VIRGINIA TECH—FACILITIES SERVICES

Stormwater Management Facility Operation and Maintenance Manual

Site & Infrastructure Development

August 2019

Internal Procedures

The 'Stormwater Management Facility Operation and Maintenance Manual' provides guidance on conducting and documenting stormwater management facility inspections. The table of contents is designed to help identify key components of BMPs that often require ongoing maintenance.

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RELEVANT ACRONYMS

BMP	Best Management Practice
CWA	Clean Water Act
DEQ	Virginia Department of Environmental Quality
EPA	Environmental Protection Agency
IDDE	Illicit Discharge Detection and Elimination
LDA	Land Disturbance Activities
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
VPDES	Virginia Pollutant Discharge Elimination System
VT SID	Virginia Tech Site and Infrastructure Development

1 Introduction & Purpose

Land disturbance activities, or LDA, disrupt stable landscapes and increase easily erodible surface area. Once a parcel of land is developed, impervious surface area increases, causing additional stormwater runoff. In addition to this larger volume of stormwater, there is a higher concentration of pollution in these waters. Pollutants include: sediment, trash, animal waste, fertilizers, pesticides, herbicides, heavy metals, chlorides, and bacteria. In order to improve the quality of the stormwater, BMPs are installed to reduce the potential for flooding, remove pollutants, and decrease the amount of total runoff by absorbing water into the groundwater supply. These BMPs, or Best Management Practices, require maintenance and management to ensure that they continue to function properly.

This manual expresses the standard protocol that Virginia Tech follows after the installation of BMPs to provide their long-term care. In addition to complying with the standards listed in this manual, Virginia Tech also maintains compliance with the MS4 General Permit which is administered by DEQ. The MS4 program is part of the Federal National Pollutant Discharge Elimination System (NPDES), which is authorized through the Clean Water Act and regulated through the US Environmental Protection Agency (EPA).

The operations and maintenance discussed in this document explicitly state the processes followed by VT SID in regards to BMP care and upkeep.

2 Documentation

Documentation is required once BMPs are constructed to demonstrate ongoing compliance with the General Permit. Documentation is to be maintained on file and available upon request for a minimum of 3 years. These documents must include:

- Completed BMP Inspection Forms; and
- HokieServ work order completion notifications when applicable.

2.1 BMP Inspection Forms

Inspections of the BMPs are carried out by VT SID quarterly. These inspections examine the efficacy of each BMP component, allow for maintenance orders to be filed when needed, and demonstrate compliance with Virginia Tech's General Permit. VT SID is responsible for quarterly inspection of these BMP facilities by completing the following steps:

- Inspect each critical component of the facility;
- Identify maintenance needs; and
- Properly document inspections to demonstrate compliance with the General permit.

The four different types of inspection sheets are included in Appendix A of this document.

2.2 Hokieserv Work Order

VT SID is required to initiate work orders for maintenance needs. Once a BMP work order is marked “PM Complete” VT SID is required to complete a visual inspection of the BMP and the completed maintenance. If the work order is satisfied upon visual inspection the status is then changed to Closed through HokieServ.

2.3 Annual Reporting to DEQ

VT SID is to report to DEQ annually on October 1st to provide the Annual Report. This report must include information about all of the BMPs. In accordance with DEQ, the permittee shall maintain an electronic database or spreadsheet of all known permittee-owned or permittee-operated and privately owned stormwater management facilities that discharge into the MS4. The database shall also include all BMPs implemented by the permittee to meet the Chesapeake Bay TMDL load reduction as required in Part II A. A database shall include the following information as applicable:

(1) The stormwater management facility or BMP type;

(2) The stormwater management facility or BMPs location as latitude and longitude;

(3) The acres treated by the stormwater management facility or BMP, including total acres, pervious acres, and impervious acres;

(4) The date the facility was brought online (MM/YYYY). If the date brought online is not known, the permittee shall use June 30, 2005;

(5) The 6th Order Hydrologic Unit Code in which the stormwater management facility is located;

(6) Whether the stormwater management facility or BMP is owned or operated by the permittee or privately owned;

(7) Whether or not the stormwater management facility or BMP is part of the permittee's Chesapeake Bay TMDL action plan required in Part II A or local TMDL action plan required in Part II B, or both;

(8) If the stormwater management facility or BMP is privately owned, whether a maintenance agreement exists; and

(9) The date of the permittee's most recent inspection of the stormwater management facility or BMP.

