

APPENDIX B

**WATER QUALITY BEST MANAGEMENT PRACTICES
FOR OPERATION AND MAINTENANCE OF
PUBLICLY-OWNED PROPERTY**

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OPERATIONS AND ACTIVITIES THAT REQUIRE WATER QUALITY BMPS

INTRODUCTION

Water quality protection is now a consideration for all activities performed by the City. This appendix is intended to meet specific needs of the City of Soap Lake. The goal is to provide standard management practices for each activity that maintenance crews perform. This appendix includes guidance on operation and maintenance of stormwater management BMPs that are not currently in use within the City, however, the guidance is included in case the City does install new BMPs in the future.

Scope

Water quality protection practices are addressed here. These include two main categories:

- Practices to assure that water quality BMPs such as swales and treatment ponds are maintained to make sure they are performing as intended; and
- Practices to eliminate or reduce the pollution caused by operation and maintenance activities such as ditch cleaning or road repairs.

Habitat preservation practices are largely avoiding or minimizing vegetation removal and the use of chemical controls, and promoting native vegetation where feasible.

Practices in this appendix are subject to updates as more detailed storm sewer and road maintenance standards are developed.

Layout

This appendix lists activities to operate and maintain stormwater facilities, maintain roads, and perform park and landscape maintenance.

For each activity, this appendix:

- Briefly describes the activity that needs BMPs.
- Lists the water quality and non-water quality outcomes from the activity. In many cases there is added description of the desired outcome for the activity.
- Lists the BMPs to meet the water quality protection requirements.

Activities

Activities are the actions that road and storm sewer maintenance crews take in the routine performance of their jobs. Some activities such as catch basin cleaning are water quality best management practices. Others, such as ditch maintenance require best management practices. The activities are listed in the table of contents.

Activities covered may include small capital projects and overlays, but any project with work in a habitat buffer or stream channel is a larger project that requires permitting and specific BMPs beyond those included here.

Outcomes

Each activity meets desired outcomes, which are listed for each activity. There are two sets of outcomes for each activity:

- Water Quality Outcomes
- Infrastructure Maintenance Outcomes

This appendix provides practices to reach the water quality outcomes and infrastructure maintenance requirements specific to water quality or habitat protection.

The Water Quality Outcomes are:

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants

The Infrastructure Maintenance Outcomes are:

- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure
- O10 Meet public expectations for aesthetics

Practices

Practices are the best management practices necessary to meet the water quality outcomes for each activity. Practices were compiled from other agencies' manuals, the NPDES stormwater management program, or from regulatory requirements.

The practices listed for each activity may be more thoroughly described in separate chapters about BMPs or in other agencies' manuals. The Washington State Department of Ecology Stormwater Management Manual for Eastern Washington (Manual, 2004) is a good reference for specific BMPs. Maintenance guidance is included in Appendix A of Chapter 5 and Appendix A of Chapter 6 in the Manual.

STORMWATER FACILITY OPERATION AND MAINTENANCE

Stormwater facility maintenance includes activities that care for storm drains. They include all of the pipes, catch basins, drywells, manholes, swales, retention/detention ponds, oil/water separators, etc. in urbanized areas and some subdivisions in rural areas. Storm sewer maintenance does not include roadside ditch maintenance, which is described as a road maintenance activity.

SPECIAL FACILITIES MAINTENANCE REQUIREMENTS

This appendix provides a set of minimum standards and practices for maintaining stormwater facilities. Manufactured stormwater facilities such as leaf compost filters and oil/water separators often have maintenance requirements and manuals specified or written by the manufacturer. Also, larger or more complex stormwater facilities may include specifications for maintenance and vegetation management that provide specific detail above this appendix.

Manufacturer or Designer's Maintenance Manuals

Where the Public Works Supervisor determines that manuals or plans provide equal or greater level of maintenance and water quality protection, they shall be followed by the owner. These individual maintenance plans, specifications, or manuals must be approved by the Public Works Supervisor. Review of the manuals and plans should include an engineer, senior maintenance staff and, if available, the manual preparer.

One of a Kind Facilities

The director may require development and implementation of a site-specific maintenance plan for complex or unusual facilities. The plan is required when the general provisions of this manual do not provide sufficient detail for inspection, maintenance, vegetation management, and repair practices to operate the facility.

CATCH BASINS AND INLETS

Catch Basins trap sediment and some oils that can pollute water bodies. They need to be inspected and cleaned annually to remove accumulated sediment, fluids, and trash.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect catch basins at least once per year. All catch basins within the City should be inspected within a 5-year period.

Periodically inspect the catch basin and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Act to have the pollutant source removed.

Cleaning

Clean catch basins when they become one third full to maintain sediment-trapping capacity. Catch basin and manhole cleaning should be performed in a manner that keeps removed sediment and water from being discharged back into the storm sewer.

Clean materials from catch basins when discovered or reported.

Keep the inlet cleared of debris and litter.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or

other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair any damages that prevent the catch basin from functioning as designed. An example is broken or missing outlet elbow.

Follow the practices described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 5, Appendix A, Section 5 (page 5A-8).

DEBRIS BARRIERS/TRASH RACKS

Trash racks are barred covers to pipe openings. They prevent large objects from entering pipes and keep pets and people out of pipes.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect trash racks at least once per year.

Cleaning

Clean trash racks when debris is plugging more than 20 percent of the openings.

Repairs

Immediately replace missing racks and missing bars.

Replace bars that are deteriorated to the point where they may be easily removed.

Bend bent bars back into position.

Follow the practices described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 5, Appendix A, Section 6 (page 5A-9).

ENERGY DISSIPATERS

Energy dissipaters are critical for preventing erosion at storm drain outfalls. There are a variety of designs including wire gabion baskets, rock splash pads, trenches, and specially designed pools or manholes.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect at least once per year.

Cleaning

Dispersion Trench: Remove sediment from pipe when it reaches 20 percent of pipe diameter.

Repairs

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Rock Pads: Replace missing or moved rock to cover exposed soil and meet design standards.

Dispersion Trench: Repair conditions that cause concentrated flow along the trench.

Clean pipe perforations when one half of them are plugged or if flows bypass or overflow the trench.

Manhole/Chamber: When the structure deteriorates to one half its original size, or it becomes structurally unsound, replace it to the design standards.

Manual Reference: Chapter 5, Appendix A, Section 7 (page 5A-10).

FENCES, GATES, AND WATER QUALITY SIGNS

Stormwater facilities such as infiltration ponds or treatment ponds often have fences to protect them from damage and keep children away from ponds or hazardous areas. Certain facilities such as biofiltration swales, approved by the City, may also be required to have informational signs telling the public that the swale is a stormwater facility.

Outcomes

- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect fences, gates, and water quality signs when facilities are maintained.

Repairs

Repair any opening that allows entry into the facility.

Close any opening that allows access beneath a fence

Replace any missing gates.

Repair broken gate hinges or gates which do not close and lock properly.

Replace any missing signs or signs that have more than 20 percent unreadable surface.

Repair sign posts that lean more than 8 inches off vertical.

ACCESS ROADS AND EASEMENTS

Many stormwater facilities have access roads to bring in heavy equipment for facility maintenance. These roads should be maintained for inspection access and ease of equipment access.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Inspect once a year or when facilities are maintained.

Cleaning

Remove litter when mowing or litter accumulation exceeds 1 cubic foot (about one and a half 5-gallon buckets) per 1,000 square feet.

Remove any debris that blocks roads or may damage tires.

Vegetation Management

Manage vegetation as for the rest of the facility. Trees and shrubs may be removed from access roads and easements if they block access for necessary maintenance or will prevent or harm intended stormwater facility function.

Repairs

Correct any bare or eroded soils by seeding or cover BMP.

Repair road surfaces when they may lead to erosion or limit equipment access.

MANHOLES

Manholes are large cylindrical vaults usually set at storm sewer pipe connections. Unless you have OSHA approved training and equipment, never enter a manhole. There is a considerable risk of poisonous gas and injury.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function

- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect manholes once per year. All manholes within the City shall be checked within a 5-year period. Check the frame and lid for cracks and wear, such as rocking lids or lids moved by traffic. Periodically inspect the manhole and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Clean manholes when there is a blockage of a water flow path. Cleaning should be performed in a way that ensures removed sediment and water is not discharged back into the storm sewer.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs. Replace broken parts or lids that rock or are moved by traffic.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 5, Appendix A, Section 5 (page 5A-8).

OIL/WATER SEPARATORS AND BURIED WET VAULTS

An oil/water separator is an underground vault that treats stormwater by mechanically separating oil from water. The oil rises to the surface and floats on the water and sediment settles to the bottom. Buried wet vaults are similar to oil/water separators in that they are subsurface vaults that separate sediment and floating materials from stormwater.

These facilities have special problems for maintenance and should be serviced by contractors. The main issues are working in confined spaces and properly handling any sludge and oil cleaned from vaults or oil/water separators.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Periodically check stormwater flow out of the facility. It should be clear and not have a thick, visible oil sheen.

Annually check for cracks large enough to let soil enter the vault, broken or defective plates and baffles, and crushed or damaged pipes.

Periodically inspect the surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Inspect water levels after an extended dry period to check for leakage.

Cleaning

Remove trash and litter from the vault, inlet and piping.

Remove oil when it reaches one-inch thickness.

Remove sediment when it accumulates to 6 inches depth.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than 1/4 inch are present. Repair any leaks that allow water levels to drop and cause oil to be washed from the unit.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual References: Chapter 5, Appendix A, Section 10 (page 5A-13).
Chapter 5, Appendix A, Section 14 (page 5A-18).
Chapter 5, Appendix A, Section 15 (page 5A-19).

STORMFILTERTM (LEAF COMPOST FILTER)

The StormFilter is a patented system for treating stormwater. The systems have evolved during the years from very simple above ground filter beds to a variety of vault devices containing cylindrical filters filled with leaf compost pellets. StormFilter facilities consist of cartridges filled with one or a combination of media. Media can be selected to target pollutants specific to a particular site. The cartridges are housed in pre-cast or cast in place concrete vaults or in a steel catch basin configuration. Each configuration uses

baffles to promote settling of solids and separation of oils and other floatable materials. The majority of pollutants are captured by the media and held in the cartridges. Some additional settling will occur in the inlet and cartridge bays of each vault.

The manufacturer has a detailed maintenance manual for these facilities. That manual should be used. The following practices are general requirements.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect the StormFilter every six months. The inspection should determine sediment depth and the specific maintenance and repairs needed.

Annually check for cracks large enough to let soil enter the vault, broken or defective plates and baffles, and crushed or damaged pipes.

Periodically inspect the catch basin and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Remove trash and litter from the vault, inlet and piping.

Remove sediment when it accumulates to 6 inches depth in settling chambers.

Remove sediment when it exceeds 0.25 inches on filter media.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted 'in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils; are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Return used compost or canisters to the manufacturer for proper disposal or dispose of them in the garbage as solid waste.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than 1/4 inch are found.

Replace media cartridges if it takes longer than an hour for water to empty through media or if water frequently overflows the treatment chamber. Replace defective cartridges.

Repair all security and access features so they are fully functional. This includes locking manhole lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 5, Appendix A, Section 13 (page 5A-17).

CATCH BASIN INSERTS

Catch basin inserts are becoming more widely used to trap sediment and oil entering catch basins. Most involve some type of filter media and oil-absorbent pads. Filters avoid flooding by overflowing when they become clogged or there are high storm flows.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect following the manufacturer's specifications. During the wet season (October through April), inserts should be inspected once every 2 weeks. Two-week inspection can determine if a longer inspection interval is appropriate at a specific site. During the dry season, inspect them at least every 2 months.

If inserts are used for trapping sediment on a construction project, they should be inspected after every major storm.

Periodically inspect the catch basin and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Generally, the filter media is removed, then cleaned or disposed. It is easier to remove the filter after it has drained and dried. If this is not possible, consider contracting the service or dewatering the filter in a container.

Remove trash and litter from the filter.

If discharges have an oily sheen, replace the oil-trapping media. If the oil trapping media is full, remove it and replace it with a new one or if manufacturer's specifications allow, clean and replace it.

If sediment clogs media, clean it following manufacturer's specifications or replace the filter.

Material Handling

Persons handling used filters should wear rubber gloves and safety protection.

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be handled and disposed of in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Replace any media after typical service life.

Manual Reference: Chapter 5, Appendix A, Section 16 (page 5A-20).

STORMWATER BIOFILTRATION SWALES

Biofiltration swales use grass or other dense vegetation to filter sediment and oily materials out of stormwater. Usually they look like flat-bottomed channels with grass or other vegetation growing in them. Swales are stormwater treatment devices that must be properly maintained to sustain pollutant removal capacity.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Swales are easy to inspect and need to be well maintained to treat stormwater. Every 9 months, make frequent visual inspections for problems such as channeling flow, rills, bare ground, sediment and oily material.

Identify and remove pollutant sources discharging to the swale.

Cleaning

Clear inlets and outlets to prevent blockage.

Remove litter when mowing or litter accumulation exceeds two inches.

Use a rake and shovel to hand remove sediment accumulations greater than 2-inches thick that cover grass areas, avoiding vegetation removal.

Vegetation Management

Mow to keep grass at the optimum height (6 inches). Mow to no less than 4 inches height and a minimum of four cuttings per year.

Remove clippings from the treatment area in the base of the swale. Clippings may be raked or blown onto the side slopes. If the swale has vertical walls or no side-slopes, the clippings must be removed.

Preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots.

Use cover BMPs on bare soils. BMPs include hydroseeding or mulches.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Stormwater control facilities are, in effect, water body buffers where pesticides and fertilizer are not used. See Vegetation Management in Stormwater Control Facilities for more information.

Repairs

Often swales have problems due to flooding or erosion. Where possible, correct the underlying problem before trying to repair the symptom.

Level spreaders must be in proper working order for swales to function properly. Where level spreaders are damaged, sunken, or bypassed by erosion, repair them to design standard.

If there is a problem with grass dying due to the swale being flooded during the wet season, there are two options: convert the swale to plant varieties that can stand being flooded or find a way to fix the swale so it drains better.

Manual Reference: Chapter 5, Appendix A, Section 8 (page 5A-11).

WET BIOFILTRATION SWALES AND TREATMENT WETLANDS

Wet biofiltration swales and treatment wetlands use dense wetland vegetation and settling to filter sediment and oily materials out of stormwater. These stormwater treatment devices must be properly maintained to sustain pollutant removal capacity. In some cases, biofiltration swales that were designed to drain between storms remain wet and need to be rebuilt or converted to wetland swales. A designed wet biofiltration swale uses wetland plants instead of grass.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources

- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Swales are easy to inspect and need to be well maintained to treat stormwater. Every 9 months, make visual inspections for problems such as bare ground, sediment and oily material.

Identify and remove pollutant sources to the swale.

Cleaning

Clear inlets and outlets to prevent blockage.

Remove litter and trash when accumulation exceeds 1 cubic foot (about one and a half, 5-gallon buckets) per thousand square feet.

Where possible, use a rake and shovel to hand remove sediment accumulations greater than 2-inches thick in 10 percent of the treatment area.

Vegetation Management

Sparse vegetation or dense clumps of cattail do not properly treat stormwater. Try to find the cause of the problem and fix it to ensure dense vegetation. Cut back excessive cattail shoots. Normally, wetland vegetation does not need to be harvested unless there is an excessive die back that causes water quality problems.

If there is a problem with grass dying due to the swale being flooded during the wet season, there are two options: plant varieties that can stand being flooded or find a way to fix the swale so it drains better.

