CITY OF
Millersburg
A COMMUNITY LINKING
AGRICULTURE AND INDUSTRY

OPERATION AND MAINTENANCE STRATEGY FOR EXISTING STRUCTURAL STORMWATER CONTROLS

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Developed for the City of Millersburg

by

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O&M Appendix E-1: Structural Stormwater Control Checklists

Abbreviations

BMPs	Best Management Practices
DEQ	Oregon Department of Environmental Quality
GIS	Geographic Information System
MS4	Municipal Separate Storm Sewer System
O&M Strategy	Operation and Maintenance Strategy for Existing Controls Program
SWMP	Stormwater Management Program

Plan Revisions

Date	Revisions
11/16/23	Update Appendix Titles, Table of Contents, Font, and stormwater controls.

OPERATION AND MAINTENANCE STRATEGY FOR EXISTING STRUCTURAL STORMWATER CONTROLS

1 INTRODUCTION

On June 1, 2021, the Oregon Department of Environmental Quality (DEQ) issued a Phase II Municipal Separate Storm Sewer System (MS4) General Permit[1] to the City of Millersburg (the City). An MS4 is the storm sewer system that is owned and maintained by the City through which runoff from precipitation and snow melt events flow, eventually discharging into waters of the state. The City's MS4 discharges into the Willamette Basin through Crooks Creek and Crooks Creek Tributary. Through the implementation of the requirements described in the Permit, the City's MS4 discharges are essentially void of pollutants.

The City is in the process of satisfying the significant requirements that are outlined in the Phase II MS4 General Permit, including development of a Stormwater Management Program (SWMP) document, which describes the programs that are, or will be, implemented under six different minimum control measures, as required by DEQ. More information concerning the Phase II MS4 General Permit minimum control measures can be found in the SWMP document.

One of the six minimum control measures outlined in the Phase II MS4 General Permit is the Pollution Prevention and Good Housekeeping for Municipal Operations, which requires the City to manage their facilities and activities in a way that reduces to the maximum extent practicable pollutants from stormwater runoff. This Operation and Maintenance Strategy for Existing Controls was a requirement under the Pollution Prevention and Good Housekeeping for Municipal Operations minimum control measure and has been developed to document the City's commitment in the identification and maintenance of structural stormwater controls that were built prior to the Phase II MS4 Permit effective date.

2 OPERATION AND MAINTENANCE STRATEGY FOR EXISTING CONTROLS

The Operation and Maintenance Strategy for Existing Controls Program (O&M Strategy) is mandated by the Phase II MS4 General Permit and pertains to both public and private existing structural stormwater controls that have been implemented in the City. According to the Phase II MS4 General Permit, existing controls are defined as "existing

[1] Phase I MS4 permittees are communities with populations over 100,000. Phase II permits are issued for those entities with populations less than 100,000.

structural stormwater controls installed or permitted by the permit registrant prior to the effective date of this permit," which is June 1, 2021.[2]

Schedule D of the Phase II MS4 General Permit defines structural stormwater controls or best management practices (BMPs) as "stormwater controls that are physically designed, installed, and maintained to prevent or reduce the discharge of pollutants in stormwater to minimize the impacts of stormwater on waterbodies."

Examples of structural stormwater controls or BMPs include:

1. Storage practices such as wet ponds and extended-detention outlet structures.
2. Filtration practices such as grassed swales, sand filters and filter strips.
3. Infiltration practices such as infiltration basins and infiltration trenches.

This O&M Strategy includes an inventory of controls, both public and private, that were permitted by the City and that discharge into the City's MS4 prior to June 1, 2021. Structural stormwater controls that do not discharge to the City's MS4 are not included in the O&M Strategy.

3 EXISTING CONTROLS INVENTORY

Important to the implementation of the O&M Strategy is maintaining current contact information for the owner of the structural stormwater control and documentation of maintenance responsibilities. The City is a small community and therefore, has very few existing controls to regulate under this Strategy. The identified public and private controls are listed in Tables 1, 2 and 3 below.

