

Appendix V-C – Maintenance Guidelines

This appendix provides facility-specific maintenance standards. The standards are intended to provide conditions for determining, through inspection, if maintenance actions are required. Failure to meet these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, the inspection and maintenance schedules must be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

Instructions for Use of Maintenance Checklists

The following pages contain maintenance tables for most of the BMPs included in Volume V. Where private developers, rather than Thurston County staff, are responsible for facility maintenance, they should plan to complete a checklist for all system components on the following schedule:

- (M) Monthly from October through April.
- Annually, once in late summer (preferably September)
- (S) Storm-based, after any major storm (use 1 inch in 24 hours as a guideline).

The tables contained in this appendix may be used as checklists. Maintenance personnel may use photocopies of these pages and check off items inspected and problems noted during each inspection. Actions taken and corrective action recommended should also be noted.

Table C-1. Maintenance Checklist for Bioretention Facilities (BMP LID.08)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
S	General		Erosion	Look for signs of erosion in flow entrance, ponding area, and surface overflow. If erosion has occurred, reassess flow volumes, cell sizing, velocities, and flow dissipation.	Replace soil, plant material and/or mulch layer. If needed, cell geometry and erosion protection measures have been modified to prevent future erosion problems.
S			Drawdown	Look for standing water beyond 48-hours after a storm event. If standing water lingers beyond 48 hours risk of mosquito and other pests increases and ability of facility to handle larger storms is restricted.	Facility should drawdown after a storm event within 48-hours. If needed rehabilitate treatment soils and clean debris from surface of soils to restore infiltration capacity. Scarify surface soils to a depth of 2-6 inches & add mulch.
A	Plants		Dead or unhealthy plants	Dead plants, sparse vegetation. If a specific plant type has a high mortality rate, assess cause and replace with appropriate species. Consider analyzing soils for fertility and adding soil amendment if needed.	Prune plants as needed. Remove dead plant material. Replace all dead plants.
M			Weeds	Weeds or invasive plant species present.	Weeds are removed.
A			Mulch	Gaps in depth or coverage of mulch.	Place additional mulch so that there is 2 to 3 inch depth. Where heavy metal deposition is likely (e.g., contributing areas that include parking lots and roads), all mulch shall be replaced annually.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-2. Maintenance Checklist for Detention Tanks (BMP D.01), Detention Vaults (BMP D.02), and Wet Vaults (BMP WP.03)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	Storage Area		Plugged Air Vents	One-half of the cross-section of a vent is blocked at any point or the vent is damaged. Plugged vent can cause storage area to collapse.	Vents open and functioning.
M			Debris and Sediment	Accumulated sediment depth exceeds 10 percent of the diameter of the storage area for one-half length of storage vault or any point depth exceeds 15 percent of diameter. (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than one-half length of tank.)	All sediment and debris removed from storage area.
A			Joints Between Tank Section	Any crack allowing material to leak into facility.	All joint between tank sections are sealed.
A			Tank Bent Out of Shape	Any part of tank is noticeably bent out of shape.	Tank repaired or replaced to design. Contact a professional engineer for evaluation.
A			Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2 inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications and is structurally sound.
A				Cracks wider than 1/2 inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls	No cracks more than 1/4 inch wide at the joint of the inlet/outlet pipe.
M, S	Crest Gage		Crest Gage Missing/Broken	Crest gage is not functioning properly, has been vandalized, or is missing.	Repair/replace

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	Manhole		Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
A			Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
A			Cover Difficult to Remove	One maintenance person cannot remove lid after applying 80 Pounds of lift. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
A			Ladder Rungs Unsafe	Maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Tanks and vaults are a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-3A. Maintenance Checklist for Detention Ponds (BMP D.01), and Wetponds (BMP WP.02)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris buildup in pond.	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	Remove trash and debris and dispose as prescribed by Thurston County Department of Resource Stewardship.
M,S			Trash rack plugged or missing	Bar screen over outlet more than 25% covered by debris or missing.	Replace screen. Remove trash and debris and dispose as prescribed by City Waste Management Section.
M			Poisonous Vegetation	Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, stinging nettles, devilsclub.	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the County.
M,S			Fire hazard or pollution	Presence of chemicals such as natural gas, oil, and gasoline, obnoxious color, odor, or sludge noted.	Find sources of pollution and eliminate them. Water is free from noticeable color, odor, or contamination.
M			Vegetation not growing or is overgrown	For grassy ponds, grass cover is sparse and weedy or is overgrown.	For grassy ponds, selectively thatch, aerate, and reseed ponds. Grass cutting unnecessary unless dictated by aesthetics. Contact the Thurston County Noxious Weed program for direction on invasive species such as purple loosestrife and reed canary grass. Pond bottoms shall have uniform dense coverage of desired plant species.
M			Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents destroyed and dam or berm repaired. Contact the Thurston County Public Health and Social Services Department for guidance.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M			Insects	When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects destroyed or removed from site. Contact Cooperative Extension Service for guidance.
A			Tree Growth	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, or equipment movements). If trees are not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood. Remove species that are not part of recorded planting plan.
M	Side Slopes of Pond		Erosion on berms or at entrance/exit	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
M	Storage Area		Sediment buildup in pond	Accumulated sediment that exceeds 10 percent of the designed pond depth. Buried or partially buried outlet structure probably indicates significant sediment deposits.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
A	Pond Dikes		Settlements	Any part of dike which has settled 4 inches lower than the design elevation.	Dike is built back to the design elevation.
A	Emergency Overflow/ Spillway		Rock Missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Replace rocks to design standards.
A	Wet Pond		Permanent Water Volume	Check that pond has a permanent water volume and does not drain between storm events.	A permanent water volume is necessary to provide water quality treatment. If no water volume, pond lining needs to be evaluated.
One time	Emergency Overflow/ Spillway		Overflow Missing	Side of pond has no area with large rocks to handle emergency overflows.	Contact County for guidance.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

- A = Annual (March or April preferred)
- M = Monthly (see schedule)
- S = After major storms

