Soil Erosion and Sediment Control Plan

For:

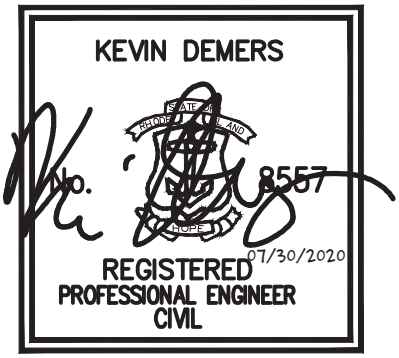
The Village at Curtis Corner

Curtis Corner Road

South Kingstown, Rhode Island 02879

Assessor's Plat 40-4 Lot 55

Owner:	5A Builders, LLC Alexander Petrucci 220 Knowlesway Extension Narragansett, RI 02882 (401) 523-1805 ajp1805@aol.com
Operator: *TO BE DETERMINED UPON CONTRACT AWARD*	Company Name Name Address City, State, Zip Code Telephone Number Email Address
Estimated Project Dates:	Start Date: Fall 2020 Completion Date: Summer 2021
SESC Plan Prepared By:	DiPrete Engineering Kevin DeMers, P.E. 2 Stafford Court Cranston, Rhode Island 02920 (401) 943-1000 kdemers@diprete-eng.com Professional Engineer RI PE 8557



SESC Plan Preparation Date:	07-30-2020
SESC Plan Revision Date:	

OWNER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I am aware that it is the responsibility of the site owner and operator to implement and amend the Soil Erosion and Sediment Control Plan as appropriate in accordance with the requirements of the RIPDES Construction General Permit.

_____

Owner Signature: Date

Owner Name: Name

Owner Title: Title

Company Name: Company Name (if applicable)

Address: Mailing Address

Phone Number: Phone Number

Email Address: Email

OPERATOR CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

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_____

Operator Signature: Date

Contractor Representative:

Contractor Title:

Contractor Company Name:

Address:

Phone Number:

Email Address:

Contractor must fill out this section and sign after the contract is awarded and before any construction begins.

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INTRODUCTION

This Construction Site Soil Erosion and Sediment Control Plan (SESC Plan) has been prepared for 5A Builders, LLC for Tthe Village at Curtis Corner in South Kingstown, RI. In accordance with the RIDEM Rhode Island Pollutant Discharge Elimination System (RIPDES) General Permit for Stormwater Discharge Associated with Construction Activity (RIPDES Construction General Permit ("CGP")), projects that disturb one (1) or more acres require the preparation of a SESC Plan. This SESC Plan provides guidance for complying with the terms and conditions of the RIPDES Construction General Permit and Minimum Standard 10 of the RI Stormwater Design and Installation Standards Manual. In addition, this SESC Plan is also consistent with Part D of the *RI SESC Handbook* entitled "Soil Erosion and Sediment Control Plans". This document does not negate or eliminate the need to understand and adhere to all applicable RIPDES regulations.

The purpose of erosion, runoff, and sedimentation control measures is to prevent pollutants from leaving the construction site and entering waterways or environmentally sensitive areas during and after construction. This SESC Plan has been prepared prior to the initiation of construction activities to address anticipated worksite conditions. The control measures depicted on the site plan and described in this narrative should be considered the minimum measures required to control erosion, sedimentation, and stormwater runoff at the site. Since construction is a dynamic process with changing site conditions, it is the operator's responsibility to manage the site during each construction phase so as to prevent pollutants from leaving the site. This may require the operator to revise and amend the SESC Plan during construction to address varying site and/or weather conditions, such as by adding or realigning erosion or sediment controls to ensure the SESC Plan remains compliant with the RIPDES Construction General Permit. Records of these changes must be added to the amendment log attached to the SESC Plan, and to the site plans as "red-lined" drawings. Please Note: **Even if practices are correctly installed on a site according to the approved plan, the site is only in compliance when erosion, runoff, and sedimentation are effectively controlled throughout the entire site.**

It is the responsibility of the site owner and the site operator to maintain the SESC Plan at the site, including all attachments, amendments and inspection records, and to make all records available for inspection by RIDEM during and after construction. (RIPDES CGP - Part III.G)

The site owner, the site operator, and the designated site inspector are required to review the SESC Plan and sign the Party Certification pages (Section 8). The primary contractor (if different) and all subcontractors (if applicable) involved in earthwork or exterior construction activities are also required to review the SESC Plan and sign the certification pages before construction begins.

Any questions regarding the SESC Plan, control measures, inspection requirements, or any other facet of this document may be addressed to the RIDEM Office of Water Resources, at 401-222-4700 or via email: water@dem.ri.gov.

ADDITIONAL RESOURCES

Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street
Providence, RI 02908-5767
phone: 401-222-4700
email: water@dem.ri.gov

RIDEM *RI Stormwater Design and Installation Standards Manual* (RISDISM) (as amended)
http://www.dem.state.ri.us/programs/benviron/water/permits/ripdes/stwater/t4guide/desman.htm

RI Soil Erosion and Sediment Control Handbook
http://www.dem.state.ri.us/soilerosion2014final.pdf

RIDEM 2013 RIPDES Construction General Permit
http://www.dem.ri.gov/pubs/regs/regs/water/ripdesca.pdf

Rhode Island Department of Transportation *Standard Specifications for Road and Bridge Design and Other Specifications* and *Standard Details*
http://www.dot.ri.gov/business/bluebook.php

RIDEM Office of Water Resources Coordinated Stormwater Permitting website
http://www.dem.state.ri.us/programs/benviron/water/permits/swcoord/index.htm

RIDEM RIPDES Stormwater website
http://www.dem.state.ri.us/programs/benviron/water/permits/ripdes/stwater/index.htm

RIDEM Water Quality website (for 303(d) and TMDL listings)
http://www.dem.ri.gov/programs/benviron/water/quality/index.htm

RIDEM Rhode Island Natural Heritage Program
http://www.dem.ri.gov/programs/bpoladm/plandev/heritage/index.htm

RIDEM Geographic Data Viewer – Environmental Resource Map
http://www.dem.ri.gov/maps/index.php

Natural Resources Conservation Service - Rhode Island Soil Survey Program
http://www.ri.nrcs.usda.gov/technical/soils.html

EPA NPDES – Stormwater Discharges from Construction Activities webpage:
http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Discharges-From-Construction-Activities.cfm

EPA Construction Site Stormwater Runoff Control BMP Menu
http://water.epa.gov/polwaste/npdes/swbmp/Construction-Site-Stormwater-Run-Off-Control.cfm

SECTION 1: SITE DESCRIPTION

1.1 Project/Site Information

The Village at Curtis Corner:

- Located on Curtis Corner Road in the Town of South Kingstown
- Total Area of the site is 28.06 ac.
- The client proposes to construct 24 lots with 32 residential units (8 duplex and 16 single-family) with associated roadway and utilities.

Location Map:

The following are estimates of the construction site area:

- Total Project Area 28.06 acres
- Total Project Area to be Disturbed 5.57 acres

1.2 Receiving Waters

RIPDES CGP - Parts IV.A.7 & IV.A.8

List/description of separate storm sewer systems or drainage systems that may be impacted during construction and the water bodies that receive discharges from each storm sewer or drainage system:

- N/A

List/description of receiving waters that may be impacted during construction:

- Tributary to Asa Pond (RI0010045R-04) – Impairment and TMDL for fecal coliform.

Are any of the receiving waters in the vicinity of the proposed construction project listed as being impaired or subject to a TMDL?

☒ Yes ☐ No

If yes, List/provide description of 303(d)/TMDL waters and applicable TMDL requirements that must be addressed during construction:

- Fecal coliform

1.3 Natural Heritage Area Information

RIPDES CGP - Part III.H

Are there any Natural Heritage Areas being disturbed by the construction activity or will discharges be directed to the Natural Heritage Area as a result of the construction activity?

☒ Yes ☐ No

If yes, describe or refer to documentation which determines the likelihood of an impact on this area and the steps that will be taken to address any impacts.

- Swaying Rush (Schoenoplectus subterminalis) state threatened, Reversed or Resupinate Bladderwort (Utricularia resupinate) state concern, and Trumpet Honeysuckle (Lonicera sempervirens) state concern, Information from RIDEM. Natural Heritage Area likely on opposite side of Curtis Corner Road from site.

1.4 Historic Preservation/Cultural Resources

Are there any historic properties, historic cemeteries or cultural resources on or near the construction site?

☐ Yes ☒ No

Describe how this determination was made and summarize state or tribal review comments:

- Field survey by DiPrete Engineering

1.5 Site Features and Constraints

List All Site Constraints and Sensitive Areas that require avoidance and protection through the implementation of control measures:

- Sensitive areas on site include:
    - All wetlands, perimeter wetlands and riverbank wetlands. The proposed limit of disturbance has been located out of all of these areas.
    - Streams and Rivers
    - Impaired Water bodies
    - Natural Heritage Areas
    - Steep slopes / exposed ledge
    - Old growth trees
- See Erosion Control Plan in the latest plan set prepared by DiPrete Engineering

SECTION 2: EROSION, RUNOFF, AND SEDIMENT CONTROL

RIPDES Construction General Permit – Part III.J.1

The purpose of erosion controls is to prevent sediment from being detached and moved by wind or the action of raindrop, sheet, rill, gully, and channel erosion. Properly installed and maintained erosion controls are the primary defense against sediment pollution.

Runoff controls are used to slow the velocity of concentrated water flows. By intercepting and diverting stormwater runoff to a stabilized outlet or treatment practice or by converting concentrated flows to sheet flow erosion and sedimentation are reduced.

Sediment controls are the last line of defense against moving sediment. The purpose is to prevent sediment from leaving the construction site and entering environmentally sensitive areas.

This section describes the set of control measures that will be installed before and during the construction project to avoid, mitigate, and reduce impacts associated with construction activity. Specific control measures and their applicability are contained in Section Four: Erosion Control Measures, Section Five: Runoff Control Measures, and Section Six: Sediment Control Measures of the *RI SESC Handbook*. The *RI SESC Handbook* can be found at the following address:

http://www.dem.ri.gov/soilerosion2014final.pdf.

2.1 Avoid and Protect Sensitive Areas and Natural Features

Per RI Stormwater Design and Installation Standards Manual 3.3.7.1:

Areas of existing and remaining vegetation and areas that are to be protected as identified in the Section 1.5 of the SESC Plan must be clearly identified on the SESC Site Plans for each Phase of Construction. Prior to any land disturbance activities commencing on the site, the Contractor shall physically mark limits of disturbance (LOD) on the site and any areas to be protected within the site, so that workers can clearly identify the areas to be protected.

Feature Requiring Protection	Construction Phase #	Method of Protection	Sheet #
Perimeter Wetland Areas	All Phases	Straw Wattle	5
Infiltration BMPs	All Phases	Silt Fence	5
Down gradient undisturbed Areas	All Phases	Straw Wattle	5
Upgradient Undisturbed Areas	All Phases	Construction Fence	5

2.2 Minimize Area of Disturbance

Per RI Stormwater Design and Installation Standards Manual 3.3.7.2:

Will >5 acres be disturbed in order to complete this project?

☒ Yes ☐ No

Will <5 acres be disturbed or will disturbance activities be completed within a six (6) month window?

☒ Yes ☐ No

Based on the answers to the above questions will phasing be required for this project?

☐ Yes ☒ No

CONSTRUCTION PLAN

The following are estimates of the construction project:

Total Area of Phase	28.06 acres
Area to be Disturbed	5.57 acres

Description of Construction Sequencing

1. Contractor is responsible for Soil Erosion and Sediment Control (SESC) on site. Sequence of construction provided may be modified as field conditions warrant with prior approval from the Owner or their representative.

2. Construction to begin in the Summer 2020 or upon receipt of all necessary approvals.

3. Survey and stake limit of sedimentation barriers/limit of disturbance.

4. Begin Construction of Wetland Crossing per sequence on construction plans.

5. Cut Trees on site, within LOD. In no case is the tree cutting to extend beyond the LOD.

6. Place perimeter erosion control barriers as shown on the plans along Limit of disturbance. In no case is the limit of disturbance to extend beyond the sedimentation barriers.

7. Grub and remove tree stumps on site. Topsoil is to be stripped and stockpiled in approved locations. Stockpiles are to be protected by a row of silt fence and covered or temporarily seeded.

8. Install temporary drainage swales and temporary sedimentation traps per site plans. All temporary control devices shall be installed per the Rhode Island Soil Erosion and Sedimentation Control Handbook. Erosion control blankets shall be used as necessary to stabilize the swales in steep slope areas. Check Dams installed as necessary to detain stormwater and prevent erosion.

9. Survey and stake drain lines, water lines, sewer lines and roadway centerline. Survey drainage BMPs and protect infiltration practices from runoff and construction vehicle traffic. Protect infiltration BMPs by installing erosion control devices around BMPs if possibility of runoff exists. If no stormwater can flow to BMP install construction fencing to prevent compaction of BMP area by construction traffic.

10. Excavate and grade the proposed roadway. Rough grade lots. Once rough grade on the lots has been established, disturbed areas shall be stabilized with hydroseeding or approved equal. Erosion control blankets shall be installed as necessary to stabilize soil and promote vegetation.

11. Install drain piping, drainage manholes and catch basins beginning at the lowest point and working up gradient. Install inlet protection on catch basins. Protect discharge outlets with rip-rap aprons. Place erosion controls at the discharge points. Install water, sewer, electric, telephone, cable, and gas in accordance with the approved final construction plans.

12. Place compacted gravel foundation and rough grade the roadway in accordance with the site plans and in accordance with the geotechnical requirements.

13. Place bituminous asphalt binder per site plans and in accordance with the geotechnical requirements.

14. Stabilize areas outside of roadway.

15. Sweep/vacuum the roadway areas to remove all sediments. Flush drainage structures and pipes.

16. Install the sediment forebays and sand filter and infiltration pond.

17. Remove sediments from sedimentation traps, excavate and construct ponds per design plans.

18. Finish permanent stabilization of grass swale areas. Sediments shall be removed from site and disposed of properly.

19. Sand filters and drainage ponds may be brought online once all tributary area has been stabilized.

20. Install erosion control on individual lots as necessary to prevent sediments from reaching the roadway. Lots to be constructed individually.

21. Begin construction of the building foundation and structure. Contractor shall limit disturbed areas to the maximum extent practicable during building construction. Contractor to coordinate the location of the drywells with design engineer.

22. Install individual lot driveway.

23. Finalize permanent stabilization around building.

24. Remove excess sediments on lots or with pavement areas.

25. Repeat 20-24 for each building site until full build out of site.

26. Repair drainage outlets and BMPs as required. Tree limbs, leaves, cobbles, boulders, etc. shall be removed from the bottom of the BMPs before the application of topsoil. Install plantings per the Landscape Plans.

27. Remove all temporary soil erosion and sedimentation control measures following final vegetative establishment of all disturbed areas.

28. Prior to activation of all utilities (water, sewer, and storm), the design engineer and the appropriate utility company shall to be notified at least 48 hours in advance to schedule final inspection.

2.3 Minimize the Disturbance of Steep Slopes

Per RI Stormwater Design and Installation Standards Manual 3.3.7.3:

Are steep slopes (>15%) present within the proposed project area?

☒ Yes ☐ No

Steep slopes are shown and hatched on the grading drawings. Steeps slopes shall be stabilized with erosion control blankets rip rap or approved equal. Alternatively, boulder retaining walls are used as necessary to eliminate/reduce steep slopes.

2.4 Preserve Topsoil

Per RI Stormwater Design and Installation Standards Manual 3.3.7.4:

Site owners and operators must preserve existing topsoil on the construction site to the maximum extent feasible and as necessary to support healthy vegetation, promote soil stabilization, and increase stormwater infiltration rates in the post-construction phase of the project.

Will existing topsoil be preserved at the site?

☒ Yes ☐ No

The site operator shall strip top soil in proposed project limit of disturbance areas. Top Soil shall be stockpiled in the location specified on the SESC plan. Stock Pile areas shall be surrounded by silt fence or approved erosion control measures to prevent migration of soils during rain events. Upon project completion, the site operation shall redistribute top soil over disturbed areas ensuring at minimum a 4" layer is provided over all disturbed areas. Additional material shall be brought on site should the need arise. Final top soil areas have been shown on the site plans as landscape areas. Top soil should be screened and free of weeds, sticks, and stones over ¾" in size and otherwise complying with section M.18.01 of the RIDOT Standard Specifications for Road and Bridge Construction. Contractor shall follow recommendations provided by the landscape plans and the Landscape Architect.

Soil compaction must be minimized by maintaining limits of disturbance throughout construction. In instances where site soils are compacted the site owner and operator must restore infiltration capacity of the compacted soils by tilling or scarifying compacted soils and amending soils as necessary to ensure a minimum depth of topsoil is available in these areas. In areas where infiltrating stormwater treatment practices are located compacted soils must be amended such that they will comply the design infiltration rates established in the *RI Stormwater Design and Installation Standards Manual*.

In areas of where over compaction has been compromised the natural infiltration rate of onsite soils, the contractor shall scarify or till these areas to restore them to their natural state. Areas prone to over compaction are paths proposed to be used by construction equipment and construction equipment storage areas. Construction equipment storage areas are shown on the SESC Plan.

2.5 Stabilize Soils

Per RI Stormwater Design and Installation Standards Manual 3.3.7.5:

Upon completion and acceptance of site preparation and initial installation of erosion, runoff, and sediment controls and temporary pollution prevention measures, the operator shall initiate appropriate temporary or permanent stabilization practices during all phases of construction on all disturbed areas as soon as possible, but not more than fourteen (14) days after the construction activity in that area has temporarily or permanently ceased.

Any disturbed areas that will not have active construction activity occurring within 14 days must be stabilized using the control measures depicted in the SESC Site Plans, in accordance with the *RI SESC Handbook*, and per manufacturer product specifications.

Only areas that can be reasonably expected to have active construction work being performed within 14 days of disturbance will be cleared/grubbed at any one time. It is NOT acceptable to clear and grub the entire construction site if portions will not be active within the 14-day time frame. Proper phasing of clearing and grubbing activities shall include temporary stabilization techniques for areas cleared and grubbed that will not be active within the 14-day time frame.

All disturbed soils exposed prior to October 15 of any calendar year shall be seeded by that date if vegetative measures are the intended soil stabilization method. Any such areas that do not have adequate vegetative stabilization, as determined by the site operator or designated inspector, by November 15, must be stabilized through the use of non-vegetative erosion control measures. If work continues within any of these areas during the period from October 15 through April 15, care must be taken to ensure that only the area required for that day's work is exposed, and all erodible soil must be restabilized within 5 working days. In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed (i.e. construction of a motocross track).

- When construction activities have temporarily or permanently ceased, stabilization controls shall consist of one or more of the following:
    - Seeding with native vegetation
    - Straw or straw application, in the amount of 2 tons/acre (temporary only)
    - Fiber mulch or covering consisting of mat/fiber lining (temporary only)
- Dust control generation shall be controlled by one or more of the following:
    - Vegetative cover (see stabilization controls above)

- Sprinkle site with water until surface is wet. Take care to not create runoff from excessive use of water. The general contractor shall have an on-site water vehicle for dust control.
- Stone to stabilize construction roads
- Calcium chloride (only with approval of the Design Engineer)

Temporary Vegetative Control Measures

- When construction activities have temporarily ceased, stabilization controls shall consist of one or more of the following:

    1. Hydro seeding
    2. Seeding with native vegetation

Temporary Non-Vegetative Control Measures

- When construction activities have temporarily ceased, stabilization controls shall consist of one or more of the following:

    1. Mulching
    2. Rolled Erosion control mats – Steep Slopes >15%
    3. Rolled Erosion control netting

Permanent Vegetative Control Measures

- When construction activities have permanently ceased, stabilization controls shall consist of one or more of the following:

    1. Hydro seeding
    2. Seeding with native vegetation
    3. Sodding

2.6 Protect Storm Drain Outlets

Per RI Stormwater Design and Installation Standards Manual 3.3.7.7:

Temporary or permanent outlet protection must be used to prevent scour and erosion at discharge points through the protection of the soil surface, reduction in discharge velocities, and through the promotion of infiltration. Outlets often have high velocity, high volume flows, and require strong materials that will withstand the forces of stormwater. Storm drain outlet control measures also offer a last line of protection against sediment entering environmentally sensitive areas.

All stormwater outlets that may discharge sediment-laden stormwater flow from the construction site must be protected using the control practices depicted on the approved plan set and in accordance with the *RI SESC Handbook*.

Temporary control measures have been designed in accordance with the RI SESC Handbook. Following development completion/implementation of the permanent stormwater control measures, all stormwater will either be directed to the man-made ponds through the proposed storm drains that eventually drain into the wetland located on site and across Curtis Corner Road.

Will temporary or permanent point source discharges be generated at the site as the result of construction of sediment traps or basins, diversions, and conveyance channels?

☒ Yes ☐ No

Sediment traps and permanent infiltration basin and sand filter will use point source discharges. Rip rap aprons have been provided where there is chance of erosive velocities. Outfalls that do not require rip rap should be stabilized with vegetation. Temporary erosion control blankets may be used to promote vegetation and eliminate erosion during stabilization, if needed. During construction, drainage outfalls should include strawbales, siltfence, and or straw wattle to reduce the chance of sediments entering the wetlands during construction. Once all tributary areas have been stabilized these measures can be removed.

2.7 Establish Temporary Controls for the Protection of Post-Construction Stormwater Treatment Practices

Per RI Stormwater Design and Installation Standards Manual 3.3.7.8:

Temporary measures shall be installed to protect permanent or long-term stormwater control and treatment measures as they are installed and throughout the construction phase of the project so that they will function properly when they are brought online.

- Storm drain outlets shall be protected during the entire duration of the project using ALL of the following:
    1. Staked strawbales or silt fence (RI Standards 9.1.0, 9.2.0 & 9.3.0) or straw wattles
    2. Flared end. See detail on SESC Site Plans.
    3. Rip rap apron. See detail on SESC Site Plans.

- Storm drain outlets shall be protected by using one or more of the following:
    1. Catch basin inserts such as silt sacks. Install according to manufacturer specifications.
    2. Sandbags
    3. Staked strawbales or silt fence (for unpaved areas ONLY – RI Standards 9.1.0, 9.2.0 & 9.3.0)
    4. Staked filter socks (for unpaved areas ONLY). Install according to manufacturer specifications.

Will long-term stormwater treatment practices be installed at the site?

☒ Yes ☐ No

Long term stormwater treatment practices, that will use infiltration, will be staked off throughout the construction phases. No construction vehicles shall enter these staked areas to avoid sedimentation and compaction. See the Erosion Control Plan prepared by DiPrete Engineering for locations of these areas.

2.8 Divert or Manage Run-on from Up-gradient Areas

Per RI Stormwater Design and Installation Standards Manual 3.3.7.10:

Is stormwater from off-site areas anticipated to flow onto the project area or onto areas where soils will be disturbed?

☒ Yes ☐ No

If Yes: Stormwater from off-site undisturbed areas will be swaled/diverted around the site construction. . See the Erosion Control Plan prepared by DiPrete Engineering for locations of these diversions.

Structural control measures will be used to limit stormwater flow from coming onto the project area, and to divert and slow on-site stormwater flow that is expected to impact exposed soils for the purpose of minimizing erosion, runoff, and the discharge of pollutants from the site.

Control measures shall be installed as depicted on the approved plan set and in accordance with the *RI SESC Handbook* or the *RI Department of Transportation Standard Specifications for Road and Bridge Construction*. **Run-on and Run-off Management**				
Construction Phase #	On-site or Off-site Run-on?	Control measure	Identified on Sheet #	Detail(s) is/are on Sheet #
1	Off - Site	Lined Waterway	5	5 of 15

2.9 Retain Sediment Onsite through Structural and Non-Structural Practices

Per RI Stormwater Design and Installation Standards Manual 3.3.7.12:

Once the erosion control measures and the run-on diversions are identified and located on the plans, the next step to site planning is sediment control and sediment management. Sediment barriers, inlet protection, construction entrances, stockpile containment, and temporary sediment traps must be integrated into the SESC Plan if applicable. Refer to the RI SESC Handbook Section Six: Sediment Control Measures for additional guidance.

Per RI Stormwater Design and Installation Standards Manual 3.3.7.9:

SEDIMENT BARRIERS must be installed along the perimeter areas of the site that will receive stormwater from disturbed areas. This also may include the use of sediment barriers along the contour of disturbed slopes to maintain sheet flow and minimize rill and gully erosion during construction. Installation and maintenance of sediment barriers must be completed in accordance with the maintenance requirements specified by the product manufacturer or the *RI SESC Handbook*.

Will sediment barriers be utilized at the toe of slopes and other downgradient areas subject to stormwater impacts and erosion during construction?

☒ Yes ☐ No

Sediment barriers will be used to protect stormwater from discharging onto adjacent properties, sensitive areas and proposed BMPs.

Will sediment barriers be utilized along the contour of slopes to maintain sheet flow and minimize rill and gully erosion during construction?

☒ Yes ☐ No

SEDIMENT BARRIERS			
Construction Phase #	Sediment Barrier Type	Sediment Barrier is Labeled on Sheet #	Detail is on Sheet #
1	20 inch dia. Fiber roll	5 of 15	13 of 15

Per RI Stormwater Design and Installation Standards Manual 3.3.7.6:

INLET PROTECTION will be utilized to prevent soil and debris from entering storm drain inlets. These measures are usually temporary and are implemented before a site is disturbed. ALL stormwater inlets &/or catch basins that are operational during construction and have the potential to receive sediment-laden

stormwater flow from the construction site must be protected using control measures outlined in the *RI SESC Handbook*.

For more information on inlet protection refer to the *RI SESC Handbook*, Inlet Protection control measure.

Maintenance

The operator must clean, or remove and replace the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or as performance is compromised. Accumulated sediment adjacent to the inlet protection measures should be removed by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible.

Do inlets exist adjacent to or within the project area that require temporary protection?

☒ Yes ☐ No

Existing on-site and off-site drainage inlets must be protected during construction. Proposed drainage inlets shall be protected once install to ensure sediments kept out of the drainage network. All inlet protections shall be maintained per the RI SESC handbook and manufacturers recommendations.

The following lists the proposed storm drain inlet types selected from Section Six of the *RI SESC Handbook*. Each row is unique for each phase and inlet protection type.

INLET PROTECTION			
Construction Phase #	Inlet Protection Type	Inlet Protection is labeled on Sheet #	Detail(s) is/are on Sheet #
All Phases	Fabric Drop, Curb Drop	As Applicable	13 of 15
All Phases	Silt Sack	As Applicable	13 of 15

CONSTRUCTION ENTRANCES will be used in conjunction with the stabilization of construction roads to reduce the amount of sediment tracking off the project. This project has avoided placing construction entrances on poorly drained soils where possible. Where poorly drained soils could not be eliminated, the detail includes subsurface drainage.

Any construction site access point must employ the control measures on the approved SESC site plans and in accordance with the *RI SESC Handbook*. Construction entrances shall be used in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by construction vehicles. All construction access roads shall be constructed prior to any roadway accepting construction traffic.

The site owner and operator must:

1. Restrict vehicle use to properly designated exit points.

2. Use properly designed and constructed construction entrances at all points that exit onto paved roads so that sediment removal occurs prior to vehicle exit.

3. When and where necessary, use additional controls to remove sediment from vehicle tires prior to exit (i.e. wheel washing racks, rumble strips, and rattle plates).

4. Where sediment has been tracked out from the construction site onto the surface of off-site streets, other paved areas, and sidewalks, the deposited sediment must be removed by the end of the same work day in which the track out occurs. Track-out must be removed by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal.

Will construction entrances be utilized at the proposed construction site?

☒ Yes ☐ No

Construction entrances have been shown on the Erosion Control Plan prepared by DiPrete Engineering. Construction entrance shall be installed per RIDOT Standard 9.9.0 and maintained in accordance with the RI SESC handbook and RIDOT Standards.

STOCKPILE CONTAINMENT will be used onsite to minimize or eliminate the discharge of soil, topsoil, base material or rubble, from entering drainage systems or surface waters. All stockpiles must be located within the limit of disturbance, protected from run-on with the use of temporary sediment barriers and provided with cover or stabilization to avoid contact with precipitation and wind where and when practical.

Stock pile management consists of procedures and practices designed to minimize or eliminate the discharge of stockpiled material (soil, topsoil, base material, rubble) from entering drainage systems or surface waters.

For any stockpiles or land clearing debris composed, in whole or in part, of sediment or soil, you must comply with the following requirements:

1. Locate piles within the designated limits of disturbance.

2. Protect from contact with stormwater (including run-on) using a temporary perimeter sediment barrier.

3. Where practicable, provide cover or appropriate temporary vegetative or structural stabilization to avoid direct contact with precipitation or to minimize sediment discharge.

4. NEVER hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or surface water.

5. To the maximum extent practicable, contain and securely protect from wind.

STOCKPILE CONTAINMENT				
Construction Phase #	Run-on measures necessary? (yes/no)	Stabilization or Cover Type	Stockpile Containment Measure	Sheet #
All Phases	No	Top and Sub-Soil piles should be covered or vegetated	Silt Fence	5
All Phases	No	Treated wood should be covered with plastic or comparable material	Treated wood should be covered with plastic or comparable material	Where applicable

CONSTRUCTED SEDIMENT STRUCTURES

TEMPORARY SEDIMENT TRAPS will be utilized onsite. There will be no disturbed drainage areas greater than one acre that will be exposed for longer than six months. Design and sizing calculations in accordance with the *RI SESC Handbook*, Section Six are found in __Attachment H___ of this SESC Plan. A summary of the calculations are provided below:

Are temporary sediment traps required at the site?

☒ Yes ☐ No

SEDIMENT TRAPS				
Construction Phase #	Exposed Area (acres)	Trap #	Sheet #	Detail found on Sheet#
1	1.37	A	5	5
1	1.26	B	5	5
1	2.85	C	5	5

Trap #	Wet Storage Volume (cu.ft)	Dry Storage Volume (cu.ft.)	Cleanout Depth (ft)	Provide Reference to Location of Supporting Design and Sizing Calculations
A	2,830	3,727	2.00	Attachment H
B	2,347	2,321	1.75	Attachment H
C	5,962	5,004	4.00	Attachment H

All traps will be functional and installed prior to disturbance in the contributing drainage area. Access for sediment removal is provided on the plans with cleanout depth requirements. The removed sediment will be utilized onsite or disposed of properly off-site.

2.10 Properly Design Constructed Stormwater Conveyance Channels

Are temporary stormwater conveyance practices required in order to properly manage runoff within the proposed construction project?

☒ Yes ☐ No

Temporary swales have been shown on the Erosion Control Plan prepared by DiPrete Engineering. Swales have been designed to handle the 10-year storm and be non erosive. Flows within the swales do not exceed 3.0ft/s and will be reinforced with erosion control blankets, jute mesh, or approved equal.

The conveyance will be maintained as depicted on SESC Site Plans and in accordance with the RI SESC Handbook and if applicable. 2.11Erosion, Runoff, and Sediment Control Measure List

It is expected that this table and corresponding Inspection Reports will be amended as needed throughout the construction project as control measures are added or modified.

Phase No. #		
Location/Station	**Control Measure Description/Reference**	**Maintenance Requirement**
Down gradient Limit of disturbance Silt Fence	Straw Wattle/Straw Bales and/or Silt Fence Section Six: Sediment Control Measures – RI SESC Handbook.	Inspection should be made after each storm event and repair or replacement should be made promptly as needed. Cleanout of accumulated sediment behind the bales is necessary if ½ of the original height of the bales becomes filled in with sediment.
Construction Entrances	Stone Stabilized Pad. Section Six: Sediment Control Measures – Construction Entrances	The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto pave surfaces. Provide periodic top dressing

	–RI SESC Handbook. Constriction pad per RIDOT Standard 9.9.0	with additional stone or additional length as conditions demand. Roads adjacent to entrance shall be clean at the end of each day. If maintenance alone is not enough to prevent excessive track out, increase length of entrance, modify construction access road surface, or install washrack or mudrack.
Silt Sacks	Inlet Protection, Section Six: Sediment Control Measures – Inlet Protection –RI SESC Handbook.	Install & maintain per manufacture specifications Inspect after each rain event Lift filters carefully from the drainage structure. Remove any accumulated sediment and reinsert device into drain opening. Remove all accumulated sediment and dispose of properly
Water or Calcium Chloride application for Dust Control	Dust Control, Section Three: Pollution Prevention and Good House Keeping –RI SESC Handbook.	When temporary measures are used, repetitive treatments should be applied as needed to control dust.
Temporary Sediment Trap	Temporary Sediment Traps, Section Six: Sediment Control Measures – RI SES Handbook	Inspect trap a minimum once per week or within 24 hours after a rainfall event greater than ¼". Remove sediments when half of the minimum required volume of the wet storage is exceeded.

