= 7.6 min
Discarded = 0.04 cfs @ 9.33 hrs, Volume= 0.104 af
Primary = 1.20 cfs @ 12.21 hrs, Volume= 0.060 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 257.72' @ 12.21 hrs Surf.Area= 1,490 sf Storage= 2,676 cf

Plug-Flow detention time= 459.3 min calculated for 0.165 af (100% of inflow)
Center-of-Mass det. time= 459.3 min (1,257.6 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	254.00'	1,475 cf	**Bio Media and Mulch (Prismatic)** Listed below (Recalc) 4,470 cf Overall x 33.0% Voids
#2	257.00'	2,232 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		3,707 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
254.00	1,490	0	0
257.00	1,490	4,470	4,470

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
257.00	1,490	0	0
258.00	1,961	1,726	1,726
258.25	2,087	506	2,232

Device	Routing	Invert	Outlet Devices
#1	Primary	257.65'	**25.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	254.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 9.33 hrs HW=254.04' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.20 cfs @ 12.21 hrs HW=257.72' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 1.20 cfs @ 0.66 fps)

Summary for Pond 126: Drywell

[42] Hint: Gap in defined storage above volume #1 at 252.25'

Inflow Area = 0.010 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.08 cfs @ 12.08 hrs, Volume= 0.007 af
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 0.007 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.00 cfs @ 8.52 hrs, Volume= 0.004 af
Primary = 0.08 cfs @ 12.09 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 253.67' @ 12.09 hrs Surf.Area= 0.002 ac Storage= 0.001 af

Plug-Flow detention time= 82.8 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 82.8 min (823.3 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	251.75'	0.000 af	**10.00'W x 9.00'L x 0.50'H Drywell**
			0.001 af Overall x 33.0% Voids
#2	252.75'	0.001 af	**6.00'D x 1.00'H Outlet Pipe** -Impervious
		0.001 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	251.75'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	253.50'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 8.52 hrs HW=251.77' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.08 cfs @ 12.09 hrs HW=253.67' TW=0.00' (Dynamic Tailwater)
2=Orifice/Grate (Orifice Controls 0.08 cfs @ 1.40 fps)

Summary for Pond 128: Bio-Retention Area

Inflow Area = 0.340 ac, 54.71% Impervious, Inflow Depth = 6.22" for 100-Year event
Inflow = 2.42 cfs @ 12.09 hrs, Volume= 0.176 af
Outflow = 0.24 cfs @ 12.93 hrs, Volume= 0.176 af, Atten= 90%, Lag= 50.6 min
Discarded = 0.05 cfs @ 9.99 hrs, Volume= 0.153 af
Primary = 0.18 cfs @ 12.93 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 261.22' @ 12.93 hrs Surf.Area= 2,274 sf Storage= 4,038 cf

Plug-Flow detention time= 620.4 min calculated for 0.176 af (100% of inflow)

Center-of-Mass det. time= 620.4 min (1,418.7 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	257.50'	2,251 cf	**Bio Media and Mulch (Prismatic)** Listed below (Recalc) 6,822 cf Overall x 33.0% Voids
#2	260.50'	3,286 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		5,538 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
257.50	2,274	0	0
260.50	2,274	6,822	6,822

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
260.50	2,274	0	0
261.75	2,984	3,286	3,286

Device	Routing	Invert	Outlet Devices
#1	Primary	261.20'	**25.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2	Discarded	257.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.05 cfs @ 9.99 hrs HW=257.54' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.18 cfs @ 12.93 hrs HW=261.22' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.18 cfs @ 0.35 fps)

Summary for Pond 130: Stone Trench

Inflow Area = 0.039 ac, 79.49% Impervious, Inflow Depth = 7.30" for 100-Year event
Inflow = 0.31 cfs @ 12.08 hrs, Volume= 0.024 af
Outflow = 0.31 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.01 cfs @ 9.77 hrs, Volume= 0.013 af
Primary = 0.30 cfs @ 12.09 hrs, Volume= 0.010 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 260.02' @ 12.09 hrs Surf.Area= 0.011 ac Storage= 0.003 af

Plug-Flow detention time= 52.2 min calculated for 0.024 af (100% of inflow)
Center-of-Mass det. time= 52.2 min (826.3 - 774.2)

Volume	Invert	Avail.Storage	Storage Description
#1	259.25'	0.003 af	**5.00'W x 92.00'L x 0.75'H Trench**
			0.008 af Overall x 33.0% Voids
#2	260.00'	0.005 af	**5.00'W x 92.00'L x 0.50'H Above Trench** -Impervious
		0.008 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	259.25'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	260.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 9.77 hrs HW=259.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.30 cfs @ 12.09 hrs HW=260.02' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 0.36 fps)