Table C-3B. Maintenance Checklist for Stormwater Wetland (BMP WP.01)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris buildup in pond or wetland.	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	Remove trash and debris and dispose as prescribed by Thurston County Department of Resource Stewardship.
M,S			Trash rack plugged or missing	Bar screen over outlet more than 25% covered by debris or missing.	Replace screen. Remove trash and debris and dispose as prescribed by City Waste Management Section.
M			Poisonous Vegetation	Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, poison ivy, stinging nettles, devilsclub.	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the County. Contact Thurston County Noxious Weeds program.
M,S			Fire hazard or pollution	Presence of chemicals such as natural gas, oil, and gasoline, obnoxious color, odor, or sludge noted.	Find sources of pollution and eliminate them. Water is free from noticeable color, odor, or contamination.
M			Vegetation not growing or is overgrown	Plants are sparse or invasive species are present.	Hand-plant nursery-grown wetland plants in baser areas. Contact the Thurston County Noxious Weed program for direction on invasive species such as purple loosestrife and reed canary grass. Pond bottoms shall have uniform dense coverage of desired plant species.
M			Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents destroyed and dam or berm repaired. Contact the Thurston County Public Health and Social Services Department for guidance.
M			Insects	When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects destroyed or removed from site. Contact Cooperative Extension Service for guidance.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Tree Growth	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, or equipment movements). If trees are not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood. Remove species that are not part of recorded planting plan.
M	Side Slopes of Pond		Erosion on berms or at entrance/exit	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
A	Internal berm or embankment		Settlements	Any part of dike which has settled 4 inches lower than the design elevation.	Dike is built back to the design elevation.
			Irregular surface on internal berm	Top of berm not uniform and level.	Top of berm graded flat to design elevation.
A	Emergency Overflow/ Spillway		Rock Missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Replace rocks to design standards.
One time			Overflow Missing	Side of pond has no area with large rocks to handle emergency overflows.	Contact County for guidance.
A	Pond Areas		Sediment accumulation (first cell / forebay)	Sediment accumulations in pond bottom that exceeds the depth of sediment storage (1 foot) plus 6 inches.	Sediment storage contains no sediment.
A			Sediment accumulation (wetland cell)	Accumulated sediment that exceeds 10% of the designed pond depth.	Sediment cleaned out to designed pond shape and depth.
A			Liner damaged (if applicable)	Liner is visible or pond does not hold water as designed.	Liner repaired or replaced.
A			Water level (first cell / forebay)	Cell does not hold 3 feet of water year round.	3 feet of water retained year round.
A			Water level (wetland cell)	Cell does not retain water for at least 10 months of the year or wetland plants are not surviving.	Water retained at least 10 months of the year or wetland plants are surviving.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Algae mats (first cell / forebay)	Algae mats develop over more than 10% of the water surface should be removed.	Algae mats removed (usually in the late summer before Fall rains.
A			Vegetation	Vegetation dead, dying, or overgrown (cattails) or not meeting original planting specifications.	Plants in wetland cell surviving and not interfering with wetland function.
A	Gravity Drain		Inoperable valve	Valve will not open and close	Valve opens and closes normally.
A			Valve won't seal	Valve does not seal completely.	Valve completely seals closed.
A	Inlet/Outlet pipe		Sediment accumulation	Sediment filling 20% or more of the pipe.	Inlet/outlet pipes clear of sediment.
A			Trash and debris	Trash and debris accumulated in inlet/outlet pipes (includes floatables and non-floatables).	No trash or debris in pipes.
A			Damaged	Cracks wider than ½ inch at the joint of the inlet / outlet pipe or any evidence of soil entering at the joints of the inlet / outlet pipes.	No cracks more than ¼ inch wide at the joint of the inlet/outlet pipe.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-4. Maintenance Checklist for Infiltration Basins (BMP IN.01), Infiltration Trenches (BMP IN.02), and Bioinfiltration Swale (BMP IN.03)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris buildup in pond	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	Remove trash and debris and dispose as prescribed by Thurston County Department of Resource Stewardship.
M			Poisonous Vegetation	Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, stinging nettles, devilsclub.	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the County.
A			Tree Growth	Tree growth in pond or swale bottoms, side slopes and maintenance access areas.	Trees removed from facility bottom, side slopes and maintenance access areas. Remove species that are not part of recorded planting plan.
M,S			Fire Hazard or Pollution	Presence of chemicals such as natural gas, oil, and gasoline, obnoxious color, odor, or sludge noted.	Find sources of pollution and eliminate them. Water is free from noticeable color, odor, or contamination.
M			Vegetation not growing or is overgrown	Grass cover is sparse and weedy or is overgrown. Plants are sparse or invasive species are present.	Selectively thatch, aerate, and reseed ponds. Grass cutting unnecessary unless dictated by aesthetics. Contact the Thurston County Noxious Weed program for direction on invasive species such as purple loosestrife and reed canary grass. Pond bottoms shall have uniform dense coverage of desired plant species.
M			Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents destroyed and dam or berm repaired. Contact the Thurston County Public Health and Social Services Department for guidance.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M			Insects	When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects destroyed or removed from site. Contact Cooperative Extension Service for guidance.
A	Storage Area		Sediment buildup in system	A soil texture test indicates facility is not working at its designed capabilities or was incorrectly designed.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design. A sediment trapping area is installed to reduce sediment transport into infiltration area.
A			Storage area drains slowly (more than 48 hours) or overflows	A soil texture test indicates facility is not working at its designed capabilities or was incorrectly designed.	Additional volume is added through excavation to provide needed storage. Soil is aerated and rototilled to improve drainage. Contact the County for information on its requirements regarding excavation.
M			Sediment trapping area	Any sediment and debris filling area to 10 percent of depth from sump bottom to bottom of outlet pipe or obstructing flow into the connector pipe.	Clean out sump to design depth.
One time			Sediment trapping area not present	Stormwater enters infiltration area directly without treatment.	Add a trapping area by constructing a sump for settling of solids. Segregate settling area from rest of facility. Contact County for more guidance.
M	Rock filters		Sediment and debris	By visual inspection little or no water flows through filter during heavy rain storms.	Replace gravel in rock filter.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