SECTION 3: CONSTRUCTION ACTIVITY POLLUTION PREVENTION

Per RI Stormwater Design and Installation Standards Manual 3.3.7.14:

The purpose of construction activity pollution prevention is to prevent day to day construction activities from causing pollution.

This section describes the key pollution prevention measures that must be implemented to avoid and reduce the discharge of pollutants in stormwater. Example control measures include the proper management of waste, material handling and storage, and equipment/vehicle fueling/washing/maintenance operations.

Where applicable, include *RI SESC Handbook* or the *RI Department of Transportation Standard Specifications for Road and Bridge Construction* (as amended) specifications.

3.1 Existing Data of Known Discharges from Site

Per RIPDES Construction General Permit – Part III.I:

Are there known discharges from the project area?

☐ Yes ☒ No

Describe how this determination was made:

- Existing Conditions Survey, Online GIS information

Is there existing data on the quality of the known discharges?

☐ Yes ☒ No

3.2 Prohibited Discharges

Per RI SESC Handbook – Part D

The following discharges are prohibited at the construction site:

- Contaminated groundwater, unless specifically authorized by the DEM. These types of discharges may only be authorized under a separate DEM RIPDES permit.
- Wastewater from washout of concrete, unless the discharge is contained and managed by appropriate control measures.
- Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials.
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance. Proper storage and spill prevention practices must be utilized at all construction sites.
- Soaps or solvents used in vehicle and equipment washing.
- Toxic or hazardous substances from a spill or other release.

All types of waste generated at the site shall be disposed of in a manner consistent with State Law and/or regulations.

Will any of the above listed prohibited discharges be generated at the site?

☐ Yes ☒ No

3.3 Proper Waste Disposal

Per RI SESC Handbook – Part D

Building materials and other construction site wastes must be properly managed and disposed of in a manner consistent with State Law and/or regulations.

- A waste collection area shall be designated on the site that does not receive a substantial amount of runoff from upland areas and does not drain directly to a waterbody or storm drain.
- All waste containers shall be covered to avoid contact with wind and precipitation.
- Waste collection shall be scheduled frequently enough to prevent containers from overfilling.
- All construction site wastes shall be collected, removed, and disposed of in accordance with applicable regulatory requirements and only at authorized disposal sites.
- Equipment and containers shall be checked for leaks, corrosion, support or foundation failure, or other signs of deterioration. Those that are found to be defective shall be immediately repaired or replaced.

Is waste disposal a significant element of the proposed project?

☒ Yes ☐ No

Building construction and general construction waste is anticipated. Before construction begins, an area within the project limits will be designated as a waste collection area. A waste collection time will be arranged so that the containers do not overflow. In the event that a container does spill, cleanup will be provided immediately. The construction waste will be collected, removed, and disposed of only at authorized disposal areas. All waste shall be disposed of in a manner consistent with federal, state and local regulations. Construction debris shall be disposed of daily to avoid exposure to precipitation.

3.4 Spill Prevention and Control

Per RI SESC Handbook – Part D

All chemicals and/or hazardous waste material must be stored properly and legally in covered areas, with containment systems constructed in or around the storage areas. Areas must be designated for materials delivery and storage. All areas where potential spills can occur and their accompanying drainage points must be described. The owner and operator must establish spill prevention and control measures to reduce the chance of spills, stop the source of spills, contain and clean-up spills, and dispose of materials contaminated by spills. The operator must establish and make highly visible location(s) for the storage of spill prevention and control equipment and provide training for personnel responsible for spill prevention and control on the construction site.

Are spill prevention and control measures required for this particular project?

☒ Yes ☐ No

- The construction site supervisor will create and adopt a spill control plan that includes measures to stop the source of the spill, contain the spill, clean up the spill, dispose of materials contaminated by the spill, and identify and train personnel responsible for spill prevention and control. The following measures will be appropriate for a spill prevention and response plan.
- Store and handle materials to prevent spills
    - Tightly seal containers.
    - Make sure all containers are clearly labeled
    - Stack containers neatly and securely
- Reduce storm water contact if there is a spill
    - Have cleanup procedures clearly posted
    - Have cleanup materials readily available
    - Contain any liquid
    - Stop the source of the spill
    - Cover spill with absorbent materials such as sawdust.
- At no time shall spills be cleaned and/or flushed down storm drains or to any environmentally sensitive area (stream, pond, wetland etc.)
- Dispose of contaminated materials according to manufacturer’s instructions or according to state or local requirements.
- Equipment/vehicle fueling and repair/maintenance operations or hazardous material storage shall not take place within regulated wetlands or buffer zone area. Designated areas shall be approved by site owner and project engineer.
- Identify personnel responsible for responding to spill of toxic or hazardous materials.

  - Provide personnel spill response training
  - Post names of spill response personnel
  - Keep the spill area well ventilated
  - If necessary, use a private firm that specializes in spill cleanup
- Spills that exceed Reportable Quantity (RQ) levels or reportable materials must be reported and documented.
  - Notify the Rhode Island Department of Environmental Management (401) 222-3961, (401) 222-6519 or (401) 222-2284 at night as soon as there is knowledge of a spill.
  - Notify the permitting authority in writing within 5 days.
  - The SESC must be modified within 14-days to provide a description of the release, the circumstances leading to the release and the date of the release.
- Stone Stabilization Pad (RI Standard 9.9.0)
  - Located at construction site entrance/exit as shown on the SESC Site Plans.
  - The maintenance shall include top dressing with additional stone or additional length as conditions demand or as directed by the engineer.
  - Sediments spilled, dropped, washed or tracked on the public right of way must be removed immediately by the contractor and disposed of according to all applicable regulations.

3.5 Control of Allowable Non-Stormwater Discharges

Per RIPDES Construction General Permit – Part III.J.2.e:

Are there allowable non-Stormwater discharges present on or near the project area?

☒ Yes ☐ No

List of allowable non-stormwater discharge(s) and the associated control measure(s):

- Water for Dust Control
- Fire Hydrant / Water Main Flushing.
- Stormwater Main Flushing

If any existing or proposed discharges consist of contaminated groundwater, such discharges are not authorized under the RIPDES Construction General Permit. These discharges must be permitted separately by seeking coverage to treat and discharge under a separate RIPDES individual permit or under the RIPDES Remediation General Permit. Contact the RIDEM Office of Water Resources RIPDES Permitting Program at 401-222-4700 for application requirements and additional information.

Are there any known or proposed contaminated discharges, including anticipated contaminated dewatering operations, planned on or near the project area?

☐ Yes ☒ No

If yes, list the discharge types and the RIPDES individual permit number(s) or RIPDES Remediation General Permit Authorization number(s) associated with these discharges.

- N/A

3.6 Control Dewatering Practices

Per RI SESC Handbook – Part D

Site owners and operators are prohibited from discharging groundwater or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, unless such waters are first effectively managed by appropriate control measures.

Examples of appropriate control measures include, but are not limited to, temporary sediment basins or sediment traps, sediment socks, dewatering tanks and bags, or filtration systems (e.g. bag or sand filters) that are designed to remove sediment. Uncontaminated, non-turbid dewatering water can be discharged without being routed to a control.

At a minimum the following discharge requirements must be met for dewatering activities:

1. Do not discharge visible floating solids or foam.

2. To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. In no case will surface waters be considered part of the treatment area.

3. At all points where dewatering water is discharged, utilize velocity dissipation devices.

4. With filter backwash water, either haul it away for disposal or return it to the beginning of the treatment process.

5. Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

6. Dewatering practices must involve the implementation of appropriate control measures as applicable (i.e. containment areas for dewatering earth materials, portable sediment tanks and bags, pumping settling basins, and pump intake protection.)

Is it at all likely that the site operator will need to implement construction dewatering in order to complete the proposed project?

☒ Yes ☐ No

Dewatering maybe required during deep utility construction. Any dewatering practices must comply with the RI SESC Handbook. Dewatering basins shall be used on site and comply with RIDOT Standard 9.7.0 or approved equal. Contractor to submit alternatives to project engineer for approval.

3.7 Establish Proper Building Material Staging Areas

Per RI SESC Handbook – Part D

All construction materials that have the potential to contaminate stormwater must be stored properly and legally in covered areas, with containment systems constructed in or around the storage areas. Areas must be designated for materials delivery and storage. Designated areas shall be approved by the site owner/engineer. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in the discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

- An inventory will be kept of all reportable materials and all materials with a reportable quantity on site. There will be neat and orderly storage of hazardous materials. Regular garbage, rubbish, construction waste, and sanitary waste disposal will be employed. There will be prompt cleanup of any spills, either liquid or dry materials. The following practices will be used to avoid problems associated with the disposal of hazardous materials.
- Check with local waste management authorities to determine what the requirements are for disposing of hazardous materials.
- Use the entire product before disposing of the container.
- Do not remove the original product label from the container, since it contains important information.

- If surplus products must be disposed, do not mix products together unless specifically recommended by the manufacturer.
- The correct method of disposal of hazardous materials varies with the product use. Follow the manufacturer's recommended method, which is often found on the label.

- Construction materials will consist of any or all of the following:

• Asphalt	• Detergents
• Concrete	• Fertilizers (no Phosphate based fertilizers permitted)
• Loam	• Petroleum Based Products
• Gravel for Roadway	• Cleaning Solvents
• Stone	• Wood
• Sewer Pipe	• Paints (enamel and latex)
• Drainage Pipe	• Roofing Shingles
• Water Pipe	• Masonry Block
• Gas pipe	• Sheet Rock / Gypsum Board
• Manholes	• Electrical Materials/Supplies
• Catch Basins	• Plumbing Materials/Supplies
• Catch Basin / Manhole Frames & Grates	

3.8 Minimize Dust

Per RI SESC Handbook – Part D

Dust control procedures and practices shall be used to suppress dust on a construction site during the construction process, as applicable. Precipitation, temperature, humidity, wind velocity and direction will determine amount and frequency of applications. However, the best method of controlling dust is to prevent dust production. This can best be accomplished by limiting the amount of bare soil exposed at one time. Dust Control measures outlined in the *RI SESC Handbook* shall be followed. Other dust control methods include watering, chemical application, surface roughening, wind barriers, walls, and covers.

- Dust control will be utilized throughout the entire construction process. For example, keeping disturbed surfaces moist during windy periods will be an effective control measure, especially for construction haul roads. The use of dust control will prevent the movement of soil to offsite areas. However, care must be taken to not create runoff from excessive use of water to control dust. The following are methods of Dust Control that may be used on-site:
  - Vegetative Cover - The most practical method for disturbed areas not subject to traffic.
  - Sprinkling - The site may be sprinkled until the surface is wet. Sprinkling will be effective for dust control on haul roads and other traffic routes.
  - Stone - Stone will be used to stabilize construction roads; it will also be effective for dust control.
  - Calcium Chloride – Calcium Chloride or other additive may be used with approval of Engineer.
  - The general contractor will have an on-site water vehicle to control dust.

3.9 Designate Washout Areas

Per RI SESC Handbook – Part D

At no time shall any material (concrete, paint, chemicals) be washed into storm drains, open ditches, streets, streams, wetlands, or any environmentally sensitive area. The site operator must ensure that construction waste is properly disposed of, to avoid exposure to precipitation, at the end of each working day.

Will washout areas be required for the proposed project?

☒ Yes ☐ No

- The construction site supervisor shall establish a washout area prior to construction as indicated on the Erosion Control Plan prepared by DiPrete Engineering. This area shall not be located in or adjacent to a permanent stormwater BMP.
- Concrete trucks may be allowed to wash out or discharge surplus concrete or drum wash water in the washout area. However, this material must be disposed of in a manner that prevents contact between these materials and stormwater runoff.

3.10 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

Per RI SESC Handbook – Part D

Vehicle fueling shall not take place within regulated wetlands or buffer zone areas, or within 50-feet of the storm drain system. Designated areas shall be depicted on the SESC Site Plans, or shall be approved by the site owner.

Vehicle maintenance and washing shall occur off-site, or in designated areas depicted on the SESC Site Plans or approved of by the site owner. Maintenance or washing areas shall not be within regulated wetlands or buffer zone areas, or within 50-feet of the storm drain system. Maintenance areas shall be clearly designated, and barriers shall be used around the perimeter of the maintenance area to prevent stormwater contamination.

Construction vehicles shall be inspected frequently for leaks. Repairs shall take place immediately. Disposal of all used oil, antifreeze, solvents and other automotive-related chemicals shall be according to applicable regulations; at no time shall any material be washed down the storm drain or in to any environmentally sensitive area.

Vehicle fueling storage and maintenance should only be done in the area as shown on the Erosion Control Plan prepared by DiPrete Engineering. Any spills should be handled per section 3.4.

3.11 Chemical Treatment for Erosion and Sediment Control

Per RI SESC Handbook – Appendix J

Chemical stabilizers, polymers, and flocculants are readily available on the market and can be easily applied to construction sites for the purposes of enhancing the control of erosion, runoff, and sedimentation. The following guidelines should be adhered to for construction sites that plan to use treatment chemicals as part of their overall erosion, runoff, and sedimentation control strategy.

The U.S. Environmental Protection Agency has conducted research into the relative toxicity of chemicals commonly used for the treatment of construction stormwater discharges. The research conducted by the EPA focused on different formulations of chitosan, a cationic compound, and both cationic and anionic polyacrylamide (PAM). In summary, the studies found significant toxicity resulting from the use of chitosan and cationic PAM in laboratory conditions, and significantly less toxicity associated with using anionic PAM. EPA's research has led to the conclusion that the use of treatment chemicals for erosion, runoff, and sedimentation control requires proper operator training and appropriate usage to avoid risk to aquatic species. In the case of cationic treatment chemicals additional safeguards may be necessary.

Application/Installation Minimum Requirements

If a site operator plans to use polymers, flocculants, or other treatment chemicals during construction the SESC plan must address the following:

1. Treatment chemicals shall not be applied directly to or within 100 feet of any surface water body, wetland, or storm drain inlet.

2. Use conventional erosion, runoff, and sedimentation controls prior to and after the application of treatment chemicals. Use conventional erosion, runoff, and sedimentation controls prior to chemical addition to ensure effective treatment. Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g. temporary sediment basin, temporary sediment trap or sediment barrier) prior to discharge.

3. Sites shall be stabilized as soon as possible using conventional measures to minimize the need to use chemical treatment.

4. Select appropriate treatment chemicals. Chemicals must be selected that are appropriately suited to the types of soils likely to be exposed during construction and to the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or treatment area. **Soil testing is essential. Using the wrong form of chemical treatment will result in some form of performance failure and unnecessary environmental risk.**

5. Minimize discharge risk from stored chemicals. Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures (e.g., spill berms, decks, spill containment pallets), or provide equivalent measures, designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means (e.g., storing chemicals in covered areas or having a spill kit available on site).

6. Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier. You must also use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the supplier of the applicable chemicals, or document specific departures from these practices or specifications and how they reflect good engineering practice.

Will chemical stabilizers, polymers, flocculants or other treatment chemicals be utilized on the proposed construction project?

☐ Yes ☒ No

3.12 Construction Activity Pollution Prevention Control Measure List

It is expected that this table will be amended as needed throughout the construction project.

Phase No. #		
Location/Station	**Control Measure Description/Reference**	**Maintenance Requirement**
Adjacent Roads	Public roads adjacent to a construction site shall be clean at the end of each day.	Street Sweep if construction site sediment is visible

Site Wide	Pick up of construction trash and debris.	All loose trash and debris must be disposed of properly at the end of each working day.
Construction Entrances	Stone Stabilized Pad. Section Six: Sediment Control Measures – Construction Entrances –RI SESC Handbook. Constriction pad per RIDOT Standard 9.9.0	The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto pave surfaces. Provide periodic top dressing with additional stone or additional length as conditions demand. Roads adjacent to entrance shall be clean at the end of each day. If maintenance alone is not enough to prevent excessive track out, increase length of entrance, modify construction access road surface, or install washrack or mudrack.
Water or Calcium Chloride application for Dust Control	Dust Control, Section Three: Pollution Prevention and Good House Keeping –RI SESC Handbook.	When temporary measures are used, repetitive treatments should be applied as needed to control dust.

SECTION 4: CONTROL MEASURE INSTALLATION, INSPECTION, and MAINTENANCE

4.1 Installation

Per RI SESC Handbook – Part D:

Complete the installation of temporary erosion, runoff, sediment, and pollution prevention control measures by the time each phase of earth-disturbance has begun. All stormwater control measures must be installed in accordance with good judgment, including applicable design and manufacturer specifications. Installation techniques and maintenance requirements may be found in manufacturer specifications and/or the *RI SESC Handbook*.

Erosion control measures shall be located per the Erosion Control Plan prepared by DiPrete Engineering.

4.2 Monitoring Weather Conditions

Per RI SESC Handbook – Part D:

Anticipating Weather Events - Care will be taken to the best of the operator's ability to avoid disturbing large areas prior to anticipated precipitation events. Weather forecasts must be routinely checked, and in the case of an expected precipitation event of over 0.25-inches over a 24-hour period, it is highly recommended that all control measures should be evaluated and maintained as necessary, prior to the weather event. In the case of an extreme weather forecast (greater than one-inch of rain over a 24-hour period), additional erosion/sediment controls may need to be installed.

Storm Event Monitoring For Inspections - At a minimum, storm events must be monitored and tracked in order to determine when post-storm event inspections must be conducted. Inspections must be conducted and documented at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event, which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff or snowmelt.

In order for an operator to successfully satisfy this requirement list the weather gauge station that will be utilized to monitor weather conditions on the construction site. See www.wunderground.com or www.weather.gov for available stations.

The weather gauge station and website that will be utilized to monitor weather conditions on the construction site is as follows:

- Weather Underground: KRIWAKEF20

4.3 Inspections

Per RI SESC Handbook – Part D:

Minimum Frequency - Each of the following areas must be inspected by or under the supervision of the owner and operator at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event, which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff or snowmelt:

a. All areas that have been cleared, graded, or excavated and where permanent stabilization has not been achieved;

b. All stormwater erosion, runoff, and sediment control measures (including pollution prevention control measures) installed at the site;

c. Construction material, unstabilized soil stockpiles, waste, borrow, or equipment storage, and maintenance areas that are covered by this permit and are exposed to precipitation;

d. All areas where stormwater typically flows within the site, including temporary drainage ways designed to divert, convey, and/or treat stormwater;

e. All points of discharge from the site;

f. All locations where temporary soil stabilization measures have been implemented;

g. All locations where vehicles enter or exit the site.

Reductions in Inspection Frequency - If earth disturbing activities are suspended due to frozen conditions, inspections may be reduced to a frequency of once per month. The owner and operator must document the beginning and ending dates of these periods in an inspection report.

Qualified Personnel – The site owner and operator are responsible for designating personnel to conduct inspections and for ensuring that the personnel who are responsible for conducting the inspections are "qualified" to do so. A "qualified person" is a person knowledgeable in the principles and practices of erosion, runoff, sediment, and pollution prevention controls, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of the permit.

Recordkeeping Requirements - All records of inspections, including records of maintenance and corrective actions must be maintained with the SESC Plan. Inspection records must include the date and time of the inspection, and the inspector's name, signature, and contact information.

General Notes

- A separate inspection report will be prepared for each inspection.
- The Inspection Reference Number shall be a combination of the RIPDES Construction General Permit No - consecutively numbered inspections.

ex/ Inspection reference number for the **4**th inspection of a project would be: RIR10####-**4**

- Each report will be signed and dated by the Inspector and must be kept onsite.
- Each report will be signed and dated by the Site Operator.
- The corrective action log contained in each inspection report must be completed, signed, and dated by the site operator once all necessary repairs have been completed.
- It is the responsibility of the site operator to maintain a copy of the SESC Plan, copies of all completed inspection reports, and amendments as part of the SESC Plan documentation at the site during construction.

Failure to make and provide documentation of inspections and corrective actions under this part constitutes a violation of your permit and enforcement actions under 46-12 of R.I. General Laws may result.

4.4 Maintenance

Per RI SESC Handbook – Part D:

Maintenance procedures for erosion and sedimentation controls and stormwater management structures/facilities are described on the SESC Site Plans and in the *RI SESC Handbook*.

Site owners and operators must ensure that all erosion, runoff, sediment, and pollution prevention controls remain in effective operating condition and are protected from activities that would reduce their effectiveness. Erosion, runoff, sedimentation, and pollution prevention control measures must be maintained throughout the course of the project.

Note: It is recommended that the site operator designates a full-time, on-site contact person responsible for working with the site owner to resolve SESC Plan-related issues.

4.5 Corrective Actions

Per RI SESC Handbook – Part D:

If, in the opinion of the designated site inspector, corrective action is required, the inspector shall note it on the inspection report and shall inform the site operator that corrective action is necessary. The site operator must make all necessary repairs whenever maintenance of any of the control measures instituted at the site is required.

In accordance with the *RI SESC Handbook*, the site operator shall initiate work to fix the problem immediately after its discovery, and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance.

When installation of a new control or a significant repair is needed, site owners and operators must ensure that the new or modified control measure is installed and made operational by no later than seven (7) calendar days from the time of discovery where feasible. If it is infeasible to complete the installation or repair within seven (7) calendar days, the reasons why it is infeasible must be documented in the SESC Plan along with the schedule for installing the control measures and making it operational as soon as practicable after the 7-day timeframe. Such documentation of these maintenance procedures and timeframes should be described in the inspection report in which the issue was first documented. If these actions result in changes to any of the control measures outlined in the SESC Plan, site owners and operators must also modify the SESC Plan accordingly within seven (7) calendar days of completing this work.

SECTION 5: AMENDMENTS

Per RIPDES Construction General Permit – Part III.F:

This SESC Plan is intended to be a working document. It is expected that amendments will be required throughout the active construction phase of the project. **Even if practices are installed on a site according to the approved plan, the site is only in compliance when erosion, runoff, and sedimentation are effectively controlled throughout the entire site for the entire duration of the project.**

The SESC Plan shall be amended within seven (7) days whenever there is a change in design, construction, operation, maintenance or other procedure which has a significant effect on the potential for the discharge of pollutants, or if the SESC Plan proves to be ineffective in achieving its objectives (i.e. the selected control measures are not effective in controlling erosion or sedimentation).

In addition, the SESC Plan shall be amended to identify any new operator that will implement a component of the SESC Plan.

All revisions must be recorded in the Record of Amendments Log Sheet, which is contained in Attachment G of this SESC Plan, and dated red-lined drawings and/or a detailed written description must be appended to the SESC Plan. Inspection Forms must be revised to reflect all amendments. Update the Revision Date and the Version # in the footer of the Report to reflect amendments made.

All SESC Plan Amendments, except minor non-technical revisions, must be approved by the site owner and operator. Any amendments to control measures that involve the practice of engineering must be reviewed, signed, and stamped by a Professional Engineer registered in the State of RI.

The amended SESC plan must be kept on file at the site while construction is ongoing and any modifications must be documented.

Attach a copy of the Amendment Log.

SECTION 6: RECORDKEEPING

RIPDES Construction General Permit – Parts III.D, III.G, III.J.3.b.iii, & V.O

It is the site owner and site operator's responsibility to have the following documents available at the construction site and immediately available for RIDEM review upon request:

- A copy of the fully signed and dated SESC Plan, which includes:
    - A copy of the General Location Map
      INCLUDED AS ATTACHMENT A
    - A copy of all SESC Site Plans
      INCLUDED AS ATTACHMENT B
    - A copy of the RIPDES Construction General Permit
      INCLUDED AS ATTACHMENT C
    - A copy of any regulatory permits (RIDEM Freshwater Wetlands Permit, CRMC Assent, RIDEM Water Quality Certification, RIDEM Groundwater Discharge Permit, RIDEM RIPDES Construction General Permit authorization letter, etc.)
      INCLUDED AS ATTACHMENT D

- The signed and certified NOI form or permit application form *(if required as part of the application, see RIPDES Construction General Permit for applicability)*
  INCLUDED AS ATTACHMENT E
- Completed Inspection Reports w/Completed Corrective Action Logs
  INCLUDED AS ATTACHMENT F
- SESC Plan Amendment Log
  INCLUDED AS ATTACHMENT G
- SESC Temporary Trap Calculations

  INCLUDE AS ATTACHMENT H

SECTION 7: PARTY CERTIFICATIONS

RIPDES Construction General Permit – Part V.G

All parties working at the project site are required to comply with the Soil Erosion and Sediment Control Plan (SESC Plan including SESC Site Plans) for any work that is performed on-site. The site owner, site operator, contractors and sub-contractors are encouraged to advise all employees working on this project of the requirements of the SESC Plan. A copy of the SESC Plan is available for your review at the following location: Construction Trailer, or may be obtained by contacting the site owner or site operator.

The site owner and site operator and each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement.

I acknowledge that I have read and understand the terms and conditions of the Soil Erosion and Sediment Control (SESC) Plan for the above designated project and agree to follow the control measures described in the SESC Plan and SESC Site Plans.

Site Owner:
Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

_____
signature/date

Site Operator:
Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

_____
signature/date

Designated Site Inspector:
Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

_____
signature/date

SubContractor SESC Plan Contact:

Insert Company or Organization Name
Insert Name & Title
Insert Address
Insert City, State, Zip Code
Insert Telephone Number, Insert Fax/Email

_____
signature/date

LIST OF ATTACHMENTS

Attachment A - General Location Map

(See latest plan set prepared by DiPrete Engineering)

Attachment B - SESC Site Plans

(See latest plan set prepared by DiPrete Engineering)

Attachment C - Copy of RIPDES Construction General Permit and Authorization to Discharge

Attachment D - Copy of Other Regulatory Permits

Attachment E - Copy of RIPDES NOI

Attachment F - Inspection Reports w/ Corrective Action Log

SESC Plan
Inspection Report Instructions

For all projects subject to the requirements of the *RI Stormwater Design and Installation Standards Manual* or the *RIPDES Construction General Permit* the site owner and operator are required to develop and comply with a site specific Soil Erosion and Sediment Control Plan (SESC Plan) in order to remain in compliance with applicable regulations.

This inspection report template has been provided by RIDEM for use by the site operator and designated inspector to document the adequacy and condition of erosion, runoff, sediment, and pollution prevention control measures specified for use on the construction site. It should be customized for your specific site conditions and consistent with the SESC Plan developed for your site.

Using the Inspection Report

This inspection report is designed to be customized according to the control measures and conditions at the site. On a copy of the applicable SESC Site Plans, number or label all stormwater control measures and areas of the site that will be inspected. Include all control measures (temporary traps, basins, inlet protection measures, etc.) and areas that will be inspected. Also, identify all point source discharges/outfalls, and the priority natural resource areas (i.e. streams, wetlands, mature trees, etc). List each control measure or area to be inspected separately in the site-specific control measure section of the inspection report.

Complete any items that will remain constant, such as the project information and control measure locations and descriptions. Then, print out multiple copies of this customized inspection report to use during the inspections.

When conducting the inspection, walk the site by following the SESC Site Plans and numbered control measure locations for inspection. Also note whether the overall site issues have been addressed. Customize this list according to the conditions at the site.

Minimum Monitoring and Reporting Requirements

Your site must be inspected by or under the supervision of the owner and operator at least once every seven (7) calendar days and within twenty-four (24) hours after any storm event which generates at least 0.25 inches of rainfall per twenty-four (24) hour period and/or after a significant amount of runoff. Read Section 4.2 of your SESC Plan for more information regarding the importance of monitoring weather conditions.

General Notes

- A separate inspection report will be prepared for each inspection.

- The Inspection Reference Number shall be a combination of the RIPDES Permit Authorization Number - consecutively numbered inspections. For example: Inspection reference number for the **4**th inspection of a project would be: RIR101000-**4**

- Each report will be signed and dated by the inspector and forwarded to the site operator within 24 hours of the inspection.

- Each report will be signed and dated by the site operator upon his/her receipt and after completion of all required corrective actions.

- It is the responsibility of the site operator to maintain a copy of the SESC Plan, copies of all completed inspection reports, and amendments as part of the SESC Plan documentation at the site during construction.

Corrective Actions

If the SESC Plan Inspection determines that corrective actions are necessary to install or repair control measures, the resultant actions taken must be documented by the site operator. The actions must be recorded in the Corrective Action Log attached to each SESC Plan inspection form. If the site operator disagrees with the corrective action recommendations, it must be documented, with justifiable reasons, in the Corrective Action Log, as well. **Required timeframes for corrective actions are established by regulation and are discussed in Section 4.5 of your SESC Plan.**

Amendments

All SESC Plan Amendments, except minor non-technical revisions, must be approved by the site owner and site operator. The revision must be recorded in the Record of Amendments Log Sheet within the SESC Plan, and dated red-line drawings and/or a detailed written description of the revision must be appended to the SESC Plan. Inspection forms must be revised to reflect all amendments. Update the *Revision Date* and the *Version* # in the footer of the report to reflect amendments made.

The SESC Plan shall be amended whenever there is a change in design, construction, operation, maintenance or other procedure, which has a significant effect on the potential for the discharge of pollutants, or if the SESC Plan proves to be ineffective in achieving its objectives.

******Remember that the regulations are performance-oriented. Even if all control measures are installed on a site according to the SESC Plan, the site is only in compliance when erosion, runoff, sedimentation, and pollution are effectively controlled. ******

SESC Plan Inspection Report

Project Information			
Name			
Location			
DEM Permit No.			
Site Owner	**Name**	**Phone**	**Email**
Site Operator	**Name**	**Phone**	**Email**

Inspection Information			
Inspector Name	**Name**	**Phone**	**Email**
Inspection Date		**Start/End Time**	
Inspection Type ❑ **Weekly** ❑ **Pre-storm event** ❑ **During storm event** ❑ **Post-storm event** ❑ **Other**			

Weather Information
Last Rain Event **Date:** **Duration (hrs):** **Approximate Rainfall (in):**
Rain Gauge Location & Source:
Weather at time of this inspection:

Check statement that applies then sign and date below:

☐ **I, as the designated Inspector, certify that this site has been inspected as required by regulation and I have determined that maintenance and corrective actions are not required at this time.**

☐ **I, as the designated Inspector, certify that this site has been inspected as required by regulation and I have made the determination that the site requires corrective actions. The required corrective actions are noted within this inspection report.**

	Print Name	**Signature**	**Date**
Inspector:			

The Site Operator acknowledges by his/her signature, the receipt of this SESC Plan inspection report and its findings. He/she acknowledges that all recommended corrective actions must be completed and documentation of all such corrective actions must be made in this inspection report per applicable regulations.

	Print Name	**Signature**	**Date**
Operator:			

Site-specific Control Measures

Number the structural and non-structural stormwater control measures identified in the SESC Plan and on the SESC Site Plans and list them below (add as necessary). Bring a copy of this inspection form and any applicable SESC Site Plans with you during your inspections. This list will assist you to inspect all control measures at your site.
FILL THIS TABLE USING THE SESC PLAN TABLES 2.11 & 3.12.

