City of Tacoma
Environmental Services Department

Memorandum

TO: Environmental Services Staff and City of Tacoma Website

FROM: Michael P. Slevin III, P.E.
Environmental Services Director

SUBJECT: Stormwater Facility Maintenance Standards – Required NPDES Permit

DATE: June 30, 2015

Effective June 30, 2015, the Maintenance Standards contained in Volume 1, Appendix C of the 2012 City of Tacoma Stormwater Management Manual shall be replaced with the new maintenance standards attached.

The City of Tacoma's (City) Environmental Services Department has developed this policy memo to ensure compliance with the National Pollutant Discharge Elimination System (NPDES) Phase I Municipal Stormwater Permit (Permit) – Section S5.C.9 – Operation and Maintenance Program.

Section S5.C.9.a of the Permit states: *"Maintenance Standards. Each Permittee shall implement maintenance standards that are as protective, as or more protective, of facility function than those specified in Chapter 4 of Volume V of the Stormwater Management Manual for Western Washington. For facilities which do not have maintenance standards, the Permittee shall develop a maintenance standard. No later than June 30, 2015 each Permittee shall update their maintenance standards as necessary to meet the requirements of this section."*

Appendix C Maintenance Standards for Drainage Facilities

The following pages contain maintenance standards for typical stormwater facilities that may be required for stormwater mitigation. The maintenance standards should be included in the project Operations and Maintenance Manual. If the proposed stormwater system contains facilities or components that are not contained within this Appendix, the applicant is responsible for developing additional maintenance standards and checklists for the proposed facility or component. If there are components listed on the checklists that are not applicable to the proposed design, those components shall be removed. The operation and maintenance checklist shall accurately reflect the proposed design.Stormwater facilities and components should be inspected as specified in the applicable maintenance standards.

The maintenance standards can be used as inspection forms for the system and associated components. Record the date each time an inspection is completed and note any problems and actions taken. Keep completed forms with the Operations and Maintenance Manual. City staff may request to review the maintenance forms as a part of their inspection process. Some components or facilities do not need to be looked at every time an inspection is conducted. Use the suggested frequency at the left of each item as a guideline for activities to be completed with each inspection.

The facility-specific maintenance standards contained in this section are intended to be conditions for determining if maintenance actions are required as identified through inspection. They are not intended to be measures of the facility's required condition at all times between inspections. In other words, exceeding these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance schedules shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

The Western Washington Low Impact Development Operation and Maintenance Guidance Document can be used for developing an operation and maintenance manual for stormwater systems that contain low impact development BMPs. The document can be found at: http://www.ecy.wa.gov/programs/wq/stormwater/municipal/LID/TRAINING/OperationsAndMaintenance.html.

NOTE: Maintenance checklist #29 contains maintenance concerns that may be applicable to any stormwater facility. This checklist must be included in all Operation and Maintenance manuals as applicable.

The City of Tacoma has developed specific template checklists to be used for City maintained facilities. These template checklists shall be used for all City maintained facilities. Do no include the Maintenance Standards contained in Volume C in the Operation and Maintenance Manual - the completed checklist satisfies the maintenance standard requirement.

Appendix C Contents

#1 - Maintenance Checklist for Detention Ponds

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Any trash and debris which exceeds 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.	Trash and debris cleared from site.
Annually (preferably Sept.)	General		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or Local Regulations (Apply requirements of adopted integrated pest management policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required. (Coordinate with the Pierce County Noxious Weed Control Board.)
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Monthly from Oct. – Apr.	General		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 removed and dam or berm repaired. (Coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	General		Beaver Dams	Beaver dam results in an adverse change in the functioning of the facility.	Facility is returned to design function. (Contact WDFW Region 6 to identify the appropriate Nuisance Wildlife Control Operator)
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site in compliance with adopted integrated pest management policies.
Annually (preferably Sept.)	General		Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that do not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses.
Annually (preferably Sept.)	General		Hazard Trees	If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements).	Remove hazard trees
Monthly from Oct. – Apr.	Side Slopes of Pond		Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
Monthly from Oct. – Apr. and after any major storm event (1” in 24 hours)	Side Slopes of Pond		Erosion	Any erosion observed over 2” deep on a compacted berm embankment.	If erosion is occurring on compacted berms a licensed Civil Engineer should be consulted to resolve source of erosion.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	Storage Area		Sediment	Accumulated sediment that exceeds 10 percent of the design pond depth unless otherwise specified or affects inletting or outletting condition of the facility.	Sediment cleaned out to design pond shape and depth; pond reseeded if necessary to control erosion. (If sediment contamination is a potential problem, sediment should be tested regularly to determine leaching potential prior to disposal.)
Monthly from Oct. – Apr.	Storage Area		Liner (If Applicable)	Liner is visible and has more than three 1/4 inch holes in it.	Liner repaired or replaced. Liner is fully covered.
Annually (preferably Sept.)	Pond Berms (Dikes)		Settlement	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed Civil Engineer should be consulted to determine the source of the settlement.	Dike is restored to the design elevation.
Annually (preferably Sept.)	Pond Berms Over 4 ft in height (Dikes)		Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed Civil Engineer should be consulted for proper berm/spillway restoration.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Pond Berms (Dikes)		Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical Engineer be called in to inspect and evaluate condition and recommend repair.)	Piping eliminated. Erosion potential eliminated.
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed Civil Engineer should be consulted for proper berm/spillway restoration.
Annually (preferably Sept.)	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 at the top of outflow path of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment over 2“ deep.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed Civil Engineer should be consulted to resolve source of erosion.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#2 - Maintenance Checklist for Infiltration Ponds/Basins

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Any trash and debris which exceeds 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.	Trash and debris cleared from site.
Annually (preferably Sept.)	General		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or Local Regulations. (Apply requirements of adopted integrated pest management policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board) Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Monthly from Oct. – Apr.	General		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 removed and dam or berm repaired. (Coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)
Monthly from Oct. – Apr.	General		Beaver Dams	Beaver dam results in an adverse change in the functioning of the facility.	Facility is returned to design function. (Contact WDFW to identify the appropriate Nuisance Wildlife Control Operator)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Monthly from Oct. – Apr.	Storage Area		Water Not Infiltrating	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration (24 hours or design infiltration time). (A percolation test pit or test of facility indicates facility is only working at 90 percent of its designed capabilities. If 2 inches or more sediment is present, remove).	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Rock Filters		Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Gravel in rock filter is replaced.
Monthly from Oct. – Apr.	Ponds		Vegetation	Exceeds 18 inches.	Mow or remove vegetation as necessary. Remove all clippings.
Monthly from Oct. – Apr.	Ponds		Vegetation	Bare spots.	Revegetate and stabilize immediately. Do not apply fertilizers.
Monthly from Oct. – Apr.	Side Slopes of Pond		Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Pond Berms (Dikes)		Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or piping. A licensed Civil Engineer should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.
Annually (preferably Sept.)	Pond Berms (Dikes)		Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical Engineer be called in to inspect and evaluate condition and recommend repair.)	Piping eliminated. Erosion potential eliminated.
Annually (preferably Sept.)	General		Hazard Trees	If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements)	Remove hazard trees
Annually (preferably Sept.)	General		Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that do not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses.
Annually (preferably Sept.)	Pond Berms (Dikes)		Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed Civil Engineer should be consulted for proper berm/spillway restoration.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed Civil Engineer should be consulted for proper berm/spillway restoration.
Annually (preferably Sept.)	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 at the top of out flowpath of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed Civil Engineer should be consulted to resolve source of erosion.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#3 - Maintenance Checklist for Infiltration Trenches

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Trash and debris in presettling basin, sump, or observation well/port.	Trash and debris cleared from site.
Annually (preferably Sept.)	General		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or Local Regulations. (Apply requirements of adopted integrated pest management policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board) Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Monthly from Oct. – Apr.	General		Water Not Infiltrating	Water ponding on surface or visible in observation well 24 hours after storm event.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design. Remove any sediment from surface inlet if applicable.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.) and after any major storm event (1" in 24 hours)	Trenches		Observation Well (Use surface of trench if well is not present)	Water ponds at surface during storm events. Water visible in observation well 48 hours after storm event.	Remove and Replace rock layer and geomembrane or clean rock and geomembrane. Check underdrain pipe for sediment accumulation and remove sediment.
Annually (preferably Sept.)	General		Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that do not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses.
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed Civil Engineer should be consulted to resolve source of erosion.
Monthly from Oct. – Apr.	Presettling Sump		Facility or sump filled with sediment and/or debris	6 inches or designed sediment trap depth of sediment.	Sediment is removed.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#4 - Maintenance Checklist for Closed Detention Systems (Tanks/Vaults)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Storage Area		Plugged Air Vents	One-half of the cross-section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Storage Area		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.
Annually (preferably Sept.)	Storage Area		Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility. (Will require engineering analysis to determine structural stability.)	All joints between tank/ pipe sections are sealed.
Annually (preferably Sept.)	Storage Area		Tank/Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10 percent of its design shape. (Will require engineering analysis to determine structural stability.)	Tank/pipe repaired or replaced to design.
Annually (preferably Sept.)	Storage Area		Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half 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.
Annually (preferably Sept.)	Storage Area		Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half 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 one-fourth inch wide at the joint of the inlet/ outlet pipe.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Manhole		Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole cover is in place.
Annually (preferably Sept.)	Manhole		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.
Annually (preferably Sept.)	Manhole		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
Annually (preferably Sept.)	Manhole		Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

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

Comments:

#5 - Maintenance Checklist for Control Structure/Flow Restrictor

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris (Includes Sediment)	Material exceeds 25 percent of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
Annually (preferably Sept.)	General		Structural Damage	Structure is not securely attached to manhole wall.	Structure securely attached to wall and outlet pipe.
Annually (preferably Sept.)	General		Structural Damage	Structure is not in upright position (allow up to 10 percent from plumb).	Structure in correct position.
Annually (preferably Sept.)	General		Structural Damage	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.
Annually (preferably Sept.)	General		Structural Damage	Any holes–other than designed holes–in the structure.	Structure has no holes other than designed holes.
Annually (preferably Sept.)	Cleanout Gate		Damaged or Missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
Annually (preferably Sept.)	Cleanout Gate		Damaged or Missing	Gate cannot be moved up and down by one maintenance person.	Gate moves up and down easily and is watertight.
Annually (preferably Sept.)	Cleanout Gate		Damaged or Missing	Chain/rod leading to gate is missing or damaged.	Chain is in place and works as designed.
Annually (preferably Sept.)	Cleanout Gate		Damaged or Missing	Gate is rusted over 50 percent of its surface area.	Gate is repaired or replaced to meet design standards.
Annually (preferably Sept.)	Orifice Plate		Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Orifice Plate		Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Overflow Pipe		Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Manhole		Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
Annually (preferably Sept.)	Manhole		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.
Annually (preferably Sept.)	Manhole		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
Annually (preferably Sept.)	Manhole		Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Control structures are usually considered a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Comments:

#6 - Maintenance Checklist for Catch Basins/Manholes

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		"Dump no pollutants" Stencil or stamp not visible	Stencil or stamp should be visible and easily read	Warning signs (e.g., "Dump No Waste-Drains to Stream") shall be painted or embossed on or adjacent to all storm drain inlets.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inlet capacity of the basin by more than 10 percent.	No trash or debris located immediately in front of catch basin or on grate opening.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Trash or debris in any inlet or outlet pipe blocking more than one-third of its height.	Inlet and outlet pipes free of trash or debris.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Dead animals or vegetation that could generate odors and cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than one-fourth inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
Annually (preferably Sept.)	General		Structure Damage to Frame and/or Top Slab	Frame not sitting flush on top slab, i.e., separation of more than three-fourth 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.
Annually (preferably Sept.)	General		Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
Annually (preferably Sept.)	General		Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than one-half-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.	Pipe is regrouted and secure at basin wall.
Annually (preferably Sept.)	General		Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
Monthly from Oct. – Apr. and after any major storm event (1” in 24 hours)	General		Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.
Monthly from Oct. – Apr. and after any major storm event (1” in 24 hours)	General		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.
Monthly from Oct. – Apr. and after any major storm event (1” in 24 hours)	General		Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Catch Basin Cover		Cover Not in Place	Cover is missing or only partially in place.	Any open catch basin requires maintenance. Catch basin cover is in place.
Annually (preferably Sept.)	Catch Basin Cover		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.	Mechanism opens with proper tools.
Annually (preferably Sept.)	Catch Basin Cover		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Annually (preferably Sept.)	Ladder		Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Annually (preferably Sept.)	Grates		Grate opening Unsafe	Grate with opening wider than seven-eighths of an inch.	Grate opening meets design standards.
Monthly from Oct. – Apr. and after any major storm event (1” in 24 hours)	Grates		Trash and Debris	Trash and debris that is blocking more than 20 percent of grate surface inletting capacity.	Grate free of trash and debris.
Annually (preferably Sept.)	Grates		Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#7 - Maintenance Checklist for Debris Barriers (e.g., Trash Racks)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Trash or debris that is plugging more than 20 percent of the openings in the barrier.	Barrier cleared to design flow capacity.
Annually (preferably Sept.)	General		Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than three-fourth inch.
Annually (preferably Sept.)	General		Damaged/ Missing Bars.	Bars are missing or entire barrier missing.	Bars in place according to design.
Annually (preferably Sept.)	General		Damaged/ Missing Bars.	Bars are loose and rust is causing 50 percent deterioration to any part of barrier.	Barrier replaced or repaired to design standards.
Annually (preferably Sept.)	General		Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe.	Barrier firmly attached to pipe.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#8 - Maintenance Checklist for Energy Dissipaters

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
External:					
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Rock Pad		Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Dispersion Trench		Pipe Plugged with Sediment	Accumulated sediment that exceeds 20 percent of the design depth.	Pipe cleaned/flushed so that it matches design.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Dispersion Trench		Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench redesigned or rebuilt to standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Dispersion Trench		Perforations Plugged	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Perforated pipe cleaned or replaced.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Dispersion Trench		Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or the trench is causing or appears likely to cause damage.	Facility rebuilt or redesigned to standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Dispersion Trench		Receiving Area Over-Saturated	Water in receiving area is causing or has potential to cause landslide problems.	No danger of landslides.
Spring and Summer	Flowpath		No or minimal vegetation	Vegetation removed or dead. Vegetation replaced by hard surface.	Design vegetated flowpath is restored.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Internal:					
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Manhole/ Chamber		Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to one-half of original size or any concentrated worn spot exceeding 1 square foot which would make structure unsound	Structure replaced to design standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Manhole/ Chamber		Trash and Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Manhole/ Chamber		Trash and Debris	Trash or debris in any inlet or outlet pipe blocking more than one-third of its height.	Inlet and outlet pipes free of trash or debris.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Manhole/ Chamber		Trash and Debris	Dead animals, trash or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals, trash or vegetation present within the catch basin.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Manhole/ Chamber		Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin.
Annually (preferably Sept.)	Manhole/ Chamber		Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than one-fourth inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Manhole/ Chamber		Structure Damage to Frame and/or Top Slab	Frame not sitting flush on top slab, i.e., separation of more than three-fourth 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.
Annually (preferably Sept.)	Manhole/ Chamber		Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
Annually (preferably Sept.)	Manhole/ Chamber		Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than one-half-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.	Pipe is regrouted and secure at basin wall.
Annually (preferably Sept.)	Manhole/ Chamber		Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Manhole/ Chamber		Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/ cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800-424-8802.)
Annually (preferably Sept.)	Catch Basin/ Manhole Cover		Cover Not in Place	Cover is missing or only partially in place.	Any open catch basin/ manhole requires maintenance. Catch basin cover is closed.
Annually (preferably Sept.)	Catch Basin/ Manhole Cover		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.	Mechanism opens with proper tools.
Annually (preferably Sept.)	Catch Basin/ Manhole Cover		Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#9 - Maintenance Checklist for Typical Biofiltration Swale

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Standing Water	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. Consult the design engineer if underdrains are proposed to be removed or conversion is proposed.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Vegetation	When the grass becomes excessively tall (greater than 10 inches); when nuisance weeds and other vegetation start to take over.	Mow vegetation or remove nuisance vegetation so that flow is not impeded. Grass should be mowed to a height of 3 to 8 inches, but not below design flow level. Remove grass clippings.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Excessive Shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back over-hanging limbs and remove brushy vegetation on adjacent slopes.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Inlet/Outlet/ Underdrain	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. If underdrain, avoid vehicular traffic on swale bottom.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#10 - Maintenance Checklist for Wet Biofiltration Swales

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Sediment Accumulation	Sediment depth exceeds 2 inches in 10 percent of the swale treatment area.	Remove sediment deposits in treatment area.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		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. Dig out roots as necessary. Note: Normally wetland vegetation does not need to be harvested unless die-back is causing oxygen depletion in downstream waters. Fall harvesting of Juncus species is not recommended.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Inlet/Outlet	Inlet/outlet area clogged with sediment and/or debris.	Remove clogging or blockage in the inlet and outlet areas.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris Accumulation	Any trash and debris which exceeds 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.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		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 Juncus effusus (soft rush) in wet areas or snowberry (Symphoricarpos albus) in drier areas, or as recommended by a wetland specialist.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#11 - Maintenance Checklist for Filter Strips

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Vegetation	When the grass becomes excessively tall (greater than 10 inches); when nuisance weeds and other vegetation start to take over.	Mow grass, control nuisance vegetation, such that flow not impeded. Grass should be mowed to a height between 3-4 inches.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris Accumulation	Trash and debris accumulated on the filter strip.	Remove trash and Debris from filter.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#12 - Maintenance Checklist for Wet Ponds

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Water level	First cell is empty, doesn't hold water.	Line the first cell to maintain at least 4 feet of water. Although the second cell may drain, the first cell must remain full to control turbulence of the incoming flow and reduce sediment resuspension.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)			Trash and Debris	Accumulation that exceeds 1 cubic foot per 1000 square feet of pond area.	Trash and debris removed from pond
Biannually (Spring & Fall)	General		Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined in State and Local Regulations. (Apply requirements of adopted integrated vegetation management (IVM) policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board). Complete eradication of noxious weeds may not be possible, however compliance with state or local eradication policies are required.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)			Inlet/Outlet Pipe	Inlet and/or outlet pipe clogged with sediment and/or debris material	No clogging or blockage in the inlet and outlet piping.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)			Sediment Accumulation in Pond Bottom	Sediment accumulations in pond bottom that exceeds the depth of sediment zone plus 6 inches, usually in the first cell.	Sediment removed from pond bottom. (If sediment contamination is a potential problem, sediment should be tested regularly to determine leaching potential prior to disposal.)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly			Vegetation	Vegetation is overgrown or sparse.	Trim vegetation as necessary to keep pond free of leaves and maintain aesthetic appearance. Revegetate bare sloped areas. Regrade before revegetation as needed.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)			Oil Sheen on Water	Prevalent and visible oil sheen.	Oil removed from water using oil- absorbent pads or vactor truck. Source of oil located and corrected. If chronic low levels of oil persist, plant wetland plants such as Juncus effusus (soft rush) which can uptake small concentrations of oil.
Annually (preferably Sept.)			Erosion	Erosion of the pond's side slopes and/or scouring of the pond bottom that exceeds 6 inches, or where continued erosion is prevalent.	Slopes stabilized using proper erosion control measures and repair methods.
Annually (preferably Sept.)			Settlement of Pond Dike/ Berm	Any part of these components that has settled 4 inches or lower than the design elevation, or inspector determines dike/berm is unsound.	Dike/berm is repaired to specifications
Annually (preferably Sept.)			Internal Berm	Berm dividing cells should be level.	Berm surface is leveled so that water flows evenly over entire length of berm.
Annually (preferably Sept.)			Overflow Spillway	Rock is missing and soil is exposed at top of spillway or outside slope.	Rocks replaced to specifications.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#13 - Maintenance Checklist for Treatment Wetlands