Table 1. Inventory of Public Structural Controls

Public Stormwater Structural Controls				
Control #	**Taxlot #**	**Type**	**Location**	**Responsible Party/ Owner**
38-00370	10S03W28 00100	Infiltration and Detention Basin	Millersburg Fire Station	City of Millersburg (COM)
38-00250	10S03W28 00100	Infiltration and Detention Basin	Millersburg Fire Station	COM
38-00980	10S03W28 00100	Infiltration Planter	Millersburg Fire Station	COM
38-00990	10S03W28 00100	Infiltration Planter	Transition Parkway	COM
38-00990	10S03W28 00100	Infiltration Planter	Transition Parkway	COM

[2] Note that the Post-Construction Site Runoff for New Development and Redevelopment Minimum Control Measure in the Phase II MS4 General Permit requires the City to regulate all structural stormwater controls or BMPs built for new construction designed after June 1, 2021.

38-00280	10S03W28 00100	Infiltration Planter	Transition Parkway	COM
38-00290	10S03W28 00100	Infiltration Planter	Transition Parkway	COM
38-00100	10S03W28 00100	Infiltration Planter	Transition Parkway	COM
38-00090	10S03W28 00100	Infiltration Planter	Transition Parkway	COM
38-00020	10S03W28 00100	Infiltration Planter	Transition Parkway	COM
Public Stormwater Structural Controls				
Control #	**Taxlot #**	**Type**	**Location**	**Responsible Party/ Owner**
38-00010	10S03W28 00100	Infiltration Planter	Transition Parkway	COM
07-00171DB	10S03W16DC 00100	Detention Basin	Morningstar Subdivision	COM
10-01261DB	10S03W16CD 02700	Detention Basin/Wet Pond	Sweetwater Subdivision	COM
05-00381DB	10S03W16CB 04300	Detention Basin	Hoffman Estates	COM
03-00071DB	10S03W17DD 00800	Detention Basin	Becker Ridge North	COM
14-01062DB	10S03W17D 09700	Detention Basin	Woods Estates	COM
16-00170	10S03W17D 02300	Water Quality MH/Vault	North Side of Millersburg Drive at Crooks Creek	COM

Table 2. Inventory of Private Structural Controls City Maintained

Private Stormwater Structural Controls				
Control #	**Taxlot #**	**Type**	**Owner/Location**	**Responsible Party**
04-00081DB	10S03W17D 06600	Detention Basin	Eagle's Nest Subdivision 2003 NE Summit Dr Shawn Bruner	COM

Table 3. Inventory of Private Structural Controls

Private Stormwater Structural Controls				
Control #	**Taxlot #**	**Type**	**Location**	**Owner/Responsible Party**
36-00990	10S03W16CC 06100	Detention Basin	West Valley Estates	West Valley Estates HOA
36-01290	10S03W16CC	Detention Basin	West Valley Estates	West Valley Estates

Private Stormwater Structural Controls				
Control #	**Taxlot #**	**Type**	**Location**	**Owner/Responsible Party**
	05100			HOA
03-00201DB	10S03W17DD 06800	Detention Basin	Becker Ridge West	H&R Homes and Development
03-00491DB	10S03W17DD 05600	Detention Basin	Becker Ridge East	H&R Homes and Development
12-00081DB	10S03W21CD 02100	Detention Basin	Walker Park Subdivision	Louann Lowther
13-00181DB	10S03W21CB 00400	Detention Basin	West Park Estates	Ed Perlenfein
31-00470	10S03W20AA 06700	Detention Basin	North Oak Estates	North Oak Estates HOA
32-00470	10S03W21AA 00500	Detention Basin	3763 Steelhead Run Drive	Pratum Co-op
33-00340	NE Crown Ln R.O.W.	Infiltration Planter A1	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00160	NE Crown Ln R.O.W.	Infiltration Planter A2	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00430	NE Crown Ln R.O.W.	Infiltration Planter B1	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00250	NE Crown Ln R.O.W.	Infiltration Planter B2	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00660	NE Crown Ln R.O.W.	Infiltration Planter C	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00560	NE Royal Dr R.O.W.	Infiltration Planter D	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00840	NE Royal Dr R.O.W.	Infiltration Planter E	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00750	NE Royal Dr R.O.W.	Infiltration Planter F	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-01110	NE Royal Dr R.O.W.	Infiltration Planter G	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-01200	NE Royal Dr R.O.W.	Infiltration Planter H	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
33-00940	NE Zuhlke Ln R.O.W.	Infiltration Planter I	Sarah's Meadows Subdivision	COM/Sarah's Meadows HOA
34-00000	10S03W16 01500	Detention Basin	6587 NE Old Salem Rd	Love's Travel Stop and Country Stores
Not assigned yet	10S03W21 00305	Detention Basin	5801 NE Old Salem Rd	Gordon Trucking
Not assigned yet	10S03W21 06200	Detention Basin	3900 Western Way	Ti-Squared Technologies, Inc.
Not	10S03W21D	Detention Basin	3939 NE Old Salem	LIM Properties