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
1	Example 1: Eastern Parcel – Slope No. 4 Adjacent to I-95. Straw Wattles	Straw Wattle. Section Six, Sediment Control Measures, Straw Wattles, Compost Tubes and Fiber Rolls - *RI SESC Handbook*.	❑Yes ❑No		
2	Example 2: Western Parcel – Green Street Construction Entrance	Stone Stabilized Pad. Section Six: Sediment Control Measures – Construction Entrances –*RI SESC Handbook*.	❑Yes ❑No		
3	Example 3: Hospital Main Footings – Excavation Area – SESC Site Plan Sheet No. 3.	Pump Intake Protection Using Stone Filled Sump with Standpipe. Section Six: Sediment Control Measures, Pump Intake Protection, *RI SESC Handbook.*	❑Yes ❑No		
4	Example 4: Bridge Abutment Construction Southbound Bridge Abutment, Bridge No. 244 – SESC Site Plan Sheet No. 18.	Prefabricated Concrete Washout Container with Ramp. Used to contain concrete washout during concrete pouring operations. Section Three: Pollution Prevention and Good Housekeeping, Concrete Washouts, *RI SESC Handbook*.	❑Yes ❑No		
5	INSERT TEXT	INSERT TEXT	❑Yes ❑No		
6	**Attention Operator:**	**You must modify this inspection form as the project progresses, control measure locations change, and amendments to the SESC Plan are instituted in the field.**	❑Yes ❑No		
7			❑Yes ❑No		
8			❑Yes ❑No		

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
9			❑Yes ❑No		
10			❑Yes ❑No		
11			❑Yes ❑No		
12			❑Yes ❑No		
13			❑Yes ❑No		
14			❑Yes ❑No		
15			❑Yes ❑No		
16			❑Yes ❑No		
17			❑Yes ❑No		
18			❑Yes ❑No		
19			❑Yes ❑No		
20			❑Yes ❑No		
21			❑Yes ❑No		
22			❑Yes ❑No		
23			❑Yes ❑No		
24			❑Yes ❑No		

	Location/Station	Control Measure Description	Installed & Operating Properly?	Assoc. Photo/ Figure #	Corrective Action Needed (Yes or No; if 'Yes', please detail action required)
25			❑Yes ❑No		
26			❑Yes ❑No		
27			❑Yes ❑No		
28			❑Yes ❑No		
29			❑Yes ❑No		
30			❑Yes ❑No		

(add more as necessary)

General Site Issues

*Below are some general site issues that should be assessed during inspections. Please **customize** this list as needed for conditions at the site.*

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
1	Have all control measures been installed as specified in the RISESC Handbook and prior to any earth disturbing activities?	❑Yes ❑No ❑ N/A		
2	Are appropriate limits of disturbance (LOD) established?	❑Yes ❑No ❑ N/A		
3	Are controls that limit runoff from exposed soils by diverting, retaining, or detaining flows (such as check dams, sediment basins, etc.) in place?	❑Yes ❑No ❑ N/A		
4	Are all temporary conveyance practices installed correctly and functioning as designed?	❑Yes ❑No ❑ N/A		
5	Has maintenance been performed as required to ensure continued proper function of all temporary conveyances practices?	❑Yes ❑No ❑ N/A		
6	Were all exposed soils seeded by October 15th?	❑Yes ❑No ❑ N/A		
7	Have soils been stabilized where earth disturbance activities have permanently or temporarily ceased on any portion of the site and will not resume for more than 14 days?	❑Yes ❑No ❑ N/A		
8	In instances where adequate vegetative stabilization was not established by November 15th, have non-vegetative erosion control measures must be employed?	❑Yes ❑No ❑ N/A		
9	If work is to continue from October 15th through April 15th, are steps taken to ensure that only the day's work area will be exposed and all erodible soil is stabilized within 5 working days?	❑Yes ❑No ❑ N/A		
10	Have inlet protection measures (such as fabric drop inlet protection, curb drop inlet protection, etc.) been properly installed?	❑Yes ❑No ❑ N/A		
11	Has the operator cleaned and maintained inlet protection measures when needed?	❑Yes ❑No ❑ N/A		
12	Has the operator removed accumulated sediment adjacent to inlet protection measures within 24 hours of detection?	❑Yes ❑No ❑ N/A		

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
13	Has the operator properly installed outlet protection (such as riprap, turf mats, etc.) at all temporary and permanent discharge points?	❑Yes ❑No ❑ N/A		
14	Are all outlet protection measures functioning properly in order to reduce discharge velocity, promote infiltration, and eliminate scour?	❑Yes ❑No ❑ N/A		
15	Have all discharge points been inspected to ensure the prevention of scouring and channel erosion?	❑Yes ❑No ❑ N/A		
16	Have sediment controls been installed along perimeter areas that will receive stormwater from earth disturbing activities?	❑Yes ❑No ❑ N/A		
17	Is the operator maintaining sediment controls in accordance with the requirements in the *RI SESC Handbook*?	❑Yes ❑No ❑ N/A		
18	Have temporary sediment barriers been installed around permanent infiltration areas (such as bioretention areas, infiltration basins, etc.)?	❑Yes ❑No ❑ N/A		
19	Have staging areas and equipment routing been implemented to avoid compaction where permanent infiltration areas will be located?	❑Yes ❑No ❑ N/A		
20	Are surface outlet structures (such as skimmers, siphons, etc.) installed for each temporary sediment basin? [Exception: frozen conditions]	❑Yes ❑No ❑ N/A		
21	Have all temporary sediment basins or traps been inspected and maintained as required to ensure proper function?	❑Yes ❑No ❑ N/A		
22	Does the project include the use of polymers, flocculants, or other chemicals to control erosion, sedimentation, or runoff from the site?	❑Yes ❑No ❑ N/A		
23	Are all chemicals being managed in accordance with Appendix J of the *RISESC Handbook* and current best management practices?	❑Yes ❑No ❑ N/A		
24	Has the site operator taken steps to **prohibit** the following pollutant discharges on the site?			
a	Contaminated groundwater.	❑Yes ❑No ❑ N/A		

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
b	Wastewater from washout of concrete; unless properly contained, managed, and disposed of.	❑Yes ❑No ❑ N/A		
c	Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction products.	❑Yes ❑No ❑ N/A		
d	Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.	❑Yes ❑No ❑ N/A		
e	Soaps or solvents used in vehicle and equipment washing.	❑Yes ❑No ❑ N/A		
f	Toxic or hazardous substances from a spill or other release.	❑Yes ❑No ❑ N/A		
25	Is the operator using properly constructed entrances/exits to the site so sediment removal occurs prior to vehicles exiting?	❑Yes ❑No ❑ N/A		
26	If needed, are additional controls (such as rumble strips, rattle plates, etc.) in place to remove sediment from tires prior to exiting?	❑Yes ❑No ❑ N/A		
27	Is sediment track-out being removed by the end of the same workday in which it occurs (via sweeping, shoveling, or vacuuming)?	❑Yes ❑No ❑ N/A		
28	Are all wastes generated at the site being managed and properly disposed of by the end of each workday?	❑Yes ❑No ❑ N/A		
29	Are all chemicals and hazardous waste materials stored properly in covered areas and surrounded by containment control systems?	❑Yes ❑No ❑ N/A		
30	Has the operator established highly visible locations for the storage of spill prevention and control equipment on the construction site?	❑Yes ❑No ❑ N/A		
31	Are allowable non-stormwater discharges being managed properly with adequate controls?	❑Yes ❑No ❑ N/A		
32	Is the site operator properly managing groundwater or stormwater that is removed from excavations, trenches, or similar points of accumulation?	❑Yes ❑No ❑ N/A		
33	Are proper procedures and controls in place for the storage of materials that may discharge pollutants if	❑Yes ❑No ❑ N/A		

	Compliance Question		**Assoc. Photo/ Figure #**	**Corrective Action Needed (If 'Yes', please detail action required and include location/station)**
	exposed to stormwater?			
	Are stockpiles located within the limits of disturbance?	❑Yes ❑No ❑ N/A		
	Are stockpiles being protected from contact with stormwater using a temporary sediment barrier?	❑Yes ❑No ❑ N/A		
	Where needed, has cover or appropriate temporary vegetative or structural stabilization been utilized for stockpiles?	❑Yes ❑No ❑ N/A		
	Is the operator effectively managing the generation of dust through the use of water, chemicals, or minimization of exposed soil?	❑Yes ❑No ❑ N/A		
	Are designated washout areas (such as wheel washing stations, washout for concrete, paint, stucco, etc.) clearly marked on the site?	❑Yes ❑No ❑ N/A		
	Are vehicle fueling and maintenance areas properly located to prevent pollutants from impacting stormwater and sensitive receptors?	❑Yes ❑No ❑ N/A		
	(Other)			

(add more as necessary)

General Field Comments:

Photos:

(Associated photos – each photo should be dated and have a unique identification # and written description indicating where it is located within the project area. If a close up photo is required, it should be preceded with a photo including both the detail area and some type of visible fixed reference point. Photos should be annotated with Station numbers and other identifying information where needed.)

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

Photo #:	Station:
(insert Photo here)	Description:

(add more as necessary)

Corrective Action Log

TO BE FILLED OUT BY SITE OPERATOR

Describe repair, replacement, and maintenance of control measures, actions taken, date completed, and note the person that completed the work.

	Location/Station	Corrective Action	Date Completed	Person Responsible
Operator Signature:			**Date:**	

Attachment G - SESC Plan Amendment Log

PROJECT:

Amendment Log

TO BE FILLED OUT BY SITE OPERATOR

Describe amendment(s) to be made to the SESC Plan, the date, and the person/title making the amendment. ALL amendments must be approved by the Site Owner.

#	Date	Description of Amendment	Amended by: Person/Title	Site Owner Must Initial
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Add more lines/pages as necessary

Attachment H - Temporary Trap Calculations

DiPrete Engineering
Engineers • Planners • Surveyors

Temporary Sediment Trap Sizing

NOTE: Only for use on contributing drainage areas of 5 acres or less. For areas larger than 5 acres use a **Temporary Sediment Basin**.

RI Soil Erosion Sediment Control Handbook - Section 6: Temporary Sediment Traps - Page 3

Per Section 6 of the RISESCH, Sediment trap storage volume is based on 134 cubic yards per tributary area, 1" over the tributary area or per the sediment volume method, which ever is greater. Based on these methodologies, 1" over the tributary area always generates the greatest sediment load based on soils commonly found in Rhode Island.

Sediment Trap A

Drainage Area (DA) = 1.366 Acres

RISDISM Standard 10 Requires 1" from contributing Area (V)

V = DA x 1"

Sediment Storage Volume Required, V = **4,959** cu.ft.

Wet Storage Volume Calc

Wet Storage Volume(V_w) = $0.85 \times A_w \times D_w$

V_w = 2,830 cu.ft.

Wet Storage Volume Check = $V_w > 0.5\ V$ Ok

Dry Storage Volume Calc

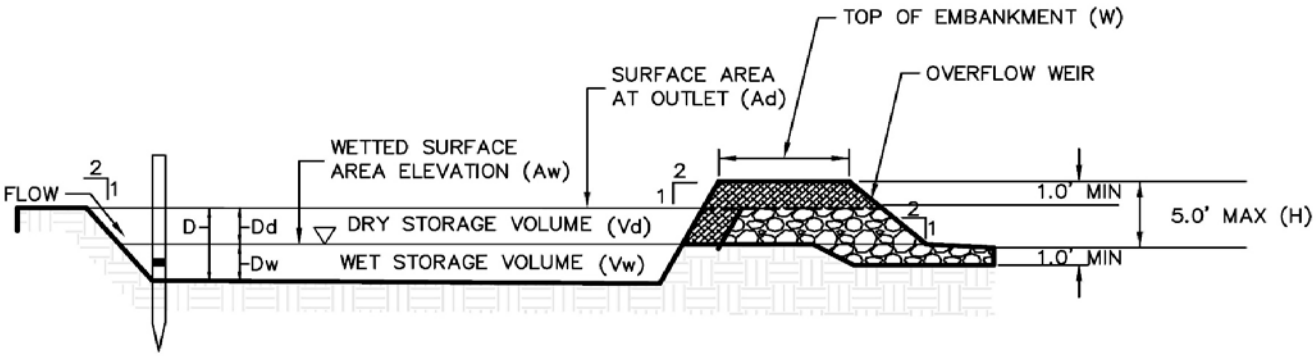
Dry Storage Volume (V_d) = $[(A_w + A_d)/2] * Dd$

V_d = 3,727 cu.ft.

Sediment Storage Volume Provided, V = **6,557** cu.ft.

Sediment Trap Dimensions

Wet Storage Depth (D_w)	1.0	ft
Dry Storage Depth (D_d)	1.0	ft
Total Depth (D)	2.0	ft
Bottom of Trap Area (A_b)	2,599	sq.ft
Wetted Surface Area (A_w)	3,329	sq.ft
Surface Area at Outlet (A_d)	4,125	sq.ft



Temporary Sediment Trap Detail

NOT TO SCALE

DiPrete Engineering
Engineers • Planners • Surveyors

Temporary Sediment Trap Sizing

NOTE: Only for use on contributing drainage areas of 5 acres or less. For areas larger than 5 acres use a **Temporary Sediment Basin**.

RI Soil Erosion Sediment Control Handbook - Section 6: Temporary Sediment Traps - Page 3

Per Section 6 of the RISESCH, Sediment trap storage volume is based on 134 cubic yards per tributary area, 1" over the tributary area or per the sediment volume method, which ever is greater. Based on these methodologies, 1" over the tributary area always generates the greatest sediment load based on soils commonly found in Rhode Island.

Sediment Trap B

Drainage Area (DA) = 1.256 Acres

RISDISM Standard 10 Requires 1" from contributing Area (V)

V = DA x 1"

Sediment Storage Volume Required, V = **4,559** cu.ft.

Wet Storage Volume Calc

Wet Storage Volume(V_w) = $0.85 \times A_w \times D_w$

V_w = 2,347 cu.ft.

Wet Storage Volume Check = $V_w > 0.5\ V$ Ok

Dry Storage Volume Calc

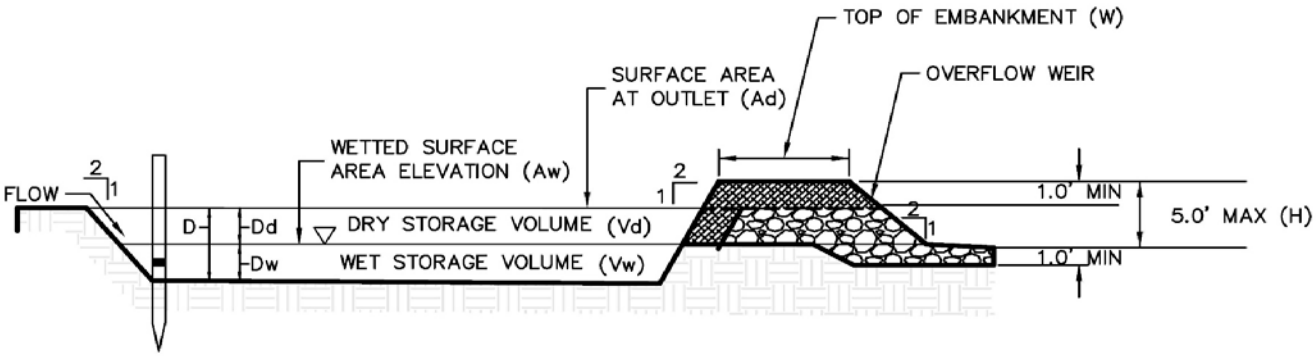
Dry Storage Volume (V_d) = $[(A_w + A_d)/2] * Dd$

V_d = 2,321 cu.ft.

Sediment Storage Volume Provided, V = **4,668** cu.ft.

Sediment Trap Dimensions

Wet Storage Depth (D_w)	1.0	ft
Dry Storage Depth (D_d)	0.8	ft
Total Depth (D)	1.8	ft
Bottom of Trap Area (A_b)	1,879	sq.ft
Wetted Surface Area (A_w)	2,761	sq.ft
Surface Area at Outlet (A_d)	3,429	sq.ft



Temporary Sediment Trap Detail

NOT TO SCALE

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Temporary Sediment Trap Sizing

NOTE: Only for use on contributing drainage areas of 5 acres or less. For areas larger than 5 acres use a **Temporary Sediment Basin**.

RI Soil Erosion Sediment Control Handbook - Section 6: Temporary Sediment Traps - Page 3

Per Section 6 of the RISESCH, Sediment trap storage volume is based on 134 cubic yards per tributary area, 1" over the tributary area or per the sediment volume method, which ever is greater. Based on these methodologies, 1" over the tributary area always generates the greatest sediment load based on soils commonly found in Rhode Island.

Sediment Trap C

Drainage Area (DA) = 2.849 Acres

RISDISM Standard 10 Requires 1" from contributing Area (V)

V = DA x 1"

Sediment Storage Volume Required, V = **10,342** cu.ft.

Wet Storage Volume Calc

Wet Storage Volume(V_w) = 0.85 x A_w x D_w

V_w = 5,962 cu.ft.

Wet Storage Volume Check = V_w > 0.5 V Ok

Dry Storage Volume Calc

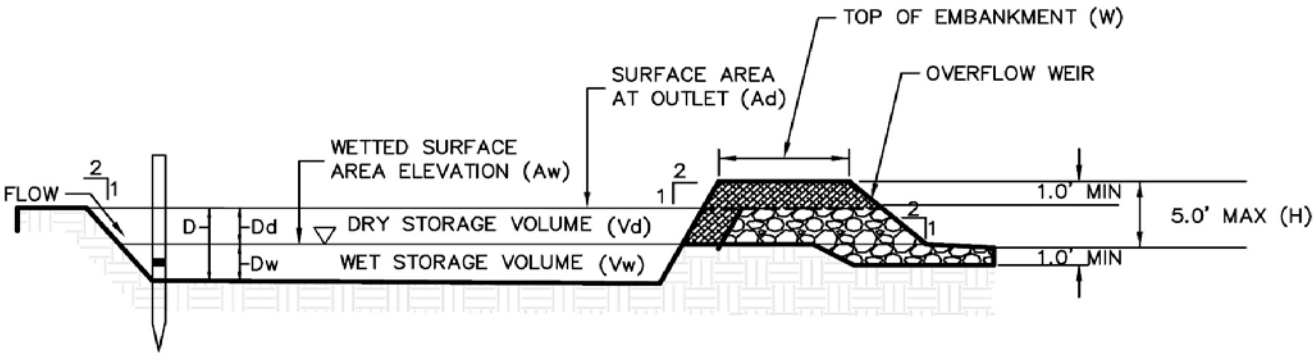
Dry Storage Volume (V_d) = [(A_w + A_d)/2] * Dd

V_d = 5,004 cu.ft.

Sediment Storage Volume Provided, V = **10,966** cu.ft.

Sediment Trap Dimensions

Wet Storage Depth (D_w)	2.5	ft
Dry Storage Depth (D_d)	1.5	ft
Total Depth (D)	4.0	ft
Bottom of Trap Area (A_b)	1,273	sq.ft
Wetted Surface Area (A_w)	2,806	sq.ft
Surface Area at Outlet (A_d)	3,866	sq.ft



Temporary Sediment Trap Detail

NOT TO SCALE

DiPrete Engineering

Stormwater Management Report

KEVIN DEMERS
No. 8557
07/30/2020
REGISTERED
PROFESSIONAL ENGINEER
CIVIL

The Village at Curtis Corner

Located in South Kingstown, RI

Applicant: 5A Builders, LLC

07-30-2020

Table of Contents

Executive Summary

On behalf of the Client, we are submitting drainage calculations for the proposed development at Curtis Corner Road. The site is located on Assessors' Plat 40-4 Lot 55. The site exists today as almost entirely wooded and pervious. The client proposes to construct 24 lots with 32 residential units (8 duplex and 16 single-family) with associated roadway and utilities. The proposed building units will provide living spaces for residents with 25% of units being affordable units.

The post development stormwater will be treated for water quality using Best Management Practices (BMPs). The site has been designed to meet the Rhode Island Stormwater Design and Installation Standards Manual (RISDISM). The site is constrained by wetlands to the back and abutting properties and Curtis Corner Road to the front and sides with no existing outlets.

To mitigate post development flows on site, drywells, stone infiltration trenches, an infiltration pond and a sand filter are utilized. As there is no existing stormwater network or outlet point at Curtis Corner Road, as much runoff has been diverted as possible. All drywells and stone infiltration trenches are designed to treat and infiltrate up to the 100-year event. The infiltration pond and sand filter are designed to control runoff for the 2 through 100-year storm events and are designed to serve as water quality BMPs. These will remove 85% or more of TSS (total suspended solids) generated by the proposed roadway, sidewalk, driveways, and roofs.

This report details how the proposed BMPs will provide water quality treatment for stormwater runoff and how the site will show no net increase in stormwater runoff from pre development to post development conditions for the discharge to wetland on site (DP-1). Runoff towards Curtis Corner Road has been minimized to the extent possible but discharge across Curtis Corner Road to Asa Pond is still necessary. However, this outfall will not be located within the 50' perimeter wetlands and will be an emergency outlet for the 100-year event with minimal outflow for the 25-year via curb level spreader and pressure flow with no above grade headwalls or rip rap aprons.

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

Subwatershed (design point)	1.2" Peak Flow		1-yr Peak Flow		2-yr Peak Flow		10-yr Peak Flow		25-yr Peak Flow		100-yr Peak Flow	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DP-1:	0.01	0.00	0.16	0.14	0.45	0.33	2.28	2.17	4.25	4.18	8.98	8.92
DP-2:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.23	1.40	2.15
Totals:	0.01	0.00	0.16	0.14	0.45	0.33	2.28	2.17	4.29	4.41	10.38	11.07

All flows in cubic feet per second (cfs)

Comparing DP-2 volumes for 25-year and 100-year storm events, there is no significant increase in flow for those events. Flow volume is 0.010 acre-feet for the pre development and 0.015 acre-feet for the post development in the 25-year event. Flow volumes for the 100-year storm event are 0.517 acre-feet for the pre-development and 0.226 for the post-development. For the 100-year storm event, the flow volume discharged from the site into Asa Pond will decrease by more than half.

1.0 Project Description

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

PROJECT NAME **The Village at Curtis Corner**	**(RIDEM USE ONLY)**
TOWN **South Kingstown**	**STW/WQC File #:**
BRIEF PROJECT DESCRIPTION: The Village at Curtis Corner proposes 24 lots with 32 residential units (8 duplex and 16 single-family) with newly paved roadway, sidewalk, driveways, and associated utilities.	**Date Received:**

Stormwater Management Plan (SMP) Elements – Minimum Standards

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 submit 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.) See Guidance to identify receiving waters.

☒ **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: Asa Pond	☐ Coldwater	☒ Warmwater	☐ Unassessed
☒ Waterbody ID: RI0010045L-02	☐ 4th order stream of pond 50 acres or more		
☒ TMDL for: N/A* *Asa Pond is not listed for any TMDL, but the stream connecting from Site to Asa Pond (RI0010045R-04) has 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: N/A	☐ Contributes to shellfishing grounds		

PROJECT HISTORY		
☐ RIDEM Pre- Application Meeting	Meeting Date:	☐ Minutes Attached
☒ Municipal Master Plan Approval	Approval Date: 03/03/2020	☐ Minutes Attached
☐ Subdivision Suitability Required	Approval #:	
☐ Previous Enforcement Action has been taken on the property	Enforcement #:	

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

CRMC JURISDICTION: N/A
☐ 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: N/A			
1. OFFICE OF WASTE MANAGEMENT (OWM)			
	☐ 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 OWM 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**): N/A	
	☒ Total Site Area (**TSA**): 28.06 ac	
	☒ Jurisdictional Wetlands (**JW**): 20.71ac	
	☐ Conservation Land (**CL**)	
☒ Calculate the Site Size (defined as contiguous properties under same ownership)		
	☒ Site Size (**SS**) = (**TSA**) – (**JW**) – (**CL**) = 7.35 ac	
	☒ (**TIA**) / (**SS**) = 0	☐ (**TIA**) / (**SS**) >**0.4**?
☐ YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1

(NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS)

This section may be deleted if not required.

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

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

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

B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS ☒ Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies ☒ Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) ☐ Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) ☒ Development sites and building envelopes have been positioned outside of floodplains ☒ Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features ☐ Development sites and building envelopes have been located to minimize impacts to steep slopes (≥15%) ☐ Other (describe):	
C) MINIMIZE CLEARING AND GRADING ☒ Site clearing has been restricted to minimum area needed for building footprints, development activities, construction access, and safety. ☒ Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) ☒ Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s) ☒ Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent	
D) REDUCE IMPERVIOUS COVER ☐ Reduced roadway widths (≤22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) ☒ Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface) ☐ Reduced building footprint: Explain approach: ☒ Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) ☒ Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) ☒ Reduced parking lot area: Explain approach ☐ Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. ☒ Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) ☐ Other (describe):	Parking proposed at individual lot driveways
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):	Runoff from select roofs and driveways adjacent to Curtis Corner Road treated and infiltrated locally using drywells and stone infiltration trenches, only letting impervious area runoff to flow towards Curtis Corner Road
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	Proposed open space areas to be left in native vegetation state. Comprehensive Permit with town to proposed residential development in as small a footprint as practical.
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	No proposed disturbances of streams or wetlands and associated buffers

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 Office of Waste Management Site Project Manager, per Part 1, Minimum Standard 8, been requested?

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

Design Point	**Impervious Area Treated (sq ft)**	**Total Re_v Required (cu ft)**	**LID Stormwater Credits (see RISDISM Section 4.6.1)**	**Recharge Required by Remaining BMPs (cu ft)**	**Recharge Provided by BMPs (cu ft)**
			Portion of Re_v directed to a QPA (cu ft)		
DP-1:	55,669.68	1,623.699	0	1,623.699	3,746.15
DP-2*:	29,909.27	872.354	0	872.354	1,437.48
TOTALS:	85,578.95	2,496.053	0	2,496.053	5,183.63

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.

*Design Point includes drywells and stone infiltration trenches designed to infiltrate up to the 100-year storm event.

☒ 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 Management Report Section 3.2

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.
☐	☒	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:	55,669.68	4,639.14	0	4,639.14	4,673.15
DP-2*:	29,909.27	2,492.44	0	2,492.44	2,803.48
TOTALS:	85,578.95	7,131.58	0	7,131.58	7,476.63

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.

*Design Point includes drywells and stone infiltration trenches designed to infiltrate up to the 100-year storm event.

☒ 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 Management Report Section 3.3

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 directs 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:	Asa Pond tributary	N	10,280	10,280	0.00**
DP-2:	N/A	N/A	2,222	2,222	0.00**
TOTALS:	N/A	N/A	12,502	12,502	0.00**
** The 1-year storm event is fully infiltrated by the BMPs Note: The Channel Protection Volume Standard must be met in each waterbody ID.					
☒ YES ☐ NO	The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM).				
☐ YES ☒ NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; If "Yes," please indicate restrictions and solutions below.				
☒ Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.). Stormwater Management Report Section 3.4.2					

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) = 5.55 ac
		☒	Impervious cover (%) = 35%
☐	☒	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:	0.01	0.00	0.16	0.14	2.28	2.17	8.98	8.92
DP-2:	0.00	0.00	0.00	0.00	0.00	0.00	1.40	2.15
TOTALS:	0.01	0.00	0.16	0.14	2.28	2.17	10.38	11.07

** 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.	Stormwater Management Report Section 3.5.3
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.	Stormwater Management Report Section 3.5.3
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.	Stormwater Management Report Appendices
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).	Stormwater Management Report Appendices

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
A	1	Infiltration Pond	Y	3,746.15	4,673.15	N/A	N/A	N/A	Y	N/A	67 ft
B	2	Sand Filter	Y	479.16	1845.16	N/A	N/A	N/A	Y	N/A	106 ft
C1	2	Drywell	N	87.12	87.12	N/A	N/A	N/A	Y	N/A	132 ft
C2	2	Drywell	N	87.12	87.12	N/A	N/A	N/A	Y	N/A	132 ft
C3	2	Drywell	N	87.12	87.12	N/A	N/A	N/A	Y	N/A	132 ft
C4	2	Drywell	N	87.12	87.12	N/A	N/A	N/A	Y	N/A	132 ft
C5	2	Drywell	N	87.12	87.12	N/A	N/A	N/A	Y	N/A	132 ft
C6	2	Drywell	N	87.12	87.12	N/A	N/A	N/A	Y	N/A	132 ft
D1	2	Stone Infiltration Trench	N	43.56	43.56	N/A	N/A	N/A	Y	N/A	113 ft

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
D2	2	Stone Infiltration Trench	N	43.56	43.56	N/A	N/A	N/A	Y	N/A	113 ft
D3	2	Stone Infiltration Trench	N	43.56	43.56	N/A	N/A	N/A	Y	N/A	113 ft
D4	2	Stone Infiltration Trench	N	130.68	130.68	N/A	N/A	N/A	Y	N/A	113 ft
D5	2	Stone Infiltration Trench	N	43.56	43.56	N/A	N/A	N/A	Y	N/A	113 ft
D6	2	Stone Infiltration Trench	N	43.56	43.56	N/A	N/A	N/A	Y	N/A	113 ft
D7	2	Stone Infiltration Trench	N	87.12	87.12	N/A	N/A	N/A	Y	N/A	113 ft
		TOTALS:		5,183.63	7,476.63						

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					
A	1	Infiltration Pond	00	114.00	108.00	111.00	3.00	B	8.27
B	2	Sand Filter	5	111.00	105.00	108.00	3.00	B	8.27
216	C1	Drywell	7	112.70	106.70	109.50	2.80	B	8.27
218	C2	Drywell	7	112.50	106.50	108.50	2.00	B	8.27
220	C3	Drywell	5	115.30	109.30	112.50	3.20	B	8.27
222	C4	Drywell	5	110.20	104.20	110.00	5.80	B	8.27
224	C5	Drywell	5	110.70	104.70	109.00	4.30	B	8.27
226	C6	Drywell	6	115.50	109.50	111.50	2.00	B	8.27
228	D1	Stone Infiltration Trench	6	114.00	108.00	112.00	4.00	B	8.27
230	D1	Stone Infiltration Trench	5	112.50	106.50	112.00	5.50	B	8.27
232	D1	Stone Infiltration Trench	6	112.00	106.00	114.00	8.00	B	8.27
234	D1	Stone Infiltration Trench	5	114.50	108.50	116.30	7.80	B	8.27
236	D1	Stone Infiltration Trench	7	113.50	107.50	118.00	10.50	B	8.27
238	D1	Stone Infiltration Trench	7	112.50	106.50	116.20	9.70	B	8.27
240	D1	Stone Infiltration Trench	7	115.50	109.50	118.00	8.50	B	8.27
		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

** In all infiltration areas, native soil is to be excavated down to the soil layer and backfilled with sand.

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	**NO**	**N/A**	
☐	☐	☒	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.

☐	☐	☒	Are these activities already covered under an MSGP? If "No," please explain if you have applied for an MSGP or intend to do so?
☐	☐	☒	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, "Acceptable BMPs for Use at LUHPPLs." Please list BMPs:
☐	☐	☒	Additional BMPs, or additional pretreatment BMP's if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

ILLICIT DISCHARGES – MINIMUM STANDARD 9

Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.

