

CITY OF KIRKLAND

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**DEPARTMENT OF PUBLIC WORKS
PRE-APPROVED PLANS POLICY**

**Policy D-7: PRIVATE MAINTENANCE AGREEMENT
AND LICENSE TO ENTER FOR A STORMWATER FACILITY**

The Private Maintenance Agreement and License to Enter will be recorded on all projects that construct a stormwater and/or LID facility.

The applicant must provide the City with an original signed copy of the maintenance agreement and license to enter prior to issuance of a Building or Land Surface Modification permit.

Maintenance Standards

The Maintenance Standards for the following flow control BMPs are included in this policy:

1. Permeable Pavement (permeable asphalt/concrete, and interlocking concrete paver blocks)
2. Bioretention and Rain Gardens
3. Infiltration Systems (including drywells and infiltration trenches)
4. Infiltration Vaults
5. Basic Dispersion Systems (including dispersion trenches, splash blocks, rock pads, and vegetated dispersion areas)
6. Vegetated Roofs
7. Rainwater Harvesting Systems
8. Native Growth Retention Area (NGRA)

Additional maintenance standards for these and other stormwater facilities can be found in the King County Surface Water Design Manual, and KMC 15.52.120.

General Maintenance Requirements for Permeable Pavement

Maintenance Components	Required Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Surface (address applicable components)			
Permeable Asphalt or Concrete	Ongoing	Proactive measures.	Prohibit use of sand and sealant application and protect surface from adjacent runoff.
	A	Infiltration capacity of surface is restricted due to clogging.	Remove sediment and debris using brushes or sidewalk sweepers equipped with vacuums. After sediment removal, use an industrial pressure washer to restore permeability.
	A	Major cracks or trip hazards, and concrete spalling and raveling.	Fill with patching mixes. Large cracks and settlement may require cutting and replacing the pavement section.
Interlocking Concrete Paver Blocks	A	Infiltration capacity of surface is restricted due to clogging.	Remove sediment and debris using brushes or sidewalk sweepers equipped with vacuums.
	A	Paver block is missing or damaged.	Replace or repair damaged paver block.
	A	Settlement of surface.	May require resetting of blocks.
	A	Loss of void material between paver blocks.	Refill per manufacturer's recommendations.
Spill Response	As needed	Release of pollutants.	Clean up spills as soon as possible to prevent contamination of stormwater.

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General Maintenance Requirements for Bioretention and Rain Gardens

Maintenance Components	Required Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Ponding Area			
Earthen reservoir (berms, weirs, and side slopes)	B, S	Erosion (gullies/rills) greater than 2 inches deep around inlets, outlet, and side slopes	Eliminate cause of erosion and stabilize damaged area (regrade, rock, vegetation, erosion control blanket)
	A, S	Settlement greater than 3 in.	Restore to design height
	A, S	Downstream face of berm or embankment wet, seeps or leaks evident	Plug holes. Contact geotechnical engineer ASAP.
Sediment or debris accumulation	B	Accumulated sediment or debris significantly impacting rain garden infiltration rate or surface storage capacity	Remove excess sediment, bioretention soil, or debris. Identify and control the sediment source.
Inlet via surface flow	A, S	Soil is exposed, signs of erosion are visible	Repair and control erosion sources
Inlet via concentrated flow (curb cuts or pipe)	A, S	Sediment, vegetation, or debris partially or fully blocking inlet structure. Pipe is damaged or clogged.	Clear the blockage. Identify source of blockage and take actions to prevent future blockages. Repair or replace pipe if needed.
	A, S	Water disrupts soil media	Reconfigure inlet, add plants/rock
Outlet pipe/structure	A, S	Sediment, vegetation, or debris partially or fully blocking outlet structure. Pipe is damaged or clogged.	Clear the blockage. Identify source of blockage and take actions to prevent future blockages. Repair or replace pipe if needed.
Trash rack	A, S	Trash or other debris present	Remove and dispose trash/debris
	A	Bar screen damaged or missing	Repair or replace bar screen
Check dams and weirs	A, S	Sediment, vegetation, or debris blocking flow control weir or check dam	Clear the blockage
	A, S	Erosion and/or undercutting is present	Repair and take preventative measures to prevent future erosion or undercutting
	A	Grade board or top of weir damaged or not level	Restore to level position
Overflow or emergency spillway	A, S	Overflow spillway is 50% plugged with sediment or debris	Remove and dispose sediment/debris
	A, S	Native soil is exposed or other signs of erosion damage	Repair erosion and stabilize surface of spillway
Bioretention soil	As Needed	Water remains in the basin 48 hours or longer after the end of a storm	Check underdrain and remove clogs. If soil is clogged, remove upper 3" of soil and replace with imported bioretention soil. Identify clogging sources and correct.