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S = After major storms

Table C-5. Maintenance Checklist for Media Filter Drain (BMP MF.04)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	No Vegetation Zone adjacent to pavement		Erosion, Scour, or Vehicular Damage	No vegetation zone uneven or clogged so that flows are not uniformly distributed.	Level the area and clean so that flows are spread evenly.
M			Sediment Accumulation on Edge of Pavement	Flows no longer sheeting off of roadway. Sediment accumulation on pavement edge exceeds top of pavement elevation.	Remove sediment deposits such that flows can sheet off of roadway.
M	Vegetated Filter		Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits, re-level so slope is even and flows pass evenly through Media Filter Drain.
M			Excessive Vegetation or Undesirable Species	When the grass becomes excessively tall; when nuisance weeds and other vegetation starts to take over or shades out desirable vegetation growth characteristics.	Mow grass, control nuisance vegetation, such that flow not impeded. Grass should be mowed to a height that encourages dense even herbaceous growth.
M			Erosion, Scour, or Vehicular Damage	Eroded or scoured areas due to flow channelization, high flows or vehicular damage.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with suitable topsoil. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the filter strip should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident.
M	Media Bed		Erosion, Scour, or Vehicular Damage	Eroded or scoured areas due to flow channelization, high flows or vehicular damage.	For ruts or areas less than 12 inches wide, repair the damaged area by filling with suitable media. If bare areas are large, generally greater than 12 inches wide, the media bed should be re-graded.
M			Sediment Accumulation on Media Bed	Sediment depth inhibits free infiltration of water.	Remove sediment deposits, re-level so slope is even and flows pass freely through Media Bed.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	Underdrains		Sediment	Depth of sediment within perforated pipe exceeds 1/2 inch.	Flush underdrains through access ports and collect flushed sediment.
M	General		Trash and Debris Accumulation	Trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one 32 gallon garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Remove trash and debris.
M			Flows are Bypassing Media Filter Drain	Evidence of significant flows downslope (rills, sediment, vegetation damage, etc.) of Media Filter Drain.	Remove sediment deposits, re-level so slope is even and flows pass evenly through Media Filter Drain. If Media Filter Drain is completely clogged it may require a more extensive repair or replacement.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

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M = Monthly (see schedule)

S = After major storms

Table C-6. Maintenance Checklist for Sand Filter Basins (BMP MF.01)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Sediment Accumulation on top layer	Sediment depth exceeds 1/2 inch.	No sediment deposit on grass layer of sand filter that would impede permeability of the filter section.
M			Trash and Debris Accumulations	Trash and debris accumulated on sand filter bed.	Trash and debris removed from sand filter bed.
M			Sediment/ Debris in Clean-Outs	When the clean-outs become full or partially plugged with sediment and/or debris.	Sediment removed from clean-outs.
M			Sand Filter Media	Drawdown of water through the sand filter media takes longer than 24 hours, and/or flow through the overflow pipes occurs frequently.	Top several inches of sand are scraped. May require replacement of entire sand filter depth depending on extent of plugging (a sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material). Other options include removal of thatch, aerating the filter surface, tilling the filter surface, replacing the top 4 inches of filter media, and inspecting geotextiles for clogging.
M			Prolonged Flows	Sand is saturated for prolonged periods of time (several weeks) and does not dry out between storms due to continuous base flow or prolonged flows from detention facilities (consider 4-8 hour drawdown tests).	Low, continuous flows are limited to a small portion of the facility by using a low wooden divider or slightly depressed sand surface.
M			Short Circuiting	Drawdown greater than 12 inches per hour. When flows become concentrated over one section of the sand filter rather than dispersed (consider 4-8 hour drawdown tests).	Flow and percolation of water through sand filter is uniform and dispersed across the entire filter area.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M			Erosion Damage to Slopes	Erosion over 2 inches deep where cause of damage is prevalent or potential for continued erosion is evident.	Slopes stabilized using proper erosion control measures.
A			Rock Pad Missing or Out of Place	Soil beneath the rock is visible.	Rock pad replaced or rebuilt to design specifications.
M			Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter. Rills and gullies on the surface of the filter can indicate improper function of the inlet flow spreader.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.
M			Damaged Pipes	Any part of the piping that is crushed or deformed more than 20 percent or any other failure to the piping.	Pipe repaired or replaced.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

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S = After major storms

Table C-7. Maintenance Checklist for Sand Filter Vault (BMP MF.02) and Linear Sand Filter (MF.03)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	Below Ground Vault		Sediment Accumulation on Sand Media Section	Sediment depth exceeds 1/2 inch.	No sediment deposits on sand filter section that which would impede permeability of the filter section.
M	Below Ground Vault		Sediment Accumulation in Presettling Portion of Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6 inches.	No sediment deposits in first chamber of vault.
M	Below Ground Vault		Trash/Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault and inlet/outlet piping.
M	Below Ground Vault		Sediment in Drain Pipes/Cleanouts	When drain pipes, cleanouts become full with sediment and/or debris.	Sediment and debris removed.
M	Below Ground Vault		Clogged Sand Filter Media	Drawdown of water through the sand filter media takes longer than 24-hours, and/or flow through the overflow pipes occurs frequently (consider 4-8 hour drawdown tests).	Top several inches of sand are scraped. May require replacement of entire sand filter depth depending on extent of plugging (a sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material). Other options include removal of thatch, aerating the filter surface, tilling the filter surface, and replacing the top 4 inches of filter media.
M	Below Ground Vault		Short Circuiting	Drawdown greater than 12 inches per hour. When seepage/flow occurs along the vault walls and corners. Sand eroding near inflow area (consider 4-8 hour drawdown tests).	Sand filter media section re-laid and compacted along perimeter of vault to form a semi-seal. Erosion protection added to dissipate force of incoming flow and curtail erosion.
A	Below Ground Vault		Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
M	Below Ground Vault		Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.