YES	NO	N/A	
☒	☐	☐	Have you checked for illicit discharges?
☐	☒	☐	Have any been found and/or corrected? If "Yes," please identify.
☐	☐	☒	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10

YES	NO	N/A		
☒	☐	☐	Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?	
☒	☐	☐	Have you provided a **separately-bound** document based upon the SESC Template? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).	
			If "No," include a document with your submittal that addresses the following elements of an SESC Plan:	
			☐	Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
			☐	Provide Natural Buffers and Maintain Existing Vegetation
			☐	Minimize Area of Disturbance
			☐	Minimize the Disturbance of Steep Slopes
			☐	Preserve Topsoil
			☐	Stabilize Soils
			☐	Protect Storm Drain Inlets
			☐	Protect Storm Drain Outlets
			☐	Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
			☐	Establish Perimeter Controls and Sediment Barriers
			☐	Divert or Manage Run-On from Up-Gradient Areas
			☐	Properly Design Constructed Stormwater Conveyance Channels
			☐	Retain Sediment On-Site
			☐	Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
			☐	Apply Construction Activity Pollution Prevention Control Measures
			☐	Install, Inspect, and Maintain Control Measures and Take Corrective Actions

	☐	Qualified SESC Plan Preparer's Information and Certification
	☐	Operator's Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities
	☐	Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9		
Operation and Maintenance Section		
YES	**NO**	
☒	☐	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
☒	☐	Have you provided a **separately-bound** Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
☒	☐	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not?
☒	☐	Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's? If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.).
☐	☒	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If "Yes," have you obtained them? Or please explain your plan to obtain them:
☐	☒	Is stormwater being directed from public areas to private property? If "Yes," note the following: Note: This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.
Pollution Prevention Section		
☒	☐	Designated snow stockpile locations?
☒	☐	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
☒	☐	Asphalt-only based sealants?
☐	☒	Pet waste stations? (Note: If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
☒	☐	Regular sweeping? Please describe:
☒	☐	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
☒	☐	A prohibition of phosphate-based fertilizers? (Note: If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)		
YES	**NO**	
☒	☐	Existing and proposed drainage area delineations

☒	☐	Locations of all streams and drainage swales	
☒	☐	Drainage flow paths, mapped according to the DEM *Guidance for Preparation of Drainage Area Maps* (included in RISDISM Appendix K)	
☒	☐	Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable	
☒	☐	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report	
☒	☐	Mapped seasonal high-water-table test pit locations	
☒	☐	Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs	
☒	☐	Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans	
☒	☐	Mapped bedrock outcrops adjacent to any infiltration BMP	
☒	☐	Soils were logged by a:	
		☒	DEM-licensed Class IV soil evaluator Name: Chris Sutter
		☐	RI-registered P.E. Name:

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	**First Receiving Water ID or MS4**	**Area Disturbed (units)**	**Existing Impervious (units)**	**Proposed Impervious (units)**
DP-1:	Unnamed (A-Series Wetland)	3.70 acres	0	1.278 acres
DP-2:	Asa Pond (add ID)	1.85 acres	0	0.687 acres
TOTALS:		5.55 acres	0	1.965 acres

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 OWM-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 Stormwater Management System to be implemented in the Village at Curtis Corner at Curtis Corner Road.

The site totals 28.06 acres located on Assessor's Plat 40-5 Lot 55 in South Kingstown, Rhode Island. Of the 28.06 acres, only 5.57 acres totals the proposed project area to be disturbed. The site has a frontage on Curtis Corner Road near the intersection of Kingstown Road. Curtis Corner Road provides a buffer between the site and Asa Pond. The proposed development will include 24 new lots with 32 residential units (8 duplex and 16 single-family) with associated roadway and utilities. The site will be serviced by public water and sewer.

The stormwater quality will be improved by utilizing Best Management Practices (BMPs) as established by the RISDISM for the treatment of stormwater runoff from the proposed development. BMPs will consist of drywells, stone infiltration trenches, an infiltration pond, and a sand filter. The system has been designed to meet the RIDEM Stormwater Design and Installations Standards Manual.

2.0 Site Conditions

2.1 SOILS

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

Soil Symbol	Description	Hydrologic Group
BmA	Bridgehampton silt loam, till substratum, 0 to 3 percent slopes	B
BmB	Bridgehampton silt loam, till substratum, 3 to 8 percent slopes	B
NbB	Narragansett very stony silt loam, 0 to 8 percent slopes	B
Rf	Ridgebury, Whitman, and Leicester extremely stony fine sandy loams	D
SwA	Swansea muck, 0 to 1 percent slopes	B/D
WcB	Wapping 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

Currently the site is predominately woods with existing stone walls. With no existing buildings or roadways, the site is considered entirely pervious. The Wooded Swamp surrounds the site to the North which captures some of the stormwater runoff from the existing site. The rest of the runoff sheet flows towards Curtis Corner Road. There is no existing outlet structure at Curtis Corner Road that outlets to Asa Pond across the road or connects to an existing drainage network. An existing catch basin on Curtis Corner Road captures runoff from the road and outlets stormwater runoff into a depression on the site.

None of the stormwater on site is treated or detained before discharging to the Wooded Swamp or Curtis Corner Road.

2.3 POST SITE CONDITIONS

In the post development conditions, as much flow as possible is directed to the North through the use of grading as there is no existing outlet or drainage network on Curtis Corner Road. Runoff from multiple roofs and driveways near Curtis Corner Road are treated and infiltrated with drywells and stone infiltration trenches to further minimize runoff towards Curtis Corner Road.

The proposed drainage analysis uses stormwater management systems to control and treat runoff from the proposed development. The following BMP's are used on site and have been designed to include the following elements:

- Sediment Forebays
    - Pretreatment of roadways, sidewalks and driveways
    - 2.5'-3.0' forebay depth with proposed 2:1 slope.
- Sand Filter
    - Fully infiltrates up to the 10-year stormwater event
    - 2.0' of sand media mix including 6" of top soil and 1.5' of sand filter sand for stormwater infiltration
- Infiltration Pond
    - Fully infiltrates up to the 1-year storm event
- Stone Infiltration Trenches
    - Provides treatment and infiltration for runoff from select driveways up to the 100-year event
- Drywells
    - Provides treatment and infiltration for runoff from select roofs up to the 100-year event

The above elements will 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 BMPs as mentioned above. Stormwater runoff mitigation is provided by either infiltrating all runoff (stone infiltration trenches and drywells) or controlling outflow (sand filter and infiltration pond). By reducing post development stormwater flow rate to a level no greater than the pre development rate where possible, the second goal of the proposed drainage system is achieved. Any potential impacts from the proposed development on the abutting properties and wetlands have been mitigated.

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). 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 "Appendix A: Stormwater Management Checklist" from the RISDISM provided at the beginning of this report.

3.2 Minimum Standard 2: Groundwater Recharge

Groundwater is to be recharged per watershed based on 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 (cf)
F=Recharge Factor based on Hydrologic Soil Groups (HSG) (see table below)
I=Impervious Area (sf)

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

Recharge volume for watersheds 1 and 2 are provided through the use of drywells, stone infiltration trenches, Infiltration Pond A and Sand Filter B. See Table 2-1 of the Appendix A checklist for a summary of recharge values.

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, stone infiltration trenches, an infiltration pond and a sand filter to treat and infiltrate stormwater runoff. See sand filter and infiltration pond design sheets for water quality requirements. Refer to Appendix A3.2 for drywells and stone infiltration trenches. There are no pollutant-specific requirements and/or pollutant removal efficiencies applicable to the site as the result of SAMP, TMDL, or other watershed-specific requirements.

Water Quality Infiltration Pond

Infiltration pond A have been sized using HydroCAD. The project site largely consists of sand, loamy sand, and sandy loam. As native soil is to be excavated and backfilled with sand to the horizon of native sandy soils within the footprint of the infiltration area, the infiltration rate for sand was used from table 5-3 in section 5.3.4 of the RISDISM. See Appendix A3.2 for the HydroCAD analysis for the water quality event. The infiltration pond has been designed to fully infiltrate up to the 1-year stormwater event.

Pretreatment for the infiltration pond have been provided through the use of sediment forebay. The forebay have been sized per section 6.4 of the RISDISM.

Infiltration Pond Parameters:

BMP	Total Watershed Area (acres)	Impervious (acres)	Required Forebay Volume (cf)	Provided Forebay Volume (cf)	Required Surface Area, As (sf)	Provided Surface Area, As (sf)
Infiltration Pond A	2.838	1.278	1,160	1,228	77	81

Sand Filter

Sand Filter B has been sized using the following spreadsheet and modeled in HydroCAD with the appropriate infiltration rate, based on proposed plan to excavate native material above the sandy horizon with lower infiltration rate and backfill with sand within the footprint of the infiltration area. The project site largely consists of sand, loamy sand, and sandy loam and the infiltration rate for sand was used from table 5-3 in section 5.3.4 of the RISDISM. See Appendix A3.2 for the HydroCAD analysis for the water quality event. The sand filter has been designed to fully infiltrate up to the 10-year stormwater event with minimal outflows for the 25-year event.

Pretreatment for the sand filter have been provided through the use of sediment forebay. The forebay have been sized per section 6.4 of the RISDISM.

DiPrete Engineering
Engineers • Planners • Surveyors

Sand Filter Sizing

Name of Sand Filter: B

Sand Filter Parameters		
At,Total Area to Sand Filter	2.009	(Acres)
Impervious Area To Sand Filter	0.390	(Acres)
d_f, Filter Bed Depth	1.50	(feet)
k, Coefficient of Permeability	3.5	(ft/day)
h_f, Average Height of Water	1.25	(ft)
t_f, Design Filter Bed Drain Time	2.00	(days)
Ponding Depth	30	(in)
Loam Depth	6	(in)

Water Quality Calculations

WQ_v= 1inch x Impervious Area

WQ_v= 1,459 (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= 114 (Square Feet) Where A_f is the required filter bed area

Provided Af= 1,260 (Square Feet)

Sand Filter Pre Treatment

Type of Pre Treatment: Sediment Forebay

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

Required As= 15 (Square Feet), where As is the required forebay Area

Provided As= 23 (Square Feet)

25% of Water Quality Volume must be provided in Forebay

Required Volume= 232 (Cubic Feet)

Provided Volume= 265 (Cubic Feet)

Required Water Quality Volume

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

Required WQ_v 1,094 (Cubic Feet)

Volume of Loam	208 (Cubic Feet)
Volume of Forebay	265 (Cubic Feet)
Volume of Ponding	5,498 (Cubic Feet)
Volume of Voids in Filter Bed	624 (Cubic Feet)
Total	**6,594 (Cubic Feet)**

3.4 Minimum Standard 4: Conveyance and Natural Channel Protection

3.4.1 Drainage Network Design Parameters:

A. PIPES

- All drainage pipes are HDPE or equivalent unless otherwise noted.
- Manning's coefficient = 0.012 for HDPE Pipe
- 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 3' sump unless otherwise noted and inverts as specified
- Manholes – Pre-cast concrete with inverts as specified.

3.4.2 Channel Protection Volume:

The site has been designed to fully infiltrate the channel protection volume. The channel protection required has been met.

See table 4-1 of the Appendix A Checklist for a Summary of Channel Protection Volumes. 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. 10.0* by HydroCAD Software Solutions LLC.

All infiltration areas have been modeled in HydroCAD with an 8.27 in/hr infiltration rate per table 5-3 in section 5.3.4 of the RISDISM. Soil evaluations have been performed by DiPrete Engineering. The existing soil has a texture of Sand, Loamy Sand, and Sandy Loam. Where native soil has an infiltration rate less than that of sand in the infiltration areas, native soil is to be excavated until the sand layer and filled with sand to get the infiltration rate of 8.27 in/hr for all infiltration areas.

The drainage system has been designed to mitigate all stormwater flows up to 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, 2-year, 10-year, 25-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, Table 3-1 for Washington County.

1 year	=	2.8 inches
2 year	=	3.3 inches
10 year	=	4.9 inches
25 year	=	6.1 inches
100 year	=	8.5 inches

3.5.3 Design Point Breakdown

The site is analyzed as 2 watershed areas. In the pre-development stage there are 3 subcatchments. In the post development stage there are 24 subcatchments. Design Point 1 (DP-1), which is the existing wetlands on site, will demonstrate zero increase of runoff due to the proposed development. For Design Point 2 (DP-2), Asa Pond, there is minimal peak flow increase for 25-year and 100-year storm events. The proposed flow volume for the 100-year storm event is less than half of the existing flow volume for Design Point 2. A description of each watershed and associated subcatchments are summarized as follows, for cover types see color watershed maps located in back of this report. Numbers in parentheses ( ) indicate the HydroCAD Node Number.

<u>Design Point 1:</u>

In pre-development, subcatchment North to DP-1 (10) makes up one of the two watershed areas and flows to DP-1 (11). This watershed consists of approximately half the site. DP-1 is the existing Wooded Swamp to the North of the site. Stormwater reaches DP-1 (11) by flowing overland, following the natural grades of the site.

In the post development conditions, there are 4 subcatchments:

Slope to Wetland (101) discharges off site without passing through any treatment systems, as it is runoff from pervious or off-site areas.

Road to Forebay A (102) is collected with catch basins and routed to Sediment forebay A (104) and Infiltration Pond A (106) for treatment before outletting to DP-1 (107).

Slope to Forebay A (103) and Slope to Pond A (105) flows directly to Infiltration Pond A (106) for treatment before outletting to DP-1 (107).

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)
North to DL-1	3.585	56	19.7
Slope to Wetland	1.844	58	17.7
Road to Forebay A	2.361	81	6.0
Slope to Forebay A	0.113	62	6.0
Slope to Pond A	0.364	75	6.0

Design Point 2:

The second watershed area, in pre-development, has two subcatchments; (20) and (21) which flow to DP-2 (24). DP-2 (24) is Asa Pond across Curtis Corner Road from the site. South to Low Spot (20) stormwater runoff flows overland, following the natural grades of the site to the low point on site. Northern Half Curtis Corner Rd (21) collects stormwater runoff from Curtis Corner Road that flows into the existing catch basin (22) and discharges to the existing low spot (23). Runoff in larger storms that can't be contained within the low spot (23) overflows out of the existing catch basin onto the roadway and to DP-2 (24).

In the post development conditions, there are 20 subcatchments:

The following subcatchments are building roof areas and runoff is directed to respective underground drywells: Roof Lot 2 (216) to Drywell C1l (217), Roof Lot 1(218) to Drywell C2 (219), Roof Lot 21 (220) to Drywell C3 (221), Roof Lot 22 (222) to Drywell C4 (223), Roof Lot 23 (224) to Drywell C5 (225), Roof Lot 24 (226) to Drywell C6 (227).

The following subcatments are areas where runoff is directed to respective stone infiltration trenches: Driveway Lot 24 (228) to Stone Infiltration Trench D1 (229), Driveway Lot 23 (230) to Stone Infiltration Trench D2 (231), Driveway Lot 22 (232) to Stone Infiltration Trench D3 (233), Driveway Lot 21 (234) to Stone Infiltration Trench D4 (235), Driveway Lot 2 (236) to Stone Infiltration Trench D5 (237), Driveway Lot 1 (238) to Stone Infiltration Trench D6 (239), Driveway Lot 20 (240) to Stone Infiltration Trench D7 (240).

Similarly to existing conditions, stormwater runoff from Half Curtis Corner Rd (209) is collected in the existing catch basin that outlets into depression-3 (212) and then into Sand Filter B (213) for treatment.

Slope to Depression 3 (211) collects stormwater runoff from the site that flows directly into depression-3 (212) which then gets directed to Sand Filter B (213).

Slope to Forebay B (205) and Slope to Sand Filter B (208) collects stormwater runoff from the site that flows directly into Sand Filter B (213).

Road to Forebay B (206) is collected with the proposed drainage network and routed into Sediment Forebay B (207) and Sand Filter B (213).

Slope to Depression 1 (201) flows into depression-1 (202) with outlet to depression-2 (204) which outlets into a proposed drainage catch basin that outlets to Sediment Forebay B (207) and Sand Filter B (213).

Slope to Depression 2 (203) flows directly to depression-2 (204) which outlets to Sediment Forebay B (207) and Sand Filter B (213).

Design Point DP-2 (215) to Asa Pond is designed for 100-year storm events with minimal outflows for the 25-year.

Below is a summary of the hydrologic parameters for the pre and post development sub-areas in Design Point-2.

	Area (acres)	CN	Tc (min)
South to Low Spot	3.484	57	16.8
Northern Half Curtis Corner Rd	0.171	98	6.0
Slope to Depression 1	0.809	62	12.8
Slope to Depression 2	0.195	64	6.0
Slope to Forebay B	0.019	62	6.0
Road to Forebay B	0.252	82	6.0
Slope to Sand Filter B	0.088	63	9.3
Half Curtis Corner Rd	0.195	97	6.0
Slope to Depression 3	0.063	64	6.0
Roof Lot 1	0.028	98	6.0
Roof Lot 2	0.028	98	6.0
Roof Lot 21	0.028	98	6.0
Roof Lot 22	0.028	98	6.0
Roof Lot 23	0.028	98	6.0
Roof Lot 24	0.028	98	6.0
Driveway Lot 1	0.010	93	6.0
Driveway Lot 2	0.011	93	6.0
Driveway Lot 20	0.015	92	6.0
Driveway Lot 21	0.119	71	6.0
Driveway Lot 22	0.050	71	6.0
Driveway Lot 23	0.083	69	6.0
Driveway Lot 24	0.083	69	6.0

3.5.4 Q_p BMP Calculations

The section includes calculations for each Qp BMP for the site. Calculations include the Emergency Outlet Calculations.

The emergency outlets have been sized to safely pass the 100-year storm and beyond without erosion or overtopping the embankment. For this analysis, the detention pond was assumed to have all of the orifices clogged and only the emergency outlet 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
Infiltration Pond A	9.64	1.88	114.00	113.76

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.

Sand Filter B does not have lower-staged orifices apart from the top dome grate outlet, which also serves as an emergency outlet. Refer to the 100-year storm event analysis for Sand Filter B in Section 3.5.6 of this report.

Outlet Protection

Rip rap aprons are designed at the infiltration pond outlet. 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.

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 5.57 acres and is 1.96 acres of impervious. This is approximately 35% impervious cover. A downstream analysis is not required.

3.5.6 Overbank Flood Protection Conclusion

The tables below presents a summary of the pre development flows vs. the mitigated post development flows. The table shows a decrease in the rate of runoff for all storms included in the analysis.

Pre Development Flows vs. Post Development Flows Mitigated

Subwatershed (design point)	1.2" Peak Flow		1-yr Peak Flow		2-yr Peak Flow		10-yr Peak Flow		25-yr Peak Flow		100-yr Peak Flow	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
DP-1:	0.01	0.00	0.16	0.14	0.45	0.33	2.28	2.17	4.25	4.18	8.98	8.92
DP-2:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.23	1.40	2.15
Totals:	0.01	0.00	0.16	0.14	0.45	0.33	2.28	2.17	4.29	4.41	10.38	11.07

All flows in cubic feet per second (cfs)

As shown in the tables above, no increase in stormwater runoff flow will occur following the proposed construction during the 1 through 100-year storm events for DP-1. Comparing DP-2 volumes for 25-year and 100-year storm events, there is no significant increase in flow for those years. Flow volume is 0.010 acre-feet for the pre development and 0.015 for the post development in the 25-year event. Flow volumes for the 100-year storm event are 0.517 acre-feet for the pre-development and 0.226 for the post-development. For the 100-year storm event, the flow volume discharged from the site into Asa Pond will decrease by more than half.

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 LUHPPL.

3.9 Minimum Standard 9: Illicit Discharges

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

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

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
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description Application Number NA

Property Owner: David L. Rodman
Property Location: #109 Curtis Corner Road (AP 40-4 Lot 33) South Kingstown, RI
Date of Test Hole: October 17, 2016
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 70's Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 00 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-4"	C	S	10YR 3/2					sl	1-sbk	fri	3
Bw	4-20"	C	S	10YR 4/6					gls	1-sbk	fri	3
C1	20-72"	C	S	2.5Y 4/4					vgcbcos	0-sg	L	1
C2	72-96"			2.5Y 5/3					gls	0-m	fri	6

TH 1 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-6"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	6-26"	C	S	10YR 4/6					fsl	1-sbk	fri	4
C	26-80"	C	S	2.5Y 5/2					vgfsl	0-m	fri	7
2C	80-120"			2.5Y 5/4					gs	0-sg	L	1

TH 00 Soil Class Ablation Till Total Depth 96" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 72" (og)

TH 1 Soil Class Ablation Till Total Depth 120" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 96" (og)

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description Application Number NA

Property Owner: David L. Rodman
Property Location: #109 Curtis Corner Road (AP 40-4 Lot 33) South Kingstown, RI
Date of Test Hole: October 17, 2016
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 70's Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 2 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-6"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	6-22"	C	S	10YR 4/6					fsl	1-sbk	fri	4
C1	22-50"	C	S	2.5Y 5/2	7.5YR 5/8	C	3	P	fsl	0-m	fri	7
C2	50-120"			2.5Y 5/4					sl	0-m	fri	6

TH 3 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-8"	C	S	10YR 3/2					sil	1-sbk	fri	4
Bw	8-24"	C	S	10YR 4/6					sil	1-sbk	fri	4
C	24-48"	C	S	2.5Y 5/3	7.5YR 5/8	C	3	P	sil	0-m	fri	5
2C	48-120"			2.5Y 5/4					gls	0-m	fri	6

TH 2 Soil Class Ablation Till Total Depth 120" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 54" (og)

TH 3 Soil Class Ablation Till Total Depth 120" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 84" (og)

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description

Application Number: NA

Property Owner: David L. Rodman
Property Location: #109 Curtis Corner Road (AP 40-4 Lot 33) South Kingstown, RI
Date of Test Hole: October 17, 2016
Soil Evaluator: Chris Sutter
License Number: D-4077
Weather: Clear, 70's
Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 4 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-5"	C	S	10YR 3/2					sil	1-sbk	fri	4
Bw	5-24"	C	S	10YR 4/6					sil	1-sbk	fri	4
C	24-37"	C	S	2.5Y 5/3	7.5YR 5/8	C	3	P	sil	0-m	fri	5
2C1	37-70"	C	S	2.5Y 5/4					gls	0-m	fri	6
2C2	70-108"			2.5Y 5/4					vgcbls	0-m	fri	6

TH 5 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-10"	C	S	10YR 3/2					sil	1-sbk	fri	4
Bw	10-19"	C	S	10YR 4/6					sil	1-sbk	fri	4
C	19-48"	C	S	2.5Y 5/3	7.5YR 5/8	C	3	P	sil	0-m	fri	5
2C	48-102"			2.5Y 5/4					vgcbcos	0-m	fri	1

TH 4 Soil Class Ablation Till Total Depth 108" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 80" (og)

TH 5 Soil Class Ablation Till Total Depth 102" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 72" (og)

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description Application Number NA

Property Owner: David L. Rodman
Property Location: #109 Curtis Corner Road (AP 40-4 Lot 33) South Kingstown, RI
Date of Test Hole: October 17, 2016
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 70's Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 6 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-6"	C	S	10YR 3/2					sil	1-sbk	fri	4
Bw	6-27"	C	S	10YR 4/6					sil	1-sbk	fri	4
C	27-70"	C	S	2.5Y 5/3	7.5YR 5/8	C	3	P	sil	0-m	fri	5
2C	70-108"			2.5Y 5/4					gls	0-m	fri	6

TH 7 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-8"	C	S	10YR 3/2					fsl	1-sbk	fri	4
Bw	8-18"	C	S	10YR 4/6					fsl	1-sbk	fri	4
C	18-48"	C	S	2.5Y 5/3	7.5YR 5/8	C	3	P	fsl	0-m	fri	5
2C	48-108"			2.5Y 5/4					gcbls	0-m	fri	6

TH 6 Soil Class Ablation Till Total Depth 108" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 72" (og)

TH 7 Soil Class Ablation Till Total Depth 108" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 72" (og)

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description Application Number NA

Property Owner: David L. Rodman
Property Location: #109 Curtis Corner Road (AP 40-4 Lot 33) South Kingstown, RI
Date of Test Hole: October 17, 2016
Soil Evaluator: Chris Sutter License Number: D-4077
Weather: Clear, 70's Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 8 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-6"	C	S	10YR 3/2					sil	1-sbk	fri	4
Bw	6-30"	C	S	10YR 4/6					sil	1-sbk	fri	4
C	30-48"	C	S	2.5Y 5/2	7.5YR 5/8	C	3	P	sil	0-m	fri	5
2C	48-120"			2.5Y 5/4					gls	0-m	fri	6

TH 9 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-5"	C	S	10YR 3/2					sil	1-sbk	fri	4
Bw	5-20"	C	S	10YR 4/6					sil	1-sbk	fri	4
C	20-60"	C	S	2.5Y 5/3	7.5YR 5/8	C	3	P	sil	0-m	fri	5
2C	60-120"			2.5Y 5/4					gsl	0-m	fri	6

TH 8 Soil Class Ablation Till Total Depth 120" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 72" (og)

TH 9 Soil Class Ablation Till Total Depth 120" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 48" (og)

Comments:

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A – Soil Profile Description

Application Number: NA

Property Owner: David L. Rodman
Property Location: #109 Curtis Corner Road (AP 40-4 Lot 33) South Kingstown, RI
Date of Test Hole: October 17, 2016
Soil Evaluator: Chris Sutter
License Number: D-4077
Weather: Clear, 70's
Shaded: Yes ☐ No ☑ Time: 8:00 am

TH 10 Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				
Ap	0-6"	C	S	10YR 3/2					gls	1-sbk	fri	3
Bw	6-30"	C	S	10YR 4/6					gls	1-sbk	fri	3
C	30-55"	C	S	2.5Y 5/4					vgcbs	0-sg	L	1
2C1	55-79"	C	S	2.5Y 5/3					gls	0-m	fri	6
2C2	79-102"			2.5Y 4/4					gls	0-m	fri	6

TH____ Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox			Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Contr.				

TH 10 Soil Class Ablation Till Total Depth 120" Impervious/Limiting Layer Depth NA (og) GW Seepage Depth NA SHWT 72" (og)

TH _____ Soil Class _____ Total Depth _____ Impervious/Limiting Layer Depth _____ (og) GW Seepage Depth _____ SHWT _____ (og)

Comments: _____

A3.2 Water Quality HydroCAD 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 101: Slope to Wetland Runoff Area=1.844 ac 1.03% Impervious Runoff Depth=0.01"
Flow Length=145' Tc=17.7 min CN=58/98 Runoff=0.01 cfs 0.002 af

Subcatchment 102: Road to Forebay A Runoff Area=2.361 ac 54.13% Impervious Runoff Depth=0.53"
Tc=6.0 min CN=61/98 Runoff=1.40 cfs 0.105 af

Subcatchment 103: Slope to Forebay A Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=62/98 Runoff=0.00 cfs 0.000 af

Subcatchment 105: Slope to Pond A Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=0.07"
Tc=6.0 min CN=75/0 Runoff=0.01 cfs 0.002 af

Subcatchment 201: Slope to Depression 1 Runoff Area=0.809 ac 5.20% Impervious Runoff Depth=0.05"
Flow Length=236' Tc=12.8 min CN=60/98 Runoff=0.04 cfs 0.003 af

Subcatchment 203: Slope to Depression 2 Runoff Area=0.195 ac 7.12% Impervious Runoff Depth=0.07"
Tc=6.0 min CN=61/98 Runoff=0.02 cfs 0.001 af

Subcatchment 205: Slope to Forebay B Runoff Area=0.019 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=62/0 Runoff=0.00 cfs 0.000 af

Subcatchment 206: Road to Forebay B Runoff Area=0.252 ac 57.89% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=61/98 Runoff=0.16 cfs 0.012 af

Subcatchment 208: Slope to Sand Filter B Runoff Area=0.471 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=333' Tc=9.3 min CN=63/0 Runoff=0.00 cfs 0.000 af

Subcatchment 209: Half Curtis Corner Rd Runoff Area=0.195 ac 96.82% Impervious Runoff Depth=0.95"
Tc=6.0 min CN=61/98 Runoff=0.21 cfs 0.015 af

Subcatchment 211: Slope to Depression 3 Runoff Area=0.063 ac 0.24% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=63/98 Runoff=0.00 cfs 0.000 af

Subcatchment 216: Roof Lot 2 Runoff Area=0.028 ac 99.94% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=61/98 Runoff=0.03 cfs 0.002 af

Subcatchment 218: Roof Lot 1 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=61/98 Runoff=0.03 cfs 0.002 af

Subcatchment 220: Roof Lot 21 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=61/98 Runoff=0.03 cfs 0.002 af

Subcatchment 222: Roof Lot 22 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.03 cfs 0.002 af

Subcatchment 224: Roof Lot 23 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.03 cfs 0.002 af

Subcatchment 226: Roof Lot 24 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=0/98 Runoff=0.03 cfs 0.002 af

Subcatchment 228: Driveway Lot 24 Runoff Area=0.083 ac 20.64% Impervious Runoff Depth=0.20"
Tc=6.0 min CN=61/98 Runoff=0.02 cfs 0.001 af

Subcatchment 230: Driveway Lot 23 Runoff Area=0.083 ac 20.41% Impervious Runoff Depth=0.20"
Tc=6.0 min CN=61/98 Runoff=0.02 cfs 0.001 af

Subcatchment 232: Driveway Lot 22 Runoff Area=0.050 ac 27.87% Impervious Runoff Depth=0.27"
Tc=6.0 min CN=61/98 Runoff=0.02 cfs 0.001 af

Subcatchment 234: Driveway Lot 21 Runoff Area=0.119 ac 28.30% Impervious Runoff Depth=0.28"
Tc=6.0 min CN=61/98 Runoff=0.04 cfs 0.003 af

Subcatchment 236: Driveway Lot 2 Runoff Area=0.011 ac 86.16% Impervious Runoff Depth=0.85"
Tc=6.0 min CN=61/98 Runoff=0.01 cfs 0.001 af

Subcatchment 238: Driveway Lot 1 Runoff Area=0.010 ac 85.86% Impervious Runoff Depth=0.85"
Tc=6.0 min CN=61/98 Runoff=0.01 cfs 0.001 af

Subcatchment 240: Driveway Lot 20 Runoff Area=0.035 ac 82.53% Impervious Runoff Depth=0.81"
Tc=6.0 min CN=61/98 Runoff=0.03 cfs 0.002 af

Pond 104: Sediment Forebay A Peak Elev=111.21' Storage=1,089 cf Inflow=1.40 cfs 0.105 af
Outflow=1.35 cfs 0.084 af

Pond 106: Infiltration Basin A Peak Elev=111.01' Storage=73 cf Inflow=1.35 cfs 0.086 af
Discarded=1.29 cfs 0.086 af Primary=0.00 cfs 0.000 af Outflow=1.29 cfs 0.086 af

Pond 202: depression-1 Peak Elev=111.01' Storage=2 cf Inflow=0.04 cfs 0.003 af
Discarded=0.04 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.003 af

Pond 204: depression-2 Peak Elev=110.00' Storage=1 cf Inflow=0.02 cfs 0.001 af
Discarded=0.02 cfs 0.001 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.001 af

Pond 207: Sediment Forebay B Peak Elev=109.04' Storage=244 cf Inflow=0.16 cfs 0.012 af
Outflow=0.11 cfs 0.007 af

Pond 210: CB-Main Road Peak Elev=109.52' Inflow=0.21 cfs 0.015 af
Primary=0.21 cfs 0.015 af Secondary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.015 af

Pond 212: depression-3 Peak Elev=109.40' Storage=675 cf Inflow=0.21 cfs 0.015 af
Outflow=0.00 cfs 0.000 af

Pond 213: Sand Filter B Peak Elev=106.00' Storage=2 cf Inflow=0.11 cfs 0.007 af
Discarded=0.11 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.007 af

Pond 214: Emergency Outlet Peak Elev=110.50' Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 217: Drywell C1 Peak Elev=109.50' Storage=0 cf Inflow=0.03 cfs 0.002 af
Outflow=0.03 cfs 0.002 af

Pond 219: Drywell C2	Peak Elev=108.50' Storage=0 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 221: Drywell C3	Peak Elev=112.50' Storage=0 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 223: Drywell C4	Peak Elev=110.00' Storage=0 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 225: Drywell C5	Peak Elev=109.00' Storage=0 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 227: Drywell C6	Peak Elev=111.50' Storage=0 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 229: Stone Trench D1	Peak Elev=112.00' Storage=0 cf Inflow=0.02 cfs 0.001 af Outflow=0.02 cfs 0.001 af
Pond 231: Stone Trench D2	Peak Elev=112.00' Storage=0 cf Inflow=0.02 cfs 0.001 af Outflow=0.02 cfs 0.001 af
Pond 233: Stone Trench D3	Peak Elev=114.00' Storage=0 cf Inflow=0.02 cfs 0.001 af Outflow=0.02 cfs 0.001 af
Pond 235: Stone Trench D4	Peak Elev=116.30' Storage=1 cf Inflow=0.04 cfs 0.003 af Outflow=0.04 cfs 0.003 af
Pond 237: Stone Trench D5	Peak Elev=118.00' Storage=0 cf Inflow=0.01 cfs 0.001 af Outflow=0.01 cfs 0.001 af
Pond 239: Stone Trench D6	Peak Elev=116.20' Storage=0 cf Inflow=0.01 cfs 0.001 af Outflow=0.01 cfs 0.001 af
Pond 241: Stone Trench D7	Peak Elev=118.00' Storage=1 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Link 107: DP-1-Wetlands	Inflow=0.01 cfs 0.002 af Primary=0.01 cfs 0.002 af
Link 215: DP-2-Asa Pond	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