Outside of the treatment area, preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots. Use cover BMPs on bare soils.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Stormwater control facilities are, in effect, water body buffers where pesticides and fertilizer are not used. See Vegetation Management in Stormwater Control Facilities for more information.

Repairs

Often swales have problems due to flooding or erosion. Where possible, correct the underlying problem before trying to repair the symptom.

Repair any defect that causes the wet swale to dry out during the wet season.

Replace stormwater facility signs that are broken, damaged, or stolen.

Manual Reference: Chapter 5, Appendix A, Section 1 (page 5A-1).

DETENTION PONDS

Detention facilities are designed to hold and slowly release stormwater by use of a pond and specially designed control structure. Styles vary greatly from well-manicured to natural appearing. Generally, more natural-appearing vegetation is preferred for reduced maintenance and wildlife habitat. Some facilities are designed to appear as natural water bodies or are in park-like areas.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Avoid or minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

On an annual basis, identify and report pollutant sources to the facility. Inspect the facility for oil and other pollutants and remove any pollutants greater in volume than a surface sheen.

Cleaning

Trash is removed when it exceeds 1 cubic foot per 1,000 square feet.

Remove sediment when it accumulates to 10 percent designed pond depth.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Vegetation Management

Where a facility has natural area, vegetation management should be timed to avoid or minimize impacts on wildlife. An example is facilities used by breeding birds such as red-winged black birds.

Mow or control vegetation to match surrounding area or sustain any other intended use of the facility, such as wildlife habitat or recreation.

Stormwater control facilities are, in effect, water body buffers in which pesticides and fertilizer are not used.

Use mechanical methods to control weeds. Pesticides, herbicides and fertilizers are not used in stormwater control facilities. See the activity: Vegetation Management in Stormwater Control Facilities for more information.

Trees should not be allowed to grow on emergency overflows and berms that are over 4 feet high. Trees can block flows and roots can lead to berm failure. Remove any trees. Remove larger roots (where the base of the tree is greater than 4 inches) and restore the berm.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Repairs

Repair and seed bare areas. Repair eroded slopes when rills form, where the cause of damage is present, or there is potential for future erosion. Use cover BMPs on exposed soils.

Level spreaders must be in proper working order to function properly. Where level spreaders are damaged, sunken, or bypassed by erosion, repair them to design standard.

Rodent holes on a dam or berm can pipe water. Destroy the rodents, preferably by trapping, and repair the dam or berm.

Repair the liner if it is visible and repair or replace where there are more than three holes greater than 1/4-inch diameter.

If berms or dams show signs of settlement or sinkholes, serious problems may be occurring. Consult a licensed professional engineer to determine the cause of the settlement or sinkhole.

Spillway areas should be completely covered by more than one layer of rock.

Manual Reference: Chapter 6, Appendix A (page 6A-2).

DRYWELLS

Drywells are perforated, open-bottomed manholes used to infiltrate stormwater into the ground. While not the intended use, drywells trap sediment and some of the oily pollutants in runoff. Drywells are more likely to fill with oily sediment in areas that lack swales or other treatment facilities. Fine oil sediment can clog drywells and lead to localize street flooding. Also, pollutants discharged into drywells can migrate into groundwater. Drywells were often installed in closed topographic depressions, areas with well-drained soils, or areas having inadequate storm sewers. Often, drywells contain groundwater.

Because drywells can be easily clogged and tend to concentrate pollutants in one place; pollution and sediment control practices should be used to protect them.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Drywells should be inspected at least once a year and no less than once every 5 years.

Periodically inspect the drywell and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

If a problem with flooding or slow drainage occurs, observe or inspect the drywell for infiltration rate and observe water level depths if monitoring wells are installed.

Cleaning

Clean out drywells when sediment depth is greater than 1/3 of the distance between the base and inlet pipe.

Drywell cleaning should be performed in a way that makes certain removed sediment and water is not discharged back into the storm sewer.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Work in drywells requires special OSHA-required confined space equipment and procedures. The most practical method for cleaning drywells may be to contract with a sewer-cleaning contractor.

If the drywell does not dissipate stormwater, it should be replaced or repaired.

It is possible to restore some drywell capacity by water-jetting clogged openings.

Another option is installing a new drywell or drainage trench, and converting the clogged drywell into a sediment trap. This has the advantage of providing a sediment trap and some amount of spill trapping. The sediment trap conversion requires grouting the holes, covering the base with concrete, and adding piping.

If there is standing water in a drywell, it probably is into the water table. Drywells in the water table should be rebuilt to prevent stormwater from going directly into groundwater.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 6, Appendix A (page 6A-9).

DRAINAGE TRENCHES

Drainage trenches are subsurface gravel-lined drain fields built to infiltrate stormwater into the ground. They have a large, perforated pipe in a bed of sorted gravel. Fine, oily sediment can clog drainfields and lead to localized street flooding. Also, pollutants discharged into drainfield can migrate into groundwater. Drainage trenches were often installed in closed topographic depressions, areas with well-drained soils, or areas having inadequate storm sewers.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Some drainage trenches have special inspection wells or clean out manholes. They should be inspected at once a year and no less than once every 5 years.

A thorough inspection of the observation points should be made if there is a decrease in capacity. Inspection points can include: inspection ports, monitoring ports built into the trench, and water table depth monitoring wells. Water levels in these inspection points can provide information about the performance of the facility.

If there is a problem with flooding or slow drainage, the facility design rate needs to be verified. If there are monitoring tubes in the drain field, use them to observe infiltration rates.

Periodically inspect the surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

If a drainage trench begins to clog, try cleaning the perforated drainpipe.

Cleaning should be performed in a way that makes certain removed sediment and water is not discharged back into the storm sewer.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according the manufacturer's instructions.

Repairs

Repairing a clogged drainage trench will involve excavation and replacement of part or all of the facility.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 6, Appendix A (page 6A-10).

INFILTRATION BASINS/PONDS

Infiltration facilities dispose of water by holding it in an area where it can soak into the ground. These are open facilities that may either drain rapidly and have grass bases, or have perpetual ponds where water levels rise and fall with stormwater flows. Infiltration

facilities may be designed to handle all of the runoff from an area or they may overflow and bypass larger storms.

Since the facility is design to pass water into the ground, anything that can cause the base to clog will reduce performance and is a large concern. Generally, infiltration basins are managed like detention ponds but with greater emphasis on maintaining the capacity to infiltrate stormwater.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Avoid or minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Check once per year after a rainstorm to see if the facility is draining as intended. Inspect annually for all features.

A thorough inspection of the observation points should be made if there is a decrease in retention basin capacity. Inspection points can include monitoring ports built into the base of the facility and water table depth monitoring wells. Water levels in these inspection points can provide information about the performance of the facility. It will probably require a licensed professional engineer or other professional trained in hydraulics to interpret the information.

Identify and remove pollutant sources to the facility. Inspect the facility for oil and other pollutants and remove any pollutants greater in volume than a surface sheen.

Cleaning

Trash is removed when it exceeds 1 cubic foot per 1,000 square feet.

Remove sediment when it accumulates to 2 inches or if the facility does not drain between storms or meet 90 percent of design capabilities.

If the facility has a sediment trap, clean out the sediment when one-half foot accumulates.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Vegetation Management

Mow or control vegetation to match surrounding area or sustain any other intended use of the facility, such as wildlife habitat or recreation.

Stormwater control facilities are, in effect, water body buffers where pesticides and fertilizer are not normally used. See the activity Vegetation Management in Stormwater Control Facilities for details.

Use mechanical methods to control weeds. Pesticides, herbicides and fertilizers are not normally used in stormwater control facilities.

Trees should not be allowed to grow on emergency overflows and berms that are over 4-feet high. Trees can block flows and roots can lead to berm failure. Remove any trees. Remove larger roots (where the base of the tree is greater than 4 inches) and restore the berm.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Repairs

If the facility is overflowing for storms it was designed to infiltrate, it needs to be repaired. This requires removing accumulated sediment and cleaning or rebuilding the system so that it works according to design.

Repair and seed bare areas. Repair eroded slopes when rills form, where the cause of damage is still present, or there is potential for future erosion. Use cover BMPs on exposed soils.

Rodent holes on a dam or berm can pipe water. Destroy rodents, preferably by trapping, and repair the dam or berm.

Spillway areas should be completely covered by more than one layer of rock.

Manual Reference: Chapter 6, Appendix A (page 6A-10).

CLOSED DETENTION SYSTEMS IN TANKS OR VAULTS

Underground tanks or vaults usually are placed under paved areas. They are hold and slowly release stormwater runoff from roofs and pavement.

Tanks and vaults are confined spaces where work requires special OSHA approved training and equipment.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect annually for the features listed under Cleaning and Repairs.

Periodically inspect the facility and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Remove trash and litter from the vault, inlet and piping.

Clean air vents that have one half of their area plugged.

Remove sediment when it accumulates to 1/10th the depth of a rectangular vault or 1/10th the diameter of a round tank or pipe.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional

Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be handled and disposed of in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than 1/4 inch are found.

Any part of a tank or pipe that is bent out of shape more than 10 percent of its design shape must be replaced or repaired.

Repair any joints that are cracked and allow soil into the facility.

Repair all security and access features. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 6, Appendix A (page 6A-5).

FLOW CONTROL STRUCTURES/FLOW RESTRICTORS

Flow control structures and flow restrictors direct or restrict flow in or out of facility components. Outflow controls on detention facilities are a common example where flow control structures slowly release stormwater at a specific rate. If these flow controls are damaged, plugged, bypassed, or not working properly, the facility could overtop or be releasing water at too high of a rate. This will likely damage streams habitat and property. Site plans should have detailed drawings showing how the flow control structures should appear. Consult a licensed professional engineer for assistance.

Outcomes

- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect at least once per year for all features listed under Cleaning and Repairs, or when a facility does not drain properly or other problems occur.

Cleaning

Remove sediment within 1.5 feet of the bottom of an orifice plate.

Remove trash and debris that may block the orifice plate.

Remove any trash or debris that may block an overflow pipe.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair or replace to original design specification any outlet orifice that is enlarged, bypassed or damaged.

Make certain that overflow outlets are not blocked.

Structures should be securely in place and within 10 percent of vertical.

Repair outlet pipe structures that have leaking connections or holes not specified by the design.

Repair or replace a non-functional or damaged cleanout gate.

Repair or replace damaged orifice plates to original design specification.

No outflow controls can be modified without approval of a Public Works Department engineer.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Manual Reference: Chapter 6, Appendix A (page 6A-6).

STORM PIPE

Storm sewer pipes convey stormwater. Pipes are built from many materials and are sometimes perforated to allow stormwater to infiltrate into the ground. Storm pipes are cleaned to remove sediment or blockages when problems are identified. Storm pipes must be clear of obstructions and breaks to prevent localized flooding.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Pipes are difficult to inspect, requiring special equipment and training. Usually, if a problem occurs the owner needs to call a sewer or plumbing contractor to inspect, repair or clean pipelines.

Cleaning

Clean pipes when sediment depth is greater than 20 percent of pipe diameter. When cleaning a pipe, minimize sediment and debris discharges from pipes to the storm sewer. Install downstream debris traps (where applicable) before cleaning and then remove material.

Generally, use mechanical methods to remove root obstructions from inside storm sewer pipes. Do not put root-dissolving chemicals in storm sewer pipes. If there is a problem, remove the vegetation over the line.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Sediment and debris from pipes should be disposed in the garbage as solid waste. Pick out any rocks first.

Repairs

Repair or replace pipes when a dent or break closes more than 20 percent of the pipe diameter.

Repair or replace pipes damaged by rust or deterioration.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

DRY DRAINAGE DITCHES

Ditches are manmade open channels that carry only stormwater. This does not include ditches that have water flowing in them during dry weather.

Ditches are often maintained for drainage to prevent localized flooding by draining stormwater. Maintenance includes removing sediment, debris and overgrown vegetation.

Protecting water quality dictates minimizing vegetation removal and preventing erosion.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Avoid or minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect ditches during routine site maintenance or at least once per year.

Cleaning

Land disturbing activities that remove vegetation or disturb soil are subject to City erosion control requirements. A good time to clean is during the growing season, when it's easiest to reestablish vegetation. This is generally April through June and September through October.

If feasible, remove small amounts of sediment by hand when performing routine site maintenance.

Vegetation should only be removed when it reduces free movement of water through the ditch. Never remove more vegetation than is absolutely needed.

Only remove sediment when it reaches 20 percent of the ditch depth or affects the historic or designed hydraulic capacity.

Alternate cleaning areas with undisturbed areas, leaving undisturbed sections to act as sediment-trapping filters between worked areas.

Trap sediment that is generated by ditch maintenance to keep it from entering water bodies. Use sediment-trapping BMPs such as fabric fencing or filter bags at the lower end of each excavated area

Prevent sediment from eroding when ditch work is performed. Perform work during dry weather unless there is an emergency such as property or road flooding.

Vegetate bare soils by hydroseeding or cover bare soils with an approved BMP. Hand seed for smaller areas.

WATER-BEARING (BASE FLOW) DRAINAGE DITCHES

Many manmade drainage ditches carry water when it is not raining. This water comes from groundwater seeps and wetlands. These ditches can be recognized by the presence of wetland plants such as cattails. Any work that disturbs these channels is probably subject to a variety of environmental regulations and will probably require an HPA permit from the Washington Department of Fish and Wildlife.

Water-bearing drainage ditches require permits for work. Requirements of county, state, and federal laws and permits may apply. Contact the Washington Department of Fish and Wildlife before beginning work.

INSTALLATION, REPAIR AND REPLACEMENT OF ENCLOSED DRAINAGE SYSTEMS

This activity includes tasks such as repair and replacement of pipe, catch basins, drywells and manholes. It also includes drainage projects that add new pipes, catch basins, or infiltration structures. New drainage projects are subject to regulations under City Code. Source control BMPs are required for activities such as concrete cutting.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming Pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding

Practices

Avoid or minimize vegetation removal.

If work is performed under contract, specify BMP performance under inspection/contract administration.

Prevent debris, oils, cleaning agents, and sediment from entering waterways.

Avoid or minimize work in wet weather. This will reduce the problems of containing sediment.

Carry spill control kit to contain and clean up possible small spills in the work area.

Protect storm drains.

- Cover storm sewer inlets, catch basins and open manholes to block sediment-bearing water.
- If runoff contains sediment, use gravel-filled filter bags or an equivalent product to build berms around inlets. Gravel-filled bags are more stable than chip-filled bags.
- Catch basin inserts are also an acceptable sediment trapping option.

At stream crossings, trap materials using screens or another form of containment. Use containment BMPs to protect roadside ditches during wet weather.

Avoid using water to clean up work sites. Sweep or vacuum dust and debris from the repair job. Do not wash materials into storm sewers.

Place stockpiles away from drainage ways, wetlands, and natural wetland and habitat buffers. Cover stockpiles or contain them with berms or other containment devices if there is a chance that materials will erode into a storm drain or water body.

MINOR CULVERT REPAIR (NOT IN A STREAM)

This activity is the replacement or repair of culverts and inlets less than 6 feet in diameter. It applies only to structures that are in ditches but specifically for drainage that do not carry water during dry weather. If there is any question about whether the ditch is a storm drain or a stream, consult with the Washington Department of Fish and Wildlife.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O3 Avoid or minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Maintenance Practices

Comply with stormwater and erosion control requirements of the City Code.

Avoid or minimize vegetation removal.

Other than to address a threat to public safety or property due to flooding, perform work during the dry season.

Minimize soil disturbance.

Use sediment controls to trap any sediment and prevent sediment from entering storm sewer and water bodies. Sediment trapping BMPs are used to the extent practical during emergencies.