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Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	Below Ground Vault		Ventilation	Ventilation area blocked or plugged	Blocking material removed or cleared from ventilation area. A specified percentage of the vault surface area must provide ventilation to the vault interior (see design specifications).
A	Below Ground Vault		Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover. Maintenance person cannot remove cover using normal lifting pressure.	Cover repaired to proper working specifications or replaced.
A	Below Ground Vault		Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than 1/2 inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
A	Below Ground Vault		Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than 1/2 inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault repaired so that no cracks exist wider than 1/4 inch at the joint of the inlet/outlet pipe.
A	Below Ground Vault		Baffles/Internal walls	Baffles or walls corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
A	Below Ground Vault		Access Ladder	Damaged ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Sand filter vaults are confined spaces. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Key:

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S = After major storms

Table C-8. Maintenance Checklist for Compost Amended Soil for Post-Construction Soil Quality and Depth (BMP LID.02) and Compost-Amended Vegetated Filter Strip (BMP BF.06)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	General		Soil media (maintain high organic soil content)	Vegetation not fully covering ground surface.	Re-mulch landscape beds with 2-3 inches of mulch until the vegetation fully closes over the ground surface
Ongoing				None. Preventative maintenance.	Return leaf fall and shredded woody materials from the landscape to the site as mulch.
Ongoing				None. Preventative maintenance.	On turf areas, "grasscycle" (mulch-mow or leave the clippings) to build turf health
Ongoing				None. Preventative maintenance.	Avoiding broadcast use of pesticides (bug and weed killers) like "weed & feed," which damage the soil life.
A				None. Preventative maintenance.	Where fertilization is needed (mainly turf and annual flower beds), a moderate fertilization program which relies on natural organic fertilizers (like compost) or slow release synthetic balanced fertilizers.
A			Compaction	Soils become waterlogged, do not appear to be infiltrating.	To remediate, aerate soil, till or further amend soil. If drainage is still slow, consider investigating alternative causes (e.g., high wet-season groundwater levels, low permeability soils). Also consider land use and protection from compacting activities. If areas are turf, aerate compacted areas and top dress them with 1/4 to 1/2 inch of compost to renovate them.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Erosion/scouring	Areas of potential erosion are visible.	Take steps to repair or prevent erosion. Identify and address the causes of erosion.
A			Grass/vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions (e.g., remove/replace plants)
M			Noxious weeds	Listed noxious vegetation is present. See Pierce County noxious weed list.	By law, noxious weeds must be removed and disposed immediately. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Q			Weeds	Weeds are present.	Remove and dispose of weed material. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms.

Q = Quarterly

Table C-9. Maintenance Checklist for Basic Biofiltration Swales (BF.01) and Continuous Inflow Biofiltration Swales (BF.03)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Sediment Accumulation on Grass	Sediment depth exceeds 2 Inches or inhibits vegetation growth in 10 percent or more of swale.	Remove sediment deposits on grass treatment area of the bioswale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
M	General		Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
M	General		Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire swale width.
M	General		Constant Baseflow	When small quantities of water continually flow through the swale, even when it has been dry for weeks, and an eroded, muddy channel has formed in the swale bottom.	Add a low-flow pea-gravel drain the length of the swale or by-pass the baseflow around the swale.
M	General		Poor Vegetation Coverage	When grass is sparse or bare or eroded patches occur in more than 10 percent of the swale bottom.	Determine why grass growth is poor and correct that condition. Re-plant with plugs of grass from the upper slope: plant in the swale bottom at 8-inch intervals. Or re-seed into loosened, fertile soil.
M	General		Vegetation	When the grass becomes excessively tall (greater than 10 inches); when nuisance weeds and other vegetation starts to take over.	Mow vegetation or remove nuisance vegetation so that flow not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings.
A			Vegetation	Trees growing in swale bottom or side slopes. Other invasive vegetation interfering with function of swale (scot's bloom).	Trees removed from swale bottom and slopes. Trees removed that are not part of planting plan. Invasive plants removed.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Excessive Shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back overhanging limbs and remove brushy vegetation on adjacent slopes.
M	General		Inlet/Outlet	Inlet/outlet areas clogged with sediment and/or debris.	Remove material so that there is no clogging or blockage in the inlet and outlet area.
M	General		Trash and Debris Accumulation	Trash and debris accumulated in the bioswale.	Remove leaves, litter, and oily materials, and re-seed or resod, and regrade, as needed. Clean curb cuts and level spreaders as needed.
M	General		Erosion/Scouring	Eroded or scoured swale bottom due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. If bare areas are large, generally greater than 12 inches wide, the swale should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident, or take plugs of grass from the upper slope and plant in the swale bottom at 8-inch intervals.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

- A = Annual (March or April preferred)
- M = Monthly (see schedule)
- S = After major storms

Table C-10. Maintenance Checklist for Wet Biofiltration Swales

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Sediment Accumulation	Sediment depth exceeds 2 inches in 10 percent of the swale treatment area.	Remove sediment deposits in treatment area.
M			Water Depth	Water not retained to a depth of about 4 inches during the wet season.	Build up or repair outlet berm so that water is retained in the wet swale.
M			Wetland Vegetation	Vegetation becomes sparse and does not provide adequate filtration, OR vegetation is crowded out by very dense clumps of cattail, which do not allow water to flow through the clumps.	Determine cause of lack of vigor of vegetation and correct. Replant as needed. For excessive cattail growth, cut cattail shoots back and compost offsite. Note: normally wetland vegetation does not need to be harvested unless die-back is causing oxygen depletion in downstream waters.
M			Inlet/Outlet	Inlet/outlet area clogged with sediment and/or debris.	Remove clogging or blockage in the inlet and outlet areas.
M			Trash and Debris Accumulation	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one 32 gallon garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Remove trash and debris from wet swale.
M			Erosion/ Scouring	Swale has eroded or scoured due to flow channelization, or higher flows.	Check design flows to assure swale is large enough to handle flows. By-pass excess flows or enlarge swale. Replant eroded areas with fibrous-rooted plants such as <i>Juncus effusus</i> (soft rush) in wet areas or snowberry (<i>Symphoricarpos albus</i>) in dryer areas.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-11. Maintenance Checklist for Basic Filter Strip (BMP BF.04) and Narrow Area Filter Strip (BMP BF.05)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits, re-level so slope is even and flows pass evenly through strip.
M	General		Vegetation	When the grass becomes excessively tall (greater than 10 inches); when nuisance weeds and other vegetation starts to take over.	Mow grass, control nuisance vegetation, such that flow not impeded. Grass should be mowed to a height between 3-4 inches.
A			Trees	Trees growing in swale bottom or side slopes.	Trees removed from swale bottom and slopes. Trees removed that are not part of planting plan.
M	General		Trash and Debris Accumulation	Trash and debris accumulated on the filter strip.	Remove trash and Debris from filter.
M	General		Erosion/Scouring	Eroded or scoured areas due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the filter strip should be re-graded and re- seeded. For smaller bare areas, overseed when bare spots are evident.
M	General		Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire filter width.	Level the spreader and clean so that flows are spread evenly over entire filter width