Summary for Pond 132: Bio-Retention Area

Inflow Area = 0.297 ac, 59.26% Impervious, Inflow Depth = 6.46" for 100-Year event
Inflow = 2.18 cfs @ 12.09 hrs, Volume= 0.160 af
Outflow = 0.55 cfs @ 12.46 hrs, Volume= 0.160 af, Atten= 75%, Lag= 22.7 min
Discarded = 0.04 cfs @ 9.58 hrs, Volume= 0.126 af
Primary = 0.50 cfs @ 12.46 hrs, Volume= 0.034 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 265.49' @ 12.46 hrs Surf.Area= 1,820 sf Storage= 3,293 cf

Plug-Flow detention time= 567.9 min calculated for 0.160 af (100% of inflow)
Center-of-Mass det. time= 568.0 min (1,361.5 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1	261.75'	1,802 cf	**Bio Media and Mulch (Prismatic)** Listed below (Recalc)
			5,460 cf Overall x 33.0% Voids
#2	264.75'	2,681 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		4,482 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
261.75	1,820	0	0
264.75	1,820	5,460	5,460

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
264.75	1,820	0	0
266.00	2,469	2,681	2,681

Device	Routing	Invert	Outlet Devices
#1	Primary	265.45'	**25.0' long x 8.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64
2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#2 Discarded 261.75' **1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 9.58 hrs HW=261.79' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.50 cfs @ 12.46 hrs HW=265.49' TW=0.00' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 0.50 cfs @ 0.49 fps)

Summary for Pond 134: Stone Trench

Inflow Area = 0.050 ac, 78.00% Impervious, Inflow Depth = 7.30" for 100-Year event
Inflow = 0.40 cfs @ 12.08 hrs, Volume= 0.030 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.3 min
Discarded = 0.01 cfs @ 9.50 hrs, Volume= 0.017 af
Primary = 0.39 cfs @ 12.09 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 264.02' @ 12.09 hrs Surf.Area= 0.012 ac Storage= 0.004 af

Plug-Flow detention time= 72.0 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 72.0 min (846.1 - 774.2)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	0.004 af	**5.00'W x 103.00'L x 1.00'H Trench** 0.012 af Overall x 33.0% Voids
#2	264.00'	0.006 af	**5.00'W x 103.00'L x 0.50'H Above Trench** -Impervious
		0.010 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	264.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.01 cfs @ 9.50 hrs HW=263.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.39 cfs @ 12.09 hrs HW=264.02' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.39 cfs @ 0.39 fps)

Summary for Pond 136: Drywell

[42] Hint: Gap in defined storage above volume #1 at 260.50'

Inflow Area = 0.017 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.14 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.00 cfs @ 6.88 hrs, Volume= 0.004 af
Primary = 0.14 cfs @ 12.09 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 263.98' @ 12.09 hrs Surf.Area= 0.002 ac Storage= 0.001 af

Plug-Flow detention time= 69.0 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 69.0 min (809.5 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	0.000 af	**10.00'W x 9.00'L x 0.50'H Drywell** 0.001 af Overall x 33.0% Voids
#2	263.00'	0.001 af	**6.00'D x 1.00'H Outlet Pipe** -Impervious
		0.001 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	263.75'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 6.88 hrs HW=260.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.14 cfs @ 12.09 hrs HW=263.98' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 1.62 fps)

Summary for Pond 138: Stone Trench

Inflow Area = 0.054 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.45 cfs @ 12.08 hrs, Volume= 0.037 af
Outflow = 0.45 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 9.81 hrs, Volume= 0.022 af
Primary = 0.43 cfs @ 12.09 hrs, Volume= 0.015 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 266.02' @ 12.09 hrs Surf.Area= 0.018 ac Storage= 0.003 af

Plug-Flow detention time= 31.6 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 31.6 min (772.1 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	265.50'	0.003 af	**5.00'W x 153.00'L x 0.50'H Trench** 0.009 af Overall x 33.0% Voids
#2	266.00'	0.009 af	**5.00'W x 153.00'L x 0.50'H Above Trench** -Impervious
		0.012 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	266.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 9.81 hrs HW=265.52' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.43 cfs @ 12.09 hrs HW=266.02' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.43 cfs @ 0.41 fps)