Use cover BMPs to prevent erosion of bare soil. Vegetate bare soils.

PAVEMENT SWEEPING

Sweeping is performed to remove sand and litter from streets and curb gutters. Sweeping also reduces dust during dry weather. Street sweeping is also storm sewer maintenance practice because it limits sediment washed into stormwater facilities. Water quality practices for street sweeping focus on sediment disposal. Reducing the amount of sediment washed into catch basins, detention facilities, drywells, and other facilities can save money because sweeping is generally cheaper than removing sediment from facilities. Sweeping also helps protect facilities from clogging with sediment.

Outcomes

- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Sweep the site if it will help keep sediment and from storm sewers or water bodies. Sweeping is especially useful for cleaning up work areas.

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Sweepings should be disposed of as solid waste or under a program permitted by the State or County Department of Health.

ROAD OPERATION AND MAINTENANCE

Road maintenance activities include just routine maintenance activities on roads, roadsides and bridges or stream culverts. It includes activities such as sweeping, roadside vegetation management, ditch cleaning, clearing debris from culverts and de-icing.

The overall goal of water quality BMPs for road O&M is to make sure that:

- Systems that control pollutants, such as vegetation in roadside ditches are preserved
- Work on roads does not become a source of pollutants such as sediment.
- Activities near sensitive areas such as stream buffers and wetland buffers follow habitat protection procedures
- Sources of pollutants to roadside ditches are identified and removed.

ACTIVITY: STREET SWEEPING (VACUUM PICKUP)

Street sweeping is performed largely for aesthetics and to remove sand and litter sediment from streets and curb gutters. Street sweeping is a water quality BMP. Water quality practices for street sweeping focus on sediment disposal.

Outcomes

- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Sweepings are disposed as provided for by the Washington Department of Ecology and State or County Department of Health requirements. Sweepings are screened to separate litter and trash (disposed as solid waste), then used as reclamation fill in permitted gravel pits.

ACTIVITY: SWEEPING (NON-PICK UP)

This form of sweeping brushes debris off the road surface, onto road shoulders, and into the ditch sides.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Do not sweep debris into wet ditches (storm or base flow) or into streams, ponds, or wetlands. Sweep debris into vegetated areas of shoulder or ditch.

Vacuum sweepers are used on bridges, and within 250 feet of water bodies, streams and wetlands.

ACTIVITY: ROADSIDE MOWING

Mowing maintains sight distances, promotes grass growth and controls unwanted vegetation. It can include mowing of grass, brush and shrubbery.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Perform mowing to the extent needed to control unwanted vegetation. Natural vegetation is left in place to the extent possible, considering safety issues for visibility and the need to maintain ditch flow capacity.

Minimize mowing to the backslope to include areas where noxious weeds or unwanted vegetation need to be controlled.

Roadside ditches are stormwater conveyances, and are in effect, water body buffers where pesticides and fertilizer are not normally used. See Activity: Vegetation and Pest Management in Stormwater Control Facilities for details.

In Habitat Conservation Areas where roads abut natural vegetation (not cultivated fields, lawns and pastures), mowing is restricted to the road shoulder and for control of patches of blackberries or other noxious or nuisance vegetation.

ACTIVITY: ROADSIDE CHEMICAL VEGETATION CONTROL

Weed control is performed to control noxious weeds on City right-of-way and to kill vegetation along the edge of pavement along arterial roads and major collectors, within pavement cracks, and on landscaped medians. This activity does not include maintaining stormwater swales or other vegetated stormwater facilities.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

Chemical controls are used where it is not practical to control by mechanical removal or cultural controls.

Herbicide is sprayed to either the top of the ditch or two feet from the edge of pavement (whichever is less) to control vegetation.

Never spray herbicides into water. Many roadside ditches carry water during dry periods and can be recognized by the presence of water and wetland plants such as cattails. Do not spray herbicide in these ditches.

Within 250 feet of a water body or wetland, or within a designated Habitat Conservation Areas, follow the practices of Activity: Vegetation and Pest Management in Stormwater Control Facilities or avoid chemical applications within 100 feet of a water body.

ACTIVITY: ROADSIDE BRUSH AND TREE CLEARING

This includes mechanical, hand removal, and spot herbicide spraying of undesirable shrubs, bushes and trees along roads.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O9 Protect infrastructure
- O10 Meet public expectations for aesthetics

Practices

Limit brush removal to the shoulder and ditch. Only remove brush and trees or branches to provide sight distance and maintain ditch flow capacity.

Do not remove native shrubs or trees within Habitat Conservation Areas, wetland buffers, or along drainage ditches that have dry weather flow unless it poses a hazard or is a nuisance or noxious weed. These ditches often have wetland plants such as cattails in them. Consult with the area supervisor before removing trees or brush within 250 feet of a stream. A habitat biologist should be consulted before removing trees in a Habitat Conservation Area.

For drainage ditches, follow the practices of Activity: Vegetation and Pest Management in Stormwater Control Facilities. For other roadside areas with natural vegetation, follow vegetation management activity: Vegetation Management in Less-Managed Areas.

Only trees that pose a danger of falling onto roadways or structures may be removed within Habitat Conservation Areas. Removed trees are replaced with the same type of

trees that cover an equal area as the canopy of the removed tree. Tree replacement is within the same basin.

If practical, hand remove weeds such as black berry vines, nightshade and scotch broom while keeping other bushes and trees.

If there is a water body or ditch with water flow during dry weather, only clear bushes when sight distance is an issue, and after checking with the area supervisor.

Cover bared soils with an erosion prevention cover BMP. Vegetate bare soils.

ACTIVITY: ROADSIDE DITCH CLEANING AND RESHAPING

This activity includes machine or hand cleaning of ditches, reshaping ditches to promote drainage, and managing any removed materials. This practice does not include ditches that have water flowing in them See the stormwater facility O&M standards for Dry Drainage Ditches.

Protecting water quality dictates minimizing vegetation removal and preventing erosion.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Practices

Use mowing as the first method to reduce capacity loss. If mowing is insufficient, use ditch cleaning methods.

Where practical, perform work during dry weather.

Only clean areas where there is a flow restriction.

Never remove more vegetation than is absolutely needed. Leave untouched sections at least 200-feet long (where feasible) to act as sediment trapping filters between cleaned sections.

Remove small amounts of sediment by hand when performing routine maintenance.

Use sediment-trapping BMPs at the lower end of each excavated area to keep it from washing out of the work area or entering water bodies.

If there are problems with steep gradient or flowing water, use a stabilization BMP such as a silt mat on the ditch bottom.

Cover bare soils with a cover BMP. Vegetate bare soils. During summer, seeding may not be feasible. Hydroseed unvegetated soils in early fall to assure growth before rainy weather begins in October.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

ACTIVITY: CULVERT AND INLET CLEANING

This activity includes cleaning sediment and debris from culverts, inlets and other drainage structures less than 6 feet in diameter. These structures are in dry drainage ditches that do not contain water during dry weather. Cleaning is performed to restore drainage capacity using flushing equipment or hand tool.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Practices

Other than to address a threat to public safety or property due to flooding, perform work during the dry season.

Minimize soil disturbance. Never remove more vegetation than is absolutely needed.

Use sediment controls to trap any sediment and prevent sediment from entering storm sewer and water bodies. Sediment trapping BMPs are used to the extent practical during emergencies.

Cover bare soils with a cover BMP. Vegetate bare soils. During summer, seeding may not be feasible. Unvegetated soil will be hydro-seeded in early fall to assure growth before rainy weather begins in October.

If there are problems with steep gradient or flowing water, use a stabilization BMP such as a silt mat on the ditch bottom.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

ACTIVITY: MINOR CULVERT REPAIR (NOT IN A STREAM)

This activity is the replacement or repair of culverts and inlets less than 6 feet in diameter. It applies only to structures that are in ditches built specifically for drainage and do not carry water during dry weather.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Practices

Other than to address a threat to public safety or property due to flooding, perform work during the dry season.

Minimize soil disturbance. Never remove more vegetation than is absolutely needed.

Use sediment controls to trap any sediment and prevent sediment from entering storm sewer and water bodies. Sediment trapping BMPs are used to the extent practical during emergencies.

If there are problems with steep gradient or flowing water, use a stabilization BMP such as a silt mat on the ditch bottom.

Cover bare soils with a cover BMP. Vegetate bare soils. During summer, seeding may not be feasible. Unvegetated soil will be hydro-seeded in early fall to assure growth before rainy weather begins in October.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

ACTIVITY: EROSION REPAIR

This activity includes the clean up and repair caused by erosion or minor soil failures. It involves reshaping the slope using material on site, importing fill material and removing material.

This activity does not include larger slide or stream erosion projects, which are overseen by an engineer who specifies the BMPs.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

Unless work is to address a threat to public safety or property, perform work during dry weather.

Never remove more vegetation than is absolutely necessary to complete the job.

Use sediment-trapping BMPs at the lower end of each excavated area. Trap sediment that is generated by work to keep it from entering water bodies.

Cover bare soils with a cover BMP. Vegetate bare soils.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

ACTIVITY: EMERGENCY SLIDE/WASHOUT REPAIR

This activity is emergency actions that must be immediately taken to avoid an imminent threat to public health or safety, or to prevent an imminent threat of serious environmental degradation (Section 197-11-880 WAC).

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

Install sediment control BMPs.

Use BMPs to avoid or minimize additional impacts to streams and wetlands.

If possible, divert water around the work area with temporary measures such as sandbags.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Install cover BMPs on bare soil and vegetate the area.

Where required, emergency permits will be obtained from appropriate agencies. Possible permits include:

- Grading
- SEPA
- Shoreline
- State HPA
- Flood Plain

ACTIVITY: CHEMICAL ROAD DEICER USE

This is a practice of using a chemical to prevent or retard ice formation on roads and structures. The primary purpose is to protect public safety.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

Limit deicer use to areas where traffic hazards occur. Apply the current Washington Department of Transportation approved material.

List sites where deicer is required. Use deicer as specified in manufacturer’s instructions. Follow materials storage and transfer BMPs in the Manual or City Code.

ACTIVITY: SANDING FOR ICE

Sand is used to provide traction in certain areas where snow and ice cause safety problems.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

Recover and reuse sand by using pick-up sweepers in urban areas, within 250 feet of lakes, ponds and streams, and on bridges.

In rural areas, and not near a water body, sweep sand onto vegetated shoulders.

Properly store sand and use containment or covering BMPs specified in the Manual or adopted City Code.

ACTIVITY: SNOW REMOVAL

This activity is snow removal from roads, shoulders, and bridges using various snowplowing devices. Plowed snow can include sediment and debris from roads and shoulders.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Minimize the amount of sediment and debris entering water bodies. When moving snow and ice, avoid pushing or casting snow directly into a water body.

Consider the influence that plowed or cast snow has on roadside vegetation. Minimize crushing or disturbance of roadside shrubs and trees within Habitat Conservation Areas.

Reduce speed, change plow angle or use other methods to protect water bodies and sensitive habitat areas.

ACTIVITY: ROAD SURFACE MAINTENANCE

This activity includes surface repairs and paving jobs. Tasks include using asphaltic concrete, midland pavement, and other materials for patching potholes, filling cracks, paving shoulders, and overlaying roads. If the job cuts or places concrete, see the concrete work activity BMPs.

The major concern is rainfall runoff carrying oils from the work area and particles of material being washed or swept into storm drains or water bodies.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

If resurfacing work is performed under contract, specify BMP performance under inspection/contract administration.

Prevent debris, oils, cleaning agents, and sediment from entering waterways. If feasible block inlets and drains.

Avoid work in wet weather. This will reduce the problems of containing sediment or oil laden runoff from the job.

Carry spill control kit.

If the work is creating sediment or other pollutants that can be washed from the work area, protect storm drains. Use the following practices as feasible.

- Cover storm sewer inlets, catch basins and open manholes to prevent or block sediment-bearing water.
- If runoff contains oil and grease use sandbags, booms, or other absorbent products to trap oil at inlets or in drainage ditches. Use catch basin inserts with oil trapping material.
- If runoff contains sediment, use gravel-filled filter bags or other appropriate products to build berms around inlets. Gravel-filled bags are more stable than chip-filled bags.
- At stream crossings, trap materials using screens or another form of containment. Use containment BMPs to protect roadside ditches during wet weather.

Avoid using water to clean up work sites. Sweep or vacuum dust and debris from the repair job. Do not wash materials into storm sewers.

Properly contain and dispose of any residue from cleaning tools. Use heat to clean equipment where possible, avoiding solvents. If vehicles and equipment are left at the site overnight, use drip pans to contain leaks.

Minimize vehicle and equipment cleaning at the site. If cleaning is performed, dispose of cleaning residue in a sanitary sewer or into a grassy area or small temporary infiltration pit.

Place cold mix and material stockpiles away from drainage ways. Cover or contain stock piles to prevent material or residues from washing off.

Recycle asphalt and fill material when possible.

ACTIVITY: CONCRETE WORK

This activity is the installation, cutting, or repair of concrete facilities such as road surfaces, curb and gutter, sidewalks, and drainage structures.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

When necessary, place storm drain covers or containment devices over all drain inlets or discharge points at the beginning of each workday. Remove all accumulated material at the end of each workday. Properly dispose of the material.

Dispose of concrete where it will not wash into a water body, ditch or storm drain. Collect slurry from exposed aggregate washing, grinding water, and any truck washout and dispose of it properly. It is acceptable to dig a hole to hold any slurry or rinse water.

Use curing and form release materials that minimize pollutant discharge.

Do not use water to wash down the area.

ACTIVITY: SHOULDER BLADING

This activity is blading and shaping of unpaved shoulders to correct ruts, sediment accumulation, excessive plant material accumulation, and to maintain drainage from the pavement to the ditch. It usually involves work on relatively flat gravel shoulders.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Try to limit this work to dry weather.

Minimize vegetation removal. If soils are disturbed beyond the top of the ditch or on a slope, apply erosion prevention BMPs and vegetate the bare areas.

Avoid or minimize vegetation removal within Habitat Conservation Areas, and wetland buffers. Consider avoiding shoulder blading.

ACTIVITY: SHOULDER REBUILDING

This activity is an expansion from shoulder blading that involves adding material to the shoulder, reshaping, and compacting aggregate. It may also include removing material. Shoulders are generally cleared and mowed areas vegetated with grass and brush and are not specifically subject to requirements of the Habitat Conservation Ordinance.

If work will take place between the road and stream, and increases the size of the shoulder or impacts vegetation or a stream channel, consult with an engineer to determine if permits are required.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

Use erosion controls and prevent sediment and debris from entering water bodies and wetlands. Apply sediment control BMPs at the outside edges of the work area.

Minimize vegetation removal. Avoid or minimize vegetation removal within Habitat Conservation Areas and wetland buffers.

Where possible, create a grassy vegetated slope area between the road and ditch bottom when rebuilding a shoulder.

ACTIVITY: PAVEMENT MARKING

This activity includes striping roadway surfaces and applying other markings such as hot plastic material to define special traffic control features such as crosswalks, and application of special markers using adhesives.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

As current paint stocks are consumed, water based or low VOC paints replace them.

Prevent paint from entering storm sewers and water bodies. Use over-spray control.

Store paint in spill proof containers or covered areas. Clean up spills during storage and handling.

When cleaning up, use methods that properly contain and dispose of unused paint, cleaning materials, and other spent materials.

When removing markings, prevent debris from entering water bodies. Clean up debris from grinding or power washing and dispose of it according to standard procedures.

Avoid using water to clean pavement and do not wash debris into storm sewers or ditches. Protect inlets, manholes and roadside ditches during any washing activities.