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

**Table C-12. Maintenance Checklist for Control Structure/ Flow Restrictor
(Structure that Controls Rate at which Water Exits Facility)**

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	Structure		Trash & debris (includes sediment)	Distance between debris buildup and bottom of orifice plate is less than 1-1/2 feet.	All trash and debris removed.
A			Structural damage	Structure is not securely attached to manhole wall and outlet pipe structure should support at least 1,000 pounds of up or down pressure.	Structure securely attached to wall and outlet pipe.
A				Structure is not upright position (allow up to 10% from plumb).	Structure in correct position.
A				Connections to outlet pipe are not watertight and show signs of rust.	Connections to outlet pipe are watertight; structure repaired or replaced and works as designed.
M				Any holes – other than designed holes – in the structure.	Structure has no holes other than designed holes.
M,S	Cleanout gate		Damaged or missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
A				Gate cannot be moved up and down by one maintenance person.	
M,S				Chain leading to gate is missing or damaged.	
A				Gate is rusted over 50% of its surface.	
M,S			Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	
M,S	Overflow pipe		Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-13. Maintenance Checklist for Catch Basins and Inlets

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris	Trash, debris, and sediment in or on basin	No trash or debris located immediately in front of catch basin opening. Grate is kept clean and allows water to enter.
M				Sediment or debris (in the basin) that exceeds 1/3 the depth (1-ft minimum storage remaining) from the bottom of basin to invert of the lowest pipe into or out of the basin.	No sediment or debris in the catch basin. Catch basin is dug out and clean.
M,S				Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
M			Structural Damage to Frame and/or Top Slab	Corner of frame extends more than 3/4 inch past curb face into the street (if applicable).	Frame is even with curb.
M				Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
M				Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached.	Frame is sitting flush on the riser rings or top slab and firmly attached.
A			Cracks in Basin Walls/ Bottom	Cracks wider than 1/2 inch and longer than 3 feet, any evidence of soil particles entering catch basin through cracks, or maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A				Cracks wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	No cracks more than 1/4 inch wide at the joint of inlet/outlet pipe.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Settlement/ Misalignment	Basin has settled more than 1 inch or has rotated more than 2 inches out of alignment.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A			Illicit discharges to Catch Basin	Look for connections from adjacent businesses, residences that are not part of drainage plan. If detected identify source of connection and notify Thurston County.	No connections to Catch Basins are allowed that are not part of the approved plans or authorized by permit from Thurston County.
M			Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.
M			Vegetation	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-14. Maintenance Checklist for Energy Dissipators

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	Rock pad		Missing or moved rock	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Replace rocks to design standard.
A	Rock pad		Vegetation	Vegetation growth in and around dispersion pad area prevents proper inspection or interferes with flows.	Remove vegetation growth and plants that are not part of approved planting plan.
A	Rock-filled trench for discharge from pond		Missing or moved rock	Trench is not full of rock.	Add large rock (~30 lbs each) so that rock is visible above edge of trench.
M	Dispersion trench		Pipe plugged with sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/flushed.
M			Perforations plugged	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Clean or replace perforated pipe.
M,S			Not discharging water properly	Visual evidence of water discharging at concentrated points along trench (under normal conditions, there should be a "sheet flow" of water along trench.) Intent is to prevent erosion damage.	Trench must be rebuilt or redesigned to standards. Pipe is provably plugged or damaged and needs replacement.
M,S			Water flows out top of "distributor" catch basin	Maintenance person observes water flowing out during any storm less than the design storm or it is causing or appears likely to cause damage.	Facility must be rebuilt or redesigned to standards. Pipe is probably plugged or damaged and needs replacement.
M,S			Receiving area over-saturated	Water in receiving area is causing or has potential of causing landslide.	Stabilize slope with grass or other vegetation, or rock if condition is severe.
A	Gabions		Damaged mesh	Mesh of gabion broken, twisted or deformed so structure is weakened or rock may fall out.	Mesh is intact, no rock missing.
A			Corrosion	Gabion mesh shows corrosion through more than ¼ of its gage	All gabion mesh capable of containing rock and retaining designed form.
A			Collapsed or deformed baskets	Gabion basket shape deformed due to any cause.	All gabion baskets intact, structure stands as designed.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Missing rock	Any rock missing that could cause gabion to loose structural integrity	No rock missing.
A	Manhole/Chamber		Worn or damaged post, baffles or side of chamber	Structure dissipating flow deteriorates to ½ of original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Structure is in no danger of failing.
A			Damage to wall, frame, bottom, and/or top slab	Cracks wider than ½-inch or any evidence of soil entering the structure through cracks. Or maintenance inspection personnel determine that the structure is not structurally sound.	Manhole/chamber is sealed and structurally sound.
A			Damaged pipe joints.	Cracks wider than ½-inch at the joint of the inlet/outlet pipes or any evidence of soil entering the structure at the joint of the inlet/outlet pipes.	No soil or water enters and no water discharges at the joint of inlet/outlet pipes.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-15. Maintenance Checklist for Fencing