Summary for Pond 140: Drywell

Inflow Area = 0.018 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.00 cfs @ 8.63 hrs, Volume= 0.006 af
Primary = 0.15 cfs @ 12.09 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 266.23' @ 12.09 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time= 38.7 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 38.7 min (779.1 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	265.50'	0.001 af	**13.00'W x 13.00'L x 0.50'H Drywell** 0.002 af Overall x 33.0% Voids
#2	265.75'	0.001 af	**6.00'D x 2.00'H Outlet Pipe** -Impervious
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	266.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 8.63 hrs HW=265.52' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.15 cfs @ 12.09 hrs HW=266.23' TW=0.00' (Dynamic Tailwater)
2=Orifice/Grate (Orifice Controls 0.15 cfs @ 1.64 fps)

Summary for Pond 142: Drywell

Inflow Area = 0.018 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af
Outflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.00 cfs @ 4.29 hrs, Volume= 0.004 af
Primary = 0.15 cfs @ 12.09 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 263.23' @ 12.09 hrs Surf.Area= 0.001 ac Storage= 0.001 af

Plug-Flow detention time= 129.8 min calculated for 0.012 af (100% of inflow)

Center-of-Mass det. time= 129.9 min (870.3 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	261.00'	0.000 af	**8.00'W x 8.00'L x 1.00'H Drywell** 0.001 af Overall x 33.0% Voids
#2	261.75'	0.001 af	**6.00'D x 2.00'H Outlet Pipe** -Impervious
		0.002 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	261.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	263.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 4.29 hrs HW=261.03' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.15 cfs @ 12.09 hrs HW=263.23' TW=0.00' (Dynamic Tailwater)
2=Orifice/Grate (Orifice Controls 0.15 cfs @ 1.65 fps)

Summary for Pond 144: Stone Trench

Inflow Area = 0.058 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.48 cfs @ 12.08 hrs, Volume= 0.040 af
Outflow = 0.48 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.02 cfs @ 9.87 hrs, Volume= 0.024 af
Primary = 0.46 cfs @ 12.09 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 258.02' @ 12.09 hrs Surf.Area= 0.019 ac Storage= 0.004 af

Plug-Flow detention time= 31.7 min calculated for 0.040 af (100% of inflow)
Center-of-Mass det. time= 31.7 min (772.2 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	257.50'	0.003 af	**5.00'W x 167.00'L x 0.50'H Trench** 0.010 af Overall x 33.0% Voids
#2	258.00'	0.010 af	**5.00'W x 167.00'L x 0.50'H Above Trench** -Impervious
		0.013 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	257.50'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	258.00'	**50.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.02 cfs @ 9.87 hrs HW=257.52' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.46 cfs @ 12.09 hrs HW=258.02' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.46 cfs @ 0.42 fps)

Summary for Pond 146: Drywell

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 0.014 af
Outflow = 0.17 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.00 cfs @ 3.18 hrs, Volume= 0.005 af
Primary = 0.17 cfs @ 12.09 hrs, Volume= 0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 262.25' @ 12.09 hrs Surf.Area= 0.001 ac Storage= 0.003 af

Plug-Flow detention time= 409.2 min calculated for 0.014 af (100% of inflow)
Center-of-Mass det. time= 409.4 min (1,149.9 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	258.00'	0.001 af	**7.00'W x 7.00'L x 3.00'H Drywell** 0.003 af Overall x 33.0% Voids
#2	259.00'	0.003 af	**6.00'D x 4.00'H Outlet Pipe** -Impervious
		0.004 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	258.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	262.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 3.18 hrs HW=258.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.17 cfs @ 12.09 hrs HW=262.25' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 1.70 fps)

A3.5.5 HydroCAD 100-Year Emergency Outlet Calculations

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 102: Subcat 102 Pr Runoff Area=10.042 ac 22.02% Impervious Runoff Depth=4.54"
Flow Length=1,646' Tc=23.9 min CN=67 Runoff=33.37 cfs 3.799 af

Reach 107: Pond Discharge Avg. Flow Depth=0.33' Max Vel=0.21 fps Inflow=29.03 cfs 3.010 af
n=0.400 L=1,214.0' S=0.0229 '/' Capacity=85.73 cfs Outflow=7.80 cfs 3.008 af

Pond 103: Bypass U Peak Elev=237.18' Inflow=33.37 cfs 3.799 af
Primary=9.56 cfs 1.185 af Secondary=23.94 cfs 2.614 af Outflow=33.37 cfs 3.799 af