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General Maintenance Requirements for Bioretention and Rain Gardens (continued)

Vegetation			
Vegetation along cell bottom	Monthly	Poor vegetation growth (less than 75% coverage) or weeds cover more than 15% of area	Determine cause of poor vegetation growth and correct. Remove weeds and replant with native species as necessary to obtain coverage.
Vegetation along cell upland slope	Monthly	Poor vegetation growth (less than 75% coverage) or weeds cover more than 15% of area	Determine cause of poor vegetation growth and correct. Remove weeds and replant with native species as necessary to obtain coverage.
Trees and shrubs	A	Large trees and shrubs interfere with operation of the basin or access for maintenance	Prune or remove large trees and shrubs. Replace with other native species as necessary to obtain coverage.
	A	Standing dead vegetation is present	Remove dead vegetation when covering greater than 10% of basin area. Replace dead vegetation annually or immediately if necessary to control erosion. Determine cause for dead vegetation and correct problem.
Mulch	A	Bare spots (without mulch cover) are present or mulch depth is less than 2 inches	Replenish mulch to cover bare spots and augment to minimum depth of 3 inches.
Weeds	Monthly (March-September)	Weeds are present. See King County noxious weed list: www.dnr.metrokc.gov/wlr/lands/weeds/laws.htm	Remove weeds. To protect water quality, do not use herbicides or pesticides. Class A & B noxious weeds must be removed, bagged, and disposed of as garbage immediately. Reasonable attempts must be made to remove class C.
Line of sight	A	Vegetation causes visibility or driver safety issues.	Prune or remove if continual safety hazard
Irrigation			
Irrigation system (if any)	Monthly (May-Sept)	Irrigation system is present but not functioning properly	Follow manufacturer's instructions for operation, maintenance, and troubleshooting
Plant Watering	Weekly or as required (May-Sept)	Plant establishment period (2-3 years)	Water weekly during periods of no rain to ensure plant establishment
	As Needed	Longer term period (3+ years)	Water during drought conditions or more often if necessary to maintain plant cover
Pest Control			
Mosquitoes	B, S	Standing water remains for 3 days following storms.	Manually remove standing water, identify cause and take appropriate actions to improve the drainage.
Rodents	As Needed	Rodent holes present	Fill and compact soil around the holes
Other			
Spill Response	As Needed	Release of pollutant into rain garden	Clean up spill as soon as possible to prevent contamination of stormwater. Replace vegetation if needed.

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General Maintenance Requirements for Infiltration Systems (Drywells and Infiltration Trenches)

Maintenance Components	Required Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Rock Trench / Well			
Surface of trench/well (i.e, water enters through exposed aggregate)	Fall, Spring	Accumulated trash, debris, or sediment on drain rock surface impedes sheet flow into facility	Remove/dispose in accordance with local solid waste requirements
	A, W	Vegetation/moss present on drain rock surface impedes sheet flow into facility	Maintain open, freely draining drain rock surface
Drain Rock	Fall, Spring	If water enters the facility from the surface, inspect to see if water is ponding at the surface during storm event	Clear piping through facility when ponding occurs Replaced rock/sand reservoirs as necessary
		If buried drain rock, observe drawdown through observation port or cleanout	Tilling of subgrade below reservoir may be necessary (for trenches) prior to backfill
Inlet/Outlet Pipe Conveyance			
Pipes(s)	A, W	Accumulation of trash, debris, or sediment in roof drains, gutters, driveway drains, area drains, etc.	Remove/dispose
	A, W	Pipe from sump to trench or drywell has accumulated sediment or is plugged	Clear sediment from inlet/outlet pipe screen and inlet/outlet pipe
	A, W	Cracked, collapsed, broken, or misaligned drain pipes	Repair/seal cracks Replace where repair is insufficient
Roof Downspout	B, W	Splash pad missing or damaged	Replace/replace
	A, W	Leaves or other debris plugging downspout	Remove/dispose
Storage Sump			
Sump	A	Sediment in the sump should be removed annually	Remove/dispose in accordance with local solid waste requirements
Access Lid	A	Cannot be easily opened	Repair/replace
	A	Buried	Refer to record drawings for design intent. If the access lid was designed to be exposed, expose and restore to surface grade
	A	Cover missing	Replace

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General Maintenance Requirements for Infiltration Vaults