ACTIVITY: SIGN INSTALLATION AND REPAIR

This activity is the routine replacement, installation, repair, straightening and cleaning of signs.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Prevent disturbed soil from entering storm sewer or surface water bodies. Seed bare soils.

Avoid discharging cleaners to storm sewers or surface water by making sure they run into vegetated areas or limiting the amount used.

Clean up any materials or debris left by the work.

Attempt to avoid placing signs in areas where there are shrubs and trees that will have to be removed and periodically cleared to keep the sign visible.

ACTIVITY: TRAFFIC SIGNAL MAINTENANCE

This activity is the routine repair and preventative maintenance of traffic signals and luminaires, including lamps, poles and bases.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Prevent disturbed soil from entering storm sewer or surface water bodies. Use sediment trapping or cover BMPs and seed bare soils.

Avoid discharging cleaners to storm sewers or surface water by making sure they run into vegetated areas or limiting the amount used.

Clean up any materials or debris left by the work.

ACTIVITY: MAINTENANCE OF POSTS, GUARDRAILS, CONCRETE BARRIERS AND OTHER ROAD FEATURES

This activity is the routine repair and replacement of guardrails and similar features. It can include straightening and minor excavation.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

Prevent disturbed soil from entering storm sewer or surface water bodies.

Minimize the area of soil disturbance.

If soil is disturbed, use sediment trapping and cover BMPs. Seed disturbed soils if the area will sustain vegetation.

Prevent pollutants such as paint and debris from entering storm sewer or surface water bodies.

If power washing, avoid discharging water and debris directly to storm sewers or surface water by trapping with gravel-filled bags and blocking inlets. If sand blasting, contain and sweep up residues and dispose of them following standard procedures.

Carry a spill response kit.

SPILL AND HAZARDOUS MATERIALS RESPONSE

Spill or hazardous materials response applies to any activity. It includes finding abandoned containers on City right-of-way or drainage structures; spills to roads, ditches or storm structures; and clean up and vehicle accidents.

The following procedures are subject to change as training, equipment, and staff changes occur.

SPILL/INCIDENT RESPONSE WHILE IN THE OFFICE OR WHILE IN THE FIELD

Purpose/Intent: This policy ensures that all Public Works employees understand notification procedures for calls or field discovery of chemicals spills (specifically, chemical spills into the City stormwater sewer system, as well as into surface and groundwater), abandoned chemical containers or garbage or trash.

Individual divisions and sections that have field staff that investigate, collect, or clean up materials must have proper training and procedures in place.

This policy applies to all Public Works employees. All employees are responsible to ensure compliance with this policy.

Policy Provisions

1.0 Spills and Leaking Containers

When an employee receives call or discovers a chemical spill into the City Stormwater System (roadside ditches, retention/detention ponds, drywells, and catch basins), and/or into surface water or groundwater (e.g., via drywell, etc.), the employee shall immediately take the following information from the caller:

- a. Caller's name, telephone number, address, and where they can be reached later that day;
- b. The address of the spill;
- c. The physical location of the spill (e.g., northeast side of intersection...; near mile marker...; north on highway near...creek, etc.); and
- d. License plates numbers, names of individuals, company names/logos on vehicles, if available.

Notification and Tracking Procedure

1. ***Call 911 (Emergency Services) and report the call and information***
2. Call the Washington Department of Ecology Spill Response at 360-407-6300
3. Notify Public Works at 509-246-1823 that a call has been report to 911 and to the Washington Department of Ecology Spill Response

2.0 Abandoned Non-leaking Chemical Containers

Calls about contained material such as paint cans or barrels, calls should go to:

1. Public Works at 509-246-1823. Operations will evaluate the situation and complete the notification and reporting procedure.

3.0 Trash and Garbage

Calls about garbage and trash should go to:

1. Public Works at 509-246-1823. Operations will evaluate the situation and complete the notification and reporting procedure.

ACTIVITY: ACCIDENT CLEANUP

This activity involves cleanup of debris and spilled automotive fluids at accident scenes. Larger spills are discussed in the Spill Response Activity.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Follow City procedures for spill cleanup. Each maintenance vehicle has spill response instructions. Contact Public Works for more information.

ACTIVITY: SPILL RESPONSE (ILLICIT DUMPING OR CHEMICAL SPILL)

This is in response to a spill on a City-owned road or a spill impacting a storm sewer owned or operated by the City.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function

Practices

Follow practices defined in the spill reporting or response plan and policies. Each maintenance vehicle has spill response instructions. Contact Public Works for more information.

ACTIVITY: ABANDONED CONTAINER RESPONSE

This is response to discovery of abandoned waste containers on roads or other facilities owned or operated by the City.

Outcomes

- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

Follow practices defined in the abandoned materials policy. Each maintenance vehicle has instructions on responding to abandoned containers. Contact Public Works for more information.

VEGETATION MANAGEMENT GOALS, VEGETATION MANAGEMENT AREAS, AND GENERAL BMPS

Vegetation management activities listed here are performed by grounds maintenance crews who care for parks, natural areas and landscaped areas. Roadside vegetation management is covered in an earlier section, Road Operation and Maintenance.

The last section of this appendix, Description of Vegetation and Pest Management Practices provides specific practices for each vegetation management activity in this section.

Vegetation management practices are adapted, with minor modifications for format and local practices, from City of Portland Parks Pest Management Policy (April 1999).

GENERAL GOALS AND PHILOSOPHY

The City recognizes the special importance of the rivers, streams, wetlands, ponds, and stormwater treatment facilities that fall under our stewardship. The sensitive nature of such habitats, their plant and animal communities, and their direct link with other waterways require that we establish specific policies to ensure their health. These sets of practices for vegetation management, pesticide use and fertilizer use establish guidelines and limitations regarding maintenance for waterways and adjacent lands.

All landscape management decisions for controlling unwanted vegetation, diseases, and pests will follow Integrated Pest Management (IPM) principles and decision-making rationale. These are

- Proper planning and management decisions begin the IPM process.
- Cultural methods of vegetation and pest control are preferred and are first employed.
- Mechanical means of vegetation and pest control are next in line of preference, and are utilized where feasible.
- Biological methods of vegetation and pest control are considered before chemical means, where they are feasible.
- Botanical and synthetic pesticides are used only when no other feasible methods exist.

MAIN CATEGORIES OF VEGETATION MANAGEMENT AREAS

Vegetation management practices vary for areas having different management objectives. The standards here apply to all areas, but more strict controls are placed on areas where code or policy dictate that native vegetation be preserved and in areas near water bodies. These are identified for each activity. There are special management areas for pesticide and fertilizer use in 25 foot setbacks from water bodies and in stormwater control facilities. Special clearing requirements may apply in areas defined by the City's Code.

All Areas

Practices for vegetation management apply as minimum standards for all areas. More restrictive standards and practices for protected habitat and water body setbacks are listed in each activity.

Habitat Conservation Areas

Few wetlands or wetlands buffers are mapped because very few wetlands are accurately mapped. Consult wetland maps or check with technical staff regarding the potential area and buffers for a wetland. Separate practices are established for vegetation management and pest control near water bodies and inside City Habitat Conservation Areas which include protections for existing trees and shrubs and special setbacks from water bodies for controls on pesticide and fertilizer use. Vegetation management practice for specific activities or types of area such as intensively managed parks or natural areas are listed under Vegetation Management Activities.

DESCRIPTIONS AND EXAMPLES OF TYPES OF VEGETATION MANAGEMENT AREAS AND ACTIVITIES

Landscape management activities are grouped by the condition and use of the area. These can include areas inside Habitat Conservation Areas, areas in water body setbacks for pesticide and fertilizer use, and areas remote from Habitat Conservation Areas (HCA) or water bodies.

Park landscapes near waterways, lakes and ponds are divided into four classifications, ranging from intensively managed high-use areas to intact natural areas. The classifications describe their current features, as well as define the differing objectives and maintenance rationales of their care. Along with these landscapes, there are activities for maintaining storm sewer facilities and constructed wetlands.

Features and Objectives in Highly-Managed Areas.

These are areas where there is exceptionally high traffic and can include areas where there are special standards for vegetation maintenance.

Features of Highly Managed Areas

- Ornamental landscape
- Public access and activity
- High public use
- Mowing of turf, sometimes to edge of waterway
- May have facilities adjacent to water
- May have highly modified stream banks
- Often limited plantings in water body buffers

Objectives for Highly Managed Areas

- Healthy plants and turf
- Maintain ability to handle high use
- May have high expectation for aesthetics in general
- Minimize need for chemical intervention
- Control invasive plants
- Safe access
- No bare soil areas
- Low tolerance for weeds

Features and Objectives in Less-Managed Areas

Less-managed areas can include a wide variety of areas where there is a lower level of vegetation management due to public access or the area is within a water body buffer. General examples are road shoulders, less used or natural areas in developed parks, and unused land where seasonal or less frequent vegetation management occurs.

Features of Less Managed Areas

- There is a mix of native and non-native plants
- Water bodies have adjacent areas of predominantly native plants
- Some impacts from use and park development apparent in water body buffers
- Managed landscapes may be nearby
- Stream bank erosion may be occurring due to use

Objectives for Less Managed Areas

- Maintain healthy plants in HCAs or water body buffers
- Minimize need for chemical intervention
- Control invasive plants where feasible
- Minimize impact on water body buffers
- No bare soil areas

- Tolerance for natural appearance and weeds

Features and Objectives in Impacted Natural Areas

Impacted natural areas are generally in parks and undeveloped land. These areas may or may not be in Habitat Conservation Areas or water body setbacks.

Features of Impacted Areas

- Very limited impact to native vegetation
- Stream banks are buffered with predominately native plants
- There are observable limited impacts from use and park development
- Managed landscapes are not nearby

Objectives for Impacted Areas

- Maintain healthy plant community
- Minimize need for chemical intervention
- Lower tolerance of invasive plants, non- natives
- Minimize any impacts on buffer
- No bare soil areas are allowed

Features and Objectives in Intact Natural Areas

Intact natural areas are rare and exceptional places where there is intact and self-sustaining native vegetation.

Features of Intact Natural Areas

- Very limited visitor impact
- Native plant communities exist
- No nearby developed park areas

Objectives for Intact Natural Areas

- Maintain healthy plant community
- No tolerance of invasive plants, non-natives
- Minimize any impacts from activities

Features and Objectives in Stormwater Facilities

Stormwater facilities are constructed features that control or treat stormwater. The most common types of facility are swales, ponds and treatment wetlands. Many include vegetation for treatment, habitat or aesthetics. Specific maintenance requirements are included in activities for storm sewer maintenance.

Features of Stormwater Facilities

- There is a mix of native and non-native plants
- Generally not used by the public
- Include areas managed to promote design function, such as turf in swales
- Managed landscapes may be nearby

Objectives for Intermediate Areas

- Maintain healthy plant communities
- Minimize need for chemical intervention
- Control invasive plants where feasible
- No bare soil areas are allowed
- Tolerance for natural appearance and weeds

Features and Objectives in Constructed Wetlands

Constructed wetlands refer to wetlands built to replace lost wetlands or as a habitat feature. They are not stormwater facilities and are considered natural surface water bodies. Constructed wetlands have specific plans for establishing and maintaining vegetation which should be consulted and followed in addition to the requirements in this manual.

Features of Constructed Wetlands

- Limited public access
- Plants may or may not be well established depending on age and condition

Objectives for Constructed Wetlands

- Maintain healthy plant communities
- Minimize need for chemical intervention
- Low tolerance of invasive plants, non- natives
- Bare soil areas are not allowed

MULCHING

Mulches and other ground coverings are useful during the installation and restoration of landscapes as well as their ongoing maintenance. Mulches meet a variety of needs. They suppress weeds, help to retain moisture around plants, reduce possible erosion, and provide visual enhancement.

Always consider the possible impacts when using mulches, which may include:

- Inadvertent introduction of non-native weeds and diseases to the site.
- Leaching of substances such as tannins from the mulch into nearby waterways.
- Migration of mulch material into waterways.
- Nutrient leaching into waterways.

The most serious problems are probably introduction of weeds and diseases. Routine maintenance in waterway buffers should minimize the use of mulches. Mulching is best used as a part of restoration activity. Mulching in areas that are below typical high water lines is discouraged in any buffer areas.

It is permissible to plant cover crops to control erosion in buffer zones. Cover crops should never introduce any persistent non-native plant species.

MINIMIZE PESTICIDE DRIFT

Managing drift is of particular importance when surface waters are nearby. Application equipment used in the application shall employ all necessary methods to limit drift. Nozzle size, pressure regulation, droplet size, and height of spray wand, are all techniques that can be modified to reduce unwanted drift of pesticides.

Spray applications are not to be allowed in a water body set back area when:

- Wind speed is above 8 mph.
- Wind direction or activity would carry pesticides toward, or deposit them upon open water.

USE ACCEPTABLE PESTICIDES

To minimize possible aquatic impacts, only a limited group of pesticides are allowed in buffer areas. Only the pesticides specifically listed in the following tables may be used as specified in each activity. Generally, restrictions fall into two groups: general use outside of water body setbacks and within 25-foot water body setbacks. This selection of pesticides considers any possible effects on aquatic life as well as pesticide tendencies to move in the environment.

This list of pesticides may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Materials Allowed in Buffer Areas in Certain Circumstances (See Individual Activities)

Post emergent herbicides:

Triclopyr products: Garlon 3A (or other amine formulations only, not Garlon 4)
Surfactant (i.e. R-11)

Pre-emergent herbicides:

Oryzalin (Surflan)
Napropamide (Devrinol)

Materials Allowed in for Use in Aquatic Habitats under Certain Circumstances

Aquatic labeled only:

Approved surfactant (R-11 or equivalent)
Aquashade (acid blue 9, acid yellow 23)

The following matrix gives specific guidelines for pesticide and fertilizer use in 25-foot water-body setbacks that have varying levels of management. Pesticide and fertilizer use also depends on whether the activity is routine maintenance or restoration and construction projects.

See the requirements for each maintenance activity in for specifics in each area.

Use of Pesticides and Fertilizers Within 25-Foot Water Body Set Backs

Chemical used	MAINTENANCE ACTIVITY	Intensively Managed Areas	Less Intensively Managed Areas/Stormwater Facilities	Impacted areas and Constructed Wetlands	Intact Natural Areas
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line	Not Allowed	Not Allowed	Not Allowed
	During Construction or Restoration	Only in shrub beds above high water line	Not Allowed	Not Allowed	Not Allowed
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray	Cut and treat stems. <i>Spot spray to establish monocots*</i>	Cut and treat stems. Spot spray	Not Allowed
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>	Cut and treat stems. <i>Broadcast spray*</i>	Not Allowed
Fertilizer Used:					
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to shrub beds if no flooding possible	Not Allowed	Not Allowed	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible	Directed applications if no flooding possible	Directed applications if no flooding possible	Directed applications if no flooding possible

* Requires approval of Manager, or Wetland Ecologist

Materials Available for Tree Injections

If a pest or disease threatens the health of *important and valuable trees* within a Habitat Conservation Area or 25-foot water body set back, there may be a need to treat them. Instances of this occurring are rare however. The intent and limit of this exception to the approved buffer area pesticide list is to allow only the insecticides or fungicides necessary to combat direct threats to the health of valuable trees. In these special cases, the use of injected pesticides may be employed, with the following limitations:

- The pesticide applied must be delivered by methods that inject or otherwise distribute the material entirely within interior tree tissues.
- Pesticides will not be injected into the soil surrounding the tree. Tree surfaces will not be sprayed or treated with pesticides, with the exception of approved fungicides and biological agents.

Following These BMPs in All Other Areas

Water body setbacks have the most restrictive controls on pesticide and fertilizer use. Generally, the standards for outside setbacks are quite similar. See each individual vegetation management activity for specific requirements.