Pond 104: Forebay Peak Elev=234.82' Storage=5,437 cf Inflow=9.56 cfs 1.185 af
Outflow=8.92 cfs 1.185 af

Pond 105: Sand Filter Peak Elev=234.81' Storage=9,548 cf Inflow=8.92 cfs 1.185 af
Discarded=0.07 cfs 0.279 af Primary=8.10 cfs 0.906 af Outflow=8.17 cfs 1.185 af

Pond 106: Basin 1 Peak Elev=234.80' Storage=28,342 cf Inflow=31.53 cfs 3.519 af
Outflow=29.03 cfs 3.010 af

Summary for Subcatchment 102: Subcat 102 Pr

Runoff = 33.37 cfs @ 12.34 hrs, Volume= 3.799 af, Depth= 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.50"

	Area (ac)	CN	Description
	4.024	55	Woods, Good, HSG B
	3.807	61	>75% Grass cover, Good, HSG B
*	0.660	98	Proposed Homes
*	0.700	98	Proposed Road
*	0.692	98	Proposed Driveways
	0.159	98	Paved parking, HSG A
	10.042	67	Weighted Average
	7.831	58	77.98% Pervious Area
	2.211	98	22.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.0	100	0.0300	0.09		**Sheet Flow, 2A-2B** Woods: Light underbrush n= 0.400 P2= 3.30"
3.9	539	0.0200	2.28		**Shallow Concentrated Flow, 2B-2C** Unpaved Kv= 16.1 fps
2.0	1,007	0.0100	8.51	26.74	**Pipe Channel, 2C-2D** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.011 Concrete pipe, straight & clean
23.9	1,646	Total			

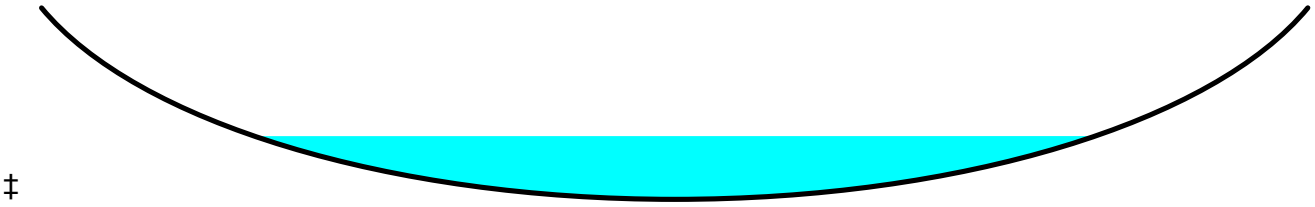
Summary for Reach 107: Pond Discharge

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 3.60" for 100-Year event
Inflow = 29.03 cfs @ 12.46 hrs, Volume= 3.010 af
Outflow = 7.80 cfs @ 13.17 hrs, Volume= 3.008 af, Atten= 73%, Lag= 42.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.21 fps, Min. Travel Time= 98.7 min
Avg. Velocity = 0.06 fps, Avg. Travel Time= 365.0 min

Peak Storage= 46,189 cf @ 13.17 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 172.54'
Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 85.73 cfs

300.00' x 1.00' deep Parabolic Channel, n= 0.400 Sheet flow: Woods+light brush
Length= 1,214.0' Slope= 0.0229 '/'
Inlet Invert= 228.75', Outlet Invert= 201.00'



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Summary for Pond 103: Bypass U

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 4.54" for 100-Year event
Inflow = 33.37 cfs @ 12.34 hrs, Volume= 3.799 af
Outflow = 33.37 cfs @ 12.34 hrs, Volume= 3.799 af, Atten= 0%, Lag= 0.0 min
Primary = 9.56 cfs @ 12.30 hrs, Volume= 1.185 af
Secondary = 23.94 cfs @ 12.35 hrs, Volume= 2.614 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 237.18' @ 12.35 hrs

Device	Routing	Invert	Outlet Devices
#1	Device 3	233.65'	**6.0' long Overflow Weir** 2 End Contraction(s)
#2	Primary	233.00'	**15.0" Round Culvert** L= 17.6' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 233.00' / 231.50' S= 0.0852 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 4	230.69'	**24.0" Round Culvert** L= 88.1' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 230.69' / 230.25' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#4	Secondary	230.25'	**24.0" Round Culvert** L= 50.5' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 230.25' / 230.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=9.45 cfs @ 12.30 hrs HW=237.01' TW=234.45' (Dynamic Tailwater)
└**2=Culvert** (Inlet Controls 9.45 cfs @ 7.70 fps)