Maintenance Components	Required Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Site			
Trash and debris		Any trash and debris which exceed 1 cubic foot per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size office garbage can). In general, there should be no visual evidence of dumping	Remove trash and debris from site
Noxious Weeds		Any noxious or nuisance vegetation which may constitute a hazard to City personnel or the public.	Noxious and nuisance vegetation removed according to applicable regulations.
Contaminants and pollution		Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint	Materials removed and disposed of according to applicable regulations.
Grass/ groundcover		Grass or groundcover exceeds 18 inches in height	Mow grass to a height no greater than 6 inches.
Infiltration Vault Storage Area			
Sediment accumulation		If two inches or more sediment is present or a percolation test indicates facility is working at or less than 90% of design	Remove sediment and reestablish infiltration to infiltrate as designed
Inlet/Outlet Pipes			
Sediment Accumulation		Sediment filling 20% or more of the pipe.	Remove sediment from inlet/outlet pipes so the system is clear of sediment.
Trash and Debris		Trash and debris accumulated in inlet/outlet pipes (includes floatables and non-floatables).	Remove trash or debris in pipe
Damaged		Cracks wider than 1/2-inch at the joint of the inlet/outlet pipes or any evidence or soil entering at the joints of the inlet/outlet pipes.	Repair cracks so that no cracks are more than 1/4-inch wide at the joint of the inlet/outlet pipe. Replace where repair is insufficient.
Access Manhole			
Cover/lid not in place		Cover/lid is missing or only partially in place. Any open manhole requires IMMEDIATE maintenance.	Replace or reposition cover/lid.
Locking mechanism not working		Mechanism cannot be opened by one maintenance person with proper tools. Bolts cannot be seated. Self-locking cover/lid does not work.	Repair mechanisms, bolts, or cover/lid. If cannot be repaired, replace the lid so that it can be opened with proper tools.
Cover/lid difficult to remove		One maintenance person cannot remove cover/lid after applying 80 lbs of lift.	
Ladder rungs unsafe		Missing rungs, misalignment, rust, or cracks	

General Maintenance Requirements for Infiltration Vaults (continued)

Large Access doors/plate			
Damage or difficult to open		Large access doors or plates cannot be opened/removed using normal equipment	Replace or repair access door so it can open as designed
Gaps, doesn't cover completely		Large access doors not flat and/or access opening not completely covered.	
Lifting Rings missing, rusted		Lifting rings not capable or listing weight of door or plate	Repair/replace rings.
Infiltration Vault Filter Bag			
Plugged		Filter bag more than ½ full	Replace filter bag or redesign system
Infiltration Vault			
Sediment accumulation		6" or more of sediment has accumulated	Remove sediment and dispose.
Damage to wall, frame, bottom, and/or top slab		Cracks wider than ½-inch, any evidence of soil entering the structure through cracks or qualified inspection personnel determines that the vault is not structurally sound	Seal vault so that it is structurally sound.

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General Maintenance Requirements for Basic Dispersion Systems

Maintenance Components	Required Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Dispersion Trench			
Dispersion trench	A	Visual evidence of water discharging at concentrated points along trench	Remove debris, realign notched grade board, or rebuild trench to standards
Surface of trench	Fall and Spring	Accumulated trash/debris or sediment on drain rock surface impedes sheet flow	Remove trash/debris, sediment
	A, W	Vegetation/moss present on drain rock surface impedes sheet flow from facility	Maintain open, freely draining drain rock surface
Pipe(s) to trench	A, W	Accumulation of trash/debris or sediment in roof drains, gutters, driveway drains, area drains, etc.	Remove trash/debris, sediment
	A, W	Pipe from sump to trench or drywell has accumulated sediment or is plugged	Clear sediment from inlet/outlet pipe screen and pipe
	A, W	Cracked, collapsed, broken, or misaligned drain pipes	Repair/seal cracks, or replace pipe
Sump	A	Sediment in sump	Remove sediment. Clear sediment from inlet/outlet pipe screen and pipe.
Access lid	A	Lid cannot be easily opened	Repair or replace lid
	A	Lid is buried	Expose and restore to surface grade
	A	Cover is missing	Replace cover
Splash Block (Downspout Dispersion)			
Splash block	B	Water is directed towards building structure	Reconfigure/repair blocks to direct water away from building structure
	B	Water disrupts soil media	Reconfigure/repair blocks
Rock Pad (Concentrated Flow Dispersion)			
Rock pad	A	Thin layer of rock 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.
	A	Soil erosion in or adjacent to rock pad	Eliminate cause of erosion, repair/replace rock
Vegetated Dispersion Area (Sheet Flow Dispersion)			
General dispersion area	B, S	Erosion (gullies/rills) greater than 2 inches deep	Eliminate cause of erosion and regrade, rock, and revegetate
	B, S	Accumulated sediment/debris blocks or channelizes flow path	Remove excess sediment or debris, identify and control sediment source
Ponded water	B, S	Standing surface water more than 3 days after storm event	Regrade to eliminate depressions or aerate/amend soils to increase infiltration
Plant establishment	Weekly (May-Sept)	Plant establishment period (2-3 years)	Water weekly during periods of no rain to ensure plant establishment
Vegetation	As needed	Poor vegetation such that erosion is occurring	Water, amend soils, replant with species for existing soil/moisture conditions
	B, S	Vegetation inhibits flow along flowpath	Trim, weed, or replant to restore dispersed flow path