3 Stormwater Management Facilities (BMPs)

This section will define the different types of Best Management Practices found on Virginia Tech's campus.

3.1 Bioretention

A Bioretention is a BMP that improves water quality by filtering water through an engineered planting bed. This planting bed typically consists of a vegetated surface layer, mulch, soil, a filtering medium, with gavel at the lowest part of the bioretention. Oftentimes, bioretentions will also include a collector pipe system beneath the planting bed for the treated water to exit the structure.

Plant species are specific to the area and should be considered prior to their installation.

Bioretention facilities are also capable of protection from streambank erosion and flooding. This is due to the nature of bioretention facilities to capture and filter a portion of the stormwater from the watershed.

Rain Gardens are a type of bioretention facility. They are planting beds installed in shallow basins where the stormwater can be treated though the soil medium filtering process. Rain Gardens should replicate the ecosystem of a forest. Given their prominent locations on campus, they have a secondary purpose of also being aesthetically pleasing.

ICTAS Bioretention

3.2 Filterra

Filterra is similar to a bioretention in that it slows the flow and assists in pollutant removal. Unlike a typical bioretention, Filterra takes up far less space and is able to be utilized even on highly developed sites. It functions when stormwater runoff enters the Filterra through a curb-inlet and flows through the specially designed filter media mixture situated inside a landscaped concrete container. From there, the pollutants are captured and immobilized in the filter media where they are decomposed, volatilized, and incorporated into the biomass of the Filterra system's micro/macro fauna and flora. The treated stormwater then flows into an underdrain system at the bottom of the container to be discharged.

Plant selection is based on the climate of that given area and maintenance is included. APEX services Virginia Tech's on-campus Filterra systems to make sure they are clean and properly functioning.

West End Filterra

3.3 Green Roof

Green Roofs can also be referred to as vegetated roofs or eco-roofs. They are systems designed to capture and temporarily store stormwater runoff in the growing media before the water is transferred into the storm drain system. A portion of the stormwater evaporates or is absorbed by the plants. This is able to relieve some pressure from the storm drain system by reducing peak runoff volume, peak runoff rates, and pollutant loads. The planting media can range in thickness depending on the type of Green Roof. Drought tolerant plant species are typically selected for green roofs. Underneath the planting media is a root barrier, an insulation layer, and a waterproof membrane. Green roofs are an effective method of insulation and can improve thermal efficiency in addition to their benefits in managing stormwater.

Life Science Green Roof 2

3.4 Detention Pond/ Retention Pond

Detention ponds, or basins, are dry ponds that have an orifice level at the bottom of the basin and do not have a permanent pool of water. All the water that enters into these detention ponds flows out between storms, leaving it dry the majority of the time. Some restraints of the detention basins include: not treating water quality and typically requiring larger spaces.

Retention ponds, or basins, are stormwater control structures that provide treatment of stormwater runoff water quality and aid in controlling flow rates of the stormwater. The pond removes pollutants through natural processes and water is released from an outlet in small increments to maintain the desired water level. Retention ponds remain wet, since the water stays to be treated and released more slowly.

In both the detention and retention basins, it is of utmost importance that the orifice does not become blocked or clogged to ensure the proper functioning of these facilities.

Alumni Retention Pond

4 Inspection Elements

4.1 Adequate Groundcover: BMPs should have dense grass coverage; there should not be patches of bare soil along banks or surrounding areas. *See Image 1.*

- Maintenance: Area needs to be reseeded when weather permits.

Image 1

4.2 Adequate Riprap: Riprap is a layer of stone usually placed at inlets and outlets to protect soil from erosion in areas of concentrated runoff. They decelerate the precipitation from a storm event by creating a rocky path that the water must travel across. Riprap can also be used on slopes that are unstable due to seepage problems. There should be adequate riprap placed in areas of concentrated flow. Additional material shall be added if there are signs of erosion downstream. *See Image 2.*

- Maintenance: Area needs additional riprap added to reduce the rate of flow entering the facility.