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Spring & Fall)	General		Trash and Debris	Any trash and debris accumulations which exceed 5 cubic feet per 1,000 square feet (this is a little more than the amount of trash it would take to fill up one standard 32 gallon garbage can). In general, there should be no visual evidence of dumping. If there is less than the threshold, remove all trash and debris as part of the next scheduled maintenance.	Trash and debris cleared from site.
Biannually (Spring & Fall)	General		Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined in State and Local Regulations. (Apply requirements of adopted integrated vegetation management (IVM) policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board). Complete eradication of noxious weeds may not be possible, however compliance with state or local eradication policies are required.
Biannually (Spring & Fall)	General		Oil Sheen on Water	Prevalent and visible oil sheen.	Oil removed from water using oil- absorbent pads or vactor truck. Source of oil located and corrected. If chronic low levels of oil persist, plant emergent wetland plants such as Juncus effusus (soft rush) which can assist filtering small concentrations of oil.
Biannually (Spring & Fall) and after any major storm event (1” in 24 hours)	General		Inlet/Outlet Pipe	Inlet/Outlet pipe clogged with sediment and/or debris material or damaged.	No clogging or blockage in the inlet and outlet piping.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Spring & Fall)	General		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 removed and dam or berm repaired. (Coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)
Biannually (Spring & Fall)	General		Beaver Dams	Beaver dam results in an adverse change in the functioning of the facility.	Facility is returned to design function. Contact WDFW to identify the appropriate Nuisance Wildlife Control Operator.
Biannually (Spring & Fall)	General		Tree Growth and Hazard Trees	Tree growth that impedes maintenance access.	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses.
Biannually (Spring & Fall)	General		Tree Growth and Hazard Trees	If dead, diseased, or dying trees are identified, use a Certified Arborist to determine the health of tree and whether removal is required.	Remove hazard trees.
Biannually (Spring & Fall)	General		Liner	Liner is visible and has more than three one-fourth inch holes in it.	Liner is repaired or replaced. Liner is fully covered.
Biannually (Spring & Fall)	Forebay		Sediment Accumulation	Sediment accumulation in forebay exceeds the design depth of the sediment zone plus 6 inches.	Accumulated sediment is removed from forebay bottom to the design depth of the sediment zone.
Biannually (Spring & Fall)	Side Slopes of Wetland		Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s) such as rock reinforcement, planting of grass, or additional compaction.
Biannually (Spring & Fall) and after any major storm event (1” in 24 hours)	Side Slopes of Wetland		Erosion	Any erosion observed on a compacted berm embankment over 2” deep.	If erosion is occurring on compacted berms a licensed Civil Engineer should be consulted to resolve source of erosion.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Spring & Fall)	Wetland Cell		Wetland Vegetation	20 percent or more of the constructed wetland area has dead or dying vegetation, as measured by stem counts relative to the design plant coverage.	Dead or dying vegetation is replaced by like species, unless recommended otherwise by the Wetlands Consultant and approved by the City. (Watering, physical support, mulching, and weed removal may be required on a regular basis especially during the first 3 years.)
Biannually (Spring & Fall)	Wetland Cell		Wetland Vegetation	Percent vegetated cover of constructed wetland bottom area, excluding exotic and invasive species, is less than 50 percent after 2 years.	Remove exotic/ invasive species, additional plantings may be required.
Biannually (Spring & Fall)	Wetland Cell		Wetland Vegetation	Decaying vegetation produces foul odors.	Decaying vegetation is removed, preferably in late summer.
Once in mid summer (July or August)	Wetland Cell		Wetland Vegetation	Wetland vegetation is blocking flowpaths causing flow back-up and flooding.	Areas of blocking vegetation are cut back sufficient to allow design flows and prevent flooding.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Wetland Cell		Wetland Vegetation	Water quality monitoring indicates that wetland vegetation is contributing phosphorus and metals to downstream waters rather than sequestering them. Environmental Services will determine when water quality monitoring is required.	To maximize removal of wetland pollutants, vegetation must be periodically harvested, particularly with respect to phosphorus and metals removal. Harvesting should occur by mid-summer before plants begin to transfer phosphorus from the aboveground foliage to subsurface roots, or begin to lose metals that desorb during plant die off. Every 3 to 5 years the entire plant mass including roots should be harvested because the below ground biomass constitutes a significant reservoir (as much as half) of the nutrients and metals that are removed from stormwater by plants.
Biannually (Spring & Fall)	Wetland Cell		Sediment Accumulation	Sediment accumulation inhibits growth of wetland plants or reduces wetland volume (greater than 1 foot of sediment accumulation).	Dredge to design depth.
Annually (preferably Sept.)	Wetland Berms (Dikes)		Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed Civil Engineer should be consulted to determine the source of the settlement.	Dike restored to the design elevation.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Wetland Berms (Dikes)		Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical Engineer be called in to inspect and evaluate condition and recommend repairs.	Piping eliminated. Erosion potential eliminated.
Annually (preferably Sept.)	Wetland Berms over 4 ft in height (Dikes)		Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed Civil Engineer should be consulted for proper berm/spillway restoration.
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Obstruction	Tree growth or other blockage on emergency spillways may cause failure of the berm due to uncontrolled overtopping.	Obstruction should be removed. A licensed Civil Engineer should be consulted for proper berm/spillway restoration.
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Rock Missing	Only one layer of rock exists above native soil in an area 5 square feet or larger, or any exposure of native soil at the top of outflow path of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
Annually (preferably Sept.)	Emergency Overflow/ Spillway		Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed Civil Engineer should be consulted to resolve source of erosion.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#14 - Maintenance Checklist for Wet Vaults

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash/Debris Accumulation	Trash and debris accumulated in vault, pipe or inlet/outlet (includes floatables and non-floatables).	Remove trash and debris from vault.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Sediment Accumulation in Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6 inches.	Remove sediment from vault. (If sediment contamination is a potential problem, sediment should be tested regularly to determine leaching potential prior to disposal.)
Annually (preferably Sept.)	General		Damaged Pipes	Inlet/outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
Annually (preferably Sept.)	General		Access Cover Damaged/Not Working	Cover cannot be opened or removed, especially by one person.	Pipe repaired or replaced to proper working specifications.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		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).
Annually (preferably Sept.)	Vault Structure		Damage - Includes Cracks in Walls/Bottom, Damage to Frame and/or Top Slab	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.
Annually (preferably Sept.)	Vault Structure		Damage - Includes Cracks in Walls/Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half-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 one-fourth inch at the joint of the inlet/ outlet pipe.
Annually (preferably Sept.)	Vault Structure		Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection staff.	Baffles repaired or replaced to specifications.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Access Ladder		Damage	Ladder is corroded or deteriorated, not functioning properly, not attached to structure wall, missing rungs, has cracks and/or misaligned. Confined space warning sign missing.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. Replace sign warning of confined space entry requirements.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

A vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Comments:

#15 - Maintenance Checklist for Sand Filters (above ground/open)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		Sediment Accumulation on top layer	Sediment depth exceeds one-half inch.	No sediment deposit on grass layer of sand filter that would impede permeability of the filter section.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		Trash and Debris Accumulations	Trash and debris accumulated on sand filter bed.	Trash and debris removed from sand filter bed.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		Sediment/ Debris in Clean-Outs	When the clean-outs become full or partially plugged with sediment and/or debris.	Sediment removed from clean-outs.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		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.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		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. Inspect periphery and cleanouts for leakage.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		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.
Annually (preferably Sept.)	Above ground (open sand filter)		Rock Pad Missing or Out of Place	Soil beneath the rock is visible.	Rock pad replaced or rebuilt to design specifications.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		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. Refill rills and gullies with sand.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Above ground (open sand filter)		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.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Every other year	General		Drawdown		Every two years conduct a drawdown test by filling the filter with water and measuring the decline in water level over a 4 - 8 hour period.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#16 - Maintenance Checklist for Sand Filters (below ground/enclosed)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Below Ground Vault		Sediment Accumulation on Sand Media Section	Sediment depth exceeds one-half inch.	No sediment deposits on sand filter section that would impede permeability of the filter section.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Below Ground Vault		Sediment in Drain Pipes/ Cleanouts	When drain pipes, cleanouts become full with sediment and/or debris.	Sediment and debris removed.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Below Ground Vault		Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	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).
Annually (preferably Sept.)	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.
Annually (preferably Sept.)	Below Ground Vault		Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than one-half 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.
Annually (preferably Sept.)	Below Ground Vault		Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than one-half 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 one-fourth inch at the joint of the inlet/ outlet pipe.
Annually (preferably Sept.)	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.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	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.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

A below ground enclosed sand filter is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Comments:

#17 - Maintenance Checklist for Baffle Oil/Water Separators - American Petroleum Institute (API) Type

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Monitoring		Inspection of discharge water for obvious signs of poor water quality.	Sheen, obvious oil present in discharge.	Effluent discharge from vault should be clear without visible sheen.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Monitoring		Sediment Accumulation	Sediment depth in bottom of vault exceeds 6 inches in depth.	No sediment deposits on vault bottom that would impede flow through the vault and reduce separation efficiency.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Monitoring		Trash and Debris Accumulation	Trash and debris accumulation in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/outlet piping.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Monitoring		Oil Accumulation	Oil accumulations that exceed 1 inch, at the surface of the water or 6 inches of sludge in the sump.	Extract oil/sludge from vault by vactoring. Dispose of in accordance with state and local rules and regulations. Clean separators by October 15 to remove material accumulated during the dry season. Clean separators after spills. Replace wash water with clean water before returning to service.
Annually (preferably Sept.)	Structure		Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired or replaced.
Annually (preferably Sept.)	Structure		Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
Annually (preferably Sept.)	Structure		Vault Structure Damage Includes Cracks in Walls/Bottom, Damage to Frame and/or Top Slab	Maintenance person judges that structure is unsound.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Structure		Vault Structure Damage Includes Cracks in Walls/Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half 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 one-fourth inch at the joint of the inlet/ outlet pipe.
Annually (preferably Sept.)	Structure		Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
Annually (preferably Sept.)	Structure		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 and meets specifications, and is safe to use as determined by inspection personnel.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

An oil/water separator vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Comments:

#18 - Maintenance Checklist for Coalescing Plate Oil/Water Separators

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Inspection of discharge water for obvious signs of poor water quality.	Sheen, obvious oil present in discharge.	Effluent discharge from vault should be clear with no visible sheen.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Sediment Accumulation	Sediment depth in bottom of vault exceeds 6 inches in depth and/or visible signs of sediment on plates.	No sediment deposits on vault bottom and plate media, which would impede flow through the vault and reduce separation efficiency.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and 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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Oil Accumulation	Oil accumulation that exceeds 1 inch at the water surface.	Oil is extracted from vault using vactoring methods. Dispose of in accordance with state and local rules and regulations. Coalescing plates are cleaned by thoroughly rinsing and flushing. Direct wash-down effluent to the sanitary sewer system where permitted. Should be no visible oil depth on water. Clean separators by October 15 to remove material accumulated during the dry season. Clean separators after spills. Replace wash water with clean water before returning to service.
Annually (preferably Sept.)	Structure		Damaged Coalescing Plates	Plate media broken, deformed, cracked and/ or showing signs of failure.	A portion of the media pack or the entire plate pack is replaced depending on severity of failure.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Structure		Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and or replaced.
Annually (preferably Sept.)	Structure		Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced per specifications.
Annually (preferably Sept.)	Structure		Vault Structure Damage - Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half 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.
Annually (preferably Sept.)	Structure		Vault Structure Damage - Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab	Cracks wider than one-half 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 one-fourth inch at the joint of the inlet/ outlet pipe.
Annually (preferably Sept.)	Structure		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 and meets specifications, and is safe to use as determined by inspection personnel.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

An oil/water separator vault is a confined space. Visual inspections should be performed aboveground. If entry is required it should be performed by qualified personnel.

Comments:

#19 - Maintenance Checklist for Fencing/Shrubbery Screen/Other Landscaping

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	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.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		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.
Monthly from Oct. – Apr.	General		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.
Annually (preferably Sept.)	Fences		Damaged Parts	Posts out of plumb more than 6 inches.	Posts are within 1.5 inches of plumb.
Annually (preferably Sept.)	Fences		Damaged Parts	Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
Annually (preferably Sept.)	Fences		Damaged Parts	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.
Annually (preferably Sept.)	Fences		Damaged Parts	Missing or loose tension wire.	Tension wire in place and holding fabric.
Annually (preferably Sept.)	Fences		Damaged Parts	Missing or loose barbed wire that is sagging more than 2.5 inches between posts.	Barbed wire in place with less than three-fourth inch sag between posts.
Annually (preferably Sept.)	Fences		Damaged Parts	Extension arm missing, broken, or bent out of shape more than 1.5 inches.	Extension arm in place with no bends larger than three-fourth inch.
Annually (preferably Sept.)	Fences		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.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#20 - Maintenance Checklist for Gates

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	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 City field staff have a key.
Monthly from Oct. – Apr.	General		Damaged or Missing Components	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.
Annually (preferably Sept.)	General		Damaged or Missing Components	Gate is out of plumb more than 6 inches and more than 1 foot out of design alignment.	Gate is aligned and vertical.
Annually (preferably Sept.)	General		Damaged or Missing Components	Missing stretcher bands, and ties.	Stretcher bar, bands, and ties in place.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#21 - Maintenance Checklist for Grounds (Landscaping)

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	General		Weeds (non-poisonous)	Weeds growing in more than 20 percent of the landscaped area (trees and shrubs only).	Weeds present in less than 5 percent of the landscaped area.
Biannually (Spring & Fall)	General		Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined in State and Local Regulations. (Apply requirements of adopted integrated vegetation management (IVM) policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board). Complete eradication of noxious weeds may not be possible, however compliance with state or local eradication policies are required.
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		Trash and Debris	Any trash and debris which exceeds 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.	Trash and debris cleared from site.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General		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.
Annually (preferably Sept.)	Trees and shrubs		Damage	Limbs or parts of trees or shrubs that are split or broken which affect more than 25 percent of the total foliage of the tree or shrub.	Trim trees/shrubs to restore shape. Replace severely damaged trees/shrubs.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	Trees and shrubs		Damage	Trees or shrubs that have been blown down or knocked over.	Replant tree, inspecting for injury to stem or roots. Replace if severely damaged.
Annually (preferably Sept.)	Trees and shrubs		Damage	Trees 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.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#22 - Maintenance Checklist for Bioretention Facilities