Private Stormwater Structural Controls				
Control #	**Taxlot #**	**Type**	**Location**	**Owner/Responsible Party**
assigned yet	01200		Rd	
21-00610DP	10S03W28 00107	Detention Basin	3484 NE Old Salem Rd	Hunter Jackson, LLC
15-00121WQ	10S03W28 00901	Treatment Swale	3075 NE Old Salem Rd	Highline Warren
15-00181WQ	10S03W28 00901	Treatment Swale	3075 NE Old Salem Rd	Highline Warren
15-00041DB	10S03W28 00901	Detention Basin	3075 NE Old Salem Rd	Highline Warren
Not assigned yet	10S03W28 00400	Detention/Treatment	3251 NE Old Salem Rd	Albany-Millersburg Economic Development Corporation
Not assigned yet	10S03W33CD 00900	Infiltration Trenches	1176 NE Old Salem Rd	Old Salem Road Storage, LLC

Existing structural stormwater controls have also been located on the Geographic Information System (GIS) storm sewer system map that is maintained by the City of Albany.

4 OUTREACH TO OWNERS AND RESPONSIBLE PARTIES

Owners and responsible parties will be notified by letters sent by postal service of the presence of a stormwater structural control that they must maintain. If not already maintained, additional maintenance of structural stormwater controls may be necessary so that they perform as was engineered, designed, approved by the City and constructed. Provided in the letter will be links to the stormwater structural control's Drainage Report and Plan Sheets, when available.

Access agreements will be attached to the correspondence that allows the City, or its identified contractor, access during regular business hours to inspect the structural stormwater controls. The access agreement requires the City to contact the owners at least two weeks prior to the scheduled inspection notifying them of the proposed inspection date and time. Owners and responsible parties are encouraged to attend the inspection and ask questions.

Subsequent to mailing letters and access agreements, telephone calls to the owners and responsible parties will be made to help answer questions and provide additional information.

5 INSPECTION

With access agreements completed, the City will conduct inspections of each control measure to determine whether it is operating as per design. If the structural stormwater facility is not operating as designed, the City must determine what actions must be conducted to repair it.

The City has developed Checklists and O&M procedures for each type of structural stormwater facility that discharges onto its MS4. The Checklists associated with the existing structural stormwater controls identified have been attached to this O&M Strategy.

5.1 Owner / Responsible Party Inspections

The City Checklists for each type of structural stormwater control provide a minimum and recommended inspection interval for each feature. The owner and/or responsible party must follow this inspection interval and use the Checklist while inspecting the stormwater structural controls on their property. The completed checklists must be maintained and provided to the City should the City request them.

Should an owner or responsible party fail to conduct inspections, the City may perform additional inspections to ensure the proper maintenance of the structural stormwater control is being conducted.

5.2 Oversight Inspections

The City will perform inspections of the structural stormwater controls on a routine basis and track those inspections in a spreadsheet.

Inspection reports created from City inspections are sent to the facility owners. Should maintenance be needed, a compliance date is provided, usually 30 days from the date the report was sent to the owner. Depending on the severity of the maintenance, the owner can send a response with photographic evidence that repairs were made, or, in more extreme cases, a reinspection is conducted. Inspections conducted by the City are documented and can be made available to DEQ upon request.

The Phase II MS4 General Permit does not specify how many of the existing controls must be inspected by the end of the Permit term, which for the City is in 2024. The Permit requires that the City's program be fully operational by February 28, 2024.