KEEP GOOD RECORDS OF PESTICIDE USE (RECORD KEEPING REQUIREMENTS)

Regular application record keeping requirements are required for all pesticide applications. Records shall include:

- Applicator name and license number;
- Date and the time intervals of the application;
- Location of application;
- Temperature and wind conditions;
- Materials and concentrations used; and
- Amount applied, coverage rate, and equipment used.

HAVE A STATE APPLICATORS' LICENSES

All personnel who apply pesticides to City lands must be Washington Department of Agriculture licensed applicators or have a license recognized by the Washington Department of Agriculture. Only licensed personnel who have received an additional aquatics license certification may apply pesticides to aquatic sites.

VEGETATION MANAGEMENT ACTIVITIES

This section describes specific vegetation management activities and the best management practices to follow.

ACTIVITY: MAINTAINING SHRUB BEDS IN HIGHLY MANAGED AREAS

This activity is caring for shrubs and plants in high-use areas such as day use parks, road medians, landscaped areas along roads, and public building landscapes. Due to their use as public areas and surroundings to public buildings, there is a low tolerance for weeds in these areas. Maintenance includes pruning, plant replacement, flower planting, plant removal, weeding and bark dust or mulch placement, litter removal, edging and irrigation system operation.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

The main goal in maintaining these areas is sustaining the appearance of the planting bed. This is largely through weed control, pruning, and mulching.

Vegetation is trimmed to keep clear “sight distances” and to keep signs visible. Trees and shrubbery are trimmed to allow street sweepers clear access to curbs.

Do not remove native shrubs or trees within stream buffers, wetland buffers, or along drainage ditches that have base flow. Consult with the area supervisor before removing trees or brush within 250 feet of a stream.

When applying bark dust or mulch, make sure that it is placed in a manner that prevents it from washing into storm sewers, ditches or streams. Bare spots are minimized by the use of mulch or appropriate cover plants to prevent erosion. Cover bare soils with an erosion prevention cover BMP. Vegetate bare soils.

Minimize the use of mulches within 25 feet of a waterbody.

Hand remove weeds such as black berry vines, nightshade, scotch broom, English ivy, and holly, while keeping other bushes and trees. Chemical intervention is minimized.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the previous section.

Follow chemical use listed in the attached table. This list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in for Shrub Beds in Highly-Managed Areas

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line
	During Construction or Restoration	Only in shrub beds above high water line
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to shrub beds if no flooding possible
	During Construction or Restoration	Directed applications if no flooding possible

** Requires approval of Public Works Supervisor or Wetland Ecologist*

ACTIVITY: LANDSCAPED TURF MAINTENANCE (HIGHLY-MANAGED AREAS)

This activity is caring for turf in landscaped areas such as parks, road medians, and around buildings. It includes mowing, fertilizing, herbicide use, sweeping, raking, top dressing, aerating, edging, debris removal, and irrigation.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

The main goal in maintaining these areas is maintaining appearance and vigorous turf growth for high-traffic areas. This includes having healthy turf and plants, minimizing weeds and bare spots, and providing safe access to the water.

Bare spots are minimized by seeding turf.

Mower clippings are left on the ground unless they are so thick that they cover the turf. Minimize the use of mulches within 25 feet of a water body.

Chemical intervention is minimized. This includes spot spraying for weeds and minimizing insecticides and fungicides. Fertilizer use is limited to that needed to sustain intended use.

Follow chemical use listed in the attached table. Outside of the 25-foot water body set back, fertilizers are applied to sustain turf growth. Lime is applied once per year. This list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the previous section: Vegetation Management Goals.

Where feasible, turf areas will be fitted with computerized irrigation systems to better maintain turf during the summer. Better irrigation will allow more frequent mowing and better control irrigation runoff.

Turf Management in Near Lakes and Ponds

In areas where intensively maintained turf extends to the edge of a water body, special management measures are used as much as feasible considering the management objectives. Special measures include more frequent, low rate fertilizer application or temperature release fertilizer and computerized irrigation systems that prevent over watering and fertilizer runoff.

Use of Pesticides and Fertilizers for Turf Management (Highly Managed Areas)

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line
	During Construction or Restoration	Only in shrub beds above high water line
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to if no flooding possible
	During Construction or Restoration	Directed applications if no flooding possible

** Requires approval of Public Works Supervisor or Wetland Ecologist*

ACTIVITY: MAINTAINING ROADSIDES AND LOWER USE AREAS OF PARKS

This activity is lower intensity management of plants along roads and lower use areas of parks, or other low use landscapes. There is a higher tolerance for weeds in these areas than in day-use parks and landscaped areas around public buildings.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

The main goal in maintaining these areas is maintaining appearance with a minimum amount of work and chemical intervention. This largely includes controlling weeds.

Consider hardiness and drought tolerance when selecting plants.

Do not remove native shrubs or trees within stream buffers, wetland buffers, or along drainage ditches that have base flow. Consult with the area supervisor before removing trees or brush within 250 feet of a stream.

If there is a water body or ditch with water flow during dry weather, only remove desirable shrubs or bushes when sight distance is an issue, and after checking with the area supervisor.

When applying mulches or bark dust, make sure that it will not wash off into storm sewer, ditches or streams. Bare spots are minimized by the use of mulch or appropriate cover plants to prevent erosion. Cover bare soils with an erosion prevention cover BMP. Vegetate bare soils.

Hand remove weeds such as black berry vines, nightshade, scotch broom, English ivy, and holly, while keeping other bushes and trees. Chemical intervention is minimized.

The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Lower Use Areas and Roadside Plantings

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line
	During Construction or Restoration	Only in shrub beds above high water line
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to shrub beds if no flooding possible
	During Construction or Restoration	Directed applications if no flooding possible

* Requires approval of Public Works Supervisor or Wetland Ecologist

ACTIVITY: VEGETATION AND PEST MANAGEMENT IN LESS-MANAGED AREAS

These are areas in parks or other lands that are less actively managed than turf or shrub beds. These areas may include degraded or modified natural areas or unused land that is maintained periodically or seasonally. In Habitat Conservation Areas, these land areas are maintained for the purpose of establishing natural vegetation. There is a tolerance for natural appearance and weeds. There may be some use such as water access by the public, but that is not the primary use of the area.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these less-managed areas focus on establishing and maintaining healthy native plantings. This includes controlling invasive plants where feasible, minimizing the human impact on the buffer, and planting cover on bare soils.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the following section.

Within natural areas, limit the use of mulches to covering bare soils while establishing plantings.

Pesticide and fertilizer should be avoided within 25 feet of a water body.

The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Less-Managed Areas

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

** Requires approval of Public Works Supervisor or Wetland Ecologist*

ACTIVITY: VEGETATION AND PEST MANAGEMENT IN IMPACTED NATURAL AREAS

Impacted natural areas are predominately native plants and limited influence from public use and park development. The main objective is to maintain and improve the healthy plant community. Impacted areas have a lower tolerance for invasive or non-native plants.

Outcomes

- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these areas focus on establishing and maintaining healthy native plantings. This includes more vigorously controlling invasive plants and the human impact on the buffer. It also includes covering for bare soils with native plants.

Limit mulch use to covering bare soil while establishing plantings.

Pesticide and fertilizer use is minimized and is avoided if possible within 25 feet of a water body.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the previous section: Vegetation Management Goals. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Impacted Natural Areas

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. <i>Spot spray to establish monocots*</i>
	During Construction or Restoration	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

**Requires approval of Public Works Supervisor or Wetland Ecologist*

ACTIVITY: VEGETATION AND PEST MANAGEMENT IN INTACT NATURAL AREAS

Intact natural areas are separate from developed parks and have very limited public access. They have established native plant communities. The objective is to maintain the healthy plant buffer and provide wildlife habitat. There is no tolerance for invasive or non-native plants. There is little public access to these areas other than trails.

Outcomes

- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these areas focus on maintaining healthy native plantings. This includes vigorously controlling invasive plants and human impact on the buffer.

Avoid the use of mulches.

Pesticide and fertilizer use is minimized or not allowed.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the previous section: Vegetation Management Goals. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Intact Natural Areas of Habitat Buffers

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. <i>Spot spray to establish monocots*</i>
	During Construction or Restoration	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

** Requires approval of Public Works Supervisor*

ACTIVITY: VEGETATION AND PEST MANAGEMENT IN STORMWATER CONTROL FACILITIES

Stormwater control facilities include biofiltration treatment swales, treatment wetlands, treatment ponds, detention ponds, open channels, and infiltration basins. Stormwater control facilities discharge to surface water or groundwater either directly or through pipes or ditches. Many facilities are built to remove pollutants from stormwater.

Generally, vegetation should be maintained to blend into surrounding areas. Stormwater facilities can provide habitat for aquatic life and birds. Promoting natural vegetation where feasible improves habitat. Swales often blend into intensively managed landscapes. Pond perimeters can include natural vegetation.

The use of pesticides and, in most cases fertilizer, is not compatible with the task of pollutant removal or the direct connection of stormwater facilities to streams and groundwater.

Features of Stormwater Facilities

- There is a mix of native and non-native plants
- Generally not used by the public
- Include areas managed to promote design function, such as turf in swales
- Managed landscapes may be nearby
- May be used by fish and wildlife

Objectives for Stormwater Facilities

- Maintain healthy plant communities
- Avoid or minimize need for chemical intervention
- Control invasive plants where feasible
- No bare soil areas are allowed
- Tolerance for natural appearance and weeds

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O10 Meet public expectations for aesthetics

Practices

Pest management practices in stormwater facilities mirror the less-managed park areas. The focus is establishing and maintaining healthy, low-maintenance native or landscape plantings and sustaining the design function of vegetated filters such as biofiltration swales. This includes controlling invasive plants where feasible, minimizing the human impact on the buffer, and planting cover on bare soils.

In some cases, the original plantings may not be appropriate for the actual condition at a facility. One example is a frequently flooded swale that cannot support normal turf. In cases like this, replace turf with appropriate plants if the underlying drainage problem cannot be fixed.

Consider the use of soil amendments such as compost before using fertilizer.

Limit mulch use to covering bare soil while establishing plantings.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the previous section: Vegetation Management Goals. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Chemical use should be avoided within 25 feet of any area that holds or conveys surface water or stormwater. This includes the base of a biofiltration swale.

Stormwater treatment and control facilities, including wetlands, intercept storm water run-off before it enters surface water or groundwater. There are no provisions for herbicide use below the high water line of these facilities.

Trees or shrubs that block access roads may be trimmed (or removed if within the access road) at the time of when access is required for maintenance by heavy equipment.

Trees that pose a risk to stormwater structures due to root growth may be removed and replaced by smaller shrubs.

Use of Pesticides and Fertilizers in Stormwater Facilities

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

* Requires approval of Public Works Supervisor or Wetland Ecologist

ACTIVITY: VEGETATION AND PEST MANAGEMENT IN CONSTRUCTED WETLAND AREAS

The City may build wetlands to mitigate for wetlands lost during road construction or other public works. These are not stormwater facilities, but compensation for wetlands taken during construction projects. This activity applies only to parts of wetlands that are not subject to inundation during the growing season. Public Works crews use no chemical controls in wetland water bodies.

Noxious weed controls may include herbicide use in wetlands.

Constructed wetlands progress from little or no natural vegetation to an ideal state where they are self-sustaining natural areas. As water bodies, wetlands connect to streams and groundwater. Wetlands also host insects, fish, amphibians, and birds that are sensitive to horticultural chemicals. Because of this, chemical use should be minimized in wetland buffers. Wetland management has a low tolerance for invasive or non-native plants.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent City roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these areas focus on establishing and maintaining healthy native plantings. This includes more vigorously controlling invasive plants and the human impact on the buffer. It also includes covering for bare soils.

Consider the use of soil amendments such as compost before using fertilizer.

Limit mulch use to covering bare soil while establishing plantings.

Chemical intervention is minimized and is avoided if possible within 25 feet of a water body.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the previous section: Vegetation Management Goals. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Constructed Wetlands

Chemical Used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. <i>Spot spray to establish monocots*</i>
	During Construction or Restoration	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

* Requires approval of Public Works Supervisor or Wetland Ecologist

ACTIVITY: WEED CONTROL WITHIN WATER BODIES

Specific practices are allowed in water bodies such as streams, ponds and wetlands. Chemical controls are allowed only in extreme cases where there is a threat of near complete habitat loss due to an invasive weed.

Weed control within natural water bodies requires an authorization under the State Hydraulic Code. Activities such as dredging require approval from the Washington Department of Fish and Wildlife. Mechanical harvesting is allowed without consultation with Washington Department of Fish and Wildlife if practices in their publication #APD-1-98, Aquatic Plants and Fish are followed.

Within Streams

In the rare need for control of noxious weeds and invasive non-native plants within a stream itself, mechanical and biological means will be utilized.

Within Pond and Lake Areas

Weed control is by mechanical removal. There are special requirements for disposal of aquatic weeds to prevent spreading seeds. The Public Works Supervisor will determine the proper disposal methods.

Biological controls are used in some situations.

If an emergency situation arises where habitat is endangered by non-native invasive submerged weeds in ponds and lakes, the Manager may approve the use of an aquatic use approved herbicide for control as a last resort.

Herbicide use is only allowed where there is no direct outflow of the treated water to streams or waterways. The herbicide utilized shall be of very low toxicity to aquatic organisms, and be applied in such a way that there are no appreciable negative effects on the health of the aquatic environment.

Within Wetlands Areas

There are no provisions for the use of herbicides in open water areas in wetlands or constructed wetlands. Aquatic use approved herbicides may be used during establishment of constructed wetlands. The City may control noxious weeds in some cases.

Within Stormwater Ponds, Swale Treatment Areas and Treatment Wetlands

Stormwater treatment and control facilities, including wetlands, intercept storm water run-off before it enters surface water or groundwater. There are no provisions for herbicide use below the high water line of these facilities. The City may control noxious weeds in some cases.

TRAINING

Training is an essential component to successful water quality BMP use. Simple diagrams and descriptions will not be adequate to demonstrate the use of many BMPs in the field. Training should include field demonstrations, videos, slide shows, and reference cards or field manuals.

INITIATION TRAINING

Training for new employees should include the basic dos and don'ts. Why things like dirt are a pollutant that we control during routine operations. What is absolutely not allowed, such as dumping excavated material into streams, washing debris into storm drains and streams, and so forth.

This training should set the base for added training about implementing BMPs.

BMP TRAINING

Staff should be provided with basic manuals that include diagrams and descriptions of the practices to meet standards for water quality.

Crew chiefs and employees under their supervision should have training in BMP use for the activities they perform. Specific training, classroom and field, in the use of the BMP should lead to more successful implementation than simply providing a written manual.

MAP/TRACK PROBLEM AREAS

Problem areas where erosion, sediment accumulation in ditches or other water quality problems occur should be mapped so that they can be systematically tracked and solutions documented.

MAP HABITAT AREAS/STREAMS/WETLANDS

Create wall maps and atlases that show the extent and type of Habitat Conservation Areas, known wetlands, and streams that require special consideration under City code. The purpose of the maps is to raise awareness of the extent of these areas as well as simply show where they are.