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually and After Major Storm Events	Earthen side slopes and berms		Failure in earthen reservoir	Erosion (gullies/rills) greater than 2 inches deep around inlets, outlet and alongside slopes.	Eliminate cause of erosion and stabilize damaged area (regrade, rock, vegetation, erosion control matting). For deep channels or cuts (over 3 inches in ponding depth), temporary erosion control measures should be put in place until permanent repairs can be made. Properly designed, constructed and established facilities with appropriate flow velocities should not have erosion problems except perhaps in extreme events. If erosion problems persist, the following should be reassessed: (1) flow volumes from contributing areas and bioretention facility sizing; (2) flow velocities and gradients within the facility; and (3) flow dissipation and erosion protection strategies at the facility inlet.
Annually	Earthen side slopes and berms		Failure in earthen reservoir	Erosion of sides causes slope to become a hazard.	Take actions to eliminate the hazard and stabilize slopes.
Annually and After Major Storm Events	Earthen side slopes and berms		Failure in earthen reservoir	Settlement greater than 3 inches (relative to undisturbed sections of the berm).	Restore to design height.
Annually and After Major Storm Events	Earthen side slopes and berms		Failure in earthen reservoir	Downstream face of berm wet, seeps or leaks evident.	Plug any holes and compact berm (may require consultation with engineer, particularly for larger berms).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Earthen side slopes and berms		Failure in earthen reservoir	Any evidence of rodent holes or water piping in berm.	Eradicate rodents (see “Pest control”). Fill holes and compact (may require consultation with engineer, particularly for larger berms).
Annually	Concrete sidewalls		Failure in sidewalls	Cracks or failure of concrete sidewalls.	Repair/seal cracks. Replace if repair is insufficient.
Annually	Rockery sidewalls		Failure in sidewalls	Rockery side walls are insecure.	Stabilize rockery sidewalls (may require consultation with engineer particularly for walls 4 feet or greater in height).
As Needed	Facility area		Accumulation of sediment or debris	Trash and debris present.	Clean out trash and debris.
Annually and After Major Storm Events	Facility bottom area		Accumulation of sediment or debris	Accumulated sediment to the extent that infiltration rate is reduced (See “Ponded water”) or surface storage capacity significantly impacted.	Remove excess sediment. Replace any vegetation damaged or destroyed by sediment accumulation and removal. Mulch newly planted vegetation. Identify and control the sediment source (if feasible). If accumulated sediment is recurrent, consider adding presettlement or installing berms to create a forebay at the inlet.
As Needed During and After Fall Leaf Drop	Facility bottom area		Accumulation of sediment or debris	Accumulated leaves in facility.	Remove leaves if there is a risk to clogging outlet structure or water flow is impeded.
Annually and After Major Storm Events	Low permeability check dams and weirs		Accumulation of sediment or debris	Sediment, vegetation, or debris accumulated at or blocking (or having the potential to block) check dam, flow control weir or orifice.	Clear the blockage.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually and After Major Storm Events	Low permeability check dams and weirs		Failure of check dams and weirs	Erosion and/or undercutting present.	Repair and take preventative measures to prevent future erosion and/or undercutting.
Annually	Low permeability check dams and weirs		Failure of check dams and weirs	Grade board or top of weir damaged and not level.	Restore to level position.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually and After Major Storm Events	Ponded water		Water remains in bioretention facility after storm event	Excessive ponding water: Water overflows during storms smaller than the design event or ponded water remains in the basin 48 hours or longer after the end of a storm.	Determine cause and resolve in the following order: 1)Confirm leaf or debris buildup in the bottom of the facility is not impeding infiltration. If necessary, remove leaf litter/debris. 2)Ensure that underdrain (if present) is not clogged. If necessary, clear underdrain. 3)Check for other water inputs (e.g., groundwater, illicit connections). 4)Verify that the facility is sized appropriately for the contributing area. Confirm that the contributing area has not increased. If steps #1-4 do not solve the problem, the bioretention soil is likely clogged by sediment accumulation at the surface or has become overly compacted. Dig a small hole to observe soil profile and identify compaction depth or clogging front to help determine the soil depth to be removed or otherwise rehabilitated (e.g., tilled). Consultation with an engineer is recommended.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
As needed	Bioretention soil media			Bioretention soil media protection is needed when performing maintenance requiring entrance into the facility footprint.	Minimize all loading in the facility footprint (foot traffic and other loads) to the degree feasible in order to prevent compaction of bioretention soils. Never drive equipment or apply heavy loads in facility footprint. Because the risk of compaction is higher during saturated soil conditions, any type of loading in the cell (including foot traffic) should be minimized during wet conditions. Consider measures to distribute loading if heavy foot traffic is required or equipment must be placed in facility. As an example, boards may be placed across soil to distribute loads and minimize compaction. If compaction occurs, soil must be loosened or otherwise rehabilitated to original design state.
Annually	Splash block inlet		Inlet Failure	Water is not being directed properly to the facility and away from the inlet structure.	Reconfigure/repair blocks to direct water to facility and away from structure.
Monthly during the wet season and before severe storm is forecasted	Curb cut inlet/outlet		Inlet Clogged	Accumulated leaves at curb cuts.	Clear leaves (particularly important for key inlet and low points along long, linear facilities).
Annually	Pipe inlet/ outlet		Inlet Pipe Structure Failure	Pipe is damaged.	Repair/replace.
Annually During the Wet Season	Pipe inlet/ outlet		Inlet Pipe Clogged	Pipe is clogged.	Remove roots or debris.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually and After Major Storm Events	Pipe inlet/ outlet		Inlet Pipe Clogged	Sediment, debris, trash or mulch reducing capacity of inlet/outlet.	Clear the blockage. Identify the source of the blockage and take actions to prevent future blockages.
Weekly During Fall Leaf Drop	Pipe inlet/ outlet		Inlet Clogged	Accumulated leaves at the inlets/outlets.	Clear leaves (particularly important for key inlets and low points along long, linear facilities).
Annually	Pipe inlet/ outlet		Inlet Blocked	Maintain access for inspections.	Clear vegetation (transplant vegetation when possible) within 1 foot of inlets and outlets, maintain access pathways. Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants.
After Major Storm Events	Trash rack		Trash Rack clogged	Trash or other debris present on trash rack.	Remove/dispose.
Annually	Trash rack		Trash Rack Damaged	Bar screen damaged or missing.	Repair/replace.
Annually and After Major Storm Events	Overflow		Overflow clogged	Capacity reduced by sediment or debris.	Remove sediment or debris/dispose.
As Needed Clean Orifice as Needed, At Least Biannually	Underdrain pipe		Prolonged surface ponding (see “Ponded water”)	Plant roots, sediment or debris reducing capacity of underdrain.	Jet clean or rotary cut debris/roots from underdrain(s). If underdrains are equipped with a flow restrictor (e.g., orifice) to attenuate flows, the orifice must be cleaned regularly.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Fall and Spring)	Facility bottom area and upland slope vegetation		Dead vegetation	Vegetation survival rate falls below 75% within first two years of establishment (unless project O&M manual or record drawing stipulates more or less than 75% survival rate).	Determine cause of poor vegetation growth and correct condition. Replant as necessary to obtain 75% survival rate or greater. Refer to original planting plan, or approved jurisdictional species list for appropriate plant replacements (See Appendix 3 - Bioretention Plant List, in the LID Technical Guidance Manual for Puget Sound). Confirm that plant selection is appropriate for site growing conditions. Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
As needed	Vegetation (general)		Diseased Vegetation	Presence of diseased plants and plant material.	Remove any diseased plants or plant parts and dispose of in an approved location (e.g., commercial landfill) to avoid risk of spreading the disease to other plants. Disinfect gardening tools after pruning to prevent the spread of disease. See Pacific Northwest Plant Disease Management Handbook for information on disease recognition and for additional resources. Replant as necessary according to recommendations provided for “facility bottom area and upland slope vegetation”.
All Pruning Seasons	Trees and shrubs		Oversized trees and shrubs	Pruning as needed.	Prune trees and shrubs in a manner appropriate for each species. Pruning should be performed by landscape professionals familiar with proper pruning techniques. All pruning of mature trees should be performed by or under the direct guidance of an ISA Certified Arborist.
Annually	Trees and Shrubs		Oversized trees and shrubs	Large trees and shrubs interfere with operation of the facility or access for maintenance.	Prune trees and shrubs using most current ANSI A300 standards and ISA BMPs. Remove trees and shrubs, if necessary.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Fall and Spring)	Trees and shrubs		Dead trees or shrubs	Standing dead vegetation is present.	Remove standing dead vegetation. Replace dead vegetation within 30 days of reported dead and dying plants (as practical depending on weather/planting season). If vegetation replacement is not feasible within 30 days, and absence of vegetation may result in erosion problems, temporary erosion control measures should be put in place immediately. Determine cause of dead vegetation and address issue, if possible. If specific plants have a high mortality rate, assess the cause and replace with appropriate species. Consultation with a landscape architect is recommended.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Fall and Spring)	Trees and shrubs			Planting beneath mature trees.	When working around and below mature trees, follow the most current ANSI A300 standards and ISA BMPs to the extent practicable (e.g., take care to minimize any damage to tree roots and avoid compaction of soil). Planting of small shrubs or groundcovers beneath mature trees may be desirable in some cases; such plantings should use mainly plants that come as bulbs, bare root or in 4-inch pots; plants should be in no larger than 1-gallon containers.
Biannually (Fall and Spring)	Trees and shrubs		Tree support	Presence of or need for stakes and guys (tree growth, maturation, and support needs).	Verify location of facility liners and underdrain (if any) prior to stake installation in order to prevent liner puncture or pipe damage. Monitor tree support systems: Repair and adjust as needed to provide support and prevent damage to tree. Remove tree supports (stakes, guys, etc.) after one growing season or maximum of 1 year. Backfill stake holes after removal.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Trees and shrubs adjacent to vehicle travel areas (or areas where visibility needs to be maintained)		Line of sight	Vegetation causes some visibility (line of sight) or driver safety issues.	Maintain appropriate height for sight clearance. Regular pruning (more than one time/ growing season) is required to maintain visual sight lines for safety or clearance along a walk or drive, consider relocating the plant to a more appropriate location. Remove or transplant if continual safety hazard. Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants.
Annually	Flower plants		Dead flowers	Dead or spent flowers present.	Remove spent flowers (deadhead).
Annually (Fall)	Perennials		Dead plants	Spent plants.	Cut back dying or dead and fallen foliage and stems.
Annually (Spring)	Emergent vegetation		Slow moving or ponded water	Vegetation compromises conveyance.	Hand rake sedges and rushes with a small rake or fingers to remove dead foliage before new growth emerges in spring or earlier only if the foliage is blocking water flow (sedges and rushes do not respond well to pruning).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Winter and Spring	Ornamental grasses (perennial)		Dead plant material	Dead material from previous year's growing cycle or dead collapsed foliage.	Leave dry foliage for winter interest. Hand rake with a small rake or fingers to remove dead foliage back to within several inches from the soil before new growth emerges in spring or earlier if the foliage collapses and is blocking water flow.
Biannually (Winter and Spring	Ornamental grasses (evergreen)		Dead plant material	Dead growth present in spring.	Hand rake with a small rake or fingers to remove dead growth before new growth emerges in spring. Clean, rake, and comb grasses when they become too tall. Cut back to ground or thin every 2-3 years as needed.
Monthly (March - October, preceding seed dispersal)	Vegetation		Noxious weeds	Listed noxious vegetation is present (refer to current Pierce County Noxious Weed Control Board noxious weed list).	By law, class A & B noxious weeds must be removed, bagged and disposed as garbage immediately. Reasonable attempts must be made to remove and dispose of class C noxious weeds. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality; use of herbicides and pesticides may be prohibited in some jurisdictions. Apply mulch after weed removal (see "Mulch").