6 OPERATION AND MAINTENANCE

The City requires all new or modified private structural stormwater controls to have an Operations & Maintenance Agreement, which includes a signed and recorded Declaration of Covenants allowing the City to inspect the facility and enforce the provisions in the O&M Agreement. However, existing structural stormwater controls were constructed prior to that requirement.

The Phase II MS4 General Permit requires this O&M Strategy to meet the long-term requirements in the Post-Construction Site Runoff for New Development and

Redevelopment, SWMP document Section 2.5.5, Long-Term Operation and Maintenance. Legal authority, inspection procedures, tracking and reporting requirements, as well as including these features on the MS4 Map is required.

- For structural stormwater controls that are ponds with forebays, trickle channels, and outlet boxes as controls, each function must perform as per design.
- For structural stormwater controls that include vegetation, the owner or responsible party should be maintaining the vegetation or replacing it to ensure its functionality.
- For structural stormwater controls that include soils in the treatment process, soil permeability must be maintained to infiltrate the design storm.

City Checklists detail maintenance requirements for each structural stormwater control that the City has permitted. Should the control require additional maintenance, the owner or responsible party must ensure that maintenance is conducted or enforcement to ensure maintenance of these measures will result.

Because the structural stormwater controls that fall under the O&M Strategy for Existing Controls were built prior to the effective date of the permit, the existing structural stormwater controls are not required to meet the site performance standards requirements in Section 2.5.3 of the SWMP document under the Post-Construction Site Runoff for New Development and Redevelopment Minimum Control Measure.

7 ENFORCEMENT

A structural stormwater control requiring maintenance is essentially a BMP that has failed and does not have the capacity to reduce the pollutants contained in the discharge. Because most structural stormwater controls constructed prior to June 1, 2021, do not have O&M Agreements associated with them, Municipal Code Title 12, Section 12.01.090, must be used, which prohibits any activity that "may cause or contribute to the introduction of pollutants to rights-of-way, wetlands, drainage ways, the municipal storm sewer system, receiving waters, and or areas that include or contribute directly to waters of the State". The MMC Section 12.80 provides enforcement authority for all of Title 12.

Should an owner or responsible party not maintain the structural control measures, enforcement escalation will be conducted.

Inspectors document the failure of the structural stormwater control and notify the owner or responsible party about the results of the inspection, identifies the improvements that are required, and provides a compliance date, normally 30 days from the correspondence. If substantial improvements must be made, the City can at any time consider extending timelines for extenuating circumstances.

<u>Verbal Warning</u>

If after 30 days, the City has not been contacted by the owner or responsible party for a reinspection, the City will contact the owner or responsible party directly by phone or in person to discuss the improvements to be made. A plan to conduct maintenance on the

structural stormwater control must be developed by the owner or responsible party and submitted to the City within 7 days of the verbal contact being made. The Plan must include work to be conducted, a timeframe for completing the project, and any intermediate measures to be implemented to ensure that contaminated stormwater runoff is not discharged while the system is being maintained.

Written Warning

If a Plan to remediate the situation has not been submitted to the City for review within the timeframe provided, the City Engineer will issue a "Cease and Desist Notice" letter to the property owner. The letter will request that maintenance be conducted immediately or the connection/discharge to the City's MS4 be removed.

Should the property owner immediately submit a Plan to remedy the situation, the City will consider this action in good faith and negotiations will ensue to ensure maintenance is conducted. If at any point the property owner defaults upon agreed upon measures or schedule in the Plan, a verbal and then written warning may be issued.

Once the Plan has been fulfilled, a follow up inspection will be performed by the City to ensure compliance. If the maintenance has not been conducted, the incident will be referred internally to the City Engineer for further review.

City Removal of Connection/Discharge

The City may conduct the maintenance required to remove the introduction of pollutants to the City's MS4 and charge the responsible party for costs to repair/abate the discharge as well as administration fees. The responsible party could also be subject to civil action for damages.

O&M Appendix E-1:

Structural Stormwater Control Checklists

The Operation & Maintenance checklists contained in this attachment have been taken from the City of Millersburg Engineering Standards – Division E, except the Detention / Infiltration Basin Checklist, which has not yet been added to the Engineering Standards. Formatting for the City of Millersburg Standards has been modified to fit this report.