Secondary OutFlow Max=23.80 cfs @ 12.35 hrs HW=237.17' TW=234.69' (Dynamic Tailwater)
└**4=Culvert** (Controls 23.80 cfs)
└**3=Culvert** (Inlet Controls 23.80 cfs @ 7.58 fps)
└**1=Overflow Weir** (Passes 23.80 cfs of 106.79 cfs potential flow)

Summary for Pond 104: Forebay

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 1.42" for 100-Year event
Inflow = 9.56 cfs @ 12.30 hrs, Volume= 1.185 af
Outflow = 8.92 cfs @ 12.35 hrs, Volume= 1.185 af, Atten= 7%, Lag= 2.9 min
Primary = 8.92 cfs @ 12.35 hrs, Volume= 1.185 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Starting Elev= 233.00' Surf.Area= 1,422 sf Storage= 2,103 cf
Peak Elev= 234.82' @ 12.48 hrs Surf.Area= 2,270 sf Storage= 5,437 cf (3,334 cf above start)

Plug-Flow detention time= 84.3 min calculated for 1.137 af (96% of inflow)
Center-of-Mass det. time= 49.8 min (860.1 - 810.3)

Volume	Invert	Avail.Storage	Storage Description
#1	231.00'	5,857 cf	**Ponding (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
231.00	710	0	0
232.00	1,037	874	874
233.00	1,422	1,230	2,103
234.00	1,863	1,643	3,746
235.00	2,360	2,112	5,857

Device	Routing	Invert	Outlet Devices
#1	Primary	233.00'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.00 cfs @ 12.35 hrs HW=234.68' TW=234.69' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 105: Sand Filter

Inflow Area =	10.042 ac,	22.02% Impervious,	Inflow Depth =	1.42" for 100-Year event
Inflow =	8.92 cfs @	12.35 hrs, Volume=	1.185 af	
Outflow =	8.17 cfs @	12.50 hrs, Volume=	1.185 af,	Atten= 8%, Lag= 9.0 min
Discarded =	0.07 cfs @	9.07 hrs, Volume=	0.279 af	
Primary =	8.10 cfs @	12.50 hrs, Volume=	0.906 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 234.81' @ 12.47 hrs Surf.Area= 2,990 sf Storage= 9,548 cf

Plug-Flow detention time= 240.7 min calculated for 1.185 af (100% of inflow)
Center-of-Mass det. time= 240.7 min (1,100.8 - 860.1)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	2,960 cf	**Sand Filter & Top Soil (Prismatic)** Listed below (Recalc) 8,970 cf Overall x 33.0% Voids
#2	233.00'	7,435 cf	**Ponding Storage (Prismatic)** Listed below (Recalc) -Impervious
		10,395 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
230.00	2,990	0	0
233.00	2,990	8,970	8,970

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
233.00	2,990	0	0
233.50	3,341	1,583	1,583
234.00	3,705	1,762	3,344
235.00	4,476	4,091	7,435

Device	Routing	Invert	Outlet Devices
#1	Discarded	230.00'	**1.020 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	233.50'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.07 cfs @ 9.07 hrs HW=230.05' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=10.04 cfs @ 12.50 hrs HW=234.80' TW=234.79' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 10.04 cfs @ 0.51 fps)

Summary for Pond 106: Basin 1

Inflow Area = 10.042 ac, 22.02% Impervious, Inflow Depth = 4.21" for 100-Year event
Inflow = 31.53 cfs @ 12.34 hrs, Volume= 3.519 af
Outflow = 29.03 cfs @ 12.46 hrs, Volume= 3.010 af, Atten= 8%, Lag= 7.1 min
Secondary = 29.03 cfs @ 12.46 hrs, Volume= 3.010 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 234.80' @ 12.46 hrs Surf.Area= 8,074 sf Storage= 28,342 cf

Plug-Flow detention time= 92.5 min calculated for 3.010 af (86% of inflow)
Center-of-Mass det. time= 30.3 min (884.7 - 854.3)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	29,951 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
230.00	3,939	0	0
231.00	4,692	4,316	4,316
232.00	5,501	5,097	9,412
233.00	6,366	5,934	15,346
234.00	7,289	6,828	22,173
235.00	8,267	7,778	29,951

Device	Routing	Invert	Outlet Devices
#1	Secondary	234.00'	**15.0' long x 8.0' breadth Emergency Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64

2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Secondary OutFlow Max=29.03 cfs @ 12.46 hrs HW=234.80' TW=228.93' (Dynamic Tailwater)
↑**1=Emergency Weir** (Weir Controls 29.03 cfs @ 2.41 fps)

Watershed Maps

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6036 www.DiPrete-Eng.com
Engineers • Planners • Surveyors

North

Old North Road (Variable Width Public R.O.W.)