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly (March - October, preceding seed dispersal)	Vegetation		Weeds	Weeds are present.	Remove weeds with their roots manually with pincer-type weeding tools, flame weeders, or hot water weeders as appropriate. Follow IPM protocols for weed management.
Once in early to mid-May and once in early to mid-September	Vegetation		Excessive vegetation	Low-lying vegetation growing beyond facility edge onto sidewalks, paths, or street edge poses pedestrian safety hazard or may clog adjacent permeable pavement surfaces due to associated leaf litter, mulch, and soil.	Edge or trim groundcovers and shrubs at facility edge. Avoid mechanical blade-type edger and do not use edger or trimmer within 2 feet of tree trunks. While some clippings can be left in the facility to replenish organic material in the soil, excessive leaf litter can cause surface soil clogging.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
As needed	Vegetation		Excessive vegetation	Excessive vegetation density inhibits stormwater flow beyond design ponding or becomes a hazard for pedestrian and vehicular circulation and safety.	Determine whether pruning or other routine maintenance is adequate to maintain proper plant density and aesthetics. Determine if plant type should be replaced to avoid ongoing maintenance issues (an aggressive grower under perfect growing conditions should be transplanted to a location where it will not impact flow) . Remove plants that are weak, broken or not true to form; replace in-kind. Thin grass or plants impacting facility function without leaving visual holes or bare soil areas. Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants.
As needed	Vegetation		Excessive Vegetation	Vegetation blocking curb cuts, causing excessive sediment buildup and flow bypass.	Remove vegetation and sediment buildup.
Following weeding	Vegetation		Mulch	Bare spots (without mulch cover) are present or mulch depth less than 2 inches.	Supplement mulch with hand tools to a depth of 2 to 3 inches. Replenish mulch per O&M manual. Often coarse compost is used in the bottom of the facility and arborist wood chips are used on side slopes and rim (above typical water levels). Keep all mulch away from woody stems.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Based on manufacturer instructions	Irrigation system (if any)		Plant Watering	Irrigation system present.	Follow manufacturer's instructions for O&M.
Annually	Irrigation system (if any)		Plant Watering	Sprinklers or drip irrigation not directed/ located to properly water plants.	Redirect sprinklers or move drip irrigation to desired areas.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Once every 1-2 weeks or as needed during prolonged dry periods	summer watering (first year)		Plant Watering	Trees, shrubs and ground cover in the first year of establishment period.	10 to 15 gallons per tree. 3 to 5 gallons per shrub. 2 gallons water per square foot for groundcover areas. Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist. Use soaker hoses or spot water with a shower type wand when irrigation system is not present. • Pulse water to enhance soil absorption, when feasible. • Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method , each pass increases soil absorption and allows more water to infiltrate prior to runoff. Add a tree bag or slow-release watering device (e.g., bucket with a perforated bottom) for watering newly installed trees when irrigation system is not present.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Once every 2 -4 weeks or as needed during prolonged dry periods	Summer watering (second and third years)		Plant Watering	Trees, shrubs and groundcovers in the second or third year of establishment period.	10 to 15 gallons per tree. 3 to 5 gallons per shrub. 2 gallons water per square foot for groundcover areas. Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist. Use soaker hoses or spot water with a shower type wand when irrigation system is not present. • Pulse water to enhance soil absorption, when feasible. • Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method , each pass increases soil absorption and allows more water to infiltrate prior to runoff.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
As needed	Summer watering (after establishment)		Plant Watering	Established vegetation (after 3 years).	Plants are typically selected to be drought tolerant and not require regular watering after establishment; however, trees may take up to 5 years of watering to become fully established. Identify trigger mechanisms for drought-stress (e.g., leaf wilt, leaf senescence, etc.) of different species and water immediately after initial signs of stress appear. Water during drought conditions or more often if necessary to maintain plant cover.
Biannually and After Major Storm Events	Pest Control		Mosquitoes	Standing water remains for more than 3 days after the end of a storm.	Identify the cause of the standing water and take appropriate actions to address the problem (see “Ponded water”). To facilitate maintenance, manually remove standing water and direct to the storm drainage system (if runoff is from non pollution-generating surfaces) or sanitary sewer system (if runoff is from pollution-generating surfaces) after getting approval from sanitary sewer authority. Do not use pesticides or *Bacillus thuringiensis israelensis* (Bti).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
As needed	Pest Control		Nuisance animals	Nuisance animals causing erosion, damaging plants, or depositing large volumes of feces.	Reduce site conditions that attract nuisance species where possible (e.g., plant shrubs and tall grasses to reduce open areas for geese, etc.). Place predator decoys. Follow IPM protocols for specific nuisance animal issues . Remove pet waste regularly. For public and right-of-way sites consider adding garbage cans with dog bags for picking up pet waste.
Every site visited associated with vegetation management	Pest Control		Insect pests	Signs of pests, such as wilting leaves, chewed leaves, and bark spotting or other indicators.	Reduce hiding places for pests by removing diseased and dead plants. For infestations, follow IPM protocols.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#23 - Maintenance Checklist for Rain Gardens

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (During Wet Season)	Earthen side slopes and berms		Failure in earthen reservoir	Persistent soil erosion on slopes.	If erosion persists, water may be flowing into the garden too rapidly. In this case, the slope of the pipe or swale directing water to the garden, or the amount of water may need to be reduced (see “Erosion control at inlet”).
Annually	Rockery sidewalls		Failure in sidewalls	Rockery sidewalls are insecure.	Stabilize rockery sidewalls (may require consultation with engineer particularly for walls 4 feet or greater in height.
Biannually	Rain Garden Footprint		Accumulation of sediment or debris	Trash and debris present.	Clean out trash and debris.
Annually	Facility bottom area		Accumulation of sediment or debris	Visible sediment deposition in the rain garden that reduces drawdown time of water in the rain garden.	Remove sediment accumulation. If sediment is deposited from water entering the rain garden, determine the source and stabilize the area or provide pretreatment.
As Needed, During and After Fall Leaf Drop	Facility Bottom Area		Accumulation of leaves	Accumulated leaves in rain garden may reduce infiltration capacity of rain garden or clog overflow.	Remove Leaves.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually and After Major Storm Events	Ponded Water		Water remains in bioretention facility 3 days after storm event	Excessive ponding water. Ponded water remains in the basin more than 3 days after the end of a storm.	Confirm leaf, debris or sediment buildup in the bottom of the rain garden is not impeding infiltration. If necessary, remove leaf litter/ debris/sediment. If this does not solve the problem, consultation with a professional with rain garden expertise is recommended to evaluate the following: • Check for other water inputs (e.g., groundwater, illicit connections). • Verify that the facility is sized appropriately for the contributing area. Confirm that the contributing area has not increased. • Determine if the soil is clogged by sediment accumulation at the surface or if the soil has become overly compacted.
Annually	Splash Block Inlet		Inlet Failure	Water is not being directed properly to the rain garden and away from the building.	Reconfigure/repair splash blocks to direct water to the rain garden and away from the building.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Pipe inlet/ outlet		Inlet Pipe Structure Failure	Damaged/cracked pipes.	Repair/seal cracks. Replace when repair is insufficient.
Annually	Pipe inlet/ outlet		Inlet Pipe Clogged	Pipe capacity is reduced by sediment or debris (can cause backups and flooding).	Clear pipes of sediment and debris.
Annually	Erosion control at inlet		Excessive Sedimentation	Rock or cobble is removed or missing and concentrated flows are contacting soil.	Maintain a cover of rock or cobbles to protect the ground where concentrated water flows into the rain garden from a pipe or swale.
As needed	Vegetation		Diseased Vegetation	Dying, dead, or unhealthy plants.	Maintain a healthy cover of plants. Remove any diseased plants or plant parts and dispose of in commercial landfill to avoid risk of spreading the disease to other plants. Disinfect gardening tools after pruning to prevent the spread of disease. Re-stake trees if they need more support, but plan to remove stakes and ties after the first year. Cars can damage roots – protect root areas of trees and plants from vehicle traffic.
As needed	Vegetation		Line of Sight	Vegetation inhibits sight distances and sidewalks.	Keep sidewalks and sight distances on roadways clear.
As needed	Vegetation		Dead Vegetation	Broken, dead, or sucker vegetation is present.	Remove broken or dead branches and suckers.
As needed	Vegetation		Localized Ponding or Obstruction of flow	Vegetation is crowding inlets and outlets.	Keep water inlets and outlines in the rain garden clear or vegetation.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
One time March through June	Vegetation		Dead/diseased plants	Yellowing: possible Nitrogen (N) deficiency. Poor growth: possible Phosphorous (P) deficiency. Poor flowering, spotting or curled leaves, or weak roots or stems: possible Potassium (K) deficiency.	Test soil to identify specific nutrient deficiencies. Consult with a professional knowledgeable in the area of natural amendments or refer to Natural Lawn and Garden Care resources and avoid synthetic fertilizers. Consider selecting different plants for soil conditions.
As needed, Preceding seed dispersal	Vegetation		Weeds Present	Problem weeds are present.	Remove weeds by hand, especially in spring when the soil is moist and the weeds are small. Dig or pull weeds out by the roots before they go to seed. Apply mulch after weeding (see “Mulch”).
Monthly March - October, preceding seed dispersal	Vegetation		Noxious Weeds	Listed noxious vegetation is present (refer to current Pierce County Noxious Weed Control Board noxious weed list).	By law, class A & B noxious weeds must be removed, bagged and disposed as garbage immediately. Reasonable attempts must be made to remove and dispose of class C noxious weeds. It is strongly encouraged that herbicides not be used in order to protect water quality; use of herbicides may be prohibited in some jurisdictions. Apply mulch after weed removal (see “Mulch”).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Following weeding	Vegetation		Mulch	Bare spots (without mulch cover) are present or mulch depth less than 2 inches.	Supplement mulch, using hand tools, to a depth of 2 to 3 inches. Use coarse compost in the bottom of the rain garden and arborist wood chips on side slopes and rim (above typical water levels). Keep all mulch from being in contact with woody stems.
Once every 1-2 weeks or as needed during prolong dry periods	Summer watering (first year)		Plant Watering	Tree, shrubs and groundcovers in first year of establishment.	10 to 15 gallons per tree. 3 to 5 gallons per shrub. 2 gallons water per square foot for groundcover areas. Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist. Use soaker hoses or spot water with a shower type wand when irrigation system is not present. Add a tree bag or slow-release watering device (e.g., bucket with a perforated bottom) for watering newly installed trees when irrigation system is not present.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Once every 2-4 weeks or as needed during prolonged dry periods	Summer watering (second and third years)		Plant Watering	Tree shrubs and groundcovers in the second or third year of establishment.	10 to 15 gallons per tree. 3 to 5 gallons per shrub. 2 gallons water per square foot for groundcover areas. Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist. Use soaker hoses or spot water with a shower type wand when irrigation system is not present.
As needed	Summer watering (after establishment)		Plant Watering	Established vegetation (after 3 years).	Water during drought conditions or more often if necessary to maintain plant cover. Identify trigger mechanisms for drought-stress (e.g., leaf wilt, leaf senescence, etc.) of different rain garden species and water immediately after initial signs of stress appear.
Biannually and After Major Storm Events	Pest Control		Mosquitoes	Standing water remains for more than 3 days after the end of a storm.	Identify the cause of the standing water and take appropriate actions to address the problem (see “Ponded water”). Do not use pesticides or *Bacillus thuringiensis israelensis* (Bti).