APPENDIX C

DETAILED COST ESTIMATES AND FINANCIAL MODELS

City of Soap Lake
 CIP #1A - East Basin Bioretention Swale and Infiltration Facility
 ENGINEER'S CONSTRUCTION COST ESTIMATE
 January 31, 2019
 G & O #17037

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	PRICE	AMOUNT
Schedule A - Biofiltration Swale					
1.	Minor Changes (S.P. 1-04-.4(5))	1	LS	\$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS	\$ 2,000.00	\$ 2,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS	\$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS	\$ 11,000.00	\$ 11,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS	\$ 2,000.00	\$ 2,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	560	SY	\$ 10.00	\$ 6,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS	\$ 2,000.00	\$ 2,000.00
8.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS	\$ 2,000.00	\$ 2,000.00
9.	Excavation and Grading for Drainage	361	CY	\$ 30.00	\$ 11,000.00
10.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN	\$ 22.00	\$ -
11.	Catch Basin, Type I (S.P. 7-05.5)	2	EA	\$ 2,000.00	\$ 4,000.00
12.	CPEP Storm Sewer Pipe, 24 in. Dia. (inc. Bedding) (S.P. 7-04.5)	150	LF	\$ 180.00	\$ 27,000.00
13.	Connection to Existing Storm System (S.P. 7-04.5)	1	EA	\$ 1,000.00	\$ 1,000.00
14.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA	\$ 5,000.00	\$ 5,000.00
15.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	70	CY	\$ 30.00	\$ 2,000.00
16.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	130	TN	\$ 30.00	\$ 4,000.00
17.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS	\$ 1,000.00	\$ 1,000.00
18.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS	\$ 5,000.00	\$ 5,000.00
19.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	0	SY	\$ 2.50	\$ -
20.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	70	CY	\$ 42.00	\$ 3,000.00
21.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	100	CY	\$ 48.00	\$ 5,000.00
22.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	40	CY	\$ 50.00	\$ 2,000.00
23.	PSIPE Plantings (S.P. 8-02.5)	1	LS	\$ 13,000.00	\$ 13,000.00
24.	Pea Gravel (S.P. 8-02.5)	0	TN	\$ 45.00	\$ -
25.	Temporary Irrigation (S.P. 8-03.5)	1	LS	\$ 5,000.00	\$ 5,000.00
26.	Project Sign (S.P. 8)	0	EA	\$ 1,000.00	\$ -
27.	Project Documentation (S.P. 8)	1	LS	\$ 1,000.00	\$ 1,000.00
Schedule B - Infiltration Facility					
1.	Minor Changes (S.P. 1-04-.4(5))	1	LS	\$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS	\$ 3,000.00	\$ 3,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS	\$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS	\$ 18,000.00	\$ 18,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS	\$ 2,000.00	\$ 2,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	1,840	SY	\$ 10.00	\$ 18,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS	\$ 2,000.00	\$ 2,000.00
28.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS	\$ 2,000.00	\$ 2,000.00
29.	Excavation and Grading for Drainage	1,287	CY	\$ 30.00	\$ 39,000.00
30.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN	\$ 22.00	\$ -
31.	Catch Basin, Type I (S.P. 7-05.5)	0	EA	\$ 2,000.00	\$ -
32.	CPEP Storm Sewer Pipe, 24 in. Dia. (inc. Bedding) (S.P. 7-04.5)	300	LF	\$ 180.00	\$ 54,000.00
33.	Connection to Existing Storm System (S.P. 7-04.5)	1	EA	\$ 1,000.00	\$ 1,000.00
34.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA	\$ 5,000.00	\$ 5,000.00
35.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	140	CY	\$ 30.00	\$ 4,000.00
36.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	250	TN	\$ 30.00	\$ 8,000.00
37.	Quarry Spalls (S.P. 7-08.5)	10	TN	\$ 50.00	\$ 1,000.00
38.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS	\$ 1,000.00	\$ 1,000.00
39.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS	\$ 5,000.00	\$ 5,000.00
40.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	1,840	SY	\$ 2.50	\$ 5,000.00
41.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	210	CY	\$ 42.00	\$ 9,000.00
42.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	0	CY	\$ 48.00	\$ -
43.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	110	CY	\$ 50.00	\$ 6,000.00
44.	PSIPE Plantings (S.P. 8-02.5)	0	LS	\$ 10,000.00	\$ -
45.	Pea Gravel (S.P. 8-02.5)	0	TN	\$ 45.00	\$ -
46.	Temporary Irrigation (S.P. 8-03.5)	0	LS	\$ 5,000.00	\$ -
47.	Project Sign (S.P. 8)	0	EA	\$ 1,000.00	\$ -
48.	Project Documentation (S.P. 8)	1	LS	\$ 2,500.00	\$ 3,000.00
Subtotal Schedule A					\$ 117,000.00
Sales Tax at 7.9%					\$ 9,300.00
Permitting					\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)					\$ 157,000.00
Contingency (30%)					\$ 48,000.00
Engineering, Administration, Construction Management (25%)					\$ 40,000.00
Total Project Costs					\$ 245,000.00
Subtotal Schedule B					\$ 189,000.00
Sales Tax at 7.9%					\$ 15,000.00
Permitting					\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)					\$ 234,000.00
Contingency (30%)					\$ 71,000.00
Engineering, Administration, Construction Management (25%)					\$ 59,000.00
Total Project Costs					\$ 364,000.00
Total, Schedule A and B					\$ 609,000.00

City of Soap Lake
CIP #1B - East Basin 6th Ave SE to 1st Ave NE Bioretention Ditches and Infiltration Facility
ENGINEER'S CONSTRUCTION COST ESTIMATE
 January 31, 2019
 G & O #17037

ITEM No.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	PRICE	AMOUNT
Schedule A - Biofiltration Swales					
1.	Minor Changes (S.P. 1-04-.4(5))	1	LS	\$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS	\$ 2,000.00	\$ 2,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS	\$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS	\$ 18,000.00	\$ 18,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS	\$ 5,000.00	\$ 5,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	1,760	SY	\$ 10.00	\$ 18,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS	\$ 2,000.00	\$ 2,000.00
8.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS	\$ 2,000.00	\$ 2,000.00
9.	Excavation and Grading for Drainage	880	CY	\$ 30.00	\$ 26,000.00
10.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN	\$ 22.00	\$ -
11.	Catch Basin, Type I (S.P. 7-05.5)	2	EA	\$ 2,000.00	\$ 4,000.00
12.	CPEP Storm Sewer Pipe, 24 in. Dia. (inc. Bedding) (S.P. 7-04.5)	150	LF	\$ 180.00	\$ 27,000.00
13.	Connection to Existing Storm System (S.P. 7-04.5)	4	EA	\$ 1,000.00	\$ 4,000.00
14.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA	\$ 5,000.00	\$ 5,000.00
15.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	70	CY	\$ 30.00	\$ 2,000.00
16.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	130	TN	\$ 30.00	\$ 4,000.00
17.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS	\$ 1,000.00	\$ 1,000.00
18.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS	\$ 5,000.00	\$ 5,000.00
19.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	0	SY	\$ 2.50	\$ -
20.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	200	CY	\$ 42.00	\$ 8,000.00
21.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	300	CY	\$ 48.00	\$ 14,000.00
22.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	100	CY	\$ 50.00	\$ 5,000.00
23.	PSIPE Plantings (S.P. 8-02.5)	1	LS	\$ 30,000.00	\$ 30,000.00
24.	Pea Gravel (S.P. 8-02.5)	0	TN	\$ 45.00	\$ -
25.	Temporary Irrigation (S.P. 8-03.5)	1	LS	\$ 5,000.00	\$ 5,000.00
26.	Project Sign (S.P. 8)	0	EA	\$ 1,000.00	\$ -
27.	Project Documentation (S.P. 8)	1	LS	\$ 1,000.00	\$ 1,000.00
Schedule B - Infiltration Facility					
1.	Minor Changes (S.P. 1-04-.4(5))	1	LS	\$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS	\$ 3,000.00	\$ 3,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS	\$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS	\$ 16,000.00	\$ 16,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS	\$ 2,000.00	\$ 2,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	1,540	SY	\$ 10.00	\$ 15,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS	\$ 2,000.00	\$ 2,000.00
28.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS	\$ 2,000.00	\$ 2,000.00
29.	Excavation and Grading for Drainage	1,049	CY	\$ 30.00	\$ 31,000.00
30.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN	\$ 22.00	\$ -
31.	Catch Basin, Type I (S.P. 7-05.5)	0	EA	\$ 2,000.00	\$ -
32.	CPEP Storm Sewer Pipe, 24 in. Dia. (inc. Bedding) (S.P. 7-04.5)	300	LF	\$ 180.00	\$ 54,000.00
33.	Connection to Existing Storm System (S.P. 7-04.5)	1	EA	\$ 1,000.00	\$ 1,000.00
34.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA	\$ 5,000.00	\$ 5,000.00
35.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	140	CY	\$ 30.00	\$ 4,000.00
36.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	250	TN	\$ 30.00	\$ 8,000.00
37.	Quarry Spalls (S.P. 7-08.5)	10	TN	\$ 50.00	\$ 1,000.00
38.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS	\$ 1,000.00	\$ 1,000.00
39.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS	\$ 5,000.00	\$ 5,000.00
40.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	1,540	SY	\$ 2.50	\$ 4,000.00
41.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	180	CY	\$ 42.00	\$ 8,000.00
42.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	0	CY	\$ 48.00	\$ -
43.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	90	CY	\$ 50.00	\$ 5,000.00
44.	PSIPE Plantings (S.P. 8-02.5)	0	LS	\$ 5,000.00	\$ -
45.	Pea Gravel (S.P. 8-02.5)	0	TN	\$ 45.00	\$ -
46.	Temporary Irrigation (S.P. 8-03.5)	0	LS	\$ 5,000.00	\$ -
47.	Project Sign (S.P. 8)	0	EA	\$ 1,000.00	\$ -
48.	Project Documentation (S.P. 8)	1	LS	\$ 2,500.00	\$ 3,000.00
Subtotal Schedule A					\$ 191,000.00
Sales Tax at 7.9%					\$ 15,100.00
Permitting and DAHP Compliance/Monitoring					\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)					\$ 237,000.00
Contingency (30%)					\$ 72,000.00
Engineering, Administration, Construction Management (25%)					\$ 60,000.00
Property Acquisition					\$ 10,000.00
Total Project Costs					\$ 379,000.00
Subtotal Schedule B					\$ 173,000.00
Sales Tax at 7.9%					\$ 13,700.00
Permitting and DAHP Compliance/Monitoring					\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)					\$ 217,000.00
Contingency (30%)					\$ 66,000.00
Engineering, Administration, Construction Management (25%)					\$ 55,000.00
Total Project Costs					\$ 368,000.00
Total, Schedule A and B					\$ 747,000.00

City of Soap Lake
 CIP #2 - Central Basin Bioretention Swale and Infiltration Facility
 ENGINEER'S CONSTRUCTION COST ESTIMATE
 January 31, 2019
 G & O #17037

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
Schedule A - Biofiltration Swale				
1.	Minor Changes (S.P. 1-04.4(5))	1	LS \$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS \$ 2,000.00	\$ 2,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS \$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS \$ 8,000.00	\$ 8,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS \$ 2,000.00	\$ 2,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	380	SY \$ 10.00	\$ 4,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS \$ 2,000.00	\$ 2,000.00
8.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS \$ 2,000.00	\$ 2,000.00
9.	Excavation and Grading for Drainage	242	CY \$ 30.00	\$ 7,000.00
10.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN \$ 22.00	\$ -
11.	Catch Basin, Type I (S.P. 7-05.5)	2	EA \$ 2,000.00	\$ 4,000.00
12.	CPEP Storm Sewer Pipe, 12 in. Dia. (inc. Bedding) (S.P. 7-04.5)	150	LF \$ 55.00	\$ 8,000.00
13.	Connection to Existing Storm System (S.P. 7-04.5)	1	EA \$ 1,000.00	\$ 1,000.00
14.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA \$ 5,000.00	\$ 5,000.00
15.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	70	CY \$ 30.00	\$ 2,000.00
16.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	130	TN \$ 30.00	\$ 4,000.00
17.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS \$ 1,000.00	\$ 1,000.00
18.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS \$ 5,000.00	\$ 5,000.00
19.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	0	SY \$ 2.50	\$ -
20.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	50	CY \$ 42.00	\$ 2,000.00
21.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	70	CY \$ 48.00	\$ 3,000.00
22.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	30	CY \$ 50.00	\$ 2,000.00
23.	PSIPE Plantings (S.P. 8-02.5)	1	LS \$ 10,000.00	\$ 10,000.00
24.	Pea Gravel (S.P. 8-02.5)	0	TN \$ 45.00	\$ -
25.	Temporary Irrigation (S.P. 8-03.5)	1	LS \$ 5,000.00	\$ 5,000.00
26.	Project Sign (S.P. 8)	0	EA \$ 1,000.00	\$ -
27.	Project Documentation (S.P. 8)	1	LS \$ 1,000.00	\$ 1,000.00
Schedule B - Infiltration Facility				
1.	Minor Changes (S.P. 1-04.4(5))	1	LS \$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS \$ 3,000.00	\$ 3,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS \$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS \$ 7,000.00	\$ 7,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS \$ 2,000.00	\$ 2,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	270	SY \$ 10.00	\$ 3,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS \$ 2,000.00	\$ 2,000.00
28.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS \$ 2,000.00	\$ 2,000.00
29.	Excavation and Grading for Drainage	113	CY \$ 30.00	\$ 3,000.00
30.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN \$ 22.00	\$ -
31.	Catch Basin, Type I (S.P. 7-05.5)	0	EA \$ 2,000.00	\$ -
32.	CPEP Storm Sewer Pipe, 12 in. Dia. (inc. Bedding) (S.P. 7-04.5)	300	LF \$ 55.00	\$ 17,000.00
33.	Connection to Existing Storm System (S.P. 7-04.5)	1	EA \$ 1,000.00	\$ 1,000.00
34.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA \$ 5,000.00	\$ 5,000.00
35.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	140	CY \$ 30.00	\$ 4,000.00
36.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	250	TN \$ 30.00	\$ 8,000.00
37.	Quarry Spalls (S.P. 7-08.5)	10	TN \$ 50.00	\$ 1,000.00
38.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS \$ 1,000.00	\$ 1,000.00
39.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS \$ 5,000.00	\$ 5,000.00
40.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	270	SY \$ 2.50	\$ 1,000.00
41.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	30	CY \$ 42.00	\$ 1,000.00
42.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	0	CY \$ 48.00	\$ -
43.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	20	CY \$ 50.00	\$ 1,000.00
44.	PSIPE Plantings (S.P. 8-02.5)	0	LS \$ 10,000.00	\$ -
45.	Pea Gravel (S.P. 8-02.5)	0	TN \$ 45.00	\$ -
46.	Temporary Irrigation (S.P. 8-03.5)	0	LS \$ 5,000.00	\$ -
47.	Project Sign (S.P. 8)	0	EA \$ 1,000.00	\$ -
48.	Project Documentation (S.P. 8)	1	LS \$ 2,500.00	\$ 3,000.00
Subtotal Schedule A				\$ 83,000.00
Sales Tax at 7.9%				\$ 6,600.00
Permitting and DAHP Compliance/Monitoring				\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)				\$ 120,000.00
Contingency (30%)				\$ 36,000.00
Engineering, Administration, Construction Management (25%)				\$ 30,000.00
Total Project Costs				\$ 186,000.00
Subtotal Schedule B				\$ 73,000.00
Sales Tax at 7.9%				\$ 5,800.00
Permitting and DAHP Compliance/Monitoring				\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)				\$ 109,000.00
Contingency (30%)				\$ 33,000.00
Engineering, Administration, Construction Management (25%)				\$ 28,000.00
Total Project Costs				\$ 170,000.00
Total, Schedule A and B				\$ 356,000.00

January 2019 ENR Value

11206

City of Soap Lake
 CIP #3 - West Basin Bioretention Swale and Infiltration Facility
 ENGINEER'S CONSTRUCTION COST ESTIMATE
 January 31, 2019
 G & O #17037