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Missing or broken parts/dead shrubbery	Any defect in the fence or screen that permits easy entry to a facility.	Fence is mended or shrubs replaced to form a solid barrier to entry.
M,S			Erosion	Erosion has resulted in an opening under a fence that allows entry by people or pets.	Replace soil under fence so that no opening exceeds 4 inches in height.
M			Unruly Vegetation	Shrubbery is growing out of control or is infested with weeds.	Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.
A	Wire Fences		Damaged Parts	Posts out of plumb more than 6 inches.	Posts plumb to within 1.5 inches of plumb.
A				Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
A				Any part of fence (including posts, top rails, and fabric) more than 1 foot out of design alignment.	Fence is aligned and meets design standards.
A				Missing or loose tension wire.	Tension wire in place and holding fabric.
A				Missing or loose barbed wire that is sagging more than 2.5 inches between posts.	Barbed wire in place with less than 3/4 inch sag between posts.
A				Extension arm missing, broken, or bent out of shape more than 1.5 inches.	Extension arm in place with no bends larger than 3/4 inch.
A			Deteriorated Paint or Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Structurally adequate posts or parts with a uniform protective coating.
M			Openings in Fabric	Openings in fabric are such that an 8-inch diameter ball could fit through.	No openings in fabric.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-16. Maintenance Checklist for Gates

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Damaged or Missing Components	Gate is broken, jammed, or missing.	Pond has a functioning gate to allow entry of people and maintenance equipment such as mowers and backhoe. If a lock is used, make sure the county field staff have a key.
M				Broken or missing hinges such that gate cannot be easily opened and closed by one maintenance person.	Hinges intact and lubed. Gate is working freely.
A				Gate is out of plumb more than 6 inches and more than 1 foot out of design alignment.	Gate is aligned and vertical.
A				Missing stretcher bar, stretcher bands, and ties.	Stretcher bar, bands, and ties in place.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-17. Maintenance Checklist for Access Roads/Easements

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
One Time	General		No access road exists	If ponds or other drainage system features needing maintenance by motorized equipment are present, either an access road or access from public streets is required.	Determine whether an easement to drainage feature exists. If yes, obtain County permits and construct gravel (or equal) access road. If not report lack of easement to County attention.
M			Block roadway	Debris which could damage vehicle tires (glass or metal)	Roadway free of debris which could damage tires.
A				Any obstructions which reduce clearance above road surface to less than 14 feet.	Roadway overhead clear to 14 feet high.
A				Any obstructions restricting access to less than 15 feet width.	Obstruction removed to allow at least a 15 foot wide access.
A	Easement Markers		Easement Not Clearly Identified	Check that easement markers are in place identifying limits of easement	Easement markers installed at 100-ft intervals and changes in direction along easement lines.
A,S	Road surface		Settlement, potholes, mush spots, ruts	When any surface exceeds 6-inches in depth and 6 square feet in area. In general, any surface defect which hinders or prevents maintenance access.	Road surface uniformly smooth with no evidence of settlement, potholes, mush spots, or ruts. Occasionally application of additional gravel or pit run rock will be needed.
M			Vegetation in road surface	Woody growth that could block vehicular access. Excessive weed cover.	Remove woody growth at early stage to prevent blockage. Cut back weeds if they begin to encroach on road surface.
M,S	Shoulders and ditches		Erosion damage	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep	Shoulder free of erosion and matching the surrounding road.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

- A = Annual (March or April preferred)
- M = Monthly (see schedule)
- S = After major storms

Table C-18. Conveyance Pipes and Ditches

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	Pipes		Sediment & Debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
M			Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely through pipes.
A			Damaged (rusted, bent, or crushed)	Protective coating is damaged, rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
M				Any dent that significantly impedes flow (i.e. decreases the cross section area of pipe by more than 20%)	Pipe repaired or replaced
M				Pipe has major cracks or tears allowing groundwater leakage.	Pipe repaired or replaced.
M,S	Open ditches		Trash & debris	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam and coated paper.	Remove trash and debris and dispose as prescribed by solid waste regulations.
M			Sediment buildup	Accumulated sediment that exceeds 20% of the design depth.	Ditch cleared of all sediment and debris so that it matches design.
A			Vegetation	Vegetation (e.g. weedy shrubs or saplings) that reduces free movements of water through ditches.	Water flows freely through ditches. Grass vegetation should be left alone.
M			Erosion on	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
A			Rock lining out of place or missing (if applicable)	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standard.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:
 A = Annual (March or April preferred)
 M = Monthly (see schedule)
 S = After major storms

Table C-19. Debris Barriers (E.G. Trash Racks)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	Site		Trash and debris	Trash and debris plugging more than 20% of the area of the barrier.	Barrier clear to receive capacity flow.
A			Sediment accumulation	Sediment accumulation of greater than 20% of the area of the barrier	Barrier clear to receive capacity flow
A	Structure		Cracked, broken or loose	Structure with bars attached to is damaged – pipe is loose or cracked or concrete structure is cracked, broken or loose.	Structure barrier attached to is sound.
A	Bars		Bar spacing	Bar spacing exceeds 6-inches	Bars have at most 6-inches spacing
A			Damaged or missing bars	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than ¼ inch.
A				Bars are missing or entire barrier missing.	Bars in place according to design.
A				Bars are loose and rust is causing 50% deterioration to any part of barrier.	Repair or replace barrier to design standards.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

- A = Annual (March or April preferred)
- M = Monthly (see schedule)
- S = After major storms