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#24 - Maintenance Checklist for Cisterns

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Spring & Fall)	Roof		Low flow into cistern or excessive overflow	Debris has accumulated.	Remove debris.
Biannually (Spring & Fall)	Gutter		Low flow into cistern or excessive overflow	Debris has accumulated.	Clean gutters (the most critical cleaning is in mid- to late-spring to flush the pollen deposits from surrounding trees).
Annually (preferably Sept.)	Screens		Excessive sediment accumulation in cistern	Screen has deteriorated.	Replace.
Monthly from Oct. – Apr.	Screens		Low flow into cistern or excessive overflow	Accumulation of material on screen.	Clear screen of any accumulated debris.
Monthly from Oct. – Apr.	Low Flow Orifice		Low or no flow out of cistern.	Material clogging orifice.	Clean low flow orifice.
Biannually (Spring & Fall)	Overflow pipe		Low or no flow out of cistern.	Pipe is damaged.	Repair/replace.
Biannually (Spring & Fall)	Overflow pipe		Low or no flow out of cistern.	Pipe is clogged.	Remove debris.
Annually (preferably Sept.)	Cistern		Excess overflow	Debris has accumulated at bottom of tank.	Remove debris.
At 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.
Ongoing	Safety		Access and Safety	Access to cistern required for maintenance or cleaning.	Any cistern detention system opening that could allow the entry of people must be marked: “DANGER—CONFINED SPACE".
Ongoing	Cistern		Leaking Cistern	Excess water around cistern. Damage to cistern.	Disconnect inlets. Contact design engineer.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#25 - Maintenance Checklist for Compost Amended Soil

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Soil Media (maintain high organic soil content)		Potential Erosion	Vegetation not fully covering ground surface or vegetation health is poor.	Maintain 2 to 3 inches of mulch over bare areas in landscape beds. Add plants if sufficient space. Re-seed bare turf areas until the vegetation fully covers ground surface.
Ongoing	Soil media (maintain high organic soil content)		Routine Maintenance	None. (routine maintenance)	Return leaf fall and shredded woody materials from the landscape to the site when possible in order to replenish soil nutrients and structure.
Ongoing	Soil media (maintain high organic soil content)		Routine Maintenance	None. (routine maintenance)	On turf areas, “grasscycle” (mulch-mow or leave the clippings) to improve turf health.
Ongoing	Soil media (maintain high organic soil content)		Routine Maintenance	None. (routine maintenance)	Avoid use of pesticides (bug and weed killers) and herbicides, like “weed & feed”, which damage the soil.
Annually	Soil media (maintain high organic soil content)		Routine Maintenance	None. (routine maintenance)	Where fertilization is needed (mainly turf and annual flower beds), a moderate fertilization program should be used which relies on compost, natural fertilizers or slow-release synthetic balanced fertilizers. Follow IPM protocols for fertilization procedures.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (inspect during storm event)	Soil media (maintain infiltration)		Wet Soils Ponding	Soils become waterlogged, do not appear to be infiltrating.	To remediate compaction, aerate soil, till to at least 8-inch depth, or further amend soil with compost and re-till. If areas are turf, aerate compacted areas and topdress them with 1/4 to 1/2 inch of compost to renovate them. If drainage is still slow, consider investigating alternative causes (e.g., high wet season groundwater levels, low permeability soils). Also consider site use and protection from compacting activities.
Annually (at least once during the wet season) and after major storm events)	Erosion/ Scouring		Visible Erosion	Areas of potential erosion are visible.	Identify and address cause of erosion (e.g., concentrated flow entering area, channelization of runoff) and stabilize damaged area (regrade, rock, vegetation, erosion control matting). For deep channels or cuts (over 3 inches in ponding depth), temporary erosion control measures should be put in place until permanent repairs can be made.
Annually	Grass/ vegetation		Unhealthy Vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions (e.g., remove/replace plants). If problem persists, evaluate if vegetation is appropriate for the location (e.g., exposure, soil, soil moisture).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly (March - October, preceding seed dispersal)	Vegetation		Noxious weeds	Listed noxious vegetation is present (refer to current Pierce County Noxious Weed Control Board noxious weed list).	By law, class A & B noxious weeds must be removed, bagged and disposed as garbage immediately. Reasonable attempts must be made to remove and dispose of class C noxious weeds. Watch for and respond to new occurrences of especially aggressive weeds such as Himalayan blackberry, Japanese knotweed, morning glory, English ivy, and reed canary grass to avoid invasions. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality; use of herbicides and pesticides may be prohibited in some jurisdictions.
Monthly (March - October, preceding seed dispersal)	Vegetation		Weeds	Weeds are present.	Remove weeds with their roots manually with pincer-type weeding tools, flame weeders, or hot water weeders as appropriate. Follow IPM protocols for weed management.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#26 - Maintenance Checklist for Vegetated Roof

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (Inspect During Rain Event)	Growth Medium		Ponding or slow infiltration	Water does not permeate growth media (runs off soil surface) or crusting is observed.	Aerate (e.g., rake) or replace medium taking care not to damage the waterproof membrane.
Annually	Growth Medium		Thin growth medium	Growth medium thickness is less than design thickness (due to erosion and plant uptake).	Supplement growth medium to design thickness.
Biannually (at least once during wet season)	Growth Medium		Leaf/Debris Buildup	Fallen leaves or debris are present.	Remove/dispose of debris and fallen leaves.
Annually (at least once during the wet season and after major storm events	Growth Medium		Erosion and sedimentation	Growth media erosion/ scour is visible (e.g., gullies).	Take steps to repair or prevent erosion. Fill, hand tamp, or lightly compact, and stabilize with additional soil substrate/growth medium (similar in nature to the original material) and additional plants.
Biannually (inspect during plant establishment)	Erosion Control Measures		Erosion	Mat or other erosion control is damaged or depleted during plant establishment period.	Repair/replace erosion control measures until 90% vegetation coverage attained. Avoid application of mulch on extensive vegetated roofs.
Biannually and after major storm events	Roof Drain		Water Flow Issues	Sediment, vegetation, or debris reducing capacity of inlet structure.	Clear blockage. Identify and correct any problems that led to blockage.
Annually	Roof Drain		Water Flow Issues	Pipe is clogged.	Remove roots or debris.
Annually	Roof Drain		Damaged roof drain	Inlet pipe is in poor condition.	Repair/replace.
Annually	Border Zone		Aesthetics	Vegetation is encroaching into border zone aggregate.	Remove and dispose of weeds and transplant desirable vegetation to growth medium area.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Flashing, gravel, stops, utilities, or other structures on roof		Deteriorating roof components	Flashing, utilities or other structures on roof are deteriorating (can serve as source of metal pollution in vegetated roof runoff).	Repair (e.g., recoat) or replace to eliminate potential pollutant source. Note that any work done around flashings and drains should be done with care to protect the waterproof membrane.
Biannually	Access and Safety		Access Concerns	Insufficient egress/ ingress routes and fall protection.	Maintain egress and ingress routes to design standards and fire codes. Ensure appropriate fall protection.
Biannually	Vegetation		Plant Coverage	Vegetative coverage falls below 90% (unless design specifications stipulate less than 90% coverage).	Plant bare areas with vegetation. If necessary, install erosion control measures until percent coverage goal is attained.
Annually (first 2 years in spring, as needed thereafter)	Vegetation		Sedum Coverage	Extensive roof with low density sedum population.	Mulch mow sedums-creating cuttings from existing plants to encourage colonization.
Biannually (Fall and Spring)	Dead Plants		Dead Vegetation	Dead vegetation is present.	Normally dead plant material can be recycled on the roof; however, specific plants or aesthetic considerations may warrant removing and replacing dead material (see manufacturer's recommendations).
All pruning seasons (timing varies by species)	Trees and shrubs - intensive vegetated roof		Plants Overgrown	Pruning as needed.	All pruning of mature trees should be performed by or under the direct guidance of an ISA Certified Arborist.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Vegetation - extensive vegetated roof		Fertilization	Poor plant establishment and possible nutrient deficiency in growth medium.	Allow organic debris to replenish and maintain long-term nutrient balance and growth medium structure. Conduct annual soil test 2-3 weeks prior to the spring growth flush to assess need for fertilizer. Utilize test results to adjust fertilizer type and quantity appropriately. Apply minimum amount slow-release fertilizer necessary to achieve successful plant establishment. Apply fertilizer only after acquiring required approval from facility owner and operator. Note that extensive vegetated roofs are designed to require zero to minimal fertilization after establishment (excess fertilization can contribute to nutrient export).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Vegetation		Fertilization - intensive vegetated roof	Fertilization may be necessary during establishment period or for plant health and survivability after establishment.	Conduct annual soil test 2-3 weeks prior to the spring growth flush to assess need for fertilizer. Utilize test results to adjust fertilizer type and quantity appropriately. Apply minimum amount slow-release fertilizer necessary to achieve successful plant establishment. Apply fertilizer only after acquiring required approval from facility owner and operator. Intensive vegetated roofs may require more fertilization than extensive vegetated roofs.
Monthly (March-October) Preceding Seed Dispersal	Vegetation		Weeds	Weeds are present.	Remove weeds with their roots manually with pincer-type weeding tools or hot water weeders as appropriate. Follow IPM protocols for weed management.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Monthly (March-October Preceding Seed Dispersal)	Vegetation - intensive vegetated roof		Noxious Weeds	Listed Noxious vegetation is present (refer to the Pierce County Noxious Control Board noxious weed list).	By law, class A & B noxious weeds must be removed, bagged and disposed as garbage immediately. Reasonable attempts must be made to remove and dispose of class C noxious weeds. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality; use of herbicides and pesticides may be prohibited in some jurisdictions.
Based on manufacturer's Instructions	Irrigation System (if any)		Irrigation	Irrigation system present and functioning.	Follow manufacturer's instructions for operation and maintenance.
Once every 1-2 weeks as needed during prolonged dry periods	Summer watering - extensive vegetated roof		Watering	Vegetation in establishment period (1-2 years).	Water weekly during periods of no rain to ensure establishment (30 to 50 gallons per 100 square feet).
Once every 1-2 weeks as needed during prolonged dry periods	Summer watering - intensive vegetated roof		Watering	Vegetation in establishment period (1-2 years).	Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist. Use soaker hoses or spot water with a shower type wand when irrigation system not present.
As needed	Summer watering - intensive vegetated roof		Watering	Established vegetation (after 2 years).	Water during drought conditions or more often if necessary to maintain plant cover.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually and After Major Storm Events	Pests		Mosquito	Standing water remains for more than 3 days after the end of a storm.	Identify the cause of the standing water and take appropriate actions to address the problem (e.g., aerate or replace medium, unplug drainage). Manually remove standing water and direct to storm drainage system. Do not use pesticides or Bacillus thuringiensis israelensis (Bti).
As Needed	Pests		Nuisance Animals	Nuisance animals causing erosion, damaging plants, or depositing large volumes of feces.	Reduce site conditions that attract nuisance species. Place predator decoys. Follow IPM protocols for specific nuisance animal issues.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#27 - Maintenance Checklist for Pervious Pavement