A3.4.2 Drainage Network Hydraulic Calculations

Inlets

Line No.	Inlet ID	Total Area (ac)	Area A1 (ac)	Coeff C1 (C)	Area A2 (ac)	Coeff C2 (C)	Area A3 (ac)	Coeff C3 (C)	Total CxA	Tc (min)	i Inlet (in/hr)	Q Byp (cfs)	Q Capt (cfs)	Q Carry (cfs)	Byp Ln No
1	7	2.56	0.00	0.20	0.00	0.50	0.00	0.90	1.80	7.1	0.00	....	....	....	n/a
2	4	1.60	0.00	0.20	0.21	0.50	0.19	0.90	1.10	6.6	7.94	1.98	1.66	1.44	6
3	2	0.80	0.00	0.20	0.21	0.50	0.19	0.90	0.55	6.1	7.94	1.44	0.75	0.00	2
4	1	0.40	0.00	0.20	0.21	0.50	0.19	0.90	0.28	6.0	7.94	1.44	0.75	0.00	5
5	3	0.40	0.00	0.20	0.21	0.50	0.19	0.90	0.28	6.0	7.94	1.98	1.66	1.44	7
6	5	0.48	0.00	0.20	0.22	0.50	0.27	0.90	0.35	6.0	7.94	0.00	4.72	1.98	Sag
7	6	0.48	0.00	0.20	0.22	0.50	0.27	0.90	0.35	6.0	7.94	0.00	4.72	1.98	Sag
8	10	0.30	0.00	0.20	0.07	0.50	0.08	0.90	0.21	6.3	7.94	0.43	0.42	0.00	10
9	9	0.15	0.00	0.20	0.07	0.50	0.08	0.90	0.11	6.0	7.94	0.43	0.42	0.00	11
10	14	0.16	0.00	0.20	0.00	0.50	0.03	0.90	0.12	6.2	7.94	0.30	0.34	0.43	Offsite
11	13	0.13	0.00	0.20	0.07	0.50	0.06	0.90	0.09	6.1	7.94	0.63	0.52	0.43	Offsite
12	12	0.00	0.00	0.20	0.00	0.50	0.00	0.90	0.00	6.0	0.00	....	....	....	n/a

Project File: 0265-053-ALLS-CALP-INHS.stm | Number of lines: 12 | Date: 7/30/2020

NOTES: Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82 -- Return period = 25 Yrs. ; ** Critical depth

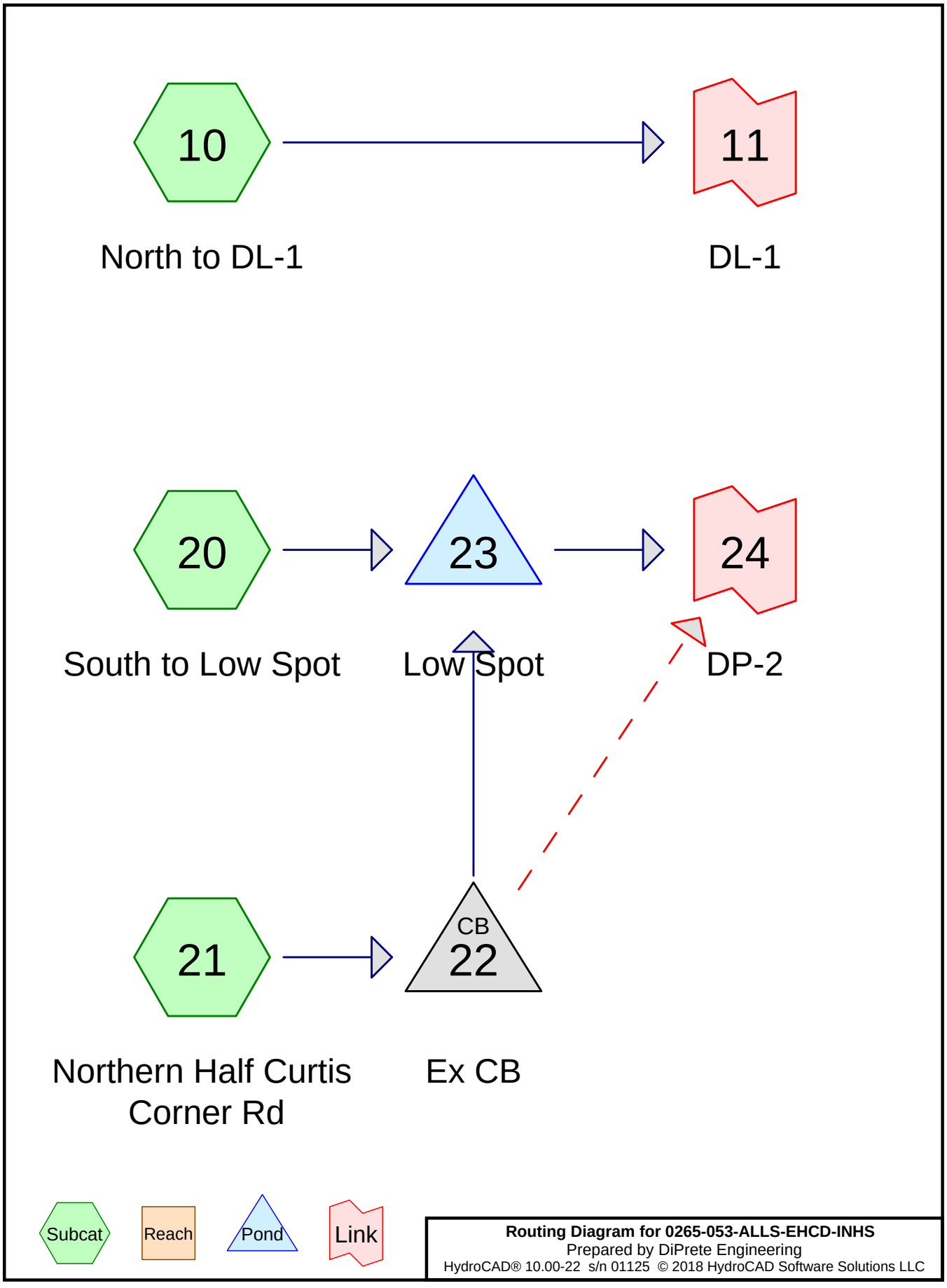
Pipes

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	7-8	126.474	24	1.98	13.73	34.45	1.00	2.12	108.50	111.00	4.66	112.34	112.65	2.13	111.50	115.12	....	....	....	0.00
2	4-7	125.232	18	0.64	8.57	9.09	2.12	2.21	111.50	112.30	5.08	112.99	113.59	1.76	115.12	116.01	1.98	1.66	1.44	0.00
3	2-4	110.754	15	0.99	4.37	0.00	2.21	3.18	112.55	113.65	3.82	114.19	114.57	3.12	116.01	118.08	1.44	0.75	0.00	0.00
4	1-2	19.992	12	0.50	2.19	0.00	3.18	2.12	113.90	114.00	2.79	114.96	115.00	2.00	118.08	117.12	1.44	0.75	0.00	0.00
5	3-4	20.981	12	0.48	2.19	0.00	2.21	2.11	112.80	112.90	2.79	114.19	114.26	1.63	116.01	116.01	1.98	1.66	1.44	0.00
6	5-7	37.469	12	1.07	2.75	0.00	3.12	2.08	111.00	111.40	3.50	112.97	113.16	1.13	115.12	114.48	0.00	4.72	1.98	0.00
7	6-7	59.451	12	0.61	2.75	0.00	3.12	2.11	111.00	111.36	3.50	112.97	113.27	1.01	115.12	114.47	0.00	4.72	1.98	0.00
8	10-11	40.288	12	2.48	1.67	0.00	0.75	5.42	108.00	109.00	2.13	110.56	110.64	4.70	109.75	115.42	0.43	0.42	0.00	0.00
9	9-10	20.010	12	1.00	0.85	0.00	5.42	5.22	109.00	109.20	1.08	110.72	110.73	4.67	115.42	115.42	0.43	0.42	0.00	0.00
10	14-15	21.750	12	4.60	2.54	0.00	0.58	2.46	108.00	109.00	3.24	110.98	111.07	1.23	109.58	112.46	0.30	0.34	0.43	0.00
11	13-14	19.885	12	1.01	2.33	0.00	2.46	2.27	109.00	109.20	2.97	111.23	111.30	1.05	112.46	112.47	0.63	0.52	0.43	0.00
12	12-13	16.665	8	7.80	1.62	0.00	2.10	0.92	109.70	111.00	4.64	111.42	111.66	0.59	112.47	112.59	....	....	....	1.62

Project File: 0265-053-ALLS-CALP-INHS.stm | Number of lines: 12 | Date: 7/30/2020

NOTES: ** Critical depth

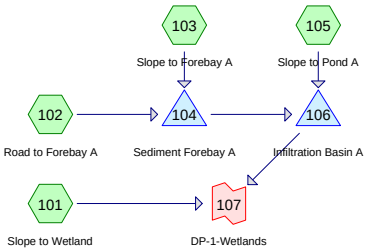
A3.5.4.1 HydroCAD Node Diagram

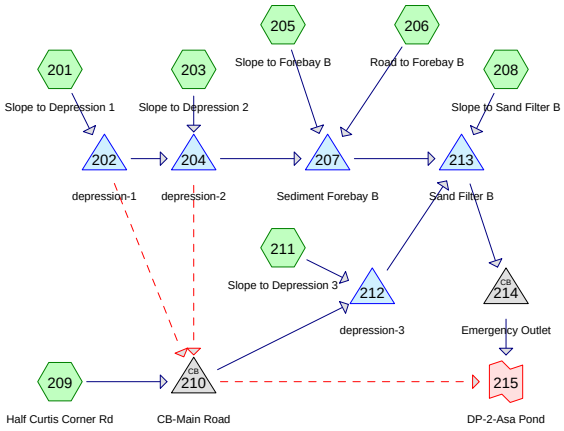


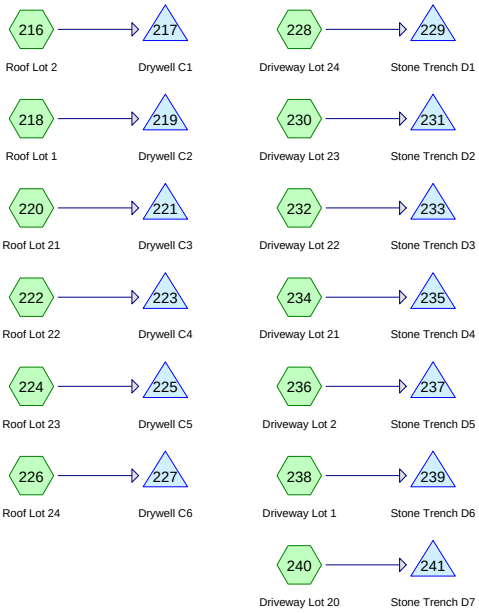
Routing Diagram for 0265-053-ALLS-EHCD-INHS
Prepared by DiPrete Engineering
HydroCAD® 10.00-22 s/n 01125 © 2018 HydroCAD Software Solutions LLC

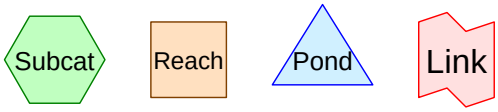
Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.702	61	>75% Grass cover, Good, HSG B (10, 20)
0.014	74	>75% Grass cover, Good, HSG C (20)
0.008	80	>75% Grass cover, Good, HSG D (20)
0.213	98	Offsite Impervious, HSG B (10, 20, 21)
0.023	98	Offsite Impervious, HSG C (20, 21)
0.017	98	Offsite Impervious, HSG D (20, 21)
0.044	98	Offsite Roofs, HSG B (10, 20)
6.220	55	Woods, Good, HSG B (10, 20)
0.000	77	Woods, Good, HSG D (20)
7.241	**57**	**TOTAL AREA**









Routing Diagram for 0265-053-ALLS-PHCD-INHS
Prepared by DiPrete Engineering
HydroCAD® 10.00-22 s/n 01125 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.028	61	>75% Grass cover, Good, HSG B (101, 102, 103, 105, 201, 203, 205, 206, 208, 209, 211, 216, 218, 220, 228, 230, 232, 234, 236, 238, 240)
0.014	74	>75% Grass cover, Good, HSG C (201)
0.008	80	>75% Grass cover, Good, HSG D (211)
1.093	98	Impervious, HSG B (102, 103, 201, 203, 206, 209, 216, 218, 228, 230, 232, 234, 236, 238, 240)
0.175	98	Offsite Impervious, HSG B (101, 201, 203, 209, 211)
0.023	98	Offsite Impervious, HSG C (201, 209)
0.017	98	Offsite Impervious, HSG D (209, 211)
0.012	98	Offsite Roofs, HSG B (101, 201)
0.661	98	Roofs, HSG B (102, 103, 216, 218, 220, 222, 224, 226, 228, 234)
0.173	98	Water Surface, 0% imp, HSG B (103, 105, 205, 208)
1.036	55	Woods, Good, HSG B (101, 102, 201)
7.241	**71**	**TOTAL AREA**

A3.5.4.2 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 10: North to DL-1 Runoff Area=3.585 ac 0.53% Impervious Runoff Depth=0.17"
Flow Length=266' Tc=19.7 min CN=56 Runoff=0.16 cfs 0.050 af

Subcatchment 20: South to Low Spot Runoff Area=3.484 ac 3.05% Impervious Runoff Depth=0.19"
Flow Length=309' Tc=16.8 min CN=57 Runoff=0.21 cfs 0.055 af

Subcatchment 21: Northern Half Curtis Runoff Area=0.171 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.46 cfs 0.037 af

Pond 22: Ex CB Peak Elev=109.83' Inflow=0.46 cfs 0.037 af
Primary=0.46 cfs 0.037 af Secondary=0.00 cfs 0.000 af Outflow=0.46 cfs 0.037 af

Pond 23: Low Spot Peak Elev=109.83' Storage=0.091 af Inflow=0.46 cfs 0.091 af
Outflow=0.00 cfs 0.000 af

Link 11: DL-1 Inflow=0.16 cfs 0.050 af
Primary=0.16 cfs 0.050 af

Link 24: DP-2 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 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: Slope to Wetland Runoff Area=1.844 ac 1.03% Impervious Runoff Depth=0.21"
Flow Length=145' Tc=17.7 min CN=58 Runoff=0.14 cfs 0.033 af

Subcatchment 102: Road to Forebay A Runoff Area=2.361 ac 54.13% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=81 Runoff=3.17 cfs 0.229 af

Subcatchment 103: Slope to Forebay A Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=0.32"
Tc=6.0 min CN=62 Runoff=0.02 cfs 0.003 af

Subcatchment 105: Slope to Pond A Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=0.83"
Tc=6.0 min CN=75 Runoff=0.33 cfs 0.025 af

Subcatchment 201: Slope to Depression 1 Runoff Area=0.809 ac 5.20% Impervious Runoff Depth=0.32"
Flow Length=236' Tc=12.8 min CN=62 Runoff=0.13 cfs 0.022 af

Subcatchment 203: Slope to Depression 2 Runoff Area=0.195 ac 7.12% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=64 Runoff=0.05 cfs 0.006 af

Subcatchment 205: Slope to Forebay B Runoff Area=0.019 ac 0.00% Impervious Runoff Depth=0.32"
Tc=6.0 min CN=62 Runoff=0.00 cfs 0.001 af

Subcatchment 206: Road to Forebay B Runoff Area=0.252 ac 57.89% Impervious Runoff Depth=1.22"
Tc=6.0 min CN=82 Runoff=0.36 cfs 0.026 af

Subcatchment 208: Slope to Sand Filter B Runoff Area=0.471 ac 0.00% Impervious Runoff Depth=0.35"
Flow Length=333' Tc=9.3 min CN=63 Runoff=0.10 cfs 0.014 af

Subcatchment 209: Half Curtis Corner Rd Runoff Area=0.195 ac 96.82% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=97 Runoff=0.52 cfs 0.040 af

Subcatchment 211: Slope to Depression 3 Runoff Area=0.063 ac 0.24% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=64 Runoff=0.02 cfs 0.002 af

Subcatchment 216: Roof Lot 2 Runoff Area=0.028 ac 99.94% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 218: Roof Lot 1 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 220: Roof Lot 21 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 222: Roof Lot 22 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 224: Roof Lot 23 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 226: Roof Lot 24 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=2.57"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 228: Driveway Lot 24 Runoff Area=0.083 ac 20.64% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=69 Runoff=0.04 cfs 0.004 af

Subcatchment 230: Driveway Lot 23 Runoff Area=0.083 ac 20.41% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=69 Runoff=0.04 cfs 0.004 af

Subcatchment 232: Driveway Lot 22 Runoff Area=0.050 ac 27.87% Impervious Runoff Depth=0.65"
Tc=6.0 min CN=71 Runoff=0.03 cfs 0.003 af

Subcatchment 234: Driveway Lot 21 Runoff Area=0.119 ac 28.30% Impervious Runoff Depth=0.65"
Tc=6.0 min CN=71 Runoff=0.08 cfs 0.006 af

Subcatchment 236: Driveway Lot 2 Runoff Area=0.011 ac 86.16% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=93 Runoff=0.03 cfs 0.002 af

Subcatchment 238: Driveway Lot 1 Runoff Area=0.010 ac 85.86% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=93 Runoff=0.02 cfs 0.002 af

Subcatchment 240: Driveway Lot 20 Runoff Area=0.035 ac 82.53% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=92 Runoff=0.08 cfs 0.006 af

Pond 104: Sediment Forebay A Peak Elev=111.37' Storage=1,219 cf Inflow=3.18 cfs 0.232 af
Outflow=3.07 cfs 0.210 af

Pond 106: Infiltration Basin A Peak Elev=111.21' Storage=1,446 cf Inflow=3.40 cfs 0.236 af
Discarded=1.33 cfs 0.236 af Primary=0.00 cfs 0.000 af Outflow=1.33 cfs 0.236 af

Pond 202: depression-1 Peak Elev=111.11' Storage=21 cf Inflow=0.13 cfs 0.022 af
Discarded=0.04 cfs 0.018 af Primary=0.09 cfs 0.004 af Outflow=0.13 cfs 0.022 af

Pond 204: depression-2 Peak Elev=110.18' Storage=64 cf Inflow=0.13 cfs 0.010 af
Discarded=0.07 cfs 0.010 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.010 af

Pond 207: Sediment Forebay B Peak Elev=109.09' Storage=253 cf Inflow=0.36 cfs 0.026 af
Outflow=0.35 cfs 0.021 af

Pond 210: CB-Main Road Peak Elev=110.03' Inflow=0.52 cfs 0.040 af
Primary=0.52 cfs 0.040 af Secondary=0.00 cfs 0.000 af Outflow=0.52 cfs 0.040 af

Pond 212: depression-3 Peak Elev=110.03' Storage=1,156 cf Inflow=0.53 cfs 0.042 af
Outflow=0.08 cfs 0.016 af

Pond 213: Sand Filter B Peak Elev=106.21' Storage=87 cf Inflow=0.42 cfs 0.051 af
Discarded=0.24 cfs 0.051 af Primary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.051 af

Pond 214: Emergency Outlet Peak Elev=110.50' Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 217: Drywell C1 Peak Elev=109.76' Storage=17 cf Inflow=0.07 cfs 0.006 af
Outflow=0.04 cfs 0.006 af

Pond 219: Drywell C2	Peak Elev=108.76' Storage=17 cf Inflow=0.07 cfs 0.006 af Outflow=0.04 cfs 0.006 af
Pond 221: Drywell C3	Peak Elev=112.76' Storage=17 cf Inflow=0.07 cfs 0.006 af Outflow=0.04 cfs 0.006 af
Pond 223: Drywell C4	Peak Elev=110.26' Storage=17 cf Inflow=0.07 cfs 0.006 af Outflow=0.04 cfs 0.006 af
Pond 225: Drywell C5	Peak Elev=109.26' Storage=17 cf Inflow=0.07 cfs 0.006 af Outflow=0.04 cfs 0.006 af
Pond 227: Drywell C6	Peak Elev=111.76' Storage=17 cf Inflow=0.07 cfs 0.006 af Outflow=0.04 cfs 0.006 af
Pond 229: Stone Trench D1	Peak Elev=112.00' Storage=1 cf Inflow=0.04 cfs 0.004 af Outflow=0.04 cfs 0.004 af
Pond 231: Stone Trench D2	Peak Elev=112.00' Storage=1 cf Inflow=0.04 cfs 0.004 af Outflow=0.04 cfs 0.004 af
Pond 233: Stone Trench D3	Peak Elev=114.00' Storage=1 cf Inflow=0.03 cfs 0.003 af Outflow=0.03 cfs 0.003 af
Pond 235: Stone Trench D4	Peak Elev=116.30' Storage=1 cf Inflow=0.08 cfs 0.006 af Outflow=0.08 cfs 0.006 af
Pond 237: Stone Trench D5	Peak Elev=118.01' Storage=0 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 239: Stone Trench D6	Peak Elev=116.21' Storage=0 cf Inflow=0.02 cfs 0.002 af Outflow=0.02 cfs 0.002 af
Pond 241: Stone Trench D7	Peak Elev=118.01' Storage=1 cf Inflow=0.08 cfs 0.006 af Outflow=0.08 cfs 0.006 af
Link 107: DP-1-Wetlands	Inflow=0.14 cfs 0.033 af Primary=0.14 cfs 0.033 af
Link 215: DP-2-Asa Pond	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

A3.5.4.3 HydroCAD 2-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 10: North to DL-1 Runoff Area=3.585 ac 0.53% Impervious Runoff Depth=0.31"
Flow Length=266' Tc=19.7 min CN=56 Runoff=0.45 cfs 0.093 af

Subcatchment 20: South to Low Spot Runoff Area=3.484 ac 3.05% Impervious Runoff Depth=0.34"
Flow Length=309' Tc=16.8 min CN=57 Runoff=0.54 cfs 0.100 af

Subcatchment 21: Northern Half Curtis Runoff Area=0.171 ac 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.55 cfs 0.044 af

Pond 22: Ex CB Peak Elev=110.17' Inflow=0.55 cfs 0.044 af
Primary=0.55 cfs 0.044 af Secondary=0.00 cfs 0.000 af Outflow=0.55 cfs 0.044 af

Pond 23: Low Spot Peak Elev=110.17' Storage=0.144 af Inflow=0.70 cfs 0.144 af
Outflow=0.00 cfs 0.000 af

Link 11: DL-1 Inflow=0.45 cfs 0.093 af
Primary=0.45 cfs 0.093 af

Link 24: DP-2 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 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: Slope to Wetland Runoff Area=1.844 ac 1.03% Impervious Runoff Depth=0.38"
Flow Length=145' Tc=17.7 min CN=58 Runoff=0.33 cfs 0.058 af

Subcatchment 102: Road to Forebay A Runoff Area=2.361 ac 54.13% Impervious Runoff Depth=1.55"
Tc=6.0 min CN=81 Runoff=4.26 cfs 0.305 af

Subcatchment 103: Slope to Forebay A Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=62 Runoff=0.05 cfs 0.005 af

Subcatchment 105: Slope to Pond A Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=75 Runoff=0.48 cfs 0.035 af

Subcatchment 201: Slope to Depression 1 Runoff Area=0.809 ac 5.20% Impervious Runoff Depth=0.52"
Flow Length=236' Tc=12.8 min CN=62 Runoff=0.28 cfs 0.035 af

Subcatchment 203: Slope to Depression 2 Runoff Area=0.195 ac 7.12% Impervious Runoff Depth=0.61"
Tc=6.0 min CN=64 Runoff=0.11 cfs 0.010 af

Subcatchment 205: Slope to Forebay B Runoff Area=0.019 ac 0.00% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=62 Runoff=0.01 cfs 0.001 af

Subcatchment 206: Road to Forebay B Runoff Area=0.252 ac 57.89% Impervious Runoff Depth=1.62"
Tc=6.0 min CN=82 Runoff=0.48 cfs 0.034 af

Subcatchment 208: Slope to Sand Filter B Runoff Area=0.471 ac 0.00% Impervious Runoff Depth=0.56"
Flow Length=333' Tc=9.3 min CN=63 Runoff=0.20 cfs 0.022 af

Subcatchment 209: Half Curtis Corner Rd Runoff Area=0.195 ac 96.82% Impervious Runoff Depth=2.96"
Tc=6.0 min CN=97 Runoff=0.61 cfs 0.048 af

Subcatchment 211: Slope to Depression 3 Runoff Area=0.063 ac 0.24% Impervious Runoff Depth=0.61"
Tc=6.0 min CN=64 Runoff=0.03 cfs 0.003 af

Subcatchment 216: Roof Lot 2 Runoff Area=0.028 ac 99.94% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 218: Roof Lot 1 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 220: Roof Lot 21 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 222: Roof Lot 22 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 224: Roof Lot 23 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 226: Roof Lot 24 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=98 Runoff=0.09 cfs 0.007 af

Subcatchment 228: Driveway Lot 24 Runoff Area=0.083 ac 20.64% Impervious Runoff Depth=0.84"
Tc=6.0 min CN=69 Runoff=0.07 cfs 0.006 af

Subcatchment 230: Driveway Lot 23 Runoff Area=0.083 ac 20.41% Impervious Runoff Depth=0.84"
Tc=6.0 min CN=69 Runoff=0.07 cfs 0.006 af

Subcatchment 232: Driveway Lot 22 Runoff Area=0.050 ac 27.87% Impervious Runoff Depth=0.94"
Tc=6.0 min CN=71 Runoff=0.05 cfs 0.004 af

Subcatchment 234: Driveway Lot 21 Runoff Area=0.119 ac 28.30% Impervious Runoff Depth=0.94"
Tc=6.0 min CN=71 Runoff=0.12 cfs 0.009 af

Subcatchment 236: Driveway Lot 2 Runoff Area=0.011 ac 86.16% Impervious Runoff Depth=2.54"
Tc=6.0 min CN=93 Runoff=0.03 cfs 0.002 af

Subcatchment 238: Driveway Lot 1 Runoff Area=0.010 ac 85.86% Impervious Runoff Depth=2.54"
Tc=6.0 min CN=93 Runoff=0.03 cfs 0.002 af

Subcatchment 240: Driveway Lot 20 Runoff Area=0.035 ac 82.53% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=92 Runoff=0.10 cfs 0.007 af

Pond 104: Sediment Forebay A Peak Elev=111.45' Storage=1,295 cf Inflow=4.31 cfs 0.309 af
Outflow=4.15 cfs 0.288 af

Pond 106: Infiltration Basin A Peak Elev=111.39' Storage=2,682 cf Inflow=4.62 cfs 0.323 af
Discarded=1.36 cfs 0.323 af Primary=0.00 cfs 0.000 af Outflow=1.36 cfs 0.323 af

Pond 202: depression-1 Peak Elev=111.17' Storage=35 cf Inflow=0.28 cfs 0.035 af
Discarded=0.04 cfs 0.023 af Primary=0.23 cfs 0.012 af Outflow=0.27 cfs 0.035 af

Pond 204: depression-2 Peak Elev=110.63' Storage=280 cf Inflow=0.30 cfs 0.022 af
Discarded=0.11 cfs 0.022 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.022 af

Pond 207: Sediment Forebay B Peak Elev=109.11' Storage=257 cf Inflow=0.48 cfs 0.035 af
Outflow=0.48 cfs 0.029 af

Pond 210: CB-Main Road Peak Elev=110.08' Inflow=0.61 cfs 0.048 af
Primary=0.61 cfs 0.048 af Secondary=0.00 cfs 0.000 af Outflow=0.61 cfs 0.048 af

Pond 212: depression-3 Peak Elev=110.07' Storage=1,193 cf Inflow=0.65 cfs 0.051 af
Outflow=0.26 cfs 0.025 af

Pond 213: Sand Filter B Peak Elev=107.46' Storage=607 cf Inflow=0.65 cfs 0.077 af
Discarded=0.24 cfs 0.077 af Primary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.077 af

Pond 214: Emergency Outlet Peak Elev=110.50' Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 217: Drywell C1 Peak Elev=109.92' Storage=27 cf Inflow=0.09 cfs 0.007 af
Outflow=0.04 cfs 0.007 af

Pond 219: Drywell C2	Peak Elev=108.91' Storage=27 cf Inflow=0.09 cfs 0.007 af Outflow=0.04 cfs 0.007 af
Pond 221: Drywell C3	Peak Elev=112.91' Storage=27 cf Inflow=0.09 cfs 0.007 af Outflow=0.04 cfs 0.007 af
Pond 223: Drywell C4	Peak Elev=110.41' Storage=27 cf Inflow=0.09 cfs 0.007 af Outflow=0.04 cfs 0.007 af
Pond 225: Drywell C5	Peak Elev=109.41' Storage=27 cf Inflow=0.09 cfs 0.007 af Outflow=0.04 cfs 0.007 af
Pond 227: Drywell C6	Peak Elev=111.91' Storage=27 cf Inflow=0.09 cfs 0.007 af Outflow=0.04 cfs 0.007 af
Pond 229: Stone Trench D1	Peak Elev=112.00' Storage=1 cf Inflow=0.07 cfs 0.006 af Outflow=0.07 cfs 0.006 af
Pond 231: Stone Trench D2	Peak Elev=112.00' Storage=1 cf Inflow=0.07 cfs 0.006 af Outflow=0.07 cfs 0.006 af
Pond 233: Stone Trench D3	Peak Elev=114.00' Storage=1 cf Inflow=0.05 cfs 0.004 af Outflow=0.05 cfs 0.004 af
Pond 235: Stone Trench D4	Peak Elev=116.30' Storage=2 cf Inflow=0.12 cfs 0.009 af Outflow=0.12 cfs 0.009 af
Pond 237: Stone Trench D5	Peak Elev=118.01' Storage=1 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 239: Stone Trench D6	Peak Elev=116.21' Storage=1 cf Inflow=0.03 cfs 0.002 af Outflow=0.03 cfs 0.002 af
Pond 241: Stone Trench D7	Peak Elev=118.01' Storage=2 cf Inflow=0.10 cfs 0.007 af Outflow=0.10 cfs 0.007 af
Link 107: DP-1-Wetlands	Inflow=0.33 cfs 0.058 af Primary=0.33 cfs 0.058 af
Link 215: DP-2-Asa Pond	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

A3.5.4.4 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 10: North to DL-1 Runoff Area=3.585 ac 0.53% Impervious Runoff Depth=0.99"
Flow Length=266' Tc=19.7 min CN=56 Runoff=2.28 cfs 0.296 af

Subcatchment 20: South to Low Spot Runoff Area=3.484 ac 3.05% Impervious Runoff Depth=1.05"
Flow Length=309' Tc=16.8 min CN=57 Runoff=2.57 cfs 0.305 af

Subcatchment 21: Northern Half Curtis Runoff Area=0.171 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.82 cfs 0.067 af

Pond 22: Ex CB Peak Elev=111.05' Inflow=0.82 cfs 0.067 af
Primary=0.82 cfs 0.066 af Secondary=0.00 cfs 0.000 af Outflow=0.82 cfs 0.066 af

Pond 23: Low Spot Peak Elev=111.05' Storage=0.372 af Inflow=2.92 cfs 0.372 af
Outflow=0.00 cfs 0.000 af

Link 11: DL-1 Inflow=2.28 cfs 0.296 af
Primary=2.28 cfs 0.296 af

Link 24: DP-2 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 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: Slope to Wetland Runoff Area=1.844 ac 1.03% Impervious Runoff Depth=1.11"
Flow Length=145' Tc=17.7 min CN=58 Runoff=1.44 cfs 0.171 af

Subcatchment 102: Road to Forebay A Runoff Area=2.361 ac 54.13% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=81 Runoff=8.01 cfs 0.570 af

Subcatchment 103: Slope to Forebay A Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=62 Runoff=0.17 cfs 0.013 af

Subcatchment 105: Slope to Pond A Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=75 Runoff=1.01 cfs 0.072 af