Detention / Infiltration Basin – Operation & Maintenance Checklist				
Detention / infiltration basins are structural stormwater controls that are designed to retain stormwater and release it slowly into the storm sewer system to reduce the potential for flooding while allowing trash, debris, sediment to settle out before stormwater discharges from the site.				
Inspection Timing	**Facility Feature**	**Problem**	**Conditions to Check For**	**Maintenance Practices**
Required: Annually Recommended: Monthly	Inlets, Outflows, Underdrains, Curb Cuts	Structural Damage	Are all structural components working properly?	Repair structural damage found with materials consistent with the original design of the feature. Major structural changes may require City approval.
Required: Annually Recommended: Monthly from November through April and after any large storm (1-inch in 24 hours)	Outflow Pipe	Standing Water	Standing water in the facility between storms that does not drain freely; no standing water should exist within 24 hours after any large storm (1-inch in 24 hours or larger)	Remove sediment or trash blockages and rake soil to clear of debris; remove sediment from clean-outs and clear perforated underdrains as needed. Ensure soil is infiltrating to the design specifications. If not, replacement of media may be required.
Required: Annually Recommended: Monthly	General	Structural Damage	Are there any cracks or damaged areas on inlet/outflow pipes? Spillway? Weir?	Repair structural damage found with materials consistent with the original design of the feature. Major structural changes may require City approval.
Required: Annually Recommended: Monthly	General	Vegetation	Does the grass need to be cut?	Mow grass often. Remove grass clipping to limit nutrients in the pond and prevent clogging.
Required: Annually Recommended: Monthly from November through April	General	Vegetation	Has unwanted vegetation grown over the outflow or inlet pipes?	Remove dense vegetation routinely to ensure outflow and inlet pipes remain operational and not clogging the drainage system.
Required: Annually Recommended: Monthly from November through April	General	Nutrients / Standing Water	Overgrowth of algae noted?	Remove algae where possible, check and repair clogging in the system causing water ponding, check for nutrient sources draining to the structure.
Required: Annually Recommended: Monthly from November through April	General	Vegetation	Invasive plants noted?	Remove invasive species, regrade and replant large bare areas; use erosion control measures as needed.**

Detention / Infiltration Basin – Operation & Maintenance Checklist				
Detention / infiltration basins are structural stormwater controls that are designed to retain stormwater and release it slowly into the storm sewer system to reduce the potential for flooding while allowing trash, debris, sediment to settle out before stormwater discharges from the site.				
Inspection Timing	**Facility Feature**	**Problem**	**Conditions to Check For**	**Maintenance Practices**

Detention / Infiltration Basin – Operation & Maintenance Checklist (continued)				
Inspection Timing	**Facility Feature**	**Problem**	**Conditions to Check For**	**Maintenance Practices**
Required: Annually Recommended: Monthly	General	Vegetation	Areas that need to be reseeded/replanted?	Regrade and replant large bare areas; use erosion control measures as needed
Required: Annually Recommended: Monthly from November through April	General	Erosion Scouring	Are there signs of erosion?	Repair ruts or bare areas by filling with facility soil media; repair or add splash blocks or rock energy dissipaters at curb and pipe inlets; regrade and replant large bare areas; use erosion control measures as needed
Required: Annually Recommended: Monthly	General	Sediment Accumulation in Treatment Area	Is there noticeable sedimentation in the basin? In the inlet/outflow?	Remove sediment from vegetated treatment area. Rake to ensure facility is level across bottom and water drains freely through soil media. Replace soil media or vegetation as needed
Required: Annually Recommended: Monthly	General	Contaminants	Signs of pollution? (Oily sheen, foam, etc.)	Remove contaminants and clear drains
Required: Annually Recommended: Monthly	General	Structural/vegetation damage; trash or debris dumping	Signs of vandalism?	Repair structural damage, remove trash or debris, repair vegetation damage, rake and revegetate
Required: Annually Recommended: Monthly	General	Rodents	Signs of pests? (Burrowing, nesting, ant hills)	Repair facility, fill rodent holes, and remove rodents**

