



DiPrete Engineering

Stormwater System Operation & Maintenance Plan



South Country Commons Buildings 26 & 28

Located in South Kingstown, RI
Applicant: SCC Investments III LLC.

12-18-2024

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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 property owner will also be the owner of the stormwater system. Upon completion of construction, the owner of the property 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 the property changes, the current owner (grantor) must provide a copy of this document to the new owner (grantee). The new owner must notify the Rhode Island Department of Environmental Management of the change of ownership and provide a signed updated Operations and Maintenance Plan to the Rhode Island Department of Environmental Management.

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, a dedicated path is proposed to provide access to all stormwater BMPs from the roadway. This access has been sized to accommodate vehicle access to the BMPs.

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

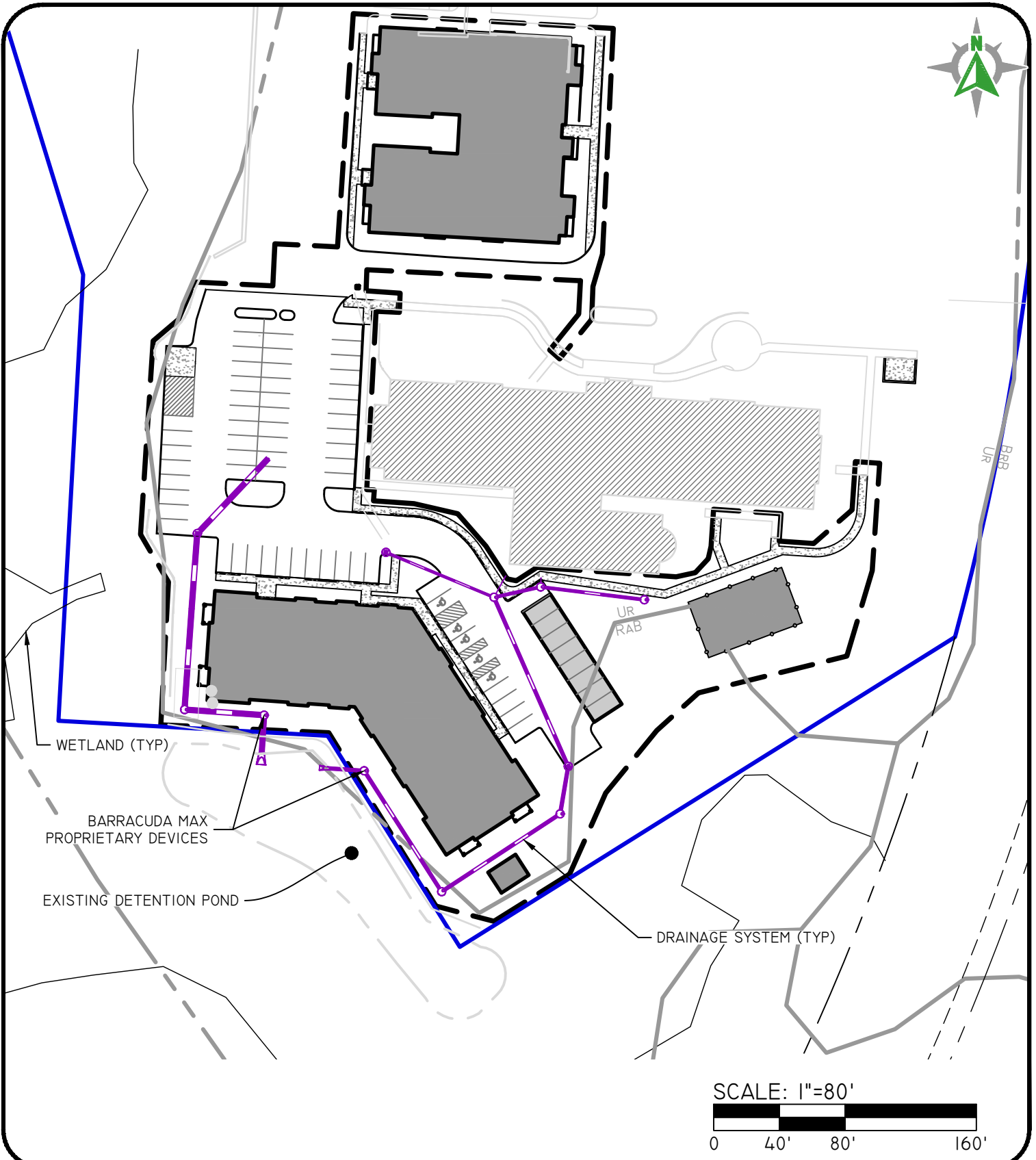
The following tasks must be performed to protect public safety during the non-winter seasons:

- 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
OF 1

OPERATIONS & MAINTENANCE SCC BUILDINGS 26 & 28

SOUTH KINGSTOWN, RHODE ISLAND
PREPARED FOR:
SCC INVESTMENTS III LLC DATE: 12-18-2024
95 SOCKANOSSET CROSSROAD #203, CRANSTON, RHODE ISLAND 02920



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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 and Parking Area Management

Street and Parking Lot Sweeping

- All street and parking 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.