Table C-20. Maintenance Checklist for Grounds (Landscaping)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Weeds (non poisonous)	Weeds growing in more than 20% of the landscaped area (trees and shrubs only)	Weeds present in less than 5% of the landscaped area.
M			Safety hazard	Any presence of poison ivy, poison oak or other poisonous vegetation or insect nests.	No poisonous vegetation or insect nests present in landscaped area.
M,S			Trash or litter	Trash/debris exceeds 5 cubic feet (this is about equal to the amount of trash in one standard garbage can) per 1,000 square feet. In general there should be no evidence of visual dumping.	Remove/dispose of waste in accordance with solid waste regulations.
M,S			Erosion of ground surface	Noticeable rills are seen in landscaped areas.	Causes of erosion are identified and steps taken to slow down/spread out the water. Eroded areas are filled, contoured, and seeded.
A	Trees and shrubs		Damage	Limbs or parts of trees or shrubs that are split or broken which affect more than 25% of the total foliage of the tree or shrub.	Trim trees/shrubs to restore shape. Replace trees/shrubs with severe damage.
M				Tree or shrubs that have been blown down or knocked over.	Replant tree, inspecting for injury to stem or roots. Replace if severely damaged.
A				Tree or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.	Place stakes and rubber-coated ties around young trees/shrubs for support.
M,S	Shoulders and ditches		Erosion damage	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep	Shoulder free of erosion and matching the surrounding road.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-21. Maintenance Checklist for Dispersion BMPs (BMP LID.05,06,07,11,12,13)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Vegetation management	Any presence invasive plants, poison ivy, poison oak or other poisonous vegetation or insect nests.	No poisonous vegetation or inspect nests present in landscaped area.
M			Disturbance	Area designated for dispersion is no encroached upon vegetation is healthy and functioning.	Restore disturbed native vegetation areas (see BMP LID.01). Remove encroachments.
M,S			Trash or litter	In general there should be no evidence of visual dumping.	Remove/dispose of waste in accordance with solid waste regulations.
M,S			Erosion of ground surface	Noticeable rills or channeling is seen in dispersion areas.	Causes of erosion are identified and steps taken to slow down/spread out the water. Eroded areas are filled, contoured, and seeded.
A	Drainage		Bypass flow	Dispersed flow concentrates and isn't spread evening through dispersion area.	No evidence of dispersed flow bypassing dispersion area.
M			Inlets & Outlets	Dispersion pads and spreaders functioning correctly. See outfall maintenance checklist.	Dispersion device functions as designed.
A	Controls		Signage & fencing	Signs removed, fencing damaged or missing.	Restore fencing & signage per design.
M,S	Sedimentation		Sediment buildup	Sediment buildup around outlet of dispersion device.	Hand remove sediment buildup and replant disturbed area.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-22. Maintenance Checklist for Vegetated Roof (BMP LID.10)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	Soil/Growth Medium		Growth Medium	Water does not permeate growth media (runs off surface)	Aerate or replace media
M			Fallen leaves/debris	Fallen leaves or debris are present.	Remove/dispose.
M,S			Erosion/scouring	Areas of potential erosion are visible.	Take steps to repair or prevent erosion. Stabilize with additional soil substrate growth medium and additional plants.
A	System Structural Components		General	Structural components are present.	Inspect structural components for deterioration or failure. Repair/replace as necessary.
M			Inlet Pipe	Sediment, vegetation, or debris blocks 35% or more of inlet structure.	Clear blockage, identify and correct any problems that led to blockage.
M				Inlet pipe is in poor condition.	Repair/replace
M				Inlet pipe is clogged	Remove roots or debris.
A	Vegetation		Coverage	Vegetative coverage falls below 75% (unless design specifications stipulate less than 75% coverage)	Install more vegetation.
M			Noxious weeds	Listed noxious vegetation is present. See Thurston County noxious weed list.	By law, noxious weeds must be removed and disposed of immediately. Herbicides and pesticides shall not be used in order to protect water quality.
M			Weeds	Weeds are present	Remove and dispose of weed material. Herbicides and pesticides shall not be used in order to protect water quality.
A			Plants	Dead vegetation is present	Remove dead vegetation when covering greater than 10% of basin area. Replace dead vegetation annually or immediately if necessary to control erosion.
Startup	Irrigation		Irrigation system (if any)	Irrigation system present.	Follow manufacturer's instructions for O&M
Weekly at startup			Plant watering	Plant establishment period (1-3 years)	Water weekly during periods of no rain to ensure plant establishment.
On-going				Longer term period (3+ years)	Water during drought conditions or more often if necessary to maintain plant cover.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
As needed	Spill Prevention and Response		Spill prevention	Storage or use of potential contaminants in the vicinity of the facility.	Exercise spill prevention measures whenever handling or storing potential contaminants.
As needed			Spill response	Release of pollutants. Call to report any spill to the Washington Dept. of Emergency Management. 1-800-258-5990	Cleanup spills as soon as possible to prevent contamination of stormwater.
Startup	Training and documentation		Training/written guidance	Training/written guidance is required for proper O&M	Provide property owners and tenants with proper training and a copy of the O&M Manual and Maintenance Plan.
On-going	Safety		Access and Safety	Egress and ingress routes	Maintain egress and ingress routes to design standards and fire codes.
M	Aesthetics		Aesthetics	Damage / vandalism / debris accumulation	Restore facility to original aesthetic conditions.
A			Grass / vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions (e.g. remove / replace plants, amend soils, etc.)
A	Pest Control		Mosquitoes	Standing water remains for more than three days following a storm	Remove standing water. Identify cause of the standing water and take appropriate action to address the problem (improve drainage).