Subcatchment 201: Slope to Depression 1 Runoff Area=0.809 ac 5.20% Impervious Runoff Depth=1.38"
Flow Length=236' Tc=12.8 min CN=62 Runoff=0.95 cfs 0.093 af

Subcatchment 203: Slope to Depression 2 Runoff Area=0.195 ac 7.12% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=64 Runoff=0.32 cfs 0.025 af

Subcatchment 205: Slope to Forebay B Runoff Area=0.019 ac 0.00% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=62 Runoff=0.03 cfs 0.002 af

Subcatchment 206: Road to Forebay B Runoff Area=0.252 ac 57.89% Impervious Runoff Depth=2.99"
Tc=6.0 min CN=82 Runoff=0.88 cfs 0.063 af

Subcatchment 208: Slope to Sand Filter B Runoff Area=0.471 ac 0.00% Impervious Runoff Depth=1.45"
Flow Length=333' Tc=9.3 min CN=63 Runoff=0.66 cfs 0.057 af

Subcatchment 209: Half Curtis Corner Rd Runoff Area=0.195 ac 96.82% Impervious Runoff Depth=4.55"
Tc=6.0 min CN=97 Runoff=0.93 cfs 0.074 af

Subcatchment 211: Slope to Depression 3 Runoff Area=0.063 ac 0.24% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=64 Runoff=0.10 cfs 0.008 af

Subcatchment 216: Roof Lot 2 Runoff Area=0.028 ac 99.94% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment 218: Roof Lot 1 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment 220: Roof Lot 21 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment 222: Roof Lot 22 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment 224: Roof Lot 23 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment 226: Roof Lot 24 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.011 af

Subcatchment 228: Driveway Lot 24 Runoff Area=0.083 ac 20.64% Impervious Runoff Depth=1.89"
Tc=6.0 min CN=69 Runoff=0.18 cfs 0.013 af

Subcatchment 230: Driveway Lot 23 Runoff Area=0.083 ac 20.41% Impervious Runoff Depth=1.89"
Tc=6.0 min CN=69 Runoff=0.18 cfs 0.013 af

Subcatchment 232: Driveway Lot 22 Runoff Area=0.050 ac 27.87% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=71 Runoff=0.12 cfs 0.009 af

Subcatchment 234: Driveway Lot 21 Runoff Area=0.119 ac 28.30% Impervious Runoff Depth=2.04"
Tc=6.0 min CN=71 Runoff=0.28 cfs 0.020 af

Subcatchment 236: Driveway Lot 2 Runoff Area=0.011 ac 86.16% Impervious Runoff Depth=4.10"
Tc=6.0 min CN=93 Runoff=0.05 cfs 0.004 af

Subcatchment 238: Driveway Lot 1 Runoff Area=0.010 ac 85.86% Impervious Runoff Depth=4.10"
Tc=6.0 min CN=93 Runoff=0.05 cfs 0.004 af

Subcatchment 240: Driveway Lot 20 Runoff Area=0.035 ac 82.53% Impervious Runoff Depth=3.99"
Tc=6.0 min CN=92 Runoff=0.16 cfs 0.012 af

Pond 104: Sediment Forebay A Peak Elev=111.96' Storage=1,785 cf Inflow=8.18 cfs 0.583 af
Outflow=7.74 cfs 0.562 af

Pond 106: Infiltration Basin A Peak Elev=111.96' Storage=6,871 cf Inflow=8.75 cfs 0.633 af
Discarded=1.47 cfs 0.579 af Primary=0.86 cfs 0.055 af Outflow=2.33 cfs 0.633 af

Pond 202: depression-1 Peak Elev=111.49' Storage=113 cf Inflow=0.95 cfs 0.093 af
Discarded=0.05 cfs 0.036 af Primary=0.86 cfs 0.057 af Outflow=0.91 cfs 0.093 af

Pond 204: depression-2 Peak Elev=111.41' Storage=878 cf Inflow=1.09 cfs 0.082 af
Discarded=0.18 cfs 0.060 af Primary=0.49 cfs 0.022 af Secondary=0.00 cfs 0.000 af Outflow=0.67 cfs 0.082 af

Pond 207: Sediment Forebay B Peak Elev=109.65' Storage=383 cf Inflow=0.91 cfs 0.087 af
Outflow=0.91 cfs 0.082 af

Pond 210: CB-Main Road Peak Elev=110.21' Inflow=0.93 cfs 0.074 af
Primary=0.93 cfs 0.074 af Secondary=0.00 cfs 0.000 af Outflow=0.93 cfs 0.074 af

Pond 212: depression-3 Peak Elev=110.17' Storage=1,298 cf Inflow=1.03 cfs 0.082 af
Outflow=0.94 cfs 0.056 af

Pond 213: Sand Filter B Peak Elev=109.65' Storage=3,683 cf Inflow=2.45 cfs 0.194 af
Discarded=0.24 cfs 0.194 af Primary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.194 af

Pond 214: Emergency Outlet Peak Elev=110.50' Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 217: Drywell C1 Peak Elev=110.61' Storage=73 cf Inflow=0.13 cfs 0.011 af
Outflow=0.04 cfs 0.011 af

Pond 219: Drywell C2	Peak Elev=109.60' Storage=73 cf Inflow=0.13 cfs 0.011 af Outflow=0.04 cfs 0.011 af
Pond 221: Drywell C3	Peak Elev=113.60' Storage=73 cf Inflow=0.13 cfs 0.011 af Outflow=0.04 cfs 0.011 af
Pond 223: Drywell C4	Peak Elev=111.10' Storage=73 cf Inflow=0.13 cfs 0.011 af Outflow=0.04 cfs 0.011 af
Pond 225: Drywell C5	Peak Elev=110.10' Storage=73 cf Inflow=0.13 cfs 0.011 af Outflow=0.04 cfs 0.011 af
Pond 227: Drywell C6	Peak Elev=112.60' Storage=73 cf Inflow=0.13 cfs 0.011 af Outflow=0.04 cfs 0.011 af
Pond 229: Stone Trench D1	Peak Elev=112.02' Storage=5 cf Inflow=0.18 cfs 0.013 af Outflow=0.16 cfs 0.013 af
Pond 231: Stone Trench D2	Peak Elev=112.02' Storage=6 cf Inflow=0.18 cfs 0.013 af Outflow=0.16 cfs 0.013 af
Pond 233: Stone Trench D3	Peak Elev=114.03' Storage=5 cf Inflow=0.12 cfs 0.009 af Outflow=0.10 cfs 0.009 af
Pond 235: Stone Trench D4	Peak Elev=116.33' Storage=11 cf Inflow=0.28 cfs 0.020 af Outflow=0.25 cfs 0.020 af
Pond 237: Stone Trench D5	Peak Elev=118.14' Storage=7 cf Inflow=0.05 cfs 0.004 af Outflow=0.03 cfs 0.004 af
Pond 239: Stone Trench D6	Peak Elev=116.33' Storage=7 cf Inflow=0.05 cfs 0.004 af Outflow=0.03 cfs 0.004 af
Pond 241: Stone Trench D7	Peak Elev=118.14' Storage=23 cf Inflow=0.16 cfs 0.012 af Outflow=0.10 cfs 0.012 af
Link 107: DP-1-Wetlands	Inflow=2.16 cfs 0.226 af Primary=2.16 cfs 0.226 af
Link 215: DP-2-Asa Pond	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af

A3.5.4.5 HydroCAD 25-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 10: North to DL-1 Runoff Area=3.585 ac 0.53% Impervious Runoff Depth=1.66"
Flow Length=266' Tc=19.7 min CN=56 Runoff=4.25 cfs 0.495 af

Subcatchment 20: South to Low Spot Runoff Area=3.484 ac 3.05% Impervious Runoff Depth=1.74"
Flow Length=309' Tc=16.8 min CN=57 Runoff=4.68 cfs 0.504 af

Subcatchment 21: Northern Half Curtis Runoff Area=0.171 ac 100.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=1.02 cfs 0.084 af

Pond 22: Ex CB Peak Elev=111.42' Inflow=1.02 cfs 0.084 af
Primary=1.02 cfs 0.079 af Secondary=0.03 cfs 0.005 af Outflow=1.02 cfs 0.084 af

Pond 23: Low Spot Peak Elev=111.56' Storage=0.582 af Inflow=5.14 cfs 0.583 af
Outflow=0.04 cfs 0.005 af

Link 11: DL-1 Inflow=4.25 cfs 0.495 af
Primary=4.25 cfs 0.495 af

Link 24: DP-2 Inflow=0.04 cfs 0.010 af
Primary=0.04 cfs 0.010 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: Slope to Wetland Runoff Area=1.844 ac 1.03% Impervious Runoff Depth=1.82"
Flow Length=145' Tc=17.7 min CN=58 Runoff=2.57 cfs 0.280 af

Subcatchment 102: Road to Forebay A Runoff Area=2.361 ac 54.13% Impervious Runoff Depth=3.97"
Tc=6.0 min CN=81 Runoff=10.93 cfs 0.782 af

Subcatchment 103: Slope to Forebay A Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=62 Runoff=0.28 cfs 0.020 af

Subcatchment 105: Slope to Pond A Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=3.37"
Tc=6.0 min CN=75 Runoff=1.44 cfs 0.102 af

Subcatchment 201: Slope to Depression 1 Runoff Area=0.809 ac 5.20% Impervious Runoff Depth=2.16"
Flow Length=236' Tc=12.8 min CN=62 Runoff=1.57 cfs 0.146 af

Subcatchment 203: Slope to Depression 2 Runoff Area=0.195 ac 7.12% Impervious Runoff Depth=2.33"
Tc=6.0 min CN=64 Runoff=0.52 cfs 0.038 af

Subcatchment 205: Slope to Forebay B Runoff Area=0.019 ac 0.00% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=62 Runoff=0.05 cfs 0.003 af

Subcatchment 206: Road to Forebay B Runoff Area=0.252 ac 57.89% Impervious Runoff Depth=4.08"
Tc=6.0 min CN=82 Runoff=1.19 cfs 0.086 af

Subcatchment 208: Slope to Sand Filter B Runoff Area=0.471 ac 0.00% Impervious Runoff Depth=2.25"
Flow Length=333' Tc=9.3 min CN=63 Runoff=1.07 cfs 0.088 af

Subcatchment 209: Half Curtis Corner Rd Runoff Area=0.195 ac 96.82% Impervious Runoff Depth=5.74"
Tc=6.0 min CN=97 Runoff=1.16 cfs 0.093 af

Subcatchment 211: Slope to Depression 3 Runoff Area=0.063 ac 0.24% Impervious Runoff Depth=2.33"
Tc=6.0 min CN=64 Runoff=0.17 cfs 0.012 af

Subcatchment 216: Roof Lot 2 Runoff Area=0.028 ac 99.94% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.013 af

Subcatchment 218: Roof Lot 1 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 220: Roof Lot 21 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 222: Roof Lot 22 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 224: Roof Lot 23 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 226: Roof Lot 24 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.013 af

Subcatchment 228: Driveway Lot 24 Runoff Area=0.083 ac 20.64% Impervious Runoff Depth=2.79"
Tc=6.0 min CN=69 Runoff=0.27 cfs 0.019 af

Subcatchment 230: Driveway Lot 23 Runoff Area=0.083 ac 20.41% Impervious Runoff Depth=2.79"
Tc=6.0 min CN=69 Runoff=0.27 cfs 0.019 af

Subcatchment 232: Driveway Lot 22 Runoff Area=0.050 ac 27.87% Impervious Runoff Depth=2.98"
Tc=6.0 min CN=71 Runoff=0.17 cfs 0.012 af

Subcatchment 234: Driveway Lot 21 Runoff Area=0.119 ac 28.30% Impervious Runoff Depth=2.98"
Tc=6.0 min CN=71 Runoff=0.41 cfs 0.029 af

Subcatchment 236: Driveway Lot 2 Runoff Area=0.011 ac 86.16% Impervious Runoff Depth=5.28"
Tc=6.0 min CN=93 Runoff=0.06 cfs 0.005 af

Subcatchment 238: Driveway Lot 1 Runoff Area=0.010 ac 85.86% Impervious Runoff Depth=5.28"
Tc=6.0 min CN=93 Runoff=0.06 cfs 0.005 af

Subcatchment 240: Driveway Lot 20 Runoff Area=0.035 ac 82.53% Impervious Runoff Depth=5.17"
Tc=6.0 min CN=92 Runoff=0.20 cfs 0.015 af

Pond 104: Sediment Forebay A Peak Elev=112.34' Storage=2,210 cf Inflow=11.20 cfs 0.802 af
Outflow=10.37 cfs 0.781 af

Pond 106: Infiltration Basin A Peak Elev=112.33' Storage=9,853 cf Inflow=11.80 cfs 0.883 af
Discarded=1.54 cfs 0.728 af Primary=1.79 cfs 0.155 af Outflow=3.33 cfs 0.883 af

Pond 202: depression-1 Peak Elev=111.92' Storage=246 cf Inflow=1.57 cfs 0.146 af
Discarded=0.07 cfs 0.042 af Primary=1.25 cfs 0.103 af Outflow=1.31 cfs 0.146 af

Pond 204: depression-2 Peak Elev=111.71' Storage=1,177 cf Inflow=1.59 cfs 0.141 af
Discarded=0.21 cfs 0.082 af Primary=1.03 cfs 0.059 af Secondary=0.00 cfs 0.000 af Outflow=1.23 cfs 0.141 af

Pond 207: Sediment Forebay B Peak Elev=110.56' Storage=669 cf Inflow=1.52 cfs 0.148 af
Outflow=1.43 cfs 0.142 af

Pond 210: CB-Main Road Peak Elev=110.53' Inflow=1.16 cfs 0.093 af
Primary=1.16 cfs 0.093 af Secondary=0.00 cfs 0.000 af Outflow=1.16 cfs 0.093 af

Pond 212: depression-3 Peak Elev=110.53' Storage=1,819 cf Inflow=1.32 cfs 0.105 af
Outflow=1.23 cfs 0.079 af

Pond 213: Sand Filter B Peak Elev=110.56' Storage=6,086 cf Inflow=3.67 cfs 0.310 af
Discarded=0.24 cfs 0.295 af Primary=0.23 cfs 0.015 af Outflow=0.47 cfs 0.310 af

Pond 214: Emergency Outlet Peak Elev=110.52' Inflow=0.23 cfs 0.015 af
Outflow=0.23 cfs 0.015 af

Pond 217: Drywell C1 Peak Elev=111.24' Storage=115 cf Inflow=0.17 cfs 0.013 af
Outflow=0.04 cfs 0.013 af

Pond 219: Drywell C2	Peak Elev=110.24' Storage=115 cf Inflow=0.16 cfs 0.013 af Outflow=0.04 cfs 0.013 af
Pond 221: Drywell C3	Peak Elev=114.24' Storage=115 cf Inflow=0.16 cfs 0.013 af Outflow=0.04 cfs 0.013 af
Pond 223: Drywell C4	Peak Elev=111.74' Storage=115 cf Inflow=0.16 cfs 0.013 af Outflow=0.04 cfs 0.013 af
Pond 225: Drywell C5	Peak Elev=110.74' Storage=115 cf Inflow=0.16 cfs 0.013 af Outflow=0.04 cfs 0.013 af
Pond 227: Drywell C6	Peak Elev=113.24' Storage=115 cf Inflow=0.16 cfs 0.013 af Outflow=0.04 cfs 0.013 af
Pond 229: Stone Trench D1	Peak Elev=112.16' Storage=45 cf Inflow=0.27 cfs 0.019 af Outflow=0.16 cfs 0.019 af
Pond 231: Stone Trench D2	Peak Elev=112.16' Storage=46 cf Inflow=0.27 cfs 0.019 af Outflow=0.16 cfs 0.019 af
Pond 233: Stone Trench D3	Peak Elev=114.17' Storage=30 cf Inflow=0.17 cfs 0.012 af Outflow=0.10 cfs 0.012 af
Pond 235: Stone Trench D4	Peak Elev=116.47' Storage=72 cf Inflow=0.41 cfs 0.029 af Outflow=0.25 cfs 0.029 af
Pond 237: Stone Trench D5	Peak Elev=118.29' Storage=16 cf Inflow=0.06 cfs 0.005 af Outflow=0.03 cfs 0.005 af
Pond 239: Stone Trench D6	Peak Elev=116.47' Storage=14 cf Inflow=0.06 cfs 0.005 af Outflow=0.03 cfs 0.005 af
Pond 241: Stone Trench D7	Peak Elev=118.29' Storage=50 cf Inflow=0.20 cfs 0.015 af Outflow=0.10 cfs 0.015 af
Link 107: DP-1-Wetlands	Inflow=4.15 cfs 0.435 af Primary=4.15 cfs 0.435 af
Link 215: DP-2-Asa Pond	Inflow=0.23 cfs 0.015 af Primary=0.23 cfs 0.015 af

A3.5.4.6 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 10: North to DL-1 Runoff Area=3.585 ac 0.53% Impervious Runoff Depth=3.25"
Flow Length=266' Tc=19.7 min CN=56 Runoff=8.98 cfs 0.970 af

Subcatchment 20: South to Low Spot Runoff Area=3.484 ac 3.05% Impervious Runoff Depth=3.36"
Flow Length=309' Tc=16.8 min CN=57 Runoff=9.67 cfs 0.976 af

Subcatchment 21: Northern Half Curtis Runoff Area=0.171 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=1.43 cfs 0.118 af

Pond 22: Ex CB Peak Elev=111.44' Inflow=1.43 cfs 0.118 af
Primary=1.43 cfs 0.083 af Secondary=0.17 cfs 0.035 af Outflow=1.43 cfs 0.118 af

Pond 23: Low Spot Peak Elev=111.63' Storage=0.614 af Inflow=10.36 cfs 1.059 af
Outflow=1.31 cfs 0.481 af

Link 11: DL-1 Inflow=8.98 cfs 0.970 af
Primary=8.98 cfs 0.970 af

Link 24: DP-2 Inflow=1.40 cfs 0.517 af
Primary=1.40 cfs 0.517 af

Summary for Subcatchment 10: North to DL-1

Runoff = 8.98 cfs @ 12.28 hrs, Volume= 0.970 af, Depth= 3.25"

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
0.206	61	>75% Grass cover, Good, HSG B
0.007	98	Offsite Impervious, HSG B
0.012	98	Offsite Roofs, HSG B
3.361	55	Woods, Good, HSG B
3.585	56	Weighted Average
3.566	55	99.47% Pervious Area
0.019	98	0.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.0	100	0.0260	0.09		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.30"
0.7	166	0.0681	4.20		**Shallow Concentrated Flow, B** Unpaved Kv= 16.1 fps
19.7	266	Total			

Summary for Subcatchment 20: South to Low Spot

Runoff = 9.67 cfs @ 12.24 hrs, Volume= 0.976 af, Depth= 3.36"

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
0.496	61	>75% Grass cover, Good, HSG B
0.014	74	>75% Grass cover, Good, HSG C
0.008	80	>75% Grass cover, Good, HSG D
0.071	98	Offsite Impervious, HSG B
0.004	98	Offsite Impervious, HSG C
0.000	98	Offsite Impervious, HSG D
0.031	98	Offsite Roofs, HSG B
2.859	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
3.484	57	Weighted Average
3.378	56	96.95% Pervious Area
0.106	98	3.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0430	0.11		**Sheet Flow, a-b** Woods: Light underbrush n= 0.400 P2= 3.30"
1.2	209	0.0335	2.95		**Shallow Concentrated Flow, b-c** Unpaved Kv= 16.1 fps
16.8	309	Total			

Summary for Subcatchment 21: Northern Half Curtis Corner Rd

Runoff = 1.43 cfs @ 12.08 hrs, Volume= 0.118 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
0.135	98	Offsite Impervious, HSG B
0.019	98	Offsite Impervious, HSG C
0.017	98	Offsite Impervious, HSG D
0.171	98	Weighted Average
0.171	98	100.00% Impervious Area

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

Summary for Pond 22: Ex CB

Inflow Area = 0.171 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 1.43 cfs @ 12.08 hrs, Volume= 0.118 af
Outflow = 1.43 cfs @ 12.08 hrs, Volume= 0.118 af, Atten= 0%, Lag= 0.0 min
Primary = 1.43 cfs @ 12.08 hrs, Volume= 0.083 af
Secondary = 0.17 cfs @ 12.67 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 111.44' @ 12.67 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	109.30'	**15.00" Round Culvert** L= 7.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 109.30' / 109.20' S= 0.0143 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	111.41'	**24.00" x 24.00" Horiz. Catch Basin** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.15 cfs @ 12.08 hrs HW=110.33' TW=110.28' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.15 cfs @ 1.44 fps)

Secondary OutFlow Max=0.17 cfs @ 12.67 hrs HW=111.44' TW=0.00' (Dynamic Tailwater)
2=Catch Basin (Weir Controls 0.17 cfs @ 0.60 fps)

Summary for Pond 23: Low Spot

Inflow Area = 3.655 ac, 7.59% Impervious, Inflow Depth = 3.48" for 100-Year event
Inflow = 10.36 cfs @ 12.23 hrs, Volume= 1.059 af
Outflow = 1.31 cfs @ 13.46 hrs, Volume= 0.481 af, Atten= 87%, Lag= 73.4 min
Primary = 1.31 cfs @ 13.46 hrs, Volume= 0.481 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 111.63' @ 13.46 hrs Surf.Area= 0.483 ac Storage= 0.614 af

Plug-Flow detention time= 303.0 min calculated for 0.481 af (45% of inflow)
Center-of-Mass det. time= 174.8 min (1,017.5 - 842.7)

Volume	Invert	Avail.Storage	Storage Description
#1	108.50'	0.810 af	**Low Spot (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
108.50	0.017	0.000	0.000
109.00	0.051	0.017	0.017
109.50	0.096	0.037	0.054
110.00	0.150	0.061	0.115
110.50	0.227	0.094	0.209
111.00	0.349	0.144	0.353
111.50	0.455	0.201	0.554
112.00	0.567	0.255	0.810

Device	Routing	Invert	Outlet Devices
#1	Primary	111.55'	**179.3 deg x 30.0' long x 0.45' rise Sharp-Crested Vee/Trap Weir X 0.50** Cv= 2.46 (C= 3.08)

Primary OutFlow Max=1.31 cfs @ 13.46 hrs HW=111.63' TW=0.00' (Dynamic Tailwater)
↑**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.31 cfs @ 0.40 fps)

Summary for Link 11: DL-1

Inflow Area = 3.585 ac, 0.53% Impervious, Inflow Depth = 3.25" for 100-Year event
Inflow = 8.98 cfs @ 12.28 hrs, Volume= 0.970 af
Primary = 8.98 cfs @ 12.28 hrs, Volume= 0.970 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Link 24: DP-2

Inflow Area = 3.655 ac, 7.59% Impervious, Inflow Depth = 1.70" for 100-Year event
Inflow = 1.40 cfs @ 13.45 hrs, Volume= 0.517 af
Primary = 1.40 cfs @ 13.45 hrs, Volume= 0.517 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, 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: Slope to Wetland Runoff Area=1.844 ac 1.03% Impervious Runoff Depth=3.48"
Flow Length=145' Tc=17.7 min CN=58 Runoff=5.22 cfs 0.535 af

Subcatchment 102: Road to Forebay A Runoff Area=2.361 ac 54.13% Impervious Runoff Depth=6.22"
Tc=6.0 min CN=81 Runoff=16.82 cfs 1.223 af

Subcatchment 103: Slope to Forebay A Runoff Area=0.113 ac 0.00% Impervious Runoff Depth=3.95"
Tc=6.0 min CN=62 Runoff=0.52 cfs 0.037 af

Subcatchment 105: Slope to Pond A Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=75 Runoff=2.33 cfs 0.167 af

Subcatchment 201: Slope to Depression 1 Runoff Area=0.809 ac 5.20% Impervious Runoff Depth=3.95"
Flow Length=236' Tc=12.8 min CN=62 Runoff=2.98 cfs 0.266 af

Subcatchment 203: Slope to Depression 2 Runoff Area=0.195 ac 7.12% Impervious Runoff Depth=4.18"
Tc=6.0 min CN=64 Runoff=0.95 cfs 0.068 af

Subcatchment 205: Slope to Forebay B Runoff Area=0.019 ac 0.00% Impervious Runoff Depth=3.95"
Tc=6.0 min CN=62 Runoff=0.09 cfs 0.006 af

Subcatchment 206: Road to Forebay B Runoff Area=0.252 ac 57.89% Impervious Runoff Depth=6.34"
Tc=6.0 min CN=82 Runoff=1.82 cfs 0.133 af

Subcatchment 208: Slope to Sand Filter B Runoff Area=0.471 ac 0.00% Impervious Runoff Depth=4.07"
Flow Length=333' Tc=9.3 min CN=63 Runoff=1.99 cfs 0.160 af

Subcatchment 209: Half Curtis Corner Rd Runoff Area=0.195 ac 96.82% Impervious Runoff Depth=8.14"
Tc=6.0 min CN=97 Runoff=1.62 cfs 0.132 af

Subcatchment 211: Slope to Depression 3 Runoff Area=0.063 ac 0.24% Impervious Runoff Depth=4.18"
Tc=6.0 min CN=64 Runoff=0.31 cfs 0.022 af

Subcatchment 216: Roof Lot 2 Runoff Area=0.028 ac 99.94% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 218: Roof Lot 1 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 220: Roof Lot 21 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 222: Roof Lot 22 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 224: Roof Lot 23 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 226: Roof Lot 24 Runoff Area=0.028 ac 100.00% Impervious Runoff Depth=8.26"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.019 af

Subcatchment 228: Driveway Lot 24 Runoff Area=0.083 ac 20.64% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=69 Runoff=0.47 cfs 0.033 af

Subcatchment 230: Driveway Lot 23 Runoff Area=0.083 ac 20.41% Impervious Runoff Depth=4.78"
Tc=6.0 min CN=69 Runoff=0.47 cfs 0.033 af

Subcatchment 232: Driveway Lot 22 Runoff Area=0.050 ac 27.87% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=71 Runoff=0.29 cfs 0.021 af

Subcatchment 234: Driveway Lot 21 Runoff Area=0.119 ac 28.30% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=71 Runoff=0.70 cfs 0.050 af

Subcatchment 236: Driveway Lot 2 Runoff Area=0.011 ac 86.16% Impervious Runoff Depth=7.66"
Tc=6.0 min CN=93 Runoff=0.09 cfs 0.007 af

Subcatchment 238: Driveway Lot 1 Runoff Area=0.010 ac 85.86% Impervious Runoff Depth=7.66"
Tc=6.0 min CN=93 Runoff=0.08 cfs 0.007 af

Subcatchment 240: Driveway Lot 20 Runoff Area=0.035 ac 82.53% Impervious Runoff Depth=7.54"
Tc=6.0 min CN=92 Runoff=0.28 cfs 0.022 af

Pond 104: Sediment Forebay A Peak Elev=113.05' Storage=3,146 cf Inflow=17.34 cfs 1.260 af
Outflow=15.68 cfs 1.239 af

Pond 106: Infiltration Basin A Peak Elev=113.05' Storage=15,857 cf Inflow=18.01 cfs 1.405 af
Discarded=1.68 cfs 0.988 af Primary=3.97 cfs 0.417 af Outflow=5.65 cfs 1.405 af

Pond 202: depression-1 Peak Elev=112.85' Storage=755 cf Inflow=2.98 cfs 0.266 af
Discarded=0.22 cfs 0.054 af Primary=2.28 cfs 0.212 af Outflow=2.50 cfs 0.266 af

Pond 204: depression-2 Peak Elev=112.34' Storage=2,004 cf Inflow=2.76 cfs 0.280 af
Discarded=0.32 cfs 0.127 af Primary=1.68 cfs 0.153 af Secondary=0.00 cfs 0.000 af Outflow=2.01 cfs 0.280 af

Pond 207: Sediment Forebay B Peak Elev=110.98' Storage=837 cf Inflow=2.98 cfs 0.292 af
Outflow=2.40 cfs 0.286 af

Pond 210: CB-Main Road Peak Elev=110.90' Inflow=1.62 cfs 0.132 af
Primary=1.62 cfs 0.132 af Secondary=0.00 cfs 0.000 af Outflow=1.62 cfs 0.132 af

Pond 212: depression-3 Peak Elev=110.90' Storage=2,599 cf Inflow=1.93 cfs 0.154 af
Outflow=1.80 cfs 0.128 af

Pond 213: Sand Filter B Peak Elev=110.98' Storage=7,395 cf Inflow=6.04 cfs 0.573 af
Discarded=0.24 cfs 0.347 af Primary=2.15 cfs 0.226 af Outflow=2.39 cfs 0.573 af

Pond 214: Emergency Outlet Peak Elev=110.60' Inflow=2.15 cfs 0.226 af
Outflow=2.15 cfs 0.226 af

Pond 217: Drywell C1 Peak Elev=112.54' Storage=206 cf Inflow=0.23 cfs 0.019 af
Outflow=0.04 cfs 0.019 af

Pond 219: Drywell C2	Peak Elev=111.54' Storage=205 cf Inflow=0.23 cfs 0.019 af Outflow=0.04 cfs 0.019 af
Pond 221: Drywell C3	Peak Elev=219.54' Storage=205 cf Inflow=0.23 cfs 0.019 af Outflow=0.04 cfs 0.019 af
Pond 223: Drywell C4	Peak Elev=113.04' Storage=205 cf Inflow=0.23 cfs 0.019 af Outflow=0.04 cfs 0.019 af
Pond 225: Drywell C5	Peak Elev=112.04' Storage=205 cf Inflow=0.23 cfs 0.019 af Outflow=0.04 cfs 0.019 af
Pond 227: Drywell C6	Peak Elev=114.54' Storage=205 cf Inflow=0.23 cfs 0.019 af Outflow=0.04 cfs 0.019 af
Pond 229: Stone Trench D1	Peak Elev=112.72' Storage=204 cf Inflow=0.47 cfs 0.033 af Outflow=0.16 cfs 0.033 af
Pond 231: Stone Trench D2	Peak Elev=112.73' Storage=206 cf Inflow=0.47 cfs 0.033 af Outflow=0.16 cfs 0.033 af
Pond 233: Stone Trench D3	Peak Elev=114.71' Storage=128 cf Inflow=0.29 cfs 0.021 af Outflow=0.10 cfs 0.021 af
Pond 235: Stone Trench D4	Peak Elev=117.01' Storage=302 cf Inflow=0.70 cfs 0.050 af Outflow=0.25 cfs 0.050 af
Pond 237: Stone Trench D5	Peak Elev=118.72' Storage=39 cf Inflow=0.09 cfs 0.007 af Outflow=0.03 cfs 0.007 af
Pond 239: Stone Trench D6	Peak Elev=116.89' Storage=36 cf Inflow=0.08 cfs 0.007 af Outflow=0.03 cfs 0.007 af
Pond 241: Stone Trench D7	Peak Elev=118.73' Storage=124 cf Inflow=0.28 cfs 0.022 af Outflow=0.10 cfs 0.022 af
Link 107: DP-1-Wetlands	Inflow=8.88 cfs 0.952 af Primary=8.88 cfs 0.952 af
Link 215: DP-2-Asa Pond	Inflow=2.15 cfs 0.226 af Primary=2.15 cfs 0.226 af

Summary for Subcatchment 101: Slope to Wetland

Runoff = 5.22 cfs @ 12.25 hrs, Volume= 0.535 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
0.922	61	>75% Grass cover, Good, HSG B
0.007	98	Offsite Impervious, HSG B
0.012	98	Offsite Roofs, HSG B
0.903	55	Woods, Good, HSG B
1.844	58	Weighted Average
1.825	58	98.97% Pervious Area
0.019	98	1.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0320	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.30"
0.2	45	0.0533	3.72		**Shallow Concentrated Flow, B** Unpaved Kv= 16.1 fps
17.7	145	Total			

Summary for Subcatchment 102: Road to Forebay A

Runoff = 16.82 cfs @ 12.09 hrs, Volume= 1.223 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
1.068	61	>75% Grass cover, Good, HSG B
0.782	98	Impervious, HSG B
0.496	98	Roofs, HSG B
0.014	55	Woods, Good, HSG B
2.361	81	Weighted Average
1.083	61	45.87% Pervious Area
1.278	98	54.13% Impervious Area