Solid Waste Containment

- Trash and recycling receptacles must be located onsite for all commercial areas.

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.

Periodic inspections, if performed by an outside entity will cost approximately \$500/yr.

Barracuda® Hydrodynamic Separator

The recommended inspection and maintenance interval for Barracuda devices is once per year, and the approximate cleaning cost can vary and will be determined following an agreed and accepted maintenance contract. The average cost can be \$500.00 per unit per year. The annual maintenance cost is approximately \$500 per year.

Based on the costs outlined above, the stormwater system will cost approximately \$500 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.

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		

**Proprietary Device
(See Manufacturer Manual/Requirements)
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

Notes:

- **Notwithstanding any recommended inspection frequencies in the guidance document, this unit must be inspected monthly during the first year of operation to determine, on average, how often the sediment accumulation reaches 15% of the unit sedimentation capacity.**
- **Monthly notes must be taken to record the amount of monthly sedimentation.**
- **Subsequent years of operation must have inspections and maintenance performed at the average 15% sedimentation accumulation frequency determined during the first year of operation. Minimum quarterly.**
- **All Checklist Maintenance items are MANDATORY.**
- **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. Post Construction		
Post construction inspection in accordance with manufacturer manuals		
2. In the event of an oil spill (immediately)		
Inspection in accordance with manufacturer manuals		

**Proprietary Device
(See Manufacturer Manual/Requirements)
Inspection Checklist**

Project:

Date:

Location:

Time:

Site Status:

Inspector:

3. First year of Operation (Monthly)		
<p>Monthly inspections and maintenance to assess performance and sedimentation accumulation has not exceeded 50% of unit storage volume (see attached guidance document for model capacity). If sedimentation exceeds 50% capacity for 2 months, increase frequency to bi-weekly.</p> <p>If over 50% storage capacity, clean out system per manufacturer requirements.</p>		
4. Subsequent years of Operation (Based on how often sediments reach 15% of unit capacity during first year of operation) Note: Minimum Quarterly		
<p>Regular inspections to assess performance and sedimentation accumulation has not exceeded 50% of unit storage capacity. If over 50% storage capacity, clean out system per manufacturer requirements.</p> <p>(see attached document for model capacity)</p>		

Barracuda[®] Max & Barracuda Maintenance Guide

One of Barracuda's advantages is the ease of maintenance. Like any system that collects pollutants, the Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes 2 to 4 hours, depending on the system's size, the captured material, and the vacuum truck's capacity.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and then on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

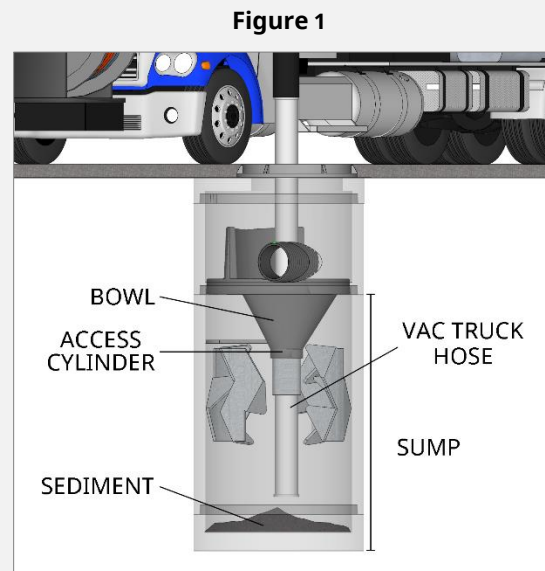
Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

Barracuda Storage Capacities

Model	Manhole Diameter in. (mm)	Total System Volume Gallons (Liters)	Treatment Chamber Capacity Gallons (Liters)	Standard Sediment Capacity (20" depth) Yards ³ (meters ³)	NJDEP Sediment Capacity (50% of standard depth) Yards ³ (meters ³)
S3	36 (900)	264 (999)	212 (803)	0.44 (0.34)	0.22 (0.17)
S4	48 (1200)	665 (2517)	564 (2135)	0.78 (0.60)	0.39 (0.30)
S6	72 (1800)	1497 (5667)	1269 (4804)	1.75 (1.34)	0.88 (0.67)
S8	96 (2400)	4196 (15884)	3835 (14517)	3.10 (2.37)	1.55 (1.19)

Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. Access this area through the 8" (200 mm), 10" (250 mm), 15" (375 mm) or 20" (500 mm) diameter access cylinder.
2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
 - a. Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
 - b. Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
 - c. Additional local regulations may apply to the maintenance procedure.



Appendix B – RIDEM Sample Stormwater Facility Maintenance Agreement

****A site-specific Stormwater Facility Maintenance Agreement between the Owner and the responsible authority 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].

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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