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually and After Major Storm Events	Permeable Pavements, All		Excessive Sedimentation	Runon from adjacent areas deposits soil, mulch or sediment on paving.	Clean deposited soil or other materials. Check if surface elevation of adjacent planted area is too high, or slopes towards pavement, and can be regraded (prior to regrading, protect permeable pavement by covering with temporary plastic and secure covering in place). Mulch and/or plant all exposed soils that may erode to pavement surface.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually or Biannually	Porous asphalt or pervious concrete		Routine Maintenance	None (routine maintenance)	Clean surface debris from pavement surface using one or a combination of the following methods: Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves). Vacuum/sweep permeable paving installation using: • Walk-behind vacuum (sidewalks) • High efficiency regenerative air or vacuum sweeper (roadways, parking lots) • ShopVac or brush brooms (small areas) • Hand held pressure washer or power washer with rotating brushes Follow equipment manufacturer guidelines for determining when equipment is most effective for cleaning permeable pavement. Dry weather is more effective for some equipment.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (inspect during rain event	Porous asphalt or pervious concrete		Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)	Surface is clogged.	Review the overall performance of the facility (note that small clogged areas may not reduce overall performance of facility). Test the surface infiltration rate using ASTM C1701 as a corrective maintenance indicator. Perform one test per installation, up to 2,500 square feet. Perform an additional test for each additional 2,500 square feet up to 15,000 square feet total. Above 15,000 square feet, add one test for every 10,000 square feet. If the results indicate an infiltration rate of 10 inches per hour or less, then perform corrective maintenance to restore permeability. To clean clogged pavement surfaces, use one or combination of the following methods: • Combined pressure wash and vacuum system calibrated to not dislodge wearing course aggregate. Hand held pressure washer or power washer with rotating brushes. • Pure vacuum sweepers.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Porous asphalt or pervious concrete		Sedimentation	Sediment present at the surface of the pavement.	Assess the overall performance of the pavement system during a rain event. If water runs off the pavement and/or there is ponding then see above. Determine source of sediment loading and evaluate whether or not the source can be reduced/ eliminated. If the source cannot be addressed, consider increasing frequency of routine cleaning (e.g., twice per year instead of once per year).
Annually (Summer)	Porous Asphalt or pervious concrete		Moss Growth	Moss growth inhibits infiltration or poses slip/safety hazard.	Sidewalks: Use a stiff broom to remove moss in the summer when it is dry. Parking lots and roadways: Pressure wash, vacuum sweep, or use a combination of the two for cleaning moss from pavement surface. May require stiff broom or power brush in areas of heavy moss.
Annually	Porous Asphalt or pervious concrete		Damaged Pavement	Major cracks or trip hazards and concrete spalling and raveling.	Fill potholes or small cracks with patching mixes. Large cracks and settlement may require cutting and replacing the pavement section. Replace in-kind where feasible. Replacing porous asphalt with conventional asphalt is acceptable if it is a small percentage of the total facility area and does not impact the overall facility function. Take appropriate precautions during pavement repair and replacement efforts to prevent clogging of adjacent porous materials.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually or Biannually	Interlocking concrete paver blocks and aggregate pavers		Routine Maintenance	None (routine maintenance)	Clean pavement surface using one or a combination of the following methods: Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves). Vacuum/sweep permeable paving installation using: • Walk-behind vacuum (sidewalks) • High efficiency regenerative air or vacuum sweeper (roadways, parking lots) • ShopVac or brush brooms (small areas) Note: Vacuum settings may have to be adjusted to prevent excess uptake of aggregate from paver openings or joints. Vacuum surface openings in dry weather to remove dry, encrusted sediment.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (inspect during rain event)	Interlocking concrete paver blocks and aggregate pavers		Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate).	Surface is clogged.	Review the overall performance of the facility (note that small clogged areas may not reduce overall performance of facility). Test the surface infiltration rate using ASTM C1701 as a corrective maintenance indicator. Perform one test per installation, up to 2,500 square feet. Perform an additional test for each additional 2,500 square feet up to 15,000 square feet total. Above 15,000 square feet, add one test for every 10,000 square feet. If the results indicate an infiltration rate of 10 inches per hour or less, then perform corrective maintenance to restore permeability. Clogging is usually an issue in the upper 2 to 3 centimeters of aggregate. Remove the upper layer of encrusted sediment, and fines, and/or vegetation from openings and joints between the pavers by mechanical means and/or suction equipment (e.g., pure vacuum sweeper). Replace aggregate in paver cells, joints, or openings per manufacturer's recommendations.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually	Interlocking concrete paver blocks and aggregate pavers		Sedimentation	Sediment present at the surface of the pavement.	Assess the overall performance of the pavement system during a rain event. If water runs off the pavement and/or there is ponding, then see above. Determine source of sediment loading and evaluate whether or not the source can be reduced/eliminated. If the source cannot be addressed, consider increasing frequency of routine cleaning (e.g., twice per year instead of once per year).
Annually	Interlocking concrete paver blocks and aggregate pavers		Moss Growth	Moss growth inhibits infiltration or poses slip/safety hazard.	Sidewalks: Use a stiff broom to remove moss in the summer when it is dry. Parking lots and roadways: Vacuum sweep or stiff broom/ power brush for cleaning moss from pavement surface.
Annually	Interlocking concrete paver blocks and aggregate pavers		Damaged Surface	Paver block missing or damaged.	Remove individual damaged paver blocks by hand and replace or repair per manufacturer's recommendations.
Annually	Interlocking Concrete paver blocks and aggregate pavers		Damaged Surface	Loss of aggregate material between paver blocks.	Refill per manufacturer's recommendations for interlocking paver sections.
Annually	Interlocking concrete paver blocks and aggregate pavers		Damaged Surface	Settlement of surface.	May require resetting.
Annually or Biannually	Open-celled paving grid with gravel		Routine Maintenance	None (routine maintenance).	Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves). Follow equipment manufacturer guidelines for cleaning surface.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (inspect during rain event)	Open-celled paving grid with gravel		Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)	Aggregate is clogged.	Use vacuum truck to remove and replace top course aggregate. Replace aggregate in paving grid per manufacturer's recommendations.
Annually	Open-celled paving grid with gravel		Damaged Surface	Paving grid missing or damaged.	Remove pins, pry up grid segments, and replace gravel. Replace grid segments where three or more adjacent rings are broken or damaged. Follow manufacturer guidelines for repairing surface.
Annually	Open-celled paving grid with gravel		Damaged Surface	Settlement of surface.	May require resetting.
Annually	Open-celled paving grid with gravel		Damaged Surface	Loss of aggregate material in paving grid.	Replenish aggregate material by spreading gravel with a rake (gravel level should be maintained at the same level as the plastic rings or no more than 1/4 inch above the top of rings). See manufacturer's recommendations.
Annually	Open-celled paving grid with gravel		Weeds	Weeds present.	Manually remove weeds. Presence of weeds may indicate that too many fines are present (refer to Actions Needed under "Aggregate is clogged" to address this issue).
Annually or Biannually	Open-celled paving grid with grass		Routine Maintenance	None (routine maintenance).	Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves). Follow equipment manufacturer guidelines for cleaning surface.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (inspect during rain event)	Open-celled paving grid with grass		Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)	Aggregate is clogged.	Rehabilitate per manufacturer's recommendations.
Annually	Open-celled paving grid with grass		Damaged Surface	Paving grid missing or damaged.	Remove pins, pry up grid segments, and replace grass. Replace grid segments where three or more adjacent rings are broken or damaged. Follow manufacturer guidelines for repairing surface.
Annually	Open-celled paving grid with grass		Damaged Surface	Settlement of surface.	May require resetting.
Annually	Open-celled paving grid with grass		Aesthetics, erosion potential	Poor grass coverage in paving grid.	Restore growing medium, reseed or plant, aerate, and/or amend vegetated area as needed. Traffic loading may be inhibiting grass growth; reconsider traffic loading if feasible.
As Needed	Open-celled paving grid with grass		Routine Maintenance	None (routine maintenance).	Use a mulch mower to mow grass.
Annually	Open-celled paving grid with grass		Routine Maintenance	None (routine maintenance).	Sprinkle a thin layer of compost on top of grass surface (1/2" top dressing) and sweep it in. Do not use fertilizer.
Annually	Open-celled paving grid with grass		Weeds	Weeds present.	Manually remove weeds. Mow, torch, or inoculate and replace with preferred vegetation.
Annually	Inlet/outlet pipe		Water Flow	Pipe is damaged.	Repair/replace.
Annually	Inlet/outlet pipe		Water Flow	Pipe is clogged.	Remove roots or debris.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
As needed, clean orifice at least biannually	Underdrain pipe		Water Flow	Plant roots, sediment, or debris is reducing capacity of underdrain (may cause prolonged drawdown period).	Jet clean or rotary cut debris/ roots from underdrain(s). If underdrains are equipped with a flow restrictor (e.g., orifice) to attenuate flows, the orifice must be cleaned regularly.
As needed, clean orifice at least biannually	Raised subsurface overflow pipe		Water Flow	Plant roots, sediment, or debris is reducing capacity of underdrain.	Jet clean or rotary cut debris/ roots from under-drain(s). If underdrains are equipped with a flow restrictor (e.g., orifice) to attenuate flows, the orifice must be cleaned regularly.
Annually and After Major Storm Events	Outlet structure		Water Flow	Sediment vegetation, or debris reducing capacity of outlet structure.	Clear the blockage. Identify the source of the blockage and take actions to prevent future blockages.
Biannually	Overflow		Erosion Potential	Native soil is exposed or other signs of erosion damage are present at discharge point.	Repair erosion and stabilize surface.
Annually and After Major Storm Events	Observatio n port		Water ponding or infiltrating slowly	Water remains in the storage aggregate longer than anticipated by design after the end of the storm.	If immediate cause of extended ponding is not identified, schedule investigation of subsurface materials or other potential causes of system failure.
As needed	Adjacent large shrubs or trees		Water ponding or infiltrating slowly	Vegetation related fallout clogs or will potentially clog voids.	Sweep leaf litter and sediment to prevent surface clogging and ponding. Prevent large root systems from damaging subsurface structural components.
Once in May and Once in September	Adjacent large shrubs or trees		Aesthetics	Vegetation growing beyond facility edge onto sidewalks, paths and street edge.	Edging and trimming of planted areas to control groundcovers and shrubs from overreaching the sidewalks, paths and street edge improves appearance and reduces clogging of permeable pavements by leaf litter, mulch and soil.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
In fall (October to December) after leaf drop (1-3 times, depending on canopy cover)	Leaves, needles, and organic debris		Clog Potential	Accumulation of organic debris and leaf litter.	Use leaf blower or vacuum to blow or remove leaves, evergreen needles, and debris (i.e., flowers, blossoms) off of and away from permeable pavement.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#28 - Proprietary Stormwater Devices (Emerging Technologies)