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
Schedule A - Biofiltration Swale				
1.	Minor Changes (S.P. 1-04-.4(5))	1	LS \$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS \$ 2,000.00	\$ 2,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS \$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS \$ 7,000.00	\$ 7,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS \$ 2,000.00	\$ 2,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	310	SY \$ 10.00	\$ 3,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS \$ 2,000.00	\$ 2,000.00
8.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS \$ 2,000.00	\$ 2,000.00
9.	Excavation and Grading for Drainage	138	CY \$ 30.00	\$ 4,000.00
10.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN \$ 22.00	\$ -
11.	Catch Basin, Type I (S.P. 7-05.5)	2	EA \$ 2,000.00	\$ 4,000.00
12.	CPEP Storm Sewer Pipe, 12 in. Dia. (inc. Bedding) (S.P. 7-04.5)	150	LF \$ 55.00	\$ 8,000.00
13.	Connection to Existing Storm System (S.P. 7-04.5)	1	EA \$ 1,000.00	\$ 1,000.00
14.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA \$ 5,000.00	\$ 5,000.00
15.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	70	CY \$ 30.00	\$ 2,000.00
16.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	130	TN \$ 30.00	\$ 4,000.00
17.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS \$ 1,000.00	\$ 1,000.00
18.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS \$ 5,000.00	\$ 5,000.00
19.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	0	SY \$ 2.50	\$ -
20.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	40	CY \$ 42.00	\$ 2,000.00
21.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	60	CY \$ 48.00	\$ 3,000.00
22.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	20	CY \$ 50.00	\$ 1,000.00
23.	PSIPE Plantings (S.P. 8-02.5)	1	LS \$ 10,000.00	\$ 10,000.00
24.	Pea Gravel (S.P. 8-02.5)	0	TN \$ 45.00	\$ -
25.	Temporary Irrigation (S.P. 8-03.5)	1	LS \$ 5,000.00	\$ 5,000.00
26.	Project Sign (S.P. 8)	0	EA \$ 1,000.00	\$ -
27.	Project Documentation (S.P. 8)	1	LS \$ 1,000.00	\$ 1,000.00
Schedule B - Infiltration Facility				
1.	Minor Changes (S.P. 1-04-.4(5))	1	LS \$ 2,000.00	\$ 2,000.00
2.	Survey (S.P. 1-05.4(2))	1	LS \$ 3,000.00	\$ 3,000.00
3.	SPCC Plan (S.P. 1-07.15(1))	1	LS \$ 500.00	\$ 1,000.00
4.	Mobilization, Cleanup, and Demobilization (S.P. 1-07.15)	1	LS \$ 7,000.00	\$ 7,000.00
5.	Temporary Traffic Control (S.P. 1-10.5)	1	LS \$ 2,000.00	\$ 2,000.00
6.	Clearing and Grubbing (S.P. 2-01.5)	310	SY \$ 10.00	\$ 3,000.00
7.	Locate Existing Utilities (S.P. 2-09.5)	1	LS \$ 2,000.00	\$ 2,000.00
8.	Removal of Structure and Obstruction (S.P. 2-02.5)	1	LS \$ 2,000.00	\$ 2,000.00
9.	Excavation and Grading for Drainage	138	CY \$ 30.00	\$ 4,000.00
10.	Crushed Surfacing Top Course (S.P. 4-04.5)	0	TN \$ 22.00	\$ -
11.	Catch Basin, Type I (S.P. 7-05.5)	0	EA \$ 2,000.00	\$ -
12.	CPEP Storm Sewer Pipe, 12 in. Dia. (inc. Bedding) (S.P. 7-04.5)	300	LF \$ 55.00	\$ 17,000.00
13.	Connection to Existing Storm System (S.P. 7-04.5)	1	EA \$ 1,000.00	\$ 1,000.00
14.	Catch Basin, Type II 54" (S.P. 7-05.5)	1	EA \$ 5,000.00	\$ 5,000.00
15.	Removal of Unsuitable Material (Trench) (S.P. 7-08.5)	140	CY \$ 30.00	\$ 4,000.00
16.	Bank Run Gravel for Trench Backfill (S.P. 7-08.5)	250	TN \$ 30.00	\$ 8,000.00
17.	Quarry Spalls (S.P. 7-08.5)	10	TN \$ 50.00	\$ 1,000.00
18.	Trench Excavation Safety Systems (S.P. 7-08.5)	1	LS \$ 1,000.00	\$ 1,000.00
19.	Erosion/Water Pollution Control (S.P. 8-01.5)	1	LS \$ 5,000.00	\$ 5,000.00
20.	Seeding, Fertilizing and Mulching (S.P. 8-01.5)	310	SY \$ 2.50	\$ 1,000.00
21.	Fine Compost, 4 In. Depth (S.P. 8-02.5)	40	CY \$ 42.00	\$ 2,000.00
22.	Bioretention Soil, 6 In. Depth (S.P. 8-02.5)	0	CY \$ 48.00	\$ -
23.	Wood Strand Mulch, 2 In. Depth (S.P. 8-02.5)	20	CY \$ 50.00	\$ 1,000.00
24.	PSIPE Plantings (S.P. 8-02.5)	0	LS \$ 10,000.00	\$ -
25.	Pea Gravel (S.P. 8-02.5)	0	TN \$ 45.00	\$ -
26.	Temporary Irrigation (S.P. 8-03.5)	0	LS \$ 5,000.00	\$ -
27.	Project Sign (S.P. 8)	0	EA \$ 1,000.00	\$ -
28.	Project Documentation (S.P. 8)	1	LS \$ 2,500.00	\$ 3,000.00
Subtotal Schedule A				\$ 77,000.00
Sales Tax at 7.9%				\$ 6,100.00
Permitting and DAHP Compliance/Monitoring				\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)				\$ 114,000.00
Contingency (30%)				\$ 35,000.00
Engineering, Administration, Construction Management (25%)				\$ 29,000.00
Total Project Costs				\$ 178,000.00
Subtotal Schedule B				\$ 75,000.00
Sales Tax at 7.9%				\$ 6,000.00
Permitting and DAHP Compliance/Monitoring				\$ 30,000.00
CONSTRUCTION COST ESTIMATE (ROUNDED)				\$ 111,000.00
Contingency (30%)				\$ 34,000.00
Engineering, Administration, Construction Management (25%)				\$ 28,000.00
Total Project Costs				\$ 173,000.00
Total, Schedule A and B				\$ 351,000.00

January 2019 ENR Value

11206

City of Soap Lake - Stormwater Comprehensive Plan
Rate Model - Scenario B

Year	Annual Stormwater Incr=										Growth Rate												
	3.0%					0.5%					3.0%					0.5%							
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
Beginning fund		\$ 61,158	\$ 129,962	\$ 201,408	\$ 275,597	\$ 352,631	\$ 432,619	\$ 515,670	\$ 601,902	\$ 691,432	\$ 784,384	\$ 880,889	\$ 981,078	\$ 1,085,091	\$ 63,165	\$ 175,260	\$ 291,624	\$ 412,418	\$ 537,807	\$ 667,964	\$ 803,067		
Revenue																							
ERUs		802	806	810	814	818	822	826	830	835	839	843	847	851	856	860	864	869	873	877	882	886	
Monthly Service Rate		\$ 10.75	\$ 11.40	\$ 11.75	\$ 12.10	\$ 12.46	\$ 12.84	\$ 13.22	\$ 13.62	\$ 14.03	\$ 14.45	\$ 14.88	\$ 15.33	\$ 15.79	\$ 16.26	\$ 16.75	\$ 17.25	\$ 17.77	\$ 18.30	\$ 18.85	\$ 19.42	\$ 20.00	
Total Service Rate		\$ 103,458	\$ 110,907	\$ 114,185	\$ 118,198	\$ 122,953	\$ 126,654	\$ 131,106	\$ 135,714	\$ 140,484	\$ 145,422	\$ 150,534	\$ 155,825	\$ 161,302	\$ 166,972	\$ 172,841	\$ 178,917	\$ 185,206	\$ 191,715	\$ 198,454	\$ 205,430	\$ 212,651	
Connection Fee		\$ 500	\$ 515	\$ 530	\$ 546	\$ 563	\$ 580	\$ 597	\$ 615	\$ 633	\$ 652	\$ 672	\$ 692	\$ 713	\$ 734	\$ 756	\$ 779	\$ 802	\$ 826	\$ 851	\$ 877	\$ 903	
Total Connection Fee		\$ -	\$ 2,065	\$ 2,188	\$ 2,213	\$ 2,291	\$ 2,455	\$ 2,641	\$ 2,841	\$ 3,056	\$ 3,287	\$ 3,534	\$ 3,797	\$ 4,076	\$ 4,371	\$ 4,683	\$ 5,013	\$ 5,361	\$ 5,728	\$ 6,115	\$ 6,523	\$ 6,961	
Total Revenue		\$ 103,458	\$ 112,972	\$ 116,322	\$ 120,411	\$ 124,644	\$ 129,025	\$ 133,560	\$ 138,255	\$ 143,114	\$ 148,145	\$ 153,352	\$ 158,742	\$ 164,322	\$ 170,098	\$ 176,077	\$ 182,266	\$ 188,673	\$ 195,305	\$ 202,170	\$ 209,276	\$ 216,632	
Expenses																							
Yearly O&M		\$ 32,000	\$ 32,960	\$ 33,949	\$ 34,967	\$ 36,016	\$ 37,097	\$ 38,210	\$ 39,356	\$ 40,537	\$ 41,753	\$ 43,005	\$ 44,295	\$ 45,624	\$ 46,993	\$ 48,403	\$ 49,855	\$ 51,351	\$ 52,891	\$ 54,478	\$ 56,112	\$ 57,796	
Total Expense		\$ 32,000	\$ 32,960	\$ 33,949	\$ 34,967	\$ 36,016	\$ 37,097	\$ 38,210	\$ 39,356	\$ 40,537	\$ 41,753	\$ 43,005	\$ 44,295	\$ 45,624	\$ 46,993	\$ 48,403	\$ 49,855	\$ 51,351	\$ 52,891	\$ 54,478	\$ 56,112	\$ 57,796	
Capital Reserve		\$ 71,458	\$ 140,571	\$ 212,335	\$ 286,852	\$ 364,224	\$ 444,559	\$ 527,969	\$ 614,959	\$ 704,479	\$ 797,624	\$ 894,731	\$ 995,336	\$ 1,099,776	\$ 1,208,196	\$ 1,300,840	\$ 1,397,871	\$ 1,489,318	\$ 1,580,276	\$ 1,670,744	\$ 1,760,822	\$ 1,850,508	
CIP Projects																							
CIP 1B		\$ 747,000																					
CIP 2		\$ 555,000																					
Miscellaneous Projects		\$ 10,000	\$ 10,300	\$ 10,609	\$ 10,927	\$ 11,255	\$ 11,593	\$ 11,941	\$ 12,299	\$ 12,668	\$ 13,048	\$ 13,439	\$ 13,842	\$ 14,258	\$ 14,685	\$ 15,126	\$ 15,580	\$ 16,047	\$ 16,528	\$ 17,024	\$ 17,535	\$ 18,061	\$ 18,603
CIP Total		\$ 10,300	\$ 10,609	\$ 10,927	\$ 11,255	\$ 11,593	\$ 11,941	\$ 12,299	\$ 12,668	\$ 13,048	\$ 13,439	\$ 13,842	\$ 14,258	\$ 14,685	\$ 15,126	\$ 15,580	\$ 16,047	\$ 16,528	\$ 17,024	\$ 17,535	\$ 18,061	\$ 18,603	\$ 19,156
Year End Total		\$ 61,158	\$ 129,962	\$ 201,408	\$ 275,597	\$ 352,631	\$ 432,619	\$ 515,670	\$ 601,902	\$ 691,432	\$ 784,384	\$ 880,889	\$ 981,078	\$ 1,085,091	\$ 63,165	\$ 175,260	\$ 291,624	\$ 412,418	\$ 537,807	\$ 667,964	\$ 803,067	\$ 943,224	\$ 1,088,920
6 Month Operating Check		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

City of Soap Lake - Stormwater Comprehensive Plan
Rate Model - Scenario C

Year	Annual Stormwater Incr=																						
	3.00%						0.5%																
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
Beginning Fund																							
Revenue																							
ERUs																							
Monthly Service Rate																							
Total Service Rate																							
Connection Fee																							
Total Connection Fee																							
Total Revenue																							
Expenses																							
Yearly O&M																							
Total Expense																							
Capital Reserve																							
CIP Projects																							
CIP 1B																							
CIP 2																							
Miscellaneous Projects																							
CIP Total																							
Year End Total																							
6 Month Operating Check																							

City of Soap Lake - Stormwater Comprehensive Plan
Rate Model - Scenario C

Scenario C Continued												
2040	2041	2042	2043	2044	2045	2046	2047	2048				
\$ 1,397,634	\$ 1,497,117	\$ 126,233	\$ 233,670	\$ 345,314	\$ 461,324	\$ 581,868	\$ 707,119	\$ 837,257				
891	895	899	904	909	913	918	922	927				
\$ 16.29	\$ 16.78	\$ 17.28	\$ 17.80	\$ 18.33	\$ 18.83	\$ 19.45	\$ 20.03	\$ 20.63				
\$ 174,053	\$ 180,171	\$ 186,504	\$ 193,059	\$ 199,845	\$ 206,870	\$ 214,141	\$ 221,668	\$ 229,460				
\$ 930	\$ 958	\$ 987	\$ 1,016	\$ 1,047	\$ 1,078	\$ 1,111	\$ 1,144	\$ 1,178				
\$ 4,121	\$ 4,266	\$ 4,416	\$ 4,571	\$ 4,732	\$ 4,888	\$ 5,070	\$ 5,249	\$ 5,433				
\$ 178,174	\$ 184,437	\$ 190,920	\$ 197,630	\$ 204,577	\$ 211,768	\$ 219,212	\$ 226,917	\$ 234,893				
\$ 59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410				
\$ 59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410				
\$ 1,516,278	\$ 1,620,238	\$ 233,670	\$ 386,251	\$ 482,890	\$ 604,081	\$ 728,999	\$ 860,823	\$ 996,740				
	\$ 1,474,289											
\$ 19,161	\$ 19,796	\$ 20,328	\$ 20,898	\$ 21,566	\$ 22,213	\$ 22,879	\$ 23,566	\$ 24,273				
\$ 19,161	\$ 1,494,005	\$ 20,328	\$ 20,938	\$ 21,566	\$ 22,213	\$ 22,879	\$ 23,566	\$ 24,273				
\$ 1,497,117	\$ 1,26,233	\$ 233,670	\$ 345,314	\$ 461,324	\$ 581,868	\$ 707,119	\$ 837,257	\$ 106,362				
YES	YES	YES	YES	YES	YES	YES	YES	YES				