***No chemical control measures such as herbicides, insecticides, pesticides, fertilizers, and rodenticides shall be used in post-construction stormwater quality facilities without prior approval from the City.*

Planter/Swale – Operation & Maintenance Checklist				
These vegetated post-construction stormwater quality facilities are designed to accept stormwater runoff from adjacent impervious surfaces. They remove pollutants by filtering runoff through vegetation and soil media. Water should drain through the facility within 24 hours after a storm event. This checklist describes required and recommended inspection and maintenance activities to provide for proper facility function.				
Inspection Timing	**Facility Feature**	**Problem**	**Conditions to Check For**	**Maintenance Practices**
Required: Annually Recommended: Monthly from November through April	General	Sediment Accumulation in Treatment Area	Sediment depth exceeds 2 inches	Remove sediment from vegetated treatment area. Rake to ensure facility is level across bottom and water drains freely through soil media. Replace soil media or vegetation as needed
Required: Annually Recommended: Monthly from November through April	General	Erosion Scouring	Eroded or scoured facility bottom due to flow channelization, or higher flows	Repair ruts or bare areas by filling with facility soil media; repair or add splash blocks or rock energy dissipaters at curb and pipe inlets; regrade and replant large bare areas; use erosion control measures as needed
Required: Annually Recommended: Monthly from November through April and after any large storm (1- inch in 24 hours)	General	Standing Water	Standing water in the facility between storms that does not drain freely; no standing water should exist within 24 hours after any large storm (1-inch in 24 hours or larger)	Remove sediment or trash blockages and rake soil to clear of debris; remove sediment from clean-outs and clear perforated underdrains as needed
Required: Annually Recommended: Monthly	General	Rodents	Evidence of rodents or water piping through facility via rodent holes	Repair facility, fill rodent holes, and remove rodents
Required: Annually Recommended: Monthly during growing season	General	Insects	Insects such as wasps and hornets interfere with maintenance activities	Remove harmful insects and insect nests as needed

Planter/Swale – Operation & Maintenance Checklist (continued)				
Inspection Timing	**Facility Feature**	**Problem**	**Conditions to Check For**	**Maintenance Practices**
Required: Annually Recommended: Monthly and after any large storm (1-inch in 24 hours)	General	Trash and Debris	Visual evidence of trash, debris or dumping	Remove trash and debris from facility
Required: Annually Recommended: Monthly from November through April	General	Contamination and Pollution	Any evidence of spills or excess oil, gasoline, contaminants, or other pollutants;	Remove/cleanup contaminants. Coordinate removal/cleanup with City of Millersburg
Required: Annually Recommended: Annually and after any large storm (1-inch in 24 hours)	General	Facility malfunction; lack of drainage even after maintenance for sediment or standing water	Facility is not receiving flow and/or draining properly; structural malfunction or broken, misaligned or missing parts have created a safety, drainage, and/or other design problem	Repair or replace entire facility or broken/non-functioning elements to meet design standards and plans
Required: Annually Recommended: Monthly and after any large storm (1-inch in 24 hours)	Inlets/Outlets	Obstructed or non-working Inlet/Outlet	Inlet/outlet areas clogged with sediment, vegetation or debris; sediment trap, if present, is ½ or more full; overflow or clean-out pipes are damaged or parts are missing	Remove material to clear inlet and outlet areas, inflow pipes or downspouts, and sediment traps. Clear perforated drain pipe as needed. Repair or replace drain pipe, cap, grate structure or other elements as needed
Required: Annually Recommended: Monthly from November through June	Inlets/Outlets	Vegetation blockages	Vegetation blocking more than 10% of the inlet or outlet opening	Trim or remove excess vegetation and soil. No vegetation should block flow at inlets/outlets or overflows. If removing excess vegetation, protect area from erosion.
Required: Annually Recommended: Monthly and after any large storm (1-inch in 24 hours)	Check Dams	Erosion, Scouring, Flow Undermining	Scoured flow paths around sides or from underneath check dams; wood rot or holes; check dam is properly attached, aligned and secure; ballast rock on downstream side is in place	Repair ruts and scour areas with compost or facility soil media; Replace ballast rock; Repair or replace check dam as needed