Image 2

4.3 Aquatic Bench: Also referred to as an 'Aquatic Landscaping', the aquatic bench shall be a 10-15 foot wide strip of vegetation around the inside perimeter of a wet pond that ranges in depth from 0-12 inches. Vegetated with emergent plants, the bench augments pollutant removal, provides habitats, conceals trash and water level fluctuations, and provides an additional safety bufer. *See Image 3.*

- Maintenance: Facility needs to be mowed to a height of 6-8" and a section of vegetation 10-15 ft. wide surrounding the water shall be allowed to grow to its natural height.

Image 3

4.4 Baffles/Curved Flow: Baffles are generally rocks or embankments that create a switchback flow to extend the total time that stormwater runoff is in the BMP. Increased suspension time allows for more sediment to settle out of the water before leaving the pond.

4.5 Basin: Basin refers to the bottom pond area of a BMP that retains water during storm events. A basin will be dry in between storm events and therefore shall be checked for areas of deficiency. A *settling basin* refers to an area which settles water and protects the outlet structure from the forceful velocity of a storm event.

4.6 Channelized flow: Channelized flow is a form of runoff seeking a concentrated flow. BMPs attempt to eliminate channelized flow and create a more even flow pattern (sheet flow). Channelized flow is apparent when grass is bent over from flow in a particular path or there is a low spot created where runoff has scoured the ground creating a path of erosion. *See Image 4.*

- Maintenance: a.) Area needs additional riprap of similar size added to reduce the rate of flow entering the facility. b.) Soil needs to be added and area needs to be stabilized/reseeded when weather permits.

Image 4

4.7 Cracks: Cracks are usually found on the crest or slope of the downstream embankment dam. Parallel cracks along the length of a dam may form for several reasons: uneven settling over time, tension/pressure from settlement that causes lateral spread, unstable slope, excessive water, or earthen pressure. Cracks may also be found perpendicular to the length of the embankment, indicating that the soil has settled along the underlying foundation and may create a path for seepage through the core of the embankment. Cracks caused by drying out and shrinking of embankments are harmless and *do not* need maintenance so long as they do not grow steadily with time.

- Maintenance: Cracks need to be filled in with soil and stabilized/reseeded when weather permits.

4.8 Crest of Embankment: The crest is the apex point of a roughly triangularly shaped embankment.

4.9 Debris: Debris is composed of organic material such as leaves, grass clippings, small sticks and woody limbs, as well as inorganic materials such as trash, fabric, plastic, and cans. Debris shall be removed from facilities as necessary. *See Image 5.*

- Maintenance: Accumulated debris needs to be removed from the facility.

Image 5

4.10 Displacement of Joints: All structures within a BMP site shall have tight joints and match the structural drawings provided in the *BMP Binder*.

- Maintenance: Structure is disjointed and needs to be realigned.

4.11 Embankment: An earthen embankment is a raised impounding structure made from compacted soil. Embankments are engineered to withhold a 10-year storm. Embankments generally surround a BMP and by nature create the basin/ponding area for stormwater during storm events.

4.12 Emergency Spillway: A vegetated emergency spillway is an open channel with a trapezoidal cross-section that is constructed beside an embankment. It consists of an inlet channel, a control section, and an exit channel, and is lined with erosion-resistant vegetation. The purpose of an emergency spillway is to convey flows that are greater than the principal spillway's design discharge at a non-erosive velocity. *See Image 6.*