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

Summary for Subcatchment 103: Slope to Forebay A

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 3.95"

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
0.111	61	>75% Grass cover, Good, HSG B
0.000	98	Impervious, HSG B
0.000	98	Roofs, HSG B
0.002	98	Water Surface, 0% imp, HSG B
0.113	62	Weighted Average
0.113	62	100.00% Pervious Area
0.000	98	0.00% Impervious Area

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

Summary for Subcatchment 105: Slope to Pond A

Runoff = 2.33 cfs @ 12.09 hrs, Volume= 0.167 af, Depth= 5.50"

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
0.222	61	>75% Grass cover, Good, HSG B
0.142	98	Water Surface, 0% imp, HSG B
0.364	75	Weighted Average
0.364	75	100.00% Pervious Area

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

Summary for Subcatchment 201: Slope to Depression 1

Runoff = 2.98 cfs @ 12.18 hrs, Volume= 0.266 af, Depth= 3.95"

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
0.634	61	>75% Grass cover, Good, HSG B
0.014	74	>75% Grass cover, Good, HSG C
0.000	98	Impervious, HSG B
0.038	98	Offsite Impervious, HSG B
0.004	98	Offsite Impervious, HSG C
0.000	98	Offsite Roofs, HSG B
0.119	55	Woods, Good, HSG B
0.809	62	Weighted Average
0.767	60	94.80% Pervious Area
0.042	98	5.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	80	0.0525	0.11		**Sheet Flow, a-b** Woods: Light underbrush n= 0.400 P2= 3.30"
0.8	156	0.0410	3.26		**Shallow Concentrated Flow, b-c** Unpaved Kv= 16.1 fps
12.8	236	Total			

Summary for Subcatchment 203: Slope to Depression 2

Runoff = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 4.18"

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
0.181	61	>75% Grass cover, Good, HSG B
0.014	98	Impervious, HSG B
0.000	98	Offsite Impervious, HSG B
0.195	64	Weighted Average
0.181	61	92.88% Pervious Area
0.014	98	7.12% Impervious Area

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

Summary for Subcatchment 205: Slope to Forebay B

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 3.95"

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	61	>75% Grass cover, Good, HSG B
0.001	98	Water Surface, 0% imp, HSG B
0.019	62	Weighted Average
0.019	62	100.00% Pervious Area

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

Summary for Subcatchment 206: Road to Forebay B

Runoff = 1.82 cfs @ 12.09 hrs, Volume= 0.133 af, Depth= 6.34"

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
0.106	61	>75% Grass cover, Good, HSG B
0.146	98	Impervious, HSG B
0.252	82	Weighted Average
0.106	61	42.11% Pervious Area
0.146	98	57.89% Impervious Area

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

Summary for Subcatchment 208: Slope to Sand Filter B

Runoff = 1.99 cfs @ 12.13 hrs, Volume= 0.160 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
0.442	61	>75% Grass cover, Good, HSG B
0.029	98	Water Surface, 0% imp, HSG B
0.471	63	Weighted Average
0.471	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.0500	0.25		**Sheet Flow, A** Grass: Short n= 0.150 P2= 3.30"
2.6	233	0.0086	1.49		**Shallow Concentrated Flow, B** Unpaved Kv= 16.1 fps
9.3	333	Total			

Summary for Subcatchment 209: Half Curtis Corner Rd

Runoff = 1.62 cfs @ 12.08 hrs, Volume= 0.132 af, Depth= 8.14"

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
0.006	61	>75% Grass cover, Good, HSG B
0.023	98	Impervious, HSG B
0.130	98	Offsite Impervious, HSG B
0.019	98	Offsite Impervious, HSG C
0.017	98	Offsite Impervious, HSG D
0.195	97	Weighted Average
0.006	61	3.18% Pervious Area
0.188	98	96.82% Impervious Area

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

Summary for Subcatchment 211: Slope to Depression 3

Runoff = 0.31 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 4.18"

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
0.054	61	>75% Grass cover, Good, HSG B
0.008	80	>75% Grass cover, Good, HSG D
0.000	98	Offsite Impervious, HSG B
0.000	98	Offsite Impervious, HSG D
0.063	64	Weighted Average
0.062	63	99.76% Pervious Area
0.000	98	0.24% Impervious Area

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

Summary for Subcatchment 216: Roof Lot 2

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 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
0.000	61	>75% Grass cover, Good, HSG B
0.000	98	Impervious, HSG B
0.028	98	Roofs, HSG B
0.028	98	Weighted Average
0.000	61	0.06% Pervious Area
0.028	98	99.94% Impervious Area

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

Summary for Subcatchment 218: Roof Lot 1

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 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
0.000	61	>75% Grass cover, Good, HSG B
0.000	98	Impervious, HSG B
0.028	98	Roofs, HSG B
0.028	98	Weighted Average
0.000	61	0.00% Pervious Area
0.028	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 220: Roof Lot 21

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 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
0.000	61	>75% Grass cover, Good, HSG B
0.028	98	Roofs, HSG B
0.028	98	Weighted Average
0.000	61	0.00% Pervious Area
0.028	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 222: Roof Lot 22

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 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
0.028	98	Roofs, HSG B
0.028	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 224: Roof Lot 23

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 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
0.028	98	Roofs, HSG B
0.028	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 226: Roof Lot 24

Runoff = 0.23 cfs @ 12.08 hrs, Volume= 0.019 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
0.028	98	Roofs, HSG B
0.028	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 228: Driveway Lot 24

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 4.78"

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
0.066	61	>75% Grass cover, Good, HSG B
0.017	98	Impervious, HSG B
0.000	98	Roofs, HSG B
0.083	69	Weighted Average
0.066	61	79.36% Pervious Area
0.017	98	20.64% Impervious Area

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

Summary for Subcatchment 230: Driveway Lot 23

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 4.78"

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
0.066	61	>75% Grass cover, Good, HSG B
0.017	98	Impervious, HSG B
0.083	69	Weighted Average
0.066	61	79.59% Pervious Area
0.017	98	20.41% Impervious Area

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

Summary for Subcatchment 232: Driveway Lot 22

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 5.02"

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
0.036	61	>75% Grass cover, Good, HSG B
0.014	98	Impervious, HSG B
0.050	71	Weighted Average
0.036	61	72.13% Pervious Area
0.014	98	27.87% Impervious Area

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

Summary for Subcatchment 234: Driveway Lot 21

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af, Depth= 5.02"

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
0.085	61	>75% Grass cover, Good, HSG B
0.034	98	Impervious, HSG B
0.000	98	Roofs, HSG B
0.119	71	Weighted Average
0.085	61	71.70% Pervious Area
0.034	98	28.30% Impervious Area

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

Summary for Subcatchment 236: Driveway Lot 2

Runoff = 0.09 cfs @ 12.08 hrs, Volume= 0.007 af, Depth= 7.66"

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
0.002	61	>75% Grass cover, Good, HSG B
0.009	98	Impervious, HSG B
0.011	93	Weighted Average
0.002	61	13.84% Pervious Area
0.009	98	86.16% Impervious Area

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

Summary for Subcatchment 238: Driveway Lot 1

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 0.007 af, Depth= 7.66"

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
0.001	61	>75% Grass cover, Good, HSG B
0.009	98	Impervious, HSG B
0.010	93	Weighted Average
0.001	61	14.14% Pervious Area
0.009	98	85.86% Impervious Area

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

Summary for Subcatchment 240: Driveway Lot 20

Runoff = 0.28 cfs @ 12.08 hrs, Volume= 0.022 af, Depth= 7.54"

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
0.006	61	>75% Grass cover, Good, HSG B
0.029	98	Impervious, HSG B
0.035	92	Weighted Average
0.006	61	17.47% Pervious Area
0.029	98	82.53% Impervious Area

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

Summary for Pond 104: Sediment Forebay A

Inflow Area = 2.474 ac, 51.65% Impervious, Inflow Depth = 6.11" for 100-Year event
Inflow = 17.34 cfs @ 12.09 hrs, Volume= 1.260 af
Outflow = 15.68 cfs @ 12.09 hrs, Volume= 1.239 af, Atten= 10%, Lag= 0.3 min
Primary = 15.68 cfs @ 12.09 hrs, Volume= 1.239 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 113.05' @ 12.44 hrs Surf.Area= 1,442 sf Storage= 3,146 cf

Plug-Flow detention time= 22.2 min calculated for 1.239 af (98% of inflow)
Center-of-Mass det. time= 11.8 min (811.3 - 799.5)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	4,687 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.00	81	0	0
109.00	180	131	131
110.00	337	259	389
111.00	738	538	927
112.00	1,068	903	1,830
113.00	1,423	1,246	3,075
114.00	1,800	1,612	4,687

Device	Routing	Invert	Outlet Devices
#1	Primary	111.00'	**5.0' long x 0.5' breadth Curb 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=13.42 cfs @ 12.09 hrs HW=112.48' TW=112.35' (Dynamic Tailwater)
1=Curb Weir (Weir Controls 13.42 cfs @ 1.82 fps)

Summary for Pond 106: Infiltration Basin A

Inflow Area = 2.838 ac, 45.02% Impervious, Inflow Depth = 5.94" for 100-Year event
Inflow = 18.01 cfs @ 12.09 hrs, Volume= 1.405 af
Outflow = 5.65 cfs @ 12.43 hrs, Volume= 1.405 af, Atten= 69%, Lag= 20.3 min
Discarded = 1.68 cfs @ 12.43 hrs, Volume= 0.988 af
Primary = 3.97 cfs @ 12.43 hrs, Volume= 0.417 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 113.05' @ 12.43 hrs Surf.Area= 8,796 sf Storage= 15,857 cf

Plug-Flow detention time= 33.0 min calculated for 1.405 af (100% of inflow)
Center-of-Mass det. time= 33.0 min (844.4 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	24,720 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	6,711	0	0
112.00	7,720	7,216	7,216
113.00	8,748	8,234	15,450
114.00	9,792	9,270	24,720

Device	Routing	Invert	Outlet Devices
#1	Discarded	111.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Device 5	111.50'	**6.00" Vert. Low Flow X 2.00** C= 0.600
#3	Device 5	112.00'	**4.00" Vert. Orifice #1 X 2.00** C= 0.600
#4	Device 5	112.50'	**6.00" Vert. Orifice #2 X 2.00** C= 0.600
#5	Primary	110.00'	**12.00" Round Pipe #24-25** L= 16.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 110.00' / 109.50' S= 0.0313 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#6	Primary	113.25'	**10.0' long x 9.0' breadth Emergency Overflow 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) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69

Discarded OutFlow Max=1.68 cfs @ 12.43 hrs HW=113.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.68 cfs)

Primary OutFlow Max=3.97 cfs @ 12.43 hrs HW=113.05' TW=0.00' (Dynamic Tailwater)
└**5=Pipe #24-25** (Passes 3.97 cfs of 7.54 cfs potential flow)
  └**2=Low Flow** (Orifice Controls 2.15 cfs @ 5.48 fps)
  └**3=Orifice #1** (Orifice Controls 0.79 cfs @ 4.52 fps)
  └**4=Orifice #2** (Orifice Controls 1.03 cfs @ 2.62 fps)
└**6=Emergency Overflow Weir** (Controls 0.00 cfs)

Summary for Pond 202: depression-1

Inflow Area = 0.809 ac, 5.20% Impervious, Inflow Depth = 3.95" for 100-Year event
Inflow = 2.98 cfs @ 12.18 hrs, Volume= 0.266 af
Outflow = 2.50 cfs @ 12.26 hrs, Volume= 0.266 af, Atten= 16%, Lag= 4.9 min
Discarded = 0.22 cfs @ 12.27 hrs, Volume= 0.054 af
Primary = 2.28 cfs @ 12.26 hrs, Volume= 0.212 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 112.85' @ 12.27 hrs Surf.Area= 1,128 sf Storage= 755 cf

Plug-Flow detention time= 4.1 min calculated for 0.266 af (100% of inflow)
Center-of-Mass det. time= 4.1 min (849.1 - 845.0)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	953 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	184	0	0
112.00	364	274	274
112.50	462	207	481
113.00	1,426	472	953

Device	Routing	Invert	Outlet Devices
#1	Primary	111.00'	**6.00" Round Culvert X 3.00** L= 35.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 111.00' / 110.00' S= 0.0286 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#2	Primary	112.80'	**176.2 deg x 12.0' long x 0.20' rise Sharp-Crested Vee/Trap Weir** Cv= 2.46 (C= 3.08)
#3	Discarded	111.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.22 cfs @ 12.27 hrs HW=112.85' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=2.25 cfs @ 12.26 hrs HW=112.84' TW=112.20' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.88 cfs @ 3.19 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.37 cfs @ 0.63 fps)

Summary for Pond 204: depression-2

Inflow Area = 1.003 ac, 5.57% Impervious, Inflow Depth = 3.35" for 100-Year event
Inflow = 2.76 cfs @ 12.26 hrs, Volume= 0.280 af
Outflow = 2.01 cfs @ 12.40 hrs, Volume= 0.280 af, Atten= 27%, Lag= 8.6 min
Discarded = 0.32 cfs @ 12.40 hrs, Volume= 0.127 af
Primary = 1.68 cfs @ 12.40 hrs, Volume= 0.153 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= 112.34' @ 12.40 hrs Surf.Area= 1,680 sf Storage= 2,004 cf

Plug-Flow detention time= 26.1 min calculated for 0.280 af (100% of inflow)
Center-of-Mass det. time= 26.1 min (847.0 - 821.0)

Volume	Invert	Avail.Storage	Storage Description
#1	110.00'	3,418 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
110.00	310	0	0
111.00	749	530	530
112.00	1,223	986	1,516
113.00	2,581	1,902	3,418

Device	Routing	Invert	Outlet Devices
#1	Primary	111.00'	**8.00" Round Pipe #14-15** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 111.00' / 110.50' S= 0.0294 '/' Cc= 0.900 n= 0.012, Flow Area= 0.35 sf
#2	Secondary	112.50'	**30.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Discarded	110.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.32 cfs @ 12.40 hrs HW=112.34' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=1.68 cfs @ 12.40 hrs HW=112.34' TW=110.89' (Dynamic Tailwater)
└**1=Pipe #14-15** (Inlet Controls 1.68 cfs @ 4.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=110.00' TW=109.30' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 207: Sediment Forebay B

Inflow Area = 1.274 ac, 15.82% Impervious, Inflow Depth = 2.75" for 100-Year event
Inflow = 2.98 cfs @ 12.10 hrs, Volume= 0.292 af
Outflow = 2.40 cfs @ 12.07 hrs, Volume= 0.286 af, Atten= 19%, Lag= 0.0 min
Primary = 2.40 cfs @ 12.07 hrs, Volume= 0.286 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 110.98' @ 12.59 hrs Surf.Area= 430 sf Storage= 837 cf

Plug-Flow detention time= 36.9 min calculated for 0.286 af (98% of inflow)
Center-of-Mass det. time= 24.8 min (807.6 - 782.8)

Volume	Invert	Avail.Storage	Storage Description
#1	106.50'	845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
106.50	23	0	0
107.00	44	17	17
108.00	104	74	91
109.00	188	146	237
110.00	298	243	480
111.00	433	366	845

Device	Routing	Invert	Outlet Devices
#1	Primary	109.00'	**5.0' long x 0.5' breadth Curb 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 @ 12.07 hrs HW=109.49' TW=109.54' (Dynamic Tailwater)
↑—**1=Curb Weir** (Controls 0.00 cfs)

Summary for Pond 210: CB-Main Road

Inflow Area = 0.195 ac, 96.82% Impervious, Inflow Depth = 8.14" for 100-Year event
Inflow = 1.62 cfs @ 12.08 hrs, Volume= 0.132 af
Outflow = 1.62 cfs @ 12.08 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.0 min
Primary = 1.62 cfs @ 12.08 hrs, Volume= 0.132 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= 110.90' @ 12.86 hrs

Device	Routing	Invert	Outlet Devices
#1	Secondary	111.41'	**24.00" x 24.00" Horiz. Catch Basin** C= 0.600 Limited to weir flow at low heads
#2	Primary	109.30'	**15.00" Round Culvert** L= 7.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 109.30' / 109.20' S= 0.0143 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=1.56 cfs @ 12.08 hrs HW=110.34' TW=110.25' (Dynamic Tailwater)
↑—**2=Culvert** (Outlet Controls 1.56 cfs @ 1.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.30' TW=0.00' (Dynamic Tailwater)
↑—**1=Catch Basin** (Controls 0.00 cfs)

Summary for Pond 212: depression-3

Inflow Area = 0.257 ac, 73.31% Impervious, Inflow Depth = 7.18" for 100-Year event
Inflow = 1.93 cfs @ 12.08 hrs, Volume= 0.154 af
Outflow = 1.80 cfs @ 12.12 hrs, Volume= 0.128 af, Atten= 7%, Lag= 1.9 min
Primary = 1.80 cfs @ 12.12 hrs, Volume= 0.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 110.90' @ 12.85 hrs Surf.Area= 2,421 sf Storage= 2,599 cf

Plug-Flow detention time= 187.8 min calculated for 0.128 af (83% of inflow)
Center-of-Mass det. time= 116.8 min (875.5 - 758.7)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	2,847 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.00	305	0	0
109.00	556	431	431
110.00	841	699	1,129
111.00	2,594	1,718	2,847

Device	Routing	Invert	Outlet Devices
#1	Primary	110.00'	**5.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.80 cfs @ 12.12 hrs HW=110.26' TW=109.91' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.80 cfs @ 1.37 fps)

Summary for Pond 213: Sand Filter B

Inflow Area = 2.002 ac, 19.48% Impervious, Inflow Depth = 3.44" for 100-Year event
Inflow = 6.04 cfs @ 12.11 hrs, Volume= 0.573 af
Outflow = 2.39 cfs @ 12.58 hrs, Volume= 0.573 af, Atten= 60%, Lag= 28.0 min
Discarded = 0.24 cfs @ 10.99 hrs, Volume= 0.347 af
Primary = 2.15 cfs @ 12.58 hrs, Volume= 0.226 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 110.98' @ 12.58 hrs Surf.Area= 1,260 sf Storage= 7,395 cf

Plug-Flow detention time= 168.0 min calculated for 0.573 af (100% of inflow)
Center-of-Mass det. time= 168.0 min (999.7 - 831.7)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	6,624 cf	**Pond Storage (Prismatic)**Listed below (Recalc) -Impervious
#2	106.00'	832 cf	**Sand Layer (Prismatic)**Listed below (Recalc) 2,520 cf Overall x 33.0% Voids
		7,455 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.00	1,260	0	0
109.00	1,813	1,537	1,537
110.00	2,436	2,125	3,661
110.50	3,138	1,394	5,055
111.00	3,138	1,569	6,624

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
106.00	1,260	0	0
108.00	1,260	2,520	2,520

Device	Routing	Invert	Outlet Devices
#1	Discarded	106.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	108.50'	**12.00" Round Culvert** L= 65.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 108.50' / 108.00' S= 0.0077 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	110.50'	**18.00" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.24 cfs @ 10.99 hrs HW=106.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=2.15 cfs @ 12.58 hrs HW=110.98' TW=110.60' (Dynamic Tailwater)
└**2=Culvert** (Outlet Controls 2.15 cfs @ 2.74 fps)
└**3=Orifice/Grate** (Passes 2.15 cfs of 4.94 cfs potential flow)

Summary for Pond 214: Emergency Outlet

Inflow Area = 2.002 ac, 19.48% Impervious, Inflow Depth = 1.35" for 100-Year event
Inflow = 2.15 cfs @ 12.58 hrs, Volume= 0.226 af
Outflow = 2.15 cfs @ 12.58 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min
Primary = 2.15 cfs @ 12.58 hrs, Volume= 0.226 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 110.60' @ 12.58 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	110.50'	**20.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.15 cfs @ 12.58 hrs HW=110.60' TW=0.00' (Dynamic Tailwater)
└**1=Sharp-Crested Rectangular Weir** (Weir Controls 2.15 cfs @ 1.05 fps)

Summary for Pond 217: Drywell C1

Inflow Area = 0.028 ac, 99.94% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 112.54' @ 12.55 hrs Surf.Area= 200 sf Storage= 206 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.6 min (768.0 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	198 cf	**Stone Storage (Prismatic)**Listed below (Recalc) 600 cf Overall x 33.0% Voids
#2	112.50'	200 cf	**Surface Storage (Prismatic)**Listed below (Recalc) -Impervious
		398 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	200	0	0
112.50	200	600	600

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.50	200	0	0
113.50	200	200	200

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.73 hrs HW=109.55' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond 219: Drywell C2

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 111.54' @ 12.54 hrs Surf.Area= 200 sf Storage= 205 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.4 min (767.8 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	108.50'	198 cf	**Stone Storage (Prismatic)**Listed below (Recalc) 600 cf Overall x 33.0% Voids
#2	111.50'	200 cf	**Surface Storage (Prismatic)**Listed below (Recalc) -Impervious
		398 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.50	200	0	0
111.50	200	600	600

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.50	200	0	0
112.50	200	200	200

Device	Routing	Invert	Outlet Devices
#1	Discarded	108.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.73 hrs HW=108.55' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond 221: Drywell C3

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.04 cfs @ 12.05 hrs, Volume= 0.019 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.04 cfs @ 12.05 hrs, Volume= 0.019 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 219.54' @ 12.54 hrs Surf.Area= 200 sf Storage= 205 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.4 min (767.8 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	112.50'	198 cf	**Stone Storage (Prismatic)**Listed below (Recalc) 600 cf Overall x 33.0% Voids
#2	219.50'	200 cf	**Surface Storage (Prismatic)**Listed below (Recalc) -Impervious
		398 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.50	200	0	0
115.50	200	600	600

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.50	200	0	0
220.50	200	200	200

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.05 hrs HW=113.65' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond 223: Drywell C4

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 113.04' @ 12.54 hrs Surf.Area= 200 sf Storage= 205 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.4 min (767.8 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	110.00'	198 cf	**Stone Storage (Prismatic)**Listed below (Recalc) 600 cf Overall x 33.0% Voids
#2	113.00'	200 cf	**Surface Storage (Prismatic)**Listed below (Recalc) -Impervious
		398 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
110.00	200	0	0
113.00	200	600	600

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
113.00	200	0	0
114.00	200	200	200

Device	Routing	Invert	Outlet Devices
#1	Discarded	110.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.73 hrs HW=110.05' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond 225: Drywell C5

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 112.04' @ 12.54 hrs Surf.Area= 200 sf Storage= 205 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.4 min (767.8 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	109.00'	198 cf	**Stone Storage (Prismatic)**Listed below (Recalc) 600 cf Overall x 33.0% Voids
#2	112.00'	200 cf	**Surface Storage (Prismatic)**Listed below (Recalc) -Impervious
		398 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.00	200	0	0
112.00	200	600	600

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.00	200	0	0
113.00	200	200	200

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.73 hrs HW=109.05' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond 227: Drywell C6

Inflow Area = 0.028 ac,100.00% Impervious, Inflow Depth = 8.26" for 100-Year event
Inflow = 0.23 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.73 hrs, Volume= 0.019 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 114.54' @ 12.54 hrs Surf.Area= 200 sf Storage= 205 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.4 min (767.8 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	111.50'	198 cf	**Stone Storage (Prismatic)**Listed below (Recalc) 600 cf Overall x 33.0% Voids
#2	114.50'	200 cf	**Surface Storage (Prismatic)**Listed below (Recalc) -Impervious
		398 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.50	200	0	0
114.50	200	600	600

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
114.50	200	0	0
115.50	200	200	200

Device	Routing	Invert	Outlet Devices
#1	Discarded	111.50'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.73 hrs HW=111.55' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Summary for Pond 229: Stone Trench D1

Inflow Area = 0.083 ac, 20.64% Impervious, Inflow Depth = 4.78" for 100-Year event
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.033 af
Outflow = 0.16 cfs @ 11.96 hrs, Volume= 0.033 af, Atten= 65%, Lag= 0.0 min
Discarded = 0.16 cfs @ 11.96 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 112.72' @ 12.38 hrs Surf.Area= 857 sf Storage= 204 cf

Plug-Flow detention time= 5.7 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 5.7 min (829.9 - 824.2)

Volume	Invert	Avail.Storage	Storage Description
#1	112.00'	212 cf	**9" Stone Layer (Prismatic)**Listed below (Recalc) 643 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.00	857	0	0
112.75	857	643	643

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.16 cfs @ 11.96 hrs HW=112.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.16 cfs)

Summary for Pond 231: Stone Trench D2

Inflow Area = 0.083 ac, 20.41% Impervious, Inflow Depth = 4.78" for 100-Year event
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.033 af
Outflow = 0.16 cfs @ 11.95 hrs, Volume= 0.033 af, Atten= 65%, Lag= 0.0 min
Discarded = 0.16 cfs @ 11.95 hrs, Volume= 0.033 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 112.73' @ 12.39 hrs Surf.Area= 850 sf Storage= 206 cf

Plug-Flow detention time= 5.8 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 5.8 min (830.0 - 824.2)

Volume	Invert	Avail.Storage	Storage Description
#1	112.00'	210 cf	**stone layer (Prismatic)**Listed below (Recalc) 638 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
112.00	850	0	0
112.75	850	638	638

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.16 cfs @ 11.95 hrs HW=112.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.16 cfs)

Summary for Pond 233: Stone Trench D3

Inflow Area = 0.050 ac, 27.87% Impervious, Inflow Depth = 5.02" for 100-Year event
Inflow = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af
Outflow = 0.10 cfs @ 11.95 hrs, Volume= 0.021 af, Atten= 65%, Lag= 0.0 min
Discarded = 0.10 cfs @ 11.95 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 114.71' @ 12.38 hrs Surf.Area= 543 sf Storage= 128 cf

Plug-Flow detention time= 5.6 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 5.6 min (825.7 - 820.1)

Volume	Invert	Avail.Storage	Storage Description
#1	114.00'	134 cf	**stone layer (Prismatic)**Listed below (Recalc) 407 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
114.00	543	0	0
114.75	543	407	407

Device	Routing	Invert	Outlet Devices
#1	Discarded	114.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.10 cfs @ 11.95 hrs HW=114.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.10 cfs)

Summary for Pond 235: Stone Trench D4

Inflow Area = 0.119 ac, 28.30% Impervious, Inflow Depth = 5.02" for 100-Year event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 0.050 af
Outflow = 0.25 cfs @ 11.95 hrs, Volume= 0.050 af, Atten= 65%, Lag= 0.0 min
Discarded = 0.25 cfs @ 11.95 hrs, Volume= 0.050 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 117.01' @ 12.38 hrs Surf.Area= 1,287 sf Storage= 302 cf

Plug-Flow detention time= 5.6 min calculated for 0.050 af (100% of inflow)
Center-of-Mass det. time= 5.6 min (825.7 - 820.1)

Volume	Invert	Avail.Storage	Storage Description
#1	116.30'	319 cf	**stone layer (Prismatic)**Listed below (Recalc) 965 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.30	1,287	0	0
117.05	1,287	965	965

Device	Routing	Invert	Outlet Devices
#1	Discarded	116.30'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.25 cfs @ 11.95 hrs HW=116.32' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Summary for Pond 237: Stone Trench D5

Inflow Area = 0.011 ac, 86.16% Impervious, Inflow Depth = 7.66" for 100-Year event
Inflow = 0.09 cfs @ 12.08 hrs, Volume= 0.007 af
Outflow = 0.03 cfs @ 11.90 hrs, Volume= 0.007 af, Atten= 65%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.90 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 118.72' @ 12.35 hrs Surf.Area= 164 sf Storage= 39 cf

Plug-Flow detention time= 5.1 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (768.9 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1	118.00'	41 cf	**stone layer (Prismatic)**Listed below (Recalc) 123 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
118.00	164	0	0
118.75	164	123	123

Device	Routing	Invert	Outlet Devices
#1	Discarded	118.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.90 hrs HW=118.02' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond 239: Stone Trench D6

Inflow Area = 0.010 ac, 85.86% Impervious, Inflow Depth = 7.66" for 100-Year event
Inflow = 0.08 cfs @ 12.08 hrs, Volume= 0.007 af
Outflow = 0.03 cfs @ 11.91 hrs, Volume= 0.007 af, Atten= 64%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.91 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 116.89' @ 12.34 hrs Surf.Area= 157 sf Storage= 36 cf

Plug-Flow detention time= 4.8 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 4.8 min (768.6 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1	116.20'	39 cf	**stone layer (Prismatic)**Listed below (Recalc) 118 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.20	157	0	0
116.95	157	118	118

Device	Routing	Invert	Outlet Devices
#1	Discarded	116.20'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.91 hrs HW=116.22' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Summary for Pond 241: Stone Trench D7

Inflow Area = 0.035 ac, 82.53% Impervious, Inflow Depth = 7.54" for 100-Year event
Inflow = 0.28 cfs @ 12.08 hrs, Volume= 0.022 af
Outflow = 0.10 cfs @ 11.90 hrs, Volume= 0.022 af, Atten= 65%, Lag= 0.0 min
Discarded = 0.10 cfs @ 11.90 hrs, Volume= 0.022 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 118.73' @ 12.35 hrs Surf.Area= 514 sf Storage= 124 cf

Plug-Flow detention time= 5.2 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 5.2 min (772.7 - 767.5)

Volume	Invert	Avail.Storage	Storage Description
#1	118.00'	127 cf	**stone layer (Prismatic)**Listed below (Recalc) 386 cf Overall x 33.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
118.00	514	0	0
118.75	514	386	386

Device	Routing	Invert	Outlet Devices
#1	Discarded	118.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.10 cfs @ 11.90 hrs HW=118.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Summary for Link 107: DP-1-Wetlands

Inflow Area = 4.682 ac, 27.70% Impervious, Inflow Depth = 2.44" for 100-Year event
Inflow = 8.88 cfs @ 12.28 hrs, Volume= 0.952 af
Primary = 8.88 cfs @ 12.28 hrs, Volume= 0.952 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Link 215: DP-2-Asa Pond

Inflow Area = 2.002 ac, 19.48% Impervious, Inflow Depth = 1.35" for 100-Year event
Inflow = 2.15 cfs @ 12.58 hrs, Volume= 0.226 af
Primary = 2.15 cfs @ 12.58 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

A3.5.4.7 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

Pond 106: Infiltration Basin A Peak Elev=113.76' Storage=22,415 cf Inflow=16.16 cfs 1.349 af
Outflow=9.64 cfs 0.943 af

Summary for Pond 106: Infiltration Basin A

Inflow Area = 2.838 ac, 45.02% Impervious, Inflow Depth = 5.70" for 100-Year event
Inflow = 16.16 cfs @ 12.08 hrs, Volume= 1.349 af
Outflow = 9.64 cfs @ 12.23 hrs, Volume= 0.943 af, Atten= 40%, Lag= 8.9 min
Primary = 9.64 cfs @ 12.23 hrs, Volume= 0.943 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 113.76' @ 12.23 hrs Surf.Area= 9,543 sf Storage= 22,415 cf

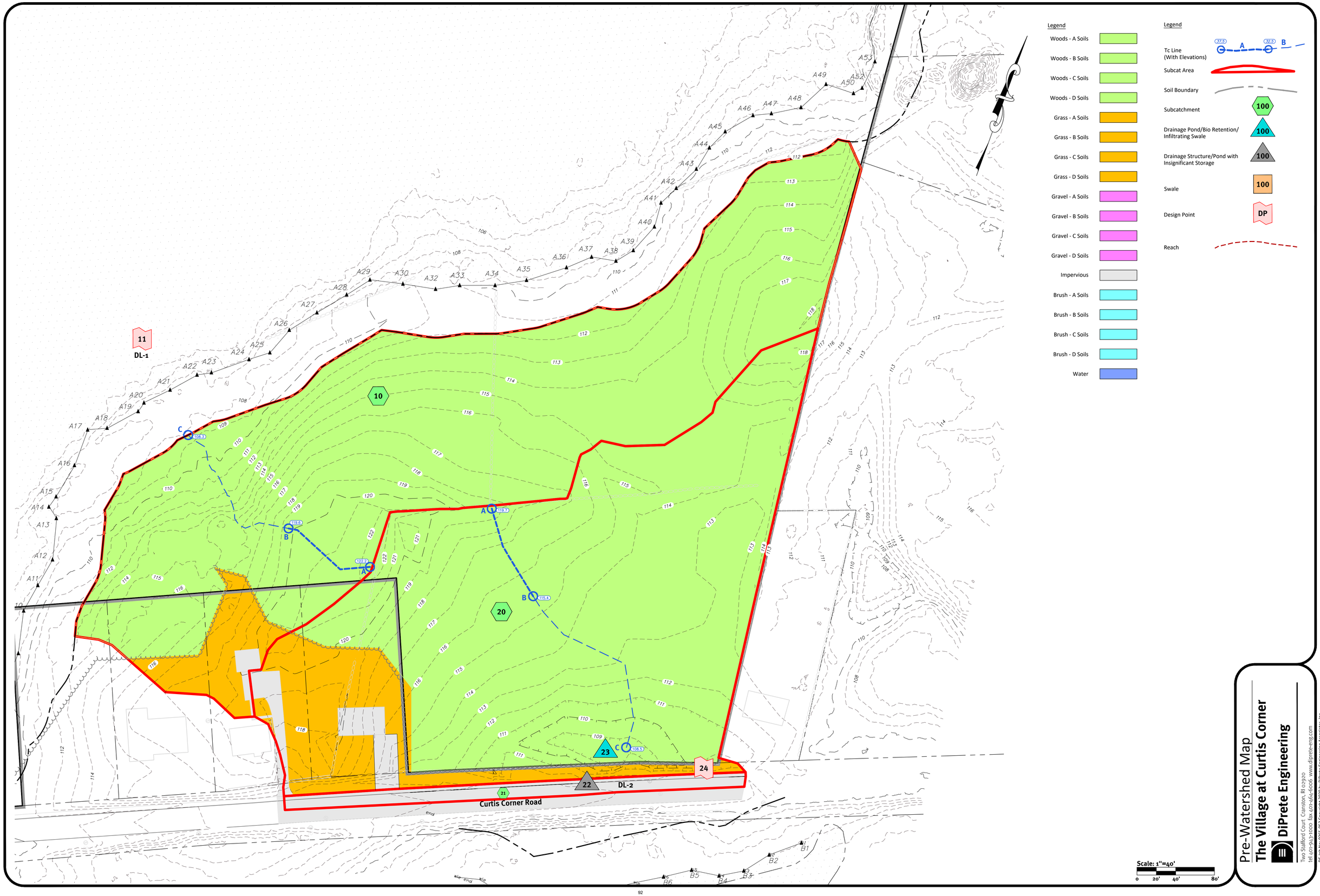
Plug-Flow detention time= 170.4 min calculated for 0.943 af (70% of inflow)
Center-of-Mass det. time= 74.8 min (888.4 - 813.6)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	24,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	6,711	0	0
112.00	7,720	7,216	7,216
113.00	8,748	8,234	15,450
114.00	9,792	9,270	24,720

Device	Routing	Invert	Outlet Devices
#1	Primary	113.25'	**10.0' long x 9.0' breadth Emergency Overflow 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) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69

Primary OutFlow Max=9.64 cfs @ 12.23 hrs HW=113.76' TW=0.00' (Dynamic Tailwater)
↑—**1=Emergency Overflow Weir** (Weir Controls 9.64 cfs @ 1.88 fps)



Pre-Watershed Map

The Village at Curtis Corner

DiPrete Engineering

Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com

Legend

- Woods - A Soils
- Woods - B Soils
- Woods - C Soils
- Woods - D Soils
- Grass - A Soils
- Grass - B Soils
- Grass - C Soils
- Grass - D Soils
- Gravel - A Soils
- Gravel - B Soils
- Gravel - C Soils
- Gravel - D Soils
- Impervious
- Brush - A Soils
- Brush - B Soils
- Brush - C Soils
- Brush - D Soils
- Water

Legend

- Tc Line (With Elevations)
- Subcat Area
- Soil Boundary
- Subcatchment
- Drainage Pond/Bio Retention/ Infiltrating Swale
- Drainage Structure/Pond with Insignificant Storage
- Swale
- Design Point
- Reach

Curtis Corner Road

Scale: 1"=40'

0 20' 40' 80'

Post-Watershed Map

The Village at Curtis Corner

DiPrete Engineering

Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com

DE Job No: 0265-053 Copyright 2020 by DiPrete Engineering Associates, Inc.