Planter/Swale – Operation & Maintenance Checklist (continued)				
Inspection Timing	**Facility Feature**	**Problem**	**Conditions to Check For**	**Maintenance Practices**
Required: Annually Recommended: Monthly	Vegetation	Dead or Stressed Vegetation and/or Poor Vegetation Coverage	Vegetation is dead, stressed, sparse, bare or soil eroded in more than 10% of the facility	Determine cause of poor growth and correct the condition; replant with containerized plants as needed to meet design density standards
Required: Annually Recommended: Monthly during growing season	Vegetation	Invasive Vegetation and weeds	Nuisance weeds present. Invasive vegetation is present, including but not limited to the following: Himalayan Blackberry; Reed Canary Grass; Teasel English Ivy; Nightshade; Clematis; Cattail Thistle; Scotch Broom	Remove excessive weeds and invasive vegetation
Required: Annually Recommended: Monthly during growing season	Vegetation	Excessive Shading	Vegetation growth is poor because sunlight does not reach facility	Remove brushy vegetation as needed; re-plant with shade tolerant plants from City facility plant lists as needed
Required: Annually Recommended: Monthly from November through April	Liner (If Applicable)	Exposed or Damaged Liner, Leaks from Lined Facility	Liner is visible; more than three 1/4-inch holes in liner	Repair or replace liner and restore cover material
Required: Annually Recommended: Annually	Signage	No Parking signs or paint striping is not present or visually clear (only where required on project plans)	Signs are missing, bent or vandalized. Paint striping on street-side curb is faded or missing	Repair/replace signs and re- paint striping as needed

***No chemical control measures such as herbicides, insecticides, pesticides, fertilizers, and rodenticides shall be used in post-construction stormwater quality facilities without prior approval from the City*

Pervious Pavement – Operation & Maintenance Checklist

These facilities are impervious area reduction measures designed with a porous surface and an underlying stone layer that temporarily stores rainwater that percolates through the surface before infiltrating into the subsoil or being collected in underlying drain pipes and being discharged to the stormwater system. This checklist describes required and recommended inspection and maintenance activities to provide for proper facility function. For manufactured paver systems, the manufacturer's maintenance recommendations shall also be followed.

Inspection Timing	Facility Feature	Problem	Conditions to Check For	Maintenance Practices
Required: Bi-annually Recommended: Twice per year and after large storms (1- inch in 24 hours)	Pavement Surface	Sediment and debris deposits, potentially reducing infiltration capacity	Sediment and debris deposits across surface	Sweep with regenerative air sweeper at least twice per year as a preventive measure against clogging
Required: Annually Recommended: Monthly for areas near landscaping, adjacent to impervious areas, or in pathways of dirty vehicles	Pavement Surface	Sediment and debris deposits, water infiltrates unevenly across surface or ponds in low areas	Clogged surface, water ponding, and/or water infiltrating unevenly across surface	Concrete or asphalt pervious pavement: Power wash; paver systems: unclog with vacuum sweeper truck or method per manufacturer's recommendations do not use surfactants; use inlet protection measures to collect debris and filter power wash runoff
Required: Annually Recommended: Annually	Structural components	Cracked or moving edge constraints; cracked or settled pavement	Cracked or moving edge constraints, or cracked or settled pavement that affects overall performance	Repair all cracks, settlement or other defects that affect performance of facility per design professional's or manufacturers' specifications
Required: Annually during fall Recommended: Monthly during the Fall	General	Leaf litter deposition on surface	Leaf litter that could affect stormwater infiltration through pavement	Sweep leaf litter and sediment to prevent surface clogging and ponding
Required: Annually Recommended: Monthly during growing season	Vegetation	Weeds	Weeds that cover 10% of the surface area	Remove weeds by hand, power washing, or other approved method; use inlet protection measures if power washing.
Required: Annually Recommended: Annually and after power washing, vacuum sweeping, and weeding)	Filter medium between pavers	Aggregate loss in pavers	Settling of pavers or lack of aggregate around pavers	Reset pavers and replace pore space with aggregate from original design

***No chemical control measures such as herbicides, insecticides, pesticides, fertilizers, and rodenticides shall be used in post-construction stormwater quality facilities without prior approval from the City.*

Green Roof Operation & Maintenance Checklist

These facilities are impervious area reduction measures and are lined and vegetated rooftop systems designed to intercept rainfall and reduce runoff - with excess flows directed to downspout drains. This checklist describes required and recommended inspection and maintenance activities to provide for proper facility function. System suppliers and manufacturer's recommendations shall also be followed for proper maintenance.