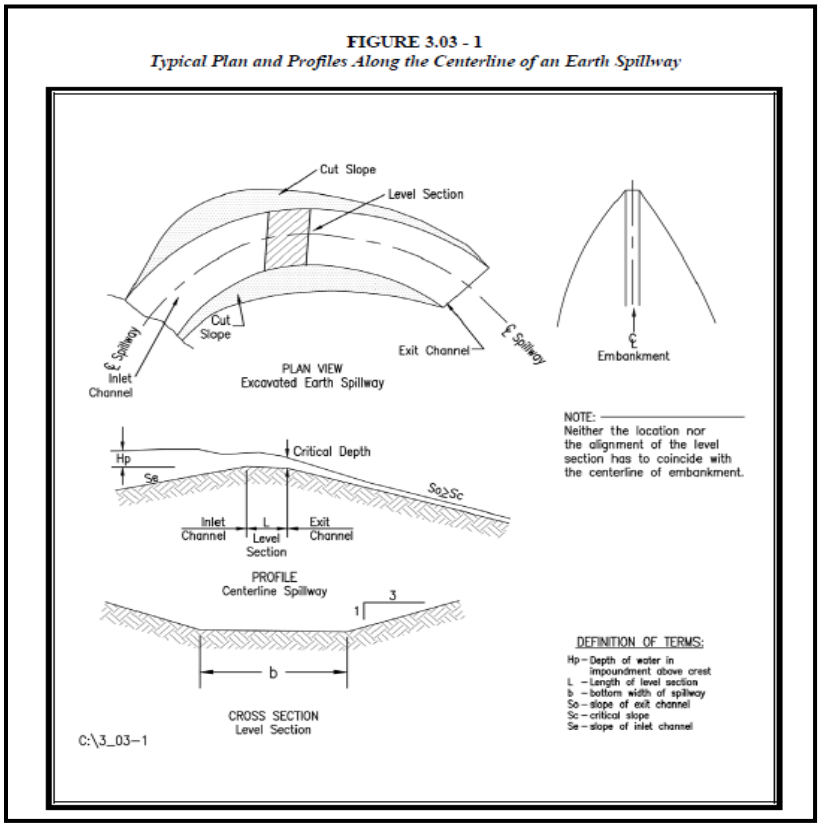


Image 6

4.13 Erosion: The wearing away of the earth's surface by water, wind, ice, or other geological agents; processes, including weathering, dissolution, abrasion, corrosion, and transportation, by which material is removed from the earth's surface. An indicator of erosion is native soil in an otherwise vegetated area, such as steep slopes or embankments. *See Image 7.*

- Maintenance: a.) Soil needs to be added and stabilized/reseeded when weather permits. b.) Riprap needs to be added to stabilize the area.

Image 7

4.14 Inflow Piping: Piping that delivers stormwater to the BMP located on the *upstream* side of the site.

4.15 Media Mixture: Bioretention filter BMPs have an engineered soil/media mixture that needs to be maintained to ensure that water is being properly filtered. The soil mixture is composed of clay, sand, soil, and mulch. The most common maintenance measure concerning media mixture is the topmost layer of mulch which is easily carried to the center of the basin over time.

4.16 Nuisance Weeds: Nuisance weeds are plant/vegetation that was either not originally intended for the site or has overgrown the site and is inhibiting maintenance.

- Maintenance: Weeds have overgrown area and need to be removed. *See Image 8.*

Image 8

- Additional Maintenance: Cattails are an invasive species and need to be removed using a glyphosate chemical solution. *See Image 9.*

Image 9

4.17 Obstructed Orifice: When debris washes downstream it can clog downstream piping or riser structure orifice openings on the principal spillway. *See Image 10.*

- Maintenance: Orifice is clogged with debris/sediment and needs to be cleaned out.

Image 10

4.18 Outlet Piping: As stormwater passes through a BMP facility it exits through the principal spillway and its outlet piping. This downstream piping is susceptible to clogging and sediment accumulation and should be checked during each inspection to ensure that it is operational. *See Image 11.*

- Maintenance: Outlet pipe has debris/sediment in it and needs to be cleaned out.

Image 11

4.19 Principal Spillway: A principal spillway is the primary outlet device for a stormwater impoundment. It usually consists of either a **riser structure** in combination with an outlet conduit, which extends through the embankment, or a **weir** control section cut through the embankment. The purpose of a principal spillway is to provide a primary outlet for storm flows, usually up to the 10 or 25-year frequency storm event. The principal spillway is designed and sized to regulate the allowable discharge from the impoundment facility.