At a minimum all stormwater devices must be inspected every six months and after every major storm event. Use the manufacturer's recommendations as tailored to the use of the site and as outlined in the Operation and Maintenance Manual. Operations and Maintenance shall conform to any Ecology issued use level designation as applicable.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#29 - General Maintenance Concerns for Stormwater Facilities

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Based on manufacturers instructions	Irrigation		Irrigation system (if any)	Irrigation system present.	Follow manufacturer's instructions for O&M.
Weekly (May – September)	Irrigation		Plant watering	Plant establishment period (1-3 years).	Water weekly during periods of no rain to ensure plant establishment.
As Needed	Irrigation		Plant watering	Longer term period (3+ years).	Water during drought conditions or more often if necessary to maintain plant cover.
Ongoing	Spill Prevention and Response		Spill prevention	Storage or use of potential contaminants in the vicinity of facility.	Exercise spill prevention measures whenever handling or storing potential contaminants.
As needed	Spill Prevention and Response		Spill response	Release of pollutants. Call to report any spill to City of Tacoma Source Control 253.502.2222.	Cleanup spills as soon as possible to prevent contamination of stormwater.
At 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.
Annually (preferably Sept.)	Safety		Safety (slopes)	Erosion of sides causes slope to exceed 1:4 or otherwise becomes a hazard.	Restore to design slope.
Annually (preferably Sept.)	Safety		Safety (hydraulic structures)	Hydraulic structures (pipes, culverts, vaults, etc.) become a hazard to children playing in and around the facility.	Take actions to eliminate the hazard (such as covering and securing any openings).
Annually (preferably Sept.)	Safety		Line of sight	Vegetation causes some visibility (line of sight) or driver safety issues.	Prune or replace plants as necessary.
Annually (preferably Sept.)	Aesthetics		Aesthetics	Damage/vandalism/ debris accumulation.	Clean, repair, and restore facility to original aesthetic conditions.
Annually (preferably Sept.)	Aesthetics		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 soil, etc.).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Aesthetics		Edging	Grass is starting to encroach on facility.	Repair edging. Remove encroaching grass. Install additional measures to prevent encroachment.
Annually (preferably Sept.)	General		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation may constitute a hazard to maintenance personnel or to the public. Any evidence of noxious weeds as defined by the State or local regulations. The Washington State Noxious Weed Control Board has a list of common noxious weeds at www.nwcb.wa.gov.	No danger of poisonous vegetation. Compliance with state or local eradication policies is required. Apply requirements of adopted integrated pest management plan as necessary.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#30 - Maintenance Checklist for Trees

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Once a year for the first three years	Trees		Future failure	Weak branch attachments; co-dominant stems.	Structural Pruning[a].
As needed	Trees		Threat to public safety	Low branches that may cause safety concerns if they remain.	Crown Raising[a].
As neeed, for safety	Trees		Threat to public safety	Dead, diseased and/or broken branches.	Pruning to remove dead, diseased and/or broken branches.
As needed	Trees		Threat to public safety	Dead, severely damaged or declining.	Replace per planting plan or acceptable substitute.

a. Trees shall be pruned according to industry standards, ANSI A300 Part 1 and the International Society of Arboriculture's Best Management Practices - Tree Pruning.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

#31 - Downspout Infiltration Trench or Drywell

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (Fall and Spring)	Surface of trench/well (i.e., water enters through exposed aggregate)		Water not reaching facility	Accumulated trash, debris, or sediment on drain rock surface impedes sheet flow into facility.	Remove/dispose in accordance with local solid waste requirements.
Annually (At least one visit during the wet season)	Surface of trench/well (i.e., water enters through exposed aggregate)		Water not reaching facility	Vegetation/moss present on drain rock surface impedes sheet flow into facility.	Maintain open, freely draining drain rock surface.
Biannually (Fall and Spring)	Drain Rock		Ponding	If water enters the facility from the surface, inspect to see if water is ponding at the surface during storm events. If buried drain rock, observe drawdown through observation port or cleanout.	Clear piping through facility when ponding occurs. Replace rock/sand reservoirs as necessary. Tilling of subgrade below reservoir may be necessary (for trenches) prior to backfill.
Annually (at least once during the wet season)	Pipe(s)		Water flow issues	Accumulation of trash, debris, or sediment in roof drains, gutters, driveway drains, area drains, etc.	Remove/ dispose.
Annually (at least once during the wet season)	Pipe(s)		Sedimentation	Pipe from sump to trench or drywell has accumulated sediment or is plugged.	Clear sediment from inlet/outlet pipe screen and inlet/outlet pipe. Cleaning operation should not move sediment into rock layer. Remove and dispose of sediment.
Annually (at least once during the wet season)	Pipe(s)		Damaged piping, water flow impeded	Cracked, collapsed, broken, or misaligned drain pipes.	Repair/seal cracks. Replace when repair is insufficient.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually (at least once during the wet season)	Roof Downspout		Erosion Potential	Splash pad missing or damaged.	Repair/ replace.
Annually (at least once during the wet season)	Roof Downspout		Water flow impeded	Leaves or other debris plugging downspout.	Remove/ dispose.
Annually	Sump		Water flow impeded	Sediment in the sump.	Remove/ dispose in accordance with local solid waste requirements.
Annually	Access Lid		Damaged Lid	Cannot be easily opened.	Repair/ replace.
Annually	Access Lid		No lid	Buried.	Refer to record drawings for design intent. If the access lid was designed to be exposed, expose and restore to surface grade.
Annually	Access Lid		Missing lid	Lid not present.	Replace.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

#32 - Downspout Dispersion

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Splashblocks					
Biannually	Splash Block		Water flow incorrect	Water is being directed towards building structure.	Reconfigure/ repair splash blocks to direct water away from building structure.
Biannually	Splash Block		Erosion Potential	Water disrupts soil media.	Reconfigure/ repair blocks, repair eroded soil, replant as necessary.
Sheet Flow Dispersion					
Annually	Transition Zone		Erosion Potential	Adjacent soil erosion; uneven surface creating concentrated flow discharge; or less than 2 feet of width.	Repair/replace transition zone to meet design criteria and eliminate concentrated flows.
Downspout Dispersion – Dispersion Trench					
Annually	Dispersion trench		Water flow issues	Visual evidence of water discharging at concentrated points along trench (normal condition is a “sheet flow” from edge of trench; intent is to prevent erosion damage).	Remove debris from trench surface, if necessary. Realign notched grade board or other distributor type, if possible. Rebuild trench to standards, if necessary.
Biannually (Fall and Spring)	Surface of Dispersion Trench		Flow impeded	Accumulated trash, debris, or sediment on drain rock surface impedes sheet flow from facility.	Remove/dispose in accordance with local solid waste requirements.
Annually (at least once during the wet season)	Surface of Dispersion Trench		Sheet flow impeded	Vegetation/moss present on drain rock surface impedes sheet flow from facility.	Maintain open, freely draining drain rock surface.
Annually (at least once during the wet season)	Pipe to dispersion trench		Flow impeded	Accumulation of trash, debris, or sediment in roof drains, gutters, driveway drains, area drains, etc.	Remove/ dispose.
Annually (at least once during the wet season)	Pipe to dispersion trench		Flow Impeded	Pipe from sump to trench or drywell has accumulated sediment or is plugged.	Clear sediment from inlet/outlet pipe screen and inlet/outlet pipe.

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Annually (at least once during the wet season)	Pipe to dispersion trench		Flow Impeded	Cracked, collapsed, broken, or misaligned drain pipes.	Repair/seal cracks. Replace when repair is insufficient.
Annually	Sump		Sediment Buildup	Sediment in the sump.	Remove/ dispose in accordance with local solid waste requirements. Clear sediment from inlet/outlet pipe screen and/or inlet/outlet pipe. Do not flush sediment downstream.
Annually	Access Lid		Damaged Cover	Cannot be easily opened.	Repair/replace.
Annually	Access Lid		No Cover	Buried.	Refer to record drawings for design intent. If the access lid was designed to be exposed, expose and restore to surface grade.
Annually	Access Lid		Missing Cover	Cover missing.	Replace.
Rock Pad (Concentrated Flow Dispersion)					
Annually	Rock pad		Erosion Potential	Only one layer of rock exists above native soil in area 6 square feet or larger, or any exposure of native soil.	Replace/ repair rock pad to meet design standards. Enlarge pad size or add additional courses of rock, if necessary.
Annually	Rock pad		Erosion	Soil erosion in or adjacent to rock pad.	Repair/replace rock pad to meet design standards.
Dispersal Area					
Biannually and After Major Storm Events	Dispersal area (general)		Erosion	Erosion (gullies/ rills) greater than 2 inches deep in dispersal area.	Eliminate cause of erosion and stabilize damaged area (regrade, rock, revegetate).
Biannually and After Major Storm Events	Dispersal area (general)		Flow impeded	Accumulated sediment or debris to extent that blocks or channelizes flowpath.	Remove excess sediment or debris. Identify and control the sediment source (if feasible).

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
Biannually and After Major Storm Events	Ponded water		Standing water	Standing surface water in dispersion area remains for more than 3 days after the end of a storm event.	Identify the cause of the standing water (e.g., grade depressions, compacted soil) and take appropriate actions to address the problem (e.g., regrade to eliminate depressions or aerate/ amend soils).
Biannually	Plant establishment			Dispersal area vegetation in establishment period (1-2 years, or additional 3rd year during extreme dry weather).	Water weekly during periods of no rain to ensure plant establishment.
As Needed	Vegetation		Vegetation cover inadequate	Poor vegetation cover such that erosion is occurring.	Ensure proper care (e.g., watering). Assess for nutrient deficiencies. Replant as needed with appropriate plant species for the soil and moisture conditions. Consider amending soils to promote plant health.
Biannually and After Major Storm Events	Vegetation		Flow impeded.	Vegetation inhibits dispersed flow along flowpath.	Trim, weed or replant to restore dispersed flowpath.
Storage Sump					
Annually	Sump		Sediment	Accumulated sediment in the sump.	Remove/ dispose in accordance with local solid waste requirements. Clear sediment from inlet/outlet pipe screen and/or inlet/outlet pipe.
Annually	Access Lid		Lid Broken	Cannot be easily opened.	Repair/replace.
Annually	Access Lid		Cannot find lid.	Buried.	Expose and restore to surface grade.
Annually	Access Lid		Lid Missing	Lid missing.	Replace.
Pest Control					

Recommended Frequency	Drainage System Feature	Date	Problem	Conditions to Check For	Maintenance Activities and Conditions that Should Exist
As Needed	Pest Control		General Pests	Signs of pest infestations (IPM protocol threshold(s) are exceeded).	Follow IPM protocols for weed and pest management.
Biannually and After Major Storm Events	Pest Control		Mosquitoes	Standing surface water in dispersion area remains for more than 3 days after the end of a storm.	Identify the cause of the standing water and take appropriate actions to address the problem. Do not use pesticides or *Bacillus thuringiensis israelensis* (Bti).
As Needed	Pest Control		Rodents	Rodent holes or mounds disturb dispersion flowpaths.	Fill and compact soil around the holes and vegetate to restore flowpath.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588