Inspection Timing	Facility Feature	Problem	Conditions to Check For	Maintenance Practices
Required: Two times per year Recommended: Monthly Nov - April and after large storms (1-inch in 24 hours).	Green Roof structural components	Standing water, super saturated soil	Clogged drain or compacted soil	Clear drains; remove organics and other debris from drain; loosen compacted soil and amend
Required: Annually Recommended: Annually and after large storms (1-inch in 24 hours).	Structural components	Leaks in roof	Tears or perforation of membrane	Repair immediately. Contact manufacturer for repair or replacement
Required: Annually Recommended: During Fall and Spring.	Vegetation	Dead or stressed vegetation	Healthy vegetation should cover 90% of facility	Replant per original planting plan; irrigate as needed
Required: Annually Recommended: During Fall and Spring.	Vegetation	Dry grass or plants that may present a fire hazard	Overgrown areas, dry grasses, dead branches and leaves	Prune grass and plantings; remove clippings & debris
Required: Quarterly Recommended: Monthly during growing season	Vegetation	Weeds	Weeds on more than 20% of the site	Remove weeds manually
Required: Annually Recommended: Monthly	Growing medium	Exposed soil	Vegetation should cover 90% of facility	Cover exposed soil with plants and mulch consistent with original design
Required: Annually Recommended: Monthly from Nov - April and after large storms (1-inch in 24 hours).	Growing medium	Erosion	Rill or gully formation	Fill eroded areas with approved soil and lightly compact and replant consistent with original design

***No chemical control measures such as herbicides, insecticides, pesticides, fertilizers, and rodenticides shall be used in post-construction stormwater quality facilities without prior approval from the City.*

Water Quality Manhole – Operation & Maintenance Checklist				
These facilities provide pre-treatment by settling sediment and large debris. This checklist describes required and recommended inspection and maintenance activities to provide for proper facility function.				
Inspection Timing	**Facility Feature**	**Problem**	**Conditions to Check For**	**Maintenance Practices**
Required: Annually Recommended: Monthly from November through April	General	Trash, Debris and Sediment	Material exceeds 50% of sump depth or one foot below the Tee or Snout	Remove trash, debris, and sediment
Required: Annually Recommended: Annually	General	Structural Damage	Tee or Snout is not securely attached to manhole wall	Securely attach snout or tee to wall and outlet pipe
Required: Annually Recommended: Annually	General	Structural Damage	Structure is not upright (allow up to 10% from plumb)	Ensure structure is in correct position
Required: Annually Recommended: Annually	General	Structural Damage	Connections to outlet pipe are not watertight	Repair or replace structure to work as designed.
Required: Annually Recommended: Annually	General	Structural Damage	Any holes in the structure(other than designed)	Repair/replace structure as needed so no holes exist, except as designed
Required: Annually Recommended: Annually	Manhole	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools; bolts into frame have less than 1/2 inch of thread (may not apply to self- locking lids)	Replace/repair as necessary to ensure mechanism opens appropriately
Required: Annually Recommended: Annually	Manhole	Cover Not in Place	Cover is missing or only partially in place	Replace cover and/or secure cover in place
Required: Annually Recommended: Annually	Manhole	Cover Difficult to Remove	One maintenance person cannot remove lid using normal lifting pressure; cover makes access for maintenance difficult	Ensure cover can be removed by one maintenance person
Required: Annually Recommended: Annually	Manhole	Ladder Rungs Unsafe	Ladder is unsafe (missing rungs, loose rungs, misalignment, rust, cracks)	Repair or secure ladder immediately. Ladder must meet design standards and allow safe access for maintenance

***Water quality manholes are considered confined spaces and are not designed for prolonged occupancy. Follow industry safety standards when maintaining facilities.*