4.20 Riser: The most common type of riser structure is a drop inlet spillway. This spillway consists of a rectangular or circular shaped raised structure with one or several orifices sized to control water discharge rates. The drop inlet spillway, often called 'riser and barrel system', is depicted in more detail below. *See Image 12.*

FIGURE 3.02 - 1a
Typical Principal Spillway Structures

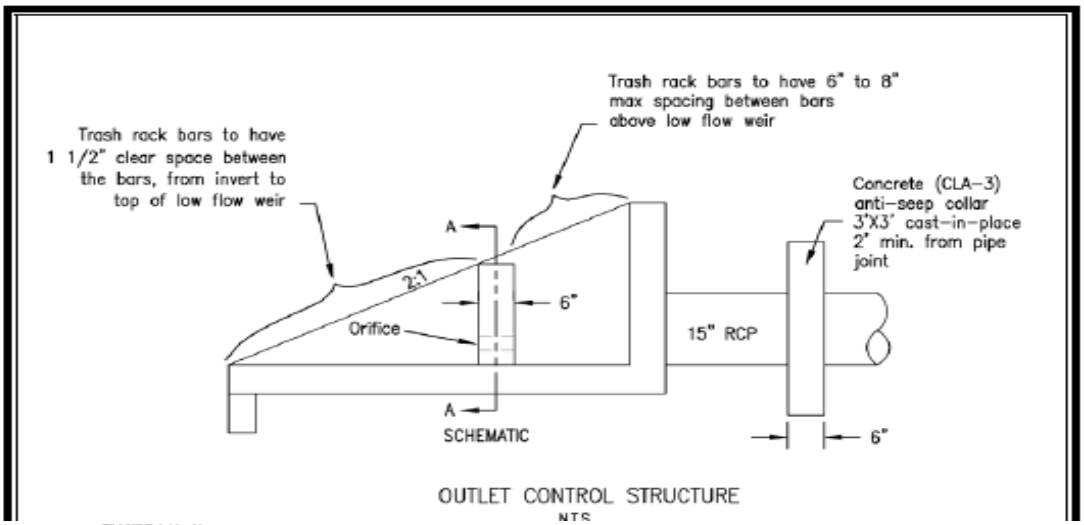


FIGURE 3.02 - 1b
Typical Principal Spillway Structures

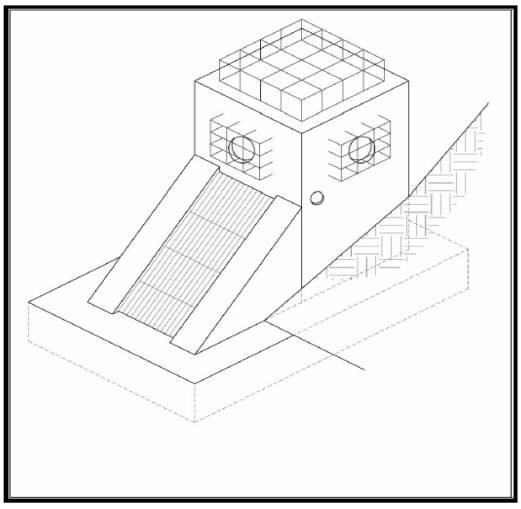
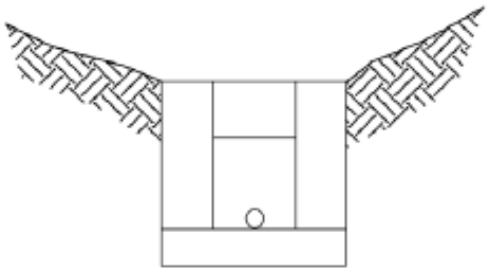


Image 12



4.21 Rodent Holes: Rodent holes can jeopardize the structural integrity of a BMP dam, either by weakening the soil structure or creating pathways for seepage. If holes appear on a downstream embankment, they will need to be filled in. *See Image 13.*

- Maintenance: Rodent holes need to be filled in with soil or clay. Area needs to be stabilized.

Image 13

4.22 Sediment Forebay: A sediment forebay is a pre detention basin designed to trap sediment within a confined area, which causes more rapid sediment accumulation. A sediment forebay is typically cleaned out every 3-5 years. The purpose of a sediment forebay is to allow sediment to settle from the incoming stormwater runoff before it is delivered to the main stormwater facility. This helps to isolate the sediment deposition in an accessible area, which also facilitates BMP maintenance efforts. *See Image 14.*

- Maintenance: Sediment forebays need to be dredged out of sediment.

Image 14

4.23 Sediment: Sediment is insoluble material suspended in water that consists mainly of particles derived from rocks, soil, and organic materials. Sediment is a major nonpoint source pollutant that other pollutants like phosphorus may attach.