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DiPrete Engineering

Stormwater System Operation & Maintenance Plan

The Village at Curtis Corner

Located in South Kingstown, RI

Applicant: 5A Builders, LLC

07-30-2020

Table of Contents

Operation & Maintenance Plan Overview

An essential component of a successful Stormwater System (SS) is the ongoing Operation and Maintenance (O&M) of the various components of the stormwater drainage, control, and conveyance systems. These components include swales, pipes, catch basins, and treatment/ control devices are commonly referred to as Best Management Practices (BMPs). Failure to provide effective maintenance can reduce the hydraulic capacity and the pollutant removal efficiency of stormwater practices.

Many people expect that stormwater facilities will continue to function correctly forever. However, it is inevitable that deterioration of the stormwater system will occur once it becomes operational. The question is not whether stormwater system maintenance is necessary but how often.

This plan has been developed to proactively address operations and maintenance to minimize potential problems and maximize potential stormwater runoff treatment and management. Ongoing inspections and maintenance will extend the service life of the Best Management Practices.

This plan addresses:

1. Stormwater management system(s) owners;
2. The party or parties responsible for operation and maintenance, including how future property owners will be notified of the presence of the stormwater management system and the requirement for proper operation and maintenance;
3. A description and delineation of public safety features;
4. The routine (scheduled) and non-routine (corrective) maintenance tasks for each BMP to be undertaken after construction is complete and a schedule for implementing those tasks;
5. A plan that is drawn to scale and shows the location of all stormwater BMPs in each treatment train along with the discharge point;
6. An estimated operation and maintenance budget; and
7. Funding source for operation and maintenance activities and equipment.

A major contributor to unmaintained stormwater facilities is a lack of clear ownership and responsibility definition. In order for an inspection and maintenance program to be effective, the roles for each responsibility must be clearly defined prior to construction of a system. This can be accomplished with a maintenance agreement between the site owners and the responsible authority.

This report is suitable for recording as an attachment to a maintenance agreement between the site owner and the responsible authority. A copy of a sample agreement prepared by RIDEM is attached to this report as Appendix B.

Stormwater System Owner / Party Responsible for O&M

Stormwater BMPs are maintained during construction by the site contractor as identified in the Soil Erosion and Sediment Control Plan (SESC) for the site. A copy of the SESC is required to be kept on site during construction. The SESC requires maintenance and inspection of the BMPs during the construction phase of project and requires a log be kept of these activities. Once construction is complete and the contractor's warranty period is elapsed, the contractor must obtain the signature of the stormwater system's owner releasing the contractor from his maintenance and inspection responsibilities. A copy of this release of contractor's responsibility must be attached to this document.

The Owners Association will be the owner of the stormwater system located outside of public right of ways and all stormwater BMP. Upon completion of construction, and creation of the Owners Association, their legal name along with mailing and emergency contact information must be added below.

Owner; _____

Mailing Address; _____

_____

Emergency Contact Name; _____

Phone; _____

Transfer of Ownership
In the event that the owner of any property included in the Owner's Association changes, the current owner (grantor) must provide a copy of this document to the new owner (grantee). In addition, the Owners Association must provide all new members with a copy of this document.

The Stormwater System Owner is the Party Responsible for the ongoing O&M of the system.
The two key components to adequately maintain the stormwater infrastructure are:

1. Performance of periodic and scheduled inspections
2. Performance of scheduled maintenance

The actual operation and maintenance of the system may be performed by a third party designated by the owner. If the owner contracts with a third party for O&M the name, address, and emergency contact information must be added below, and updated if the third party designee changes.

Name: _____
Mailing Address: _____

_____

Emergency Contact Name: _____
Phone: _____

Public Safety

Public safety was a critical factor in designing the stormwater system. Public safety features included in this design are:

- Accessibility to Stormwater BMPs
- Winter & Non-Winter Maintenance

Accessibility to Stormwater BMPs

As shown on the site plans, all stormwater BMP's are close to the road and accessible from the roadway but there is no dedicated path proposed.

Winter Maintenance

The following tasks must be performed to protect public safety during the winter season:

- Roadways and parking lots will be salted/ sanded/ plowed in accordance with applicable Town of South Kingstown and RIDOT guidelines;
- Inspect the open and closed drainage networks adjacent to the snow stockpiles to ensure they are free of clogging and debris;
- Inspect roadways and drainage structures post-storm event to alleviate any signs of icing or damming.

Non-Winter Maintenance

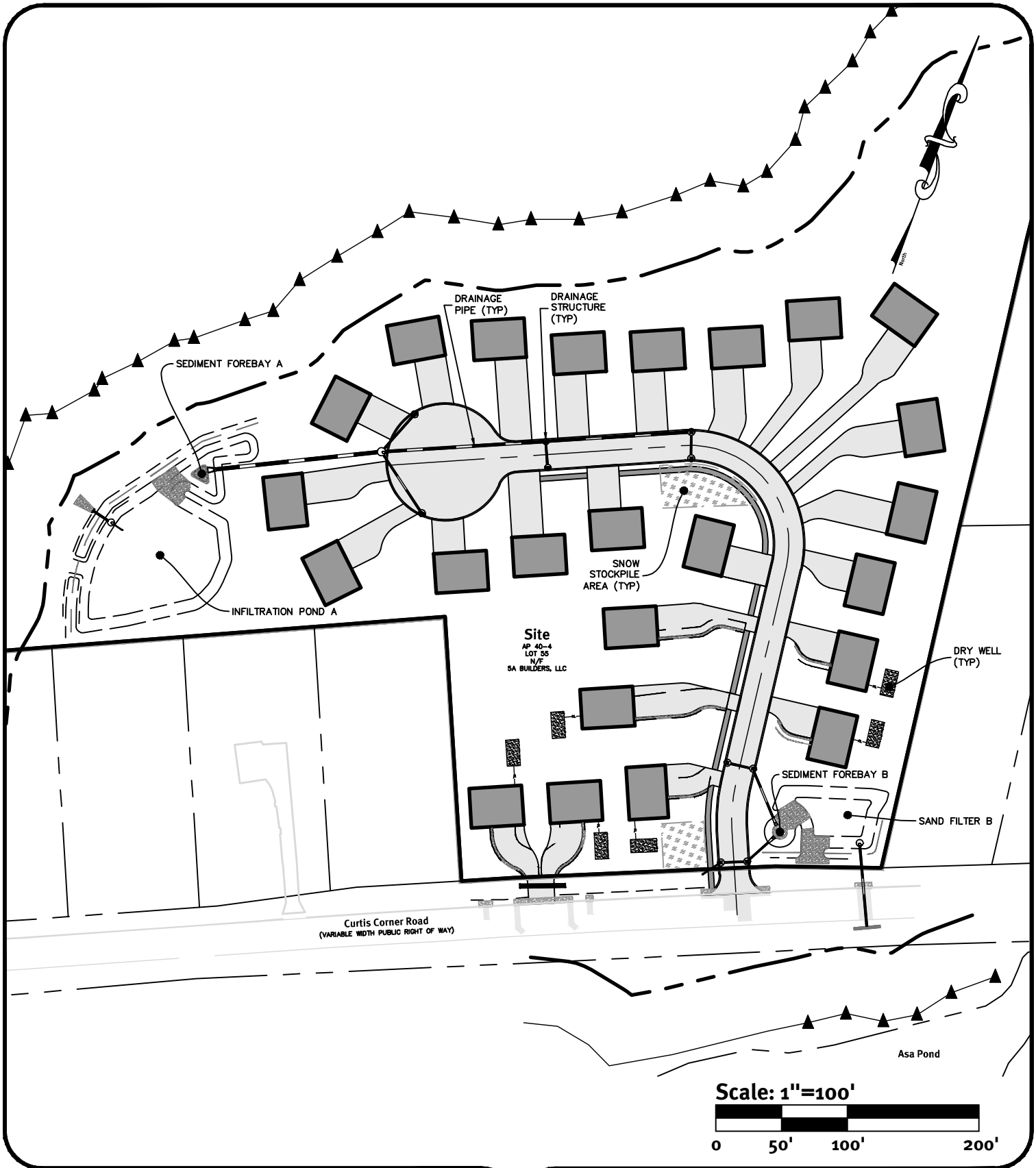
The following tasks must be performed to protect public safety during the non-winter seasons:

- Roadways and parking lots will be swept in accordance with applicable Town of South Kingstown and RIDOT guidelines;
- The stormwater management systems must be inspected and maintained in accordance with the enclosed Operations & Maintenance Plan.

Particular care must be taken in the operation and maintenance of these features.

Stormwater System Plan

A plan identifying each component of the stormwater system is included on the following page.



SHEET 1 OF 1

O&M Plan

The Village at Curtis Corner

South Kingstown, Rhode Island

Date:
7-30-2020

DiPrete Engineering

Two Stafford Court Cranston, RI 02920
tel 401-943-1000 fax 401-464-6006 www.diprete-eng.com

Boston • Providence • Newport

Inspections & Maintenance

Inspections must be performed on a regular basis and scheduled based on the BMP type and configuration. It is not mandatory that all inspectors be trained engineers, but they must have some knowledge or experience with stormwater systems and in general, trained stormwater engineers should direct the inspectors. Follow-up inspections by registered professional engineers must be performed where a routine inspection has revealed a question of structural or hydraulic integrity affecting public safety.

Not all inspections can be conducted by direct human observation. For subsurface systems, video equipment may be required. There may be cases where other specialized equipment is necessary. The inspection program must be tailored to address the operational characteristics of the system.

The inspection process must document observations made in the field and must cover structural conditions, hydraulic operational conditions, evidence of vandalism, condition of vegetation, occurrence of obstructions, unsafe conditions, and build-up of trash, sediments and pollutants.

Maintenance of the stormwater management system is essential and can be divided into two types, scheduled and corrective.

Scheduled maintenance tasks are those that are typically accomplished on a regular basis and can generally be scheduled without referencing inspection reports. These items consist of such things as vegetation maintenance (such as mowing) and trash and debris removal. These tasks are required at well-defined time intervals and are a requirement for all stormwater structural facilities.

Corrective maintenance tasks consist of items such as sediment removal, stream bank stabilization, and outlet structure repairs that are done on an as-needed basis. These tasks are typically scheduled based on inspection results or in response to complaints.

Since specialized equipment may be required, some maintenance tasks can be effectively handled on a contract basis with an outside entity specializing in that field. In addition, some maintenance may also require a formal design and bid process to accomplish the work.

Appendix A provides an "Inspection Schedule & Maintenance Checklist" for the stormwater system components on this site. Completed checklists must be maintained as an ongoing record of inspections for each component of the stormwater system.

In addition to the maintenance of the stormwater system, maintenance of other site improvements can significantly enhance the ability for the BMPs to function as designed. Several of these have been listed below, along with the recommended maintenance.

Lawn, Garden and Landscape Management

- Lawns should be cut no shorter than 1-1/2" in the spring and fall to stimulate root growth, and no shorter than 2 to 3 inches throughout the summer.
- Infiltration ponds should be mowed at least twice per year.
- Fertilize no more than twice per year, once in May-June and once in September-October.
- Avoid spreading fertilizer on impervious surfaces.
- Weeds should be dug or pulled out. Large areas of weeds can be removed by covering with large plastic sheet(s) for a few days.
- Chemical pesticides should be used as a last resort. A healthy lawn is naturally disease resistant.
    - Visible insects can be removed by hand, by spraying with water, or even vacuum cleaning.
    - Store bought traps, specific for a species, can be used.
    - Slugs and other soft bodied insects can be eliminated using diatomaceous earth.
    - Plants infected with bacteria and fungi should be removed and disposed of.
    - Beneficial organisms should be maintained on the property and should be encouraged/ attracted to the property. Homeowners and property facility maintenance personal should become familiar with beneficial organisms.
- Irrigation should be minimal if required at all. Most lawns do not require watering and will become dormant during dry periods.
    - Established lawns require no more than one inch of water per week.
    - Areas should be watered before 9am to avoid evaporation.

Road Area Management

Street Sweeping

- All street areas on site must be swept a minimum of 2 times per year.

Deicing:

- Salt storage areas must be completely covered and located on an impervious surface.
- Runoff must be contained in appropriate areas.
- See The Rhode Island Stormwater Design and Installation Standards Manual Appendix G for approved deicing agents and ways to reduce deicer impacts. The manual Appendices can be found online at: http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/pdfs/swdsnapd.pdf

Sealants:

- Only asphalt based sealants are permitted, no coal-tar based asphalt sealants can be used on site.

Snow Removal:

- Snow must not be dumped in any water body including rivers, reservoirs, ponds, lakes, wetlands, bays, or the ocean.
- Avoid disposing of snow on top of storm drain catch basins or stormwater drainage swales or ditches.
- Snow must be stored in upland areas, not in or adjacent to water bodies or wetlands. Snow must be stored in a location that will allow snow melt and enter the onsite drainage system so it can be treated by onsite BMPs.

***Reference**; Additional information relating to operation and maintenance of specific BMPs can be found in the Rhode Island Stormwater Design and Installation Standards Manual.* (www.dem.ri.gov/pubs/regs/regs/water/swmanual.pdf)

Estimated Inspections & Maintenance Budget

It is important to be able to budget for the O&M costs associated with the stormwater system. To assist the owner in budgeting, below is an estimate of the costs that may be incurred in maintaining the system. The costs have been estimated on a yearly basis.

Sand Filter:
For a 20 year maintenance period, sand filter structure cost can be calculated using this equation: $C = 10{,}556\ A^{0.534}$ Where A is tributary area in acres. The site has 2.002 acres flowing to the sand filter area and the total 20 year cost would be $15,292.60. This cost equals $764.63 per year.

Infiltration Structure:
For a 25 year finance period, Infiltration Structures cost approximately $1,277.77 per acre of tributary area per year. The site contains approximately 2.838 acres of area flowing to infiltration structures. This equates to an approximate cost of $145.05 per year to maintain the infiltration structures.

Based on the costs outlined above, the stormwater system will cost approximately $909.68 per year to maintain. This is only an estimate and costs may vary.

These costs are the responsibility of the stormwater system owner. Funding for the costs will be provided by the Owner's Association.

***Reference**; Maintenance costs are based on information provided by Horsley Witten during the January 19, 2011 Stormwater Manual Training.*
(http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/slides/sess210.ppt)

Appendix A – Inspection Schedule & Maintenance Checklists

Drainage Structures
(Catch Basins, Manholes, etc.)
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted, inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
Semi-annually inspect drainage structures for damage		
Use a vacuum truck or other means to clean out any sediment or debris present in any drainage structure or whenever sediments reach ½ of the sump depth, which ever comes first.		
Semi-annually inspect drainage structures for debris and remove as necessary		

Drainage Structures
(Catch Basins, Manholes, etc.)
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

COMMENTS:

ACTIONS TO BE TAKEN:

Drywell
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
1. Debris Cleanout (Quarterly)		
Roof gutters clear of debris		
Overflow outlets clear of debris		
2. Sedimentation (Quarterly)		
No evidence of sedimentation in drywell		
Drywell dewaters between storms		
3. Overflow Outlet (Quarterly)		
Inlet and outlet devices are free of debris		
Good condition, no need for repair		
No evidence of erosion		

Drywell
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

COMMENTS:

ACTIONS TO BE TAKEN:

Sediment Forebay
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
1. Debris Cleanout (Quarterly)		
The sediment forebay and sediment trap isolation chamber clear of debris or		
Inflow pipes / inlet area clear of debris		
Outflow pipes / outlet area clear of debris		
Overflow Weir / outlet area clear of debris		
2. Sedimentation (Quarterly)		
Obvious trapping of sediment		
Greater than 50% of storage volume remaining. If less than 50% of storage volume remaining, sediments to be removed and disposed of. (see notes at end of Forebay		

Sediment Forebay
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

3. Vegetation (Quarterly)		
Vegetation within sediment forebay to be limited to 18" in height.		
4. Embankments (Quarterly)		
Evidence of erosion		
Seeps/leaks on downstream face		
Slope protection or riprap failure		
Slopes stabilized with vegetation, slope protection, riprap, etc		

COMMENTS:

Sediment Forebay
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

ACTIONS TO BE TAKEN:

Sand Filter
Operation, Maintenance, and Management
Inspection Checklist

Project:	Date:
Location:	Time:
Site Status:	Inspector:

Notes:

- **Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
1. Debris Cleanout (Annual)		
Contributing Areas Clean of Debris		
Filtration facility clean of debris		
Inlet and outlets clear of debris		
Materials deposited on the surface of the sand filter (e.g. trash and litter) shall be removed manually.		
2. Oil and Grease (Annual, After Major Storms)		
No evidence of filter surface clogging		
Activities in drainage area minimize oil and grease entry		
3. Vegetation (Semi-Annually)		
Contributing drainage area stabilized		

Sand Filter
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

No evidence of erosion. Minor soil erosion gullies should be repaired when they occur		
Area mowed a minimum of three times per growing season to maintain maximum grass heights less than 12", and clippings removed		
4. Water Retention Where Required (Annual)		
Water holding chambers at normal pool		
No evidence of leakage		
5. Sediment Deposition (Annual)		
Filter chamber free of sediments		
Sedimentation chamber not more than half full of sediments. Sediment shall be cleaned out of the sediment forebay when it accumulates to a depth of more than ½ the design depth.		
Silt/sediment shall be removed from the filter bed when the accumulation exceeds one inch. All oil, sludge, sediment, solids, trash, debris and floatable material shall be removed from all chambers of the sand filter. Materials deposited on the surface if the sand filter (e.g. trash and litter) shall be removed manually. All resulting waste including oil, sludge, sediment, and water should be disposed of in accordance with all applicable federal and local regulations.		
When the filtering capacity of the filter diminishes substantially (i.e. when water ponds on the surface of the filter bed for more than 48 hours), the top few inches of discolored material and the top six inches of sand shall be removed and shall be replaced with fresh material. If discolored or contaminated		

Sand Filter
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

material is found below this removed surface then that material shall also be removed and replaced until all contaminated sand has been removed from the filter chamber. The removed sediments shall be disposed in an acceptable manner at an approved and permitted location		
6. Structural Components (Annual)		
No evidence of structural deterioration		
Any grates are in good condition		
No evidence of spalling or cracking of structural parts		
7. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion (if draining into natural channel). Minor soil erosion gullies should be repaired when they occur		
8. Overall Function of Facility (Annual)		
Evidence of flow bypassing facility		
No noticeable odors		
During the six months immediately after construction, filter practices shall be inspected following at least the first two precipitation events of at least 1.0 inch to ensure the system is functioning properly. Thereafter, inspections shall be conducted on an annual basis and after storm events of greater than or equal to the 1-year, 24-hour Type III precipitation event.		

Sand Filter
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

COMMENTS:

ACTIONS TO BE TAKEN:

Stone Infiltration Trench
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted, inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
Monthly inspect for trash and debris and remove if present.		
Monthly inspect for erosion and evidence of channelized flows. Erosion and channels must be corrected immediately by re-establishing original grade by raking existing stone or applying new stone as necessary.		
Semi-Annually inspect for excessive sediments and remove sediments if present. If sediment source is observed, eliminate source.		
If stormwater is ponding at ground surface and not infiltrating, remove and wash pea stone layer or replace with new pea stone.		

Stone Infiltration Trench
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

COMMENTS:

ACTIONS TO BE TAKEN:

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**
- **Sediment shall be removed from stormwater basins when the sediment volume exceeds 10% of the total basin volume. Sediment shall be disposed of in an acceptable manner at an approved and permitted location.**
- **Infiltration Ponds Only: When infiltration rates decrease below design infiltration rates, remove accumulated surface sediments and rototill pond bottom. Revegetate bottom of infiltration pond as needed**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
1. Embankment and Emergency Spillway (Annual)		
Vegetation and Ground Cover Adequate		
Embankment Erosion		
Animal Burrows		
Unauthorized Planting		
Cracking, bulging or sliding of dam		
• Upstream face		
• Downstream face		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

• At or beyond toe		
• Downstream		
• Upstream		
• Emergency Spillway		
Seeps/leaks on downstream face		
Slope protection or riprap failure		
Vertical/horizontal alignment of top of dam "As-Built"		
Emergency Spillway clear of obstructions and debris		
2. Riser and Principal Spillway (Annual)		
Type: Reinforced Concrete___ Corrugated Pipe_____ Masonry_____ Low-flow orifice obstructed		
Internal Low-flow orifice obstructed. Remove filter sock and riser to check.		
Low-flow trash rack • Debris removal necessary		
• Corrosion control		
Low Flow Filter Sock (Filter Fabric) • Signs of deterioration, replace if necessary		
Weir trash rack maintenance • Debris removal necessary		
• Corrosion control		
Excessive Sediment accumulation inside riser		
Concrete/Masonry condition riser and barrels • cracks or displacement		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

• Minor spalling (<1”)		
• Major spalling (rebars exposed)		
• Joint failures		
• Water tightness		
Metal pipe Condition		
Control Valve • Operational/ Exercised		
• Chained and Locked		
Outfall channels functioning		
3. Dry Basin Areas (Annual)		
Vegetation adequate		
Undesirable vegetative growth		
Undesirable woody vegetation		
Low-flow channels clear of obstructions		
Standing water or wet spots		
Annual mowing of vegetation along the maintenance access roads.		
Annual inspection of vegetation within basin.		
Prune all dead or dying vegetation within the extents of the basin or WVTS.		
Sediment and/or trash accumulation *		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Remove all herbaceous vegetation root stock when overcrowding of the maintenance access to the facility, remove any vegetation that has a negative impact on stormwater flowage through facility, and trim any overgrown vegetation within the basin.		
Replace any/all original vegetation that has died off or has not fully established, as determined at the time of the inspection.		
Vegetation should be reinforced to its original design standards if less than 50% of the original vegetation is established after two years.		
Any invasive vegetation encroaching upon the perimeter of the facility should be pruned or removed if it is prohibiting access to the facility, compromising sight visibility and/or compromising original design vegetation.		
4. Condition of Outfalls (Annual)		
Riprap Failures		
Slope erosion		
Storm drain pipes		
Endwalls/ Headwalls		
Other (specify)		
1. Emergent Vegetation (Annual)		
Annual mowing of vegetation: Annual mowing of the basin setback is only required along maintenance rights-of-way and the embankment. The remaining setback can be managed as rangeland (mowing every other year) or forest		
Vegetation healthy and growing maintaining 50% surface area coverage of emergent		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

plants after the second growing season (If unsatisfactory, reinforcement plantings needed)		
Dominant emergent plants: Survival of desired emergent plant species. Distribution according to planting plan?		
Evidence of invasive species		
Maintenance of adequate water depths for desired emergent plant species		
Harvesting of emergent plantings needed		
Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment		

Detention / Infiltration Pond
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

COMMENTS:

ACTIONS TO BE TAKEN:

Street Sweeping
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

Notes:

- **Beyond inspection frequency noted in parenthesis, i.e. (quarterly), inspections shall be completed after storms equal to or greater than the 1-year 24-hour Type III storm event (2.7" of rain fall)**
- **All Checklist Maintenance items are MANDATORY.**
- **During inspections, if maintenance items are found not to be applicable, note as N/A in comments**
- **All removed sediments shall be disposed at an approved and permitted location.**
- **All hazardous debris removed shall be disposed of in accordance with state and federal regulations by a properly licensed contractor**

MAINTENANCE ITEM	SATISFACTORY (YES/NO)	COMMENTS
Sweep all roadways two times per year. One of these sweepings must occur after winter sanding operations have concluded.		

COMMENTS:

Street Sweeping
Operation, Maintenance, and Management
Inspection Checklist

Project: Date:

Location: Time:

Site Status: Inspector:

ACTIONS TO BE TAKEN:

Appendix B – RIDEM Sample Stormwater Facility Maintenance Agreement

****A site specific Stormwater Facility Maintenance Agreement between the Owner and RIDEM must be developed prior to construction****

Sample Stormwater Facility Maintenance Agreement

THIS AGREEMENT, made and entered into this ___ day of _____, 20___, by and between (Insert Full Name of Owner)
_____ hereinafter called the "Landowner", and the [Local Jurisdiction], hereinafter called the "[Town/City]".
WITNESSETH, that WHEREAS, the Landowner is the owner of certain real property described as (Tax Map/Parcel Identification Number) _____
as recorded by deed in the land records of [Local Jurisdiction] Deed Book _____ Page _____, hereinafter called the "Property".

WHEREAS, the Landowner is proceeding to build on and develop the property; and
WHEREAS, the Site Plan/Subdivision Plan known as
_____, (Name of Plan/Development) hereinafter called the "Plan", which is expressly made a part hereof, as approved or to be approved by the [Town/City], provides for detention of stormwater within the confines of the property; and

WHEREAS, the [Town/City] and the Landowner, its successors and assigns, including any homeowners association, agree that the health, safety, and welfare of the residents of [Local Jurisdiction] require that on-site stormwater management facilities be constructed and maintained on the Property; and

WHEREAS, the [Town/City] requires that on-site stormwater management facilities as shown on the Plan be constructed and adequately maintained by the Landowner, its successors and assigns, including any homeowners association.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The on-site stormwater management facilities shall be constructed by the Landowner, its successors and assigns, in accordance with the plans and specifications identified in the Plan.
2. The Landowner, its successors and assigns, including any homeowners association, shall adequately maintain the stormwater management facilities in accordance with the required Operation and Maintenance Plan. This includes all pipes, channels or other conveyances built to convey stormwater to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions. The Stormwater Best Management Practices Operation, Maintenance and Management Checklists are to be used to establish what good working condition is acceptable to the [Town/City].

3. The Landowner, its successors and assigns, shall inspect the stormwater management facility and submit an inspection report annually. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structure, basin areas, access roads, etc. Deficiencies shall be noted in the inspection report.
4. The Landowner, its successors and assigns, hereby grant permission to the [Town/City], its authorized agents and employees, to enter upon the Property and to inspect the stormwater management facilities whenever the [Town/City] deems necessary. The purpose of inspection is to follow-up on reported deficiencies and/or to respond to citizen complaints. The [Town/City] shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the repairs if necessary.
5. In the event the Landowner, its successors and assigns, fails to maintain the stormwater management facilities in good working condition acceptable to the [Town/City], the [Town/City] may enter upon the Property and take whatever steps necessary to correct deficiencies identified in the inspection report and to charge the costs of such repairs to the Landowner, its successors and assigns. This provision shall not be construed to allow the [Town/City] to erect any structure of permanent nature on the land of the Landowner outside of the easement for the stormwater management facilities. It is expressly understood and agreed that the [Town/City] is under no obligation to routinely maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the [Town/City].
6. The Landowner, its successors and assigns, will perform the work necessary to keep these facilities in good working order as appropriate. In the event a maintenance schedule for the stormwater management facilities (including sediment removal) is outlined on the approved plans, the schedule will be followed.
7. In the event the [Town/City] pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner, its successors and assigns, shall reimburse the [Town/City] upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the [Town/City] hereunder.
8. This Agreement imposes no liability of any kind whatsoever on the [Town/City] and the Landowner agrees to hold the [Town/City] harmless from any liability in the event the stormwater management facilities fail to operate properly.
9. This Agreement shall be recorded among the land records of [Local Jurisdiction] and shall constitute a covenant running with the land, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and any other successors in interests, including any homeowners association.

WITNESS the following signatures and seals:

_____
Company/Corporation/Partnership Name (Seal)

By: _____

_____
(Type Name and Title)

The foregoing Agreement was acknowledged before me this ____ day of _____, 20___, by _____.

_____
NOTARY PUBLIC
My Commission Expires: _____

By: _____
_____
(Type Name and Title)

The foregoing Agreement was acknowledged before me this ____ day of _____, 20___, by _____.

_____
NOTARY PUBLIC
My Commission Expires: _____

Approved as to Form:

_____ _____
[Town/City] Attorney Date