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General Maintenance Requirements for Vegetated Roofs

Maintenance Components	Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Structural			
Drain pipes	B, S	Soil, vegetation, pebbles, or other debris partially or fully blocking drain pipe.	Clear roof drains of any debris. Identify source of blockage and take actions to prevent future blockages.
	B, S	Pipe is damaged with cracks, settling, improper alignment.	Repair or replace pipe if needed, and re-compact soils or fill materials surrounding the pipe.
Access	B	Egress and ingress routes obstructed or unsafe.	Clear all obstructions from access routes, and follow applicable safety procedures.
Fire ventilation (if part of design)	B, S	Plugged ventilation points.	Remove blockage and take corrective action to insure proper operation.
Vegetation			
Vegetation	Monthly	Poor vegetation growth, bare areas (less than 90% plant coverage)	Determine cause of poor vegetation growth and correct. Replant with manufacturer recommended plant species, typically succulents adapted to harsh conditions.
Weeds and Dead Heading	Twice Monthly (Mar-Sept)	Invasive, nuisance, or woody plants are present.	Remove all weeds and dead head manually and without herbicide applications. Remove all woody plants as their roots can damage roof membranes.
Leaf removal	Twice Monthly (Aug –Oct)	Tree leaves present covering succulents.	Remove matted tree leaves to prevent smothering.
Soil	Monthly	Displaced soil, typically due to nesting birds.	Replace displaced soil immediately.
Fertilization	April	Lack of plant growth	Use manufacturer's recommendation or an encapsulated, organic slow release fertilizer. Verify first with manufacturer that membrane is resistant to fertilizer,
Irrigation			
Irrigation system	B	Irrigation system is not functioning properly	Follow manufacturer's instructions for operation, maintenance, and troubleshooting
Plant Watering	As needed	Early plant establishment and during drought conditions.	Saturate to the base of the soil substrate and allow soil to dry completely. Water monthly during first growing season.
	Winter	Do not water in winter.	Do NOT water 4 weeks before expected frost (late Fall) or during the winter.
Pest Control			
Mosquitoes	B, S	Standing water remains for 3 days following storms.	Remove standing water, identify cause and take appropriate actions to improve the drainage. Do not use pesticides.
Birds	As needed	Seeds removed, plants dug up	Replant, tie streamers (or other) to keep birds away
Other			
Contaminants	As Needed	Release of pollutant onto vegetated roof	Remove pollutant immediately and contact the manufacturer to prevent potential damage to the membrane. Replace vegetation if needed.

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General Maintenance Requirements for Rainwater Harvesting System

Maintenance Components	Required Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Rainwater Harvesting System			
Access Manhole	A	Manhole is blocked by obstruction or debris.	Remove obstruction or debris.
Cistern tank	A	Sediment depth in cistern is 4" or greater.	Remove sediment from cistern when there is little or no water in it. Use standard power washer and vacuum/vactor truck.
Inlet/outlet pipe	A	Inlet/outlet pipes are blocked with sediment or debris.	Remove sediment or debris from inlet/outlet pipes.
Pump	A	Sediment depth in pump sump is 4" or greater.	Remove sediment from pump sump.
	A	Pump does not work properly.	Refer to pump instruction manual.

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General Maintenance Requirements for Native Growth Retention Area (NGRA)

Maintenance Components	Required Inspection Frequency ¹	Condition When Maintenance is Required	Action Required
Native Growth Retention Area			
Non-native, invasive and noxious plants	Monthly (March-September)	Non-native, invasive and noxious plants are present. See King County noxious weed list: www.dnr.metrokc.gov/wlr/lands/weeds/laws.htm	Remove non-native, invasive and noxious plants. To protect water quality, do not use herbicides or pesticides. Class A & B noxious weeds must be removed, bagged, and disposed of as garbage immediately (do not place in yard waste).
Trees	A	Dangerous or diseased trees.	All trees shall be retained, unless dangerous or diseased. Remove dangerous or diseased trees, and replace with similar native species.

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