4.24 Seepage: Water is designed to exit a BMP through the downstream embankment dam. Seeps occur when embankment foundation materials (i.e. dirt around an outfall structure) are moved by water that is flowing *around* the designed passage rather than *through* it. *See Image 15.*

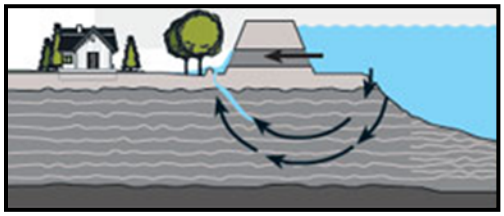


Image 15

4.25 Shoreline: In a wet pond stormwater facility the shoreline and banks shall be inspected for integrity. Stable vegetation is necessary in reducing bank erosion during high water/storm events.

4.26 Sinks: Sinks are considered severe depressions. A depression is harmless and *does not* need maintenance attention. Depressions generally have localized settlement and gently sloping bowl-like sides. A severe depression, or sink, *needs* attention as soon as it shows signs of a sink. Sinks have steep sides from the soil shearing as it collapses into an underlying void. *See Image 16.*

- Maintenance: Sinks need to be stabilized.

Image 16

4.27 Springs: Water entering the BMP should only be coming from stormwater inlets. Separate natural springs within the site should be noted.

4.28 Standing Water: Certain facilities hold water year-round, those that do not shall be inspected during dry periods to ensure that they are not retaining water longer than 24-48 hours after a storm event.

4.29 Surface Clogging: When sediment and debris collect in a basin they may inhibit the drainage potential of a facility. Standing water is a sign of surface clogging.

- Maintenance: Sediment/debris needs to be cleaned out from the basin area.

4.30 Trash Filter: Trash filters are placed on downstream outlet structures to ensure that any trash that has entered a facility remains there until it is removed. A grated structure made of metal shall be placed over outfall structures. *See Image 17.*

- Maintenance: Trash filter is clogged, debris needs to be removed.

Image 17

4.31 Trash: If there is trash present in the facility, it shall be removed: (plastic, cloth, cans, bags, wrappers, bottles, glass, etc.) Specify the location of trash if possible. *See Image 18.*

- Maintenance: Trash in the area needs to be removed and disposed of properly.

Image 18

5 Maintenance

The efficacy of each stormwater control BMP depends upon regular inspections and maintenance of all aspects of the facility. The two types of maintenance are typically known as routine maintenance and corrective maintenance.

5.1 Routine Maintenance

Routine Maintenance consists of preventative measure that are essential to the ongoing care and upkeep of a BMP. These measures are performed regularly to ensure proper function. Additionally, they help to prevent potential nuisances, namely: odors, pests, weeds, etc. They also reduce the need for corrective maintenance and diminish the likelihood of polluting stormwater runoff by identifying and repairing problems before they deteriorate further.

Common routine maintenance examples:

- Accumulated sediment removal from forebays;
- Replacement of dead or diseased plantings or vegetation called for in approved plans;
- Repair of the stormwater structures from erosion or undercutting;
- Repair of any erosion in the facility, including sloughing, animal holes, and slopes;
- Repair of any deterioration at the outfall of the facility, including the riprap outlet protection;
- Removal of blockages from all trash racks, inlets and outlets;
- Maintenance of adequate access to the facility and removal of woody vegetation as needed;
- Removal of trees from embankments;
- Exercise valves to prevent them from locking up where applicable; and
- Removal of all trash, debris, and floatables periodically from the facility.

5.2 Corrective Maintenance

Corrective Maintenance is any maintenance that should be addressed for the facility to properly function in accordance with the plans. These items require more intensive repair efforts and should be addressed as a higher priority than routine maintenance. If there are structural deficiencies, or issues that raise the water level in the facility beyond the design intentions, corrective maintenance is required and should be conducted as soon as possible to prevent downstream damage to properties and/or the environment.

Common corrective maintenance examples:

- Repair of any deterioration or issues with the principal spillway and riser, such as evidence of spalling, join failure, leakage, corrosion, etc.