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-23. Porous Pavement (BMP LID.09)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	Surface		Porous asphalt or cement concrete	Maintenance to prevent clogging with fine sediment.	Use conventional street sweepers equipped with vacuums.
Ongoing					Prohibit use of sand and sealant application and protect from construction runoff.
A				Major cracks or trip hazards	Fill with patching mixes. Large cracks and settlement may require cutting and replacing the pavement section.
As required				Utility cuts	Any damage or change due to utility cuts must be replaced in kind.
A			Fallen leaves / debris	Fallen leaves or debris	Remove / dispose
As required			Interlocking concrete paver blocks	Interlocking paving block missing or damaged	Replace paver block
As required				Settlement of surface	May require resetting
A				Sediment or debris accumulation between paver blocks	Remove / dispose.
A				Loss of void material between paver blocks	Refill per manufacturer's recommendations.
On going				Varied conditions	Perform O&M per manufacturer's recommendations.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-24. Baffle Oil/Water Separator (BMP OW.01)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	Site		Trash and debris	Any trash or debris which impairs the function of the facility.	Trash and debris removed from facility.
M			Contaminants and pollution	Floating oil in excess of 1 inch in first chamber, any oil in other chambers or other contaminants of any type in any chamber.	No contaminants present other than a surface oil film.
A	Vault treatment area		Sediment accumulation	Sediment accumulation exceeding 6 inches in the vault.	No sediment in the vault.
M			Discharge water not clear.	Inspection of discharge water shows obvious signs of poor water quality – effluent discharge from vault shows thick visible sheen.	Effluent discharge is clear.
A			Trash or debris accumulation	Any trash and debris accumulation in vault (floatables and non-floatables).	Vault is clear of trash and debris.
M			Oil accumulation	Oil accumulations that exceed 1 inch, at the surface of the water in the oil/water separator chamber.	No visible oil depth on water.
A	Vault structure		Damage to wall, frame, bottom and/or top slab.	Cracks wider than ½ inch or evidence of soil particles entering the structure through the cracks, or maintenance / inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications.
A			Baffles damaged	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance inspection personnel.	Repair or replace baffles to specifications.
A	Gravity drain		Inoperable valve	Valve will not open and close	Valve opens and closes normally.
A			Valve won't seal	Valve does not seal completely.	Valve completely seals closed.
A	Inlet/outlet pipe		Sediment accumulation	Sediment filling 20% or more of the pipe.	Inlet/outlet pipe clear of sediment.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Trash and debris	Trash and debris accumulated in inlet / outlet pipes (includes floatables and non-floatables)	No trash or debris in pipes.
A			Damaged	Cracks wider than ½ inch at the joint of the inlet/outlet pipes or any evidence of soil entering the joints of the inlet / outlet pipes.	No cracks more than ¼ inch wide at the joint of the inlet/outlet pipe.
M	Access manhole		Cover/lid not in place	Cover/lid is missing or only partially in place. Any open manhole requires immediate maintenance.	Manhole access covered.
M			Locking mechanism not working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts cannot be seated. Self-locking cover/lid does not work.	Mechanism opens with proper tools.
M			Cover/lid difficult to remove.	One maintenance person cannot remove cover/lid after applying 80 lbs of lift.	Cover/lid can be removed and reinstalled by one maintenance person.
A			Ladder rungs unsafe	Missing rungs, misalignment, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
M	Large access doors / plate		Damaged or difficult to open.	Large access doors or plates cannot be opened / removed using normal equipment.	Replace or repair access door so it can be opened as designed.
M			Gap doesn't cover completely	Large access doors not flat and/or access opening not completely covered.	Doors close flat and cover access opening completely.
M			Lifting Rings missing, rusted.	Lifting rings not capable of lifting weight of door or cover/lid.	Lifting rings sufficient to lift or remove cover/lid.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:
A = Annual (March or April preferred)
M = Monthly (see schedule)
S = After major storms

Table C-25. Coalescing Plate Oil/Water Separator (BMP OW.02)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	Site		Trash and debris	Any trash or debris which impairs the function of the facility.	Trash and debris removed from facility.
M			Contaminants and pollution	Floating oil in excess of 1 inch in first chamber, any oil in other chambers or other contaminants of any type in any chamber.	No contaminants present other than a surface oil film.
A	Vault treatment area		Sediment accumulation in forebay	Sediment accumulation exceeding 6 inches in the forebay.	No sediment in the forebay.
M			Discharge water not clear.	Inspection of discharge water shows obvious signs of poor water quality – effluent discharge from vault shows thick visible sheen.	Repair function of plates so effluent is clear.
A			Trash or debris accumulation	Any trash and debris accumulation in vault (floatables and non-floatables).	Vault is clear of trash and debris.
M			Oil accumulation	Oil accumulations that exceed 1 inch, at the surface of the water in the coalescing plate chamber.	No visible oil depth on water and coalescing plates clear of oil.
	Coalescing Plates		Damaged	Plate media broken, deformed, cracked and/or showing signs of failure.	Replace that portion of media pack or entire plate pack depending on severity of failure.
			Sediment accumulation	Any sediment accumulation which interferes with the operation of the coalescing plates.	No sediment accumulation interfering with the coalescing plates.
A	Vault structure		Damage to wall, frame, bottom and/or top slab.	Cracks wider than ½ inch or evidence of soil particles entering the structure through the cracks, or maintenance / inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications.
A			Baffles damaged	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance inspection personnel.	Repair or replace baffles to specifications.

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
	Ventilation pipes		Plugged	Any obstruction to the ventilation pipes.	Ventilation pipes are clear.
A	Shutoff valve		Damaged or inoperable	Shutoff valve cannot be opened or closed.	Shutoff valve operates normally.
A	Inlet/outlet pipe		Sediment accumulation	Sediment filling 20% or more of the pipe.	Inlet/outlet pipe clear of sediment.
A			Trash and debris	Trash and debris accumulated in inlet / outlet pipes (includes floatables and non-floatables)	No trash or debris in pipes.
A			Damaged	Cracks wider than ½ inch at the joint of the inlet/outlet pipes or any evidence of soil entering the joints of the inlet / outlet pipes.	No cracks more than ¼ inch wide at the joint of the inlet/outlet pipe.
M	Access manhole		Cover/lid not in place	Cover/lid is missing or only partially in place. Any open manhole requires immediate maintenance.	Manhole access covered.
M			Locking mechanism not working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts cannot be seated. Self-locking cover/lid does not work.	Mechanism opens with proper tools.
M			Cover/lid difficult to remove.	One maintenance person cannot remove cover/lid after applying 80 lbs of lift.	Cover/lid can be removed and reinstalled by one maintenance person.
A			Ladder rungs unsafe	Missing rungs, misalignment, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
M	Large access doors / plate		Damaged or difficult to open.	Large access doors or plates cannot be opened / removed using normal equipment.	Replace or repair access door so it can be opened as designed.
M			Gaps, doesn't cover completely	Large access doors not flat and/or access opening not completely covered.	Doors close flat and cover access opening completely.
M			Lifting Rings missing, rusted.	Lifting rings not capable of lifting weight of door or cover/lid.	Lifting rings sufficient to lift or remove cover/lid.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

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S = After major storms