AP 16-4 LOT 6 N/F ELDRED FARM, LLC

AP 16-4 LOT 5 N/F BOARD OF TRUSTEES OF STATE COLLEGES

AP 16-4 LOT 4 N/F HABITAT FOR HUMANITY FOR RI

AP 16-4 LOT 3 N/F MARY J. CRONIN

AP 16-4 LOT 2 N/F PETER & SUZANNE PLESKUNAS

AP 16-4 LOT 1 N/F RUTH R. GILBERT

AP 16-4 LOT 10 N/F KATHLEEN WOSENCROFT

AP 16-4 LOT 11 N/F NABIH A. & HAMDZADA

AP 16-4 LOT 12 N/F DONALD E.& ELISE B. BURGESS

AP 16-4 LOT 13 N/F DENNIS E. & KELLI A. ORTELT

AP 16-4 LOT 14 N/F FRANCIS X. MATHEWS

AP 16-4 LOT 7 N/F LUTHERAN CHURCH OF THE GOOD SHEPHERD

BEAR FARM ROAD

AP 16-4 LOT 8 N/F SOUTH KINGSTOWN LAND TRUST

AP 16-4 LOT 16 N/F JEMIMA REALTY, LLC

AP 16-1 LOT 3 N/F STATE OF RHODE ISLAND

AP 16-1 LOT 2 N/F STONY FORT PARTNERS, LLC

AP 16-1 LOT 1 N/F STONY FORT PARTNERS, LLC

AP 24-1 LOT 71 N/F PAUL E. & BEYNOLDS

AP 24-1 LOT 72 N/F DONNA M. O'BRIEN

AP 24 LOT 17 N/F THOMAS F. REUL

AP 24 LOT 1 N/F TOWN OF SOUTH KINGSTOWN

AP 82 B LOT N/ PHILLIP

AP 82 LOT CHARLES

MA DENISE

AP 82 BLOCK 1 LOT N/F MEMBER REALTY, L

AP 16 LOT 2 N/F KINGSTON HILL ACADEMY

SITE
AP 16 BLOCK 4 LOT 9
N/F
OLD NORTH LAND INVESTMENTS, LLC
AREA:
(118.60± ACRES)
SUITABLE AREA:
(61.83± ACRES)
ZONE R40

1A 1B 2A 2B 2C

100 200

DP-1 DL-2

ScA SdB NBB

LEGEND

- WOODS – B SOILS
- WOODS – D SOILS
- IMPERVIOUS
- GRASS – B SOILS
- GRASS – D SOILS
- TC LINE (1A, 2A)
- SUBCAT AREA
- SOIL BOUNDARY
- SOIL TYPE (ScA)
- SUBCATCHMENT (10)
- DRAINAGE POND (10)
- DRAINAGE STRUCTURE/POND WITH INSIGNIFICANT STORAGE (10)
- REACH/SWALE (10)
- DESIGN POINT (10)

Scale: 1"=150'
0 75' 150' 300'

No.	Date	Description	By
6	9/1/2022	RIDEM Response to Comments	S.R.
5	8/31/2022	RIDEM Re-Submission	S.P.B.
4	4/29/22	RIDEM Re-Submission	D.M.M.
3	4/5/22	RIDEM Re-Submission	D.A.K.
2	2-8-13	RIDEM Submission	
1	4/29/21		
0	2-8-13		

Design By: R.B.S.

Pre Watershed Map

Fieldstone Farms

Assessor's Plat 16-4, Lot 9
South Kingstown, Rhode Island

Prepared for
Old North Land Investments LLC
75 Lambert Lind Highway
Warwick, Rhode Island 02886

DE Job No: 0161.184

SHEET 1 OF 16

DiPrete Engineering
Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6036 www.DiPrete-Eng.com
Engineers • Planners • Surveyors

No.	Date	Description	By:
4	8/1/2022	RIDEM Response to Comments	S.K.
3	6/14/2022	RIDEM Re-Submission	K.P.R.
2	4/4/2022	RIDEM Re-Submission	D.M.M.
1	2-8-13	RIDEM Submission	D.A.P.

Design By: R.B.S.

Post Watershed Map

Fieldstone Farms

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SHEET 2 OF 16