- Extensive sediment removal when inspections indicate that 50% of the forebay sediment storage capacity has been filled.
- Control or removal of invasive species when their coverage exceeds 15% of a wetland cell while taking care to preserve the designed plantings and vegetation.
- Removal of woody vegetation from the embankment, if present, to prevent structural damage.
- Removal of plant growth if there are impacts to the storage volume (i.e. water levels rise because the vegetation is taking up the water storage space).

Appendix A: BMP Inspection Forms

Bioretention Facility Monthly Inspection Form

This form shall be used for the monthly inspection of Bioretention Facilities

	YES/NO	Maintenance Required?	Date:_____ Facility:_____ Underground Facility: Yes ☐ No ☐ Inspector(s):_____ Type of inspection: New ☐ Periodic ☐ Follow-up ☐ Storm Event ☐ Rain Date/Amt_____
Item			**Comments/Corrective Action:**
I. Embankment			
A. Crest			
Evidence of erosion			
Adequate groundcover			
B. Surrounding Banks			
Evidence of Erosion			
Evidence of Cracks			
Evidence of Seeps			
Rodent holes			
Adequate ground cover			
II. Principal Spillway			
Debris present			
Displace or offset joints			
Cracking on structure			
Outlet obstructed			
Trash/debris filter clogged			
III. Basin			
Bare soil/erosion			
Sediment accumulation			
Standing water			
Surface clogging			
Mulch 2-3" Deep (quarterly only)			
IV. Inflow Piping			
Obstructed			
Erosion at inlet			
Adequate riprap			
Inlet piping clean of sediment			
Cracking on inlet pipes/ headwall			

	YES/NO	Maintenance Required?	
Item			**Comments/Corrective Action:**
V. Landscaping			
Dead plants need replacing			
Inappropriate plants			
Surrounding area mowed			
Overgrown vegetation (quarterly only)			
VI. Trash			
Garbage			
Evidence of dumping			
Signs of chemicals/oil			
VII. Maintenance Access Points			
Harmful insects present			
Trees/shrubs blocking access			
Nuisance plants			
Additional Comments:			

Overall BMP rating: Excellent ☐ Good ☐ Fair ☐ Poor ☐

*If a field is not relevant during the inspection comment N/A
*Refer to the inspection binder for further field clarification and maintenance measures

I certify that this inspection was performed honestly and accurately.

Name of Inspector: _____

Signature: _____ Date: _____

Filterra Unit Quarterly Inspection Form

This form shall be used for the inspection of *Filterra* Units.

Date:_____ Facility:_____

Underground Facility: Yes ☐ No ☐

Inspector(s):_____

Type of inspection: New ☐ Periodic ☐ Follow-up ☐ Rainfall ☐ Rain Date/Amt_____

Parameter	Condition	(Circle)	Corrective Action Needed
Trash	Is Trash Present?	Yes/No	
Contaminants	Is there evidence of contaminants or pollutions such as oil or gasoline (If YES, CONTACT EHS IMMEDIATELY)	Yes/No	
Sediment	Is there sediment build-up present?	Yes/No	
	Are there any blockages due to sediment or debris?	Yes/No	
Structure	Does the structure appear to be damaged? (If yes, list where the structure is damaged and the type of damage.)	Yes/No	
	Is there any damage to the piping? (If yes, list which pipe(s) is/are damaged.)	Yes/No	

Parameter	Condition	(Circle)	Corrective Action Needed
Filterra Unit	Does the unit appear to be damaged? (If yes, list the damages and locations of the damages.)	Yes/No	
	Does the mulch need to be replaced?	Yes/No	
	Does the filter's media mixture need to be replaced or recharged?	Yes/No	
	Do the filter's plants need to be pruned or replaced? (If needing replacement, list the type of plant that needs replacement.)	Yes/No	
Additional Comments			

Overall BMP rating: Excellent ☐ Good ☐ Fair ☐ Poor ☐

*If a field is not relevant during the inspection comment N/A
*Refer to the O&M Manual and Inspection Binder for drawings and further information concerning this unit.

I certify that this inspection was performed honestly and accurately.

Name of Inspector: _____

Signature: _____ Date: _____

Green Roof Quarterly Inspection Form

This form shall be used for the inspection of Green Roof SWMFs.

	YES/NO	Maintenance Required?	Date:_____ Facility:_____ Inspector(s):_____ Underground Facility: Yes ☐ No ☐ Type of inspection: New ☐ Periodic ☐ Follow-up ☐ Storm Event ☐ Rain Date/Amt_____
Item			Comments/Corrective Action:
I. Garden Area			
Evidence of erosion			
Standing water			
Sediment buildup			
Debris buildup			
Inappropriate vegetation			
Nuisance weeds taken over			
Grass health good			
Soil pH close to 7.0			
II. Inlets and Outlets			
Clean of sediment			
Clean of debris			
Piping damaged			
III. Trash			
Garbage			
Dumping			
Signs of chemicals/oil			
IV. Maintenance Access Points			
Harmful insects present			
Trees/shrubs blocking access			
Nuisance plants			
Additional Comments:			

Overall BMP rating: Excellent ☐ Good ☐ Fair ☐ Poor ☐

*If a field is not relevant during the inspection comment N/A
*Refer to the inspection binder for further field clarification and maintenance measures

I certify that this inspection was performed honestly and accurately.

Name of Inspector: _____

Signature: _____ Date: _____

Detention Pond/Retention Pond Quarterly Inspection Form

This form shall be used for the inspection of Detention Ponds, Extended Detention Ponds, Enhanced Extended Detention Ponds, and Retention Ponds accordingly. Indicate which BMP type is being inspected below and follow rubric accordingly.

Unless otherwise noted in rubric all fields are applicable during inspections.	YES/NO	Maintenance Required?	Date:_____ Facility:_____ Type:_____ Underground Facility: Yes☐ No☐ Inspector(s):_____ Type of inspection: New ☐ Periodic ☐ Follow-up ☐ Storm Event ☐ Rain Date/Amt_____
Item			**Comments/Corrective Action:**
I. EMBANKMENTS			
A. Crest			
Evidence of erosion			
Evidence of Cracks			
Adequate groundcover			
B. Surrounding banks			
Evidence of erosion			
Evidence of Cracks			
Adequate groundcover			
Rodent holes			
C. Headwall structures			
Erosion around structure			
Evidence of cracks			
Evidence of seepage			
II. EMERGENCY SPILLWAY (if present)			
Bare soil/erosion			
Obstructed			
Operational			
III. PRINCIPAL SPILLWAY/RISER			
A. Riser structure			
Debris present			
Displaced/offset joints			

Unless otherwise noted in rubric all fields are applicable during inspections.	YES/NO	Maintenance Required?	
Item			**Comments/Corrective Action:**
Cracking on structure			
B. Outlet protection			
Adequate riprap			
Erosion at outlet			
Outlet piping clean of sediment			
Trash/debris filter on all outfalls			
Trash/debris filter clogged			
IV. BASIN			
A. Basin bottom			
Bare soil/erosion			
Sediment accumulation			
Standing water			
Surface clogging			
Shoreline stabilized (RET ONLY)			
Erosion in pond area (DET ONLY)			
Erosion greater than 6" (DET ONLY)			
B. Inflow Piping			
Obstructed			
Erosion at inlet			
Adequate riprap			
Inlet piping clean of sediment			
Cracking on pipes			
Displaced/offset joints			
D. Sediment Forebay (if present)			
Sediment accumulation			
Stable overflow into basin			
E. Landscaping			
Dead plants that need replacement (DET ONLY)			
Aquatic bench has been allowed to grow (RET ONLY)			

Unless otherwise noted in rubric all fields are applicable during inspections.	YES/NO	Maintenance Required?	
Item			**Comments/Corrective Action:**
E. Trash			
Evidence of dumping			
Trash present			
V. MAINTENANCE ACCESS PIONTS			
Harmful insects present			
Trees/shrubs blocking access			
Nuisance plants/inappropriate plants			
Facility has been mowed 6-8" tall			
Additional Comments:			

Overall BMP rating: Excellent ☐ Good ☐ Fair ☐ Poor ☐

* If a field is not relevant during the inspection comment N/A
*Refer to the inspection binder for further field clarification and maintenance measures

I certify that this inspection was performed honestly and accurately.

Name of Inspector: _____

Signature: _____ Date: _____