City of Soap Lake - Stormwater Comprehensive Plan
Rate Model - Scenario D

Year	Annual Stormwater Incr.=										loan term											
	3.0%					3.00%					0.5%					2.0%						
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Beginning fund		\$ 68,376	\$ 144,875	\$ 224,288	\$ 213,125	\$ 205,097	\$ 200,323	\$ 198,923	\$ 201,024	\$ 206,757	\$ 162,995	\$ 123,141	\$ 87,341	\$ 55,747	\$ 122,113	\$ 193,003	\$ 268,588	\$ 349,040	\$ 434,543	\$ 434,543	\$ 525,283	\$ 674,718
Revenue																						
ERUs		806	810	814	818	822	826	830	835	839	843	847	851	856	860	864	869	873	877	882	886	890
Monthly Service Rate		\$ 11.50	\$ 12.20	\$ 12.57	\$ 13.33	\$ 13.73	\$ 14.14	\$ 14.57	\$ 15.00	\$ 15.46	\$ 15.92	\$ 16.40	\$ 16.89	\$ 17.39	\$ 17.92	\$ 18.45	\$ 19.01	\$ 19.58	\$ 20.17	\$ 20.77	\$ 21.39	\$ 22.03
Total Service Rate		\$ 110,676	\$ 118,003	\$ 122,151	\$ 126,445	\$ 130,889	\$ 135,480	\$ 140,252	\$ 145,182	\$ 150,285	\$ 155,568	\$ 161,036	\$ 166,697	\$ 172,556	\$ 178,621	\$ 184,900	\$ 191,399	\$ 198,127	\$ 205,091	\$ 212,300	\$ 219,762	\$ 227,487
Connection Fee		\$ 500	\$ 515.00	\$ 530.45	\$ 546.36	\$ 562.75	\$ 579.64	\$ 597.03	\$ 615	\$ 633	\$ 652	\$ 672	\$ 692	\$ 713	\$ 734	\$ 756	\$ 779	\$ 802	\$ 826	\$ 851	\$ 877	\$ 903
Total Connection Fee		\$ 2,085	\$ 2,138	\$ 2,213	\$ 2,291	\$ 2,371	\$ 2,455	\$ 2,541	\$ 2,630	\$ 2,723	\$ 2,818	\$ 2,917	\$ 3,020	\$ 3,126	\$ 3,236	\$ 3,350	\$ 3,467	\$ 3,589	\$ 3,715	\$ 3,846	\$ 3,981	\$ 4,121
Total Revenue		\$ 110,676	\$ 120,068	\$ 124,289	\$ 128,658	\$ 133,180	\$ 137,861	\$ 142,707	\$ 147,723	\$ 152,916	\$ 158,291	\$ 163,854	\$ 169,614	\$ 175,576	\$ 181,747	\$ 188,136	\$ 194,749	\$ 201,594	\$ 208,680	\$ 216,015	\$ 223,609	\$ 231,468
Expenses																						
Yearly O&M		\$ 32,000	\$ 32,960	\$ 33,949	\$ 34,967	\$ 36,016	\$ 37,097	\$ 38,210	\$ 39,356	\$ 40,537	\$ 41,753	\$ 43,005	\$ 44,295	\$ 45,624	\$ 46,993	\$ 48,403	\$ 49,855	\$ 51,351	\$ 52,891	\$ 54,478	\$ 56,112	\$ 57,796
Total Expense		\$ 32,000	\$ 32,960	\$ 33,949	\$ 34,967	\$ 36,016	\$ 37,097	\$ 38,210	\$ 39,356	\$ 40,537	\$ 41,753	\$ 43,005	\$ 44,295	\$ 45,624	\$ 46,993	\$ 48,403	\$ 49,855	\$ 51,351	\$ 52,891	\$ 54,478	\$ 56,112	\$ 57,796
Capital Reserve		\$ 78,676	\$ 155,484	\$ 235,215	\$ 317,978	\$ 310,289	\$ 305,862	\$ 304,820	\$ 307,290	\$ 313,403	\$ 323,295	\$ 283,844	\$ 248,460	\$ 217,293	\$ 190,501	\$ 261,846	\$ 337,897	\$ 418,831	\$ 504,880	\$ 596,080	\$ 692,779	\$ 848,390
CIP Projects																						
CIP 1B		\$ 747,000																				
CIP 2		\$ 555,000																				
Miscellaneous Projects		\$ 10,000	\$ 10,609	\$ 10,927	\$ 11,255	\$ 11,593	\$ 11,941	\$ 12,299	\$ 12,666	\$ 13,048	\$ 13,439	\$ 13,842	\$ 14,256	\$ 14,685	\$ 15,126	\$ 15,580	\$ 16,047	\$ 16,528	\$ 17,024	\$ 17,535	\$ 18,061	\$ 18,603
CIP Total		\$ 10,300	\$ 10,609	\$ 10,927	\$ 10,927	\$ 10,927	\$ 10,927	\$ 10,927	\$ 10,646	\$ 106,646	\$ 160,300	\$ 160,703	\$ 161,118	\$ 161,546	\$ 161,988	\$ 162,442	\$ 162,908	\$ 163,388	\$ 163,871	\$ 164,367	\$ 164,876	\$ 165,397
Year End Total		\$ 68,376	\$ 144,875	\$ 224,288	\$ 213,125	\$ 205,097	\$ 200,323	\$ 198,923	\$ 201,024	\$ 206,757	\$ 162,995	\$ 123,141	\$ 87,341	\$ 55,747	\$ 122,113	\$ 193,003	\$ 268,588	\$ 349,040	\$ 434,543	\$ 525,283	\$ 674,718	\$ 829,787
6 Month Operating Check		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Scenario D Continued										
2040	2041	2042	2043	2044	2045	2046	2047	2048		
\$ 829,787	\$ 990,701	\$ 1,157,676	\$ 1,330,938	\$ 1,510,720	\$ 1,697,264	\$ 1,890,821	\$ 2,091,651	\$ 2,300,025		
891	895	899	904	909	913	918	922	927		
\$ 22.04	\$ 22.70	\$ 23.38	\$ 24.09	\$ 24.80	\$ 25.54	\$ 26.31	\$ 27.10	\$ 27.91		
\$ 235,483	\$ 243,760	\$ 252,328	\$ 261,198	\$ 270,379	\$ 279,883	\$ 289,721	\$ 299,904	\$ 310,446		
\$ 930	\$ 958	\$ 987	\$ 1,016	\$ 1,047	\$ 1,078	\$ 1,111	\$ 1,144	\$ 1,178		
\$ 4,121	\$ 4,266	\$ 4,416	\$ 4,571	\$ 4,732	\$ 4,888	\$ 5,070	\$ 5,249	\$ 5,433		
\$ 239,604	\$ 246,026	\$ 256,744	\$ 265,789	\$ 275,111	\$ 284,781	\$ 294,791	\$ 305,153	\$ 315,879		
\$ 59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410		
\$ 59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410		
\$ 1,009,882	\$ 1,177,472	\$ 1,351,266	\$ 1,531,658	\$ 1,718,830	\$ 1,913,034	\$ 2,114,531	\$ 2,323,590	\$ 2,540,894		
\$ 19,161	\$ 19,796	\$ 20,328	\$ 20,898	\$ 21,566	\$ 22,213	\$ 22,879	\$ 23,566	\$ 24,273		
\$ 19,161	\$ 19,796	\$ 20,328	\$ 20,898	\$ 21,566	\$ 22,213	\$ 22,879	\$ 23,566	\$ 24,273		
\$ 990,701	\$ 1,157,676	\$ 1,330,938	\$ 1,510,720	\$ 1,697,264	\$ 1,890,821	\$ 2,091,651	\$ 2,300,025	\$ 2,516,221		
YES	YES	YES	YES	YES	YES	YES	YES	YES		

City of Soap Lake - Stormwater Comprehensive Plan
Rate Model - Scenario E

Year	Annual Stormwater Inert =												loan term											
	3.0%						3.00%						0.5%						2.0%					
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039		
Beginning fund	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$		
Revenue																								
ERUs		806	810	814	818	822	826	830	835	839	843	847	851	856	860	864	869	873	877	882	886	891		
Monthly Service Rate	\$ 8.50	\$ 9.02	\$ 9.29	\$ 9.57	\$ 9.85	\$ 10.15	\$ 10.45	\$ 10.77	\$ 11.09	\$ 11.42	\$ 11.77	\$ 12.12	\$ 12.48	\$ 12.86	\$ 13.24	\$ 13.64	\$ 14.05	\$ 14.47	\$ 14.90	\$ 15.35	\$ 15.81	\$ 16.28		
Total Service Rate	\$ 81,804	\$ 87,220	\$ 90,286	\$ 93,459	\$ 96,744	\$ 100,145	\$ 103,665	\$ 107,309	\$ 111,081	\$ 114,985	\$ 119,027	\$ 123,211	\$ 127,541	\$ 132,024	\$ 136,665	\$ 141,469	\$ 146,442	\$ 151,589	\$ 156,917	\$ 162,433	\$ 168,142	\$ 174,046		
Connection Fee	\$ 500	\$ 515.00	\$ 530.45	\$ 546.36	\$ 562.75	\$ 579.64	\$ 597.03	\$ 615	\$ 633	\$ 652	\$ 672	\$ 692	\$ 713	\$ 734	\$ 756	\$ 779	\$ 802	\$ 826	\$ 851	\$ 877	\$ 903	\$ 930		
Total Connection Fee	\$	\$ 2,065	\$ 2,188	\$ 2,323	\$ 2,471	\$ 2,631	\$ 2,804	\$ 2,991	\$ 3,191	\$ 3,404	\$ 3,631	\$ 3,872	\$ 4,128	\$ 4,399	\$ 4,685	\$ 4,986	\$ 5,302	\$ 5,634	\$ 5,981	\$ 6,344	\$ 6,723	\$ 7,118		
Total Revenue	\$ 81,804	\$ 89,285	\$ 92,423	\$ 95,672	\$ 99,035	\$ 102,516	\$ 106,119	\$ 109,849	\$ 113,711	\$ 117,708	\$ 121,845	\$ 126,128	\$ 130,561	\$ 135,151	\$ 139,901	\$ 144,819	\$ 149,909	\$ 155,178	\$ 160,633	\$ 166,279	\$ 172,124	\$ 178,171		
Expenses																								
Yearly O&M	\$ 32,000	\$ 32,960	\$ 33,949	\$ 34,967	\$ 36,016	\$ 37,097	\$ 38,210	\$ 39,356	\$ 40,537	\$ 41,753	\$ 43,005	\$ 44,295	\$ 45,624	\$ 46,993	\$ 48,403	\$ 49,855	\$ 51,351	\$ 52,891	\$ 54,478	\$ 56,112	\$ 57,796	\$ 59,519		
Total Expense	\$ 32,000	\$ 32,960	\$ 33,949	\$ 34,967	\$ 36,016	\$ 37,097	\$ 38,210	\$ 39,356	\$ 40,537	\$ 41,753	\$ 43,005	\$ 44,295	\$ 45,624	\$ 46,993	\$ 48,403	\$ 49,855	\$ 51,351	\$ 52,891	\$ 54,478	\$ 56,112	\$ 57,796	\$ 59,519		
Capital Reserve	\$ 49,804	\$ 56,325	\$ 58,474	\$ 60,490	\$ 62,428	\$ 64,291	\$ 66,079	\$ 67,893	\$ 69,642	\$ 71,426	\$ 73,248	\$ 75,109	\$ 77,009	\$ 78,948	\$ 80,926	\$ 82,944	\$ 85,002	\$ 87,100	\$ 89,238	\$ 91,416	\$ 93,634	\$ 95,893		
CIP Projects																								
CIP 1B	\$ 747,000																							
CIP 2	\$ 555,000																							
Miscellaneous Projects	\$ 10,000	\$ 10,300	\$ 10,609	\$ 10,927	\$ 11,255	\$ 11,593	\$ 11,941	\$ 12,299	\$ 12,668	\$ 13,048	\$ 13,439	\$ 13,842	\$ 14,256	\$ 14,685	\$ 15,126	\$ 15,580	\$ 16,047	\$ 16,528	\$ 17,024	\$ 17,535	\$ 18,061	\$ 18,603		
CIP Total	\$ 10,300	\$ 10,609	\$ 10,927	\$ 11,255	\$ 11,593	\$ 11,941	\$ 12,299	\$ 12,668	\$ 13,048	\$ 13,439	\$ 13,842	\$ 14,256	\$ 14,685	\$ 15,126	\$ 15,580	\$ 16,047	\$ 16,528	\$ 17,024	\$ 17,535	\$ 18,061	\$ 18,603	\$ 19,156		
Year End Total	\$ 39,504	\$ 85,220	\$ 132,767	\$ 130,799	\$ 130,807	\$ 132,868	\$ 137,061	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469	\$ 143,469		
6 Month Operating Check	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		

Scenario E Continued										
	2040	2041	2042	2043	2044	2045	2046	2047	2048	
\$	102,819	\$ 122,477	\$ 146,037	\$ 225,067	\$ 308,303	\$ 395,906	\$ 488,043	\$ 584,887	\$ 715,025	
	891	895	899	904	909	913	918	922	927	
\$	16,29	\$ 16,78	\$ 17,28	\$ 17,80	\$ 18,33	\$ 18,88	\$ 19,45	\$ 20,03	\$ 20,63	
\$	174,053	\$ 180,171	\$ 186,504	\$ 193,059	\$ 199,845	\$ 206,870	\$ 214,141	\$ 221,668	\$ 229,460	
\$	930	\$ 958	\$ 987	\$ 1,016	\$ 1,047	\$ 1,078	\$ 1,111	\$ 1,144	\$ 1,178	
\$	4,121	\$ 4,266	\$ 4,416	\$ 4,571	\$ 4,732	\$ 4,888	\$ 5,070	\$ 5,249	\$ 5,433	
\$	178,174	\$ 184,437	\$ 190,920	\$ 197,630	\$ 204,577	\$ 211,768	\$ 219,212	\$ 226,917	\$ 234,893	
\$	59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410	
\$	59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410	
\$	221,483	\$ 245,588	\$ 273,802	\$ 357,948	\$ 445,879	\$ 538,683	\$ 636,173	\$ 738,590	\$ 874,508	
\$	51,418	\$ 51,418								
\$	28,407	\$ 28,407	\$ 28,407	\$ 28,407	\$ 28,407	\$ 28,407	\$ 28,407	\$ 28,407		
\$	19,161	\$ 19,796	\$ 20,328	\$ 20,898	\$ 21,566	\$ 22,213	\$ 22,879	\$ 23,566	\$ 24,273	
\$	98,986	\$ 99,581	\$ 48,785	\$ 49,345	\$ 49,973	\$ 50,620	\$ 51,287	\$ 51,966	\$ 24,273	
\$	122,477	\$ 146,037	\$ 225,067	\$ 308,303	\$ 395,906	\$ 488,043	\$ 584,887	\$ 715,025	\$ 850,235	
YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	

City of Soap Lake - Stormwater Comprehensive Plan
Rate Model - Scenario F

Year	Annual Stormwater Inct=										loan term											
	3.0%					3.00%					0.5%					2.6%						
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
Beginning fund	\$	27,474	\$	60,364	\$	94,633	\$	130,339	\$	167,538	\$	215,982	\$	271,917	\$	330,340	\$	390,697	\$	452,891	\$	517,996
Revenue																						
ERUs		806	810	814	818	822	826	830	835	839	843	847	851	856	860	864	869	873	877	882	886	891
Monthly Service Rate		7.69	7.92	8.16	8.40	8.66	8.92	9.18	9.46	9.74	10.04	10.34	10.65	10.97	11.30	11.63	11.98	12.34	12.71	13.09	13.49	13.90
Total Service Rate		69,774	74,393	77,008	79,715	82,517	85,418	88,420	91,528	94,745	98,075	101,523	105,091	108,785	112,609	116,567	120,665	124,906	129,296	133,841	138,546	143,416
Connection Fee		515.00	550.45	586.36	622.75	659.64	697.03	734.92	773.31	812.20	851.59	891.48	931.87	972.76	1,014.15	1,056.04	1,098.43	1,141.32	1,184.71	1,228.60	1,273.00	1,317.90
Total Connection Fee		2,085	2,138	2,191	2,243	2,295	2,347	2,399	2,451	2,503	2,555	2,607	2,659	2,711	2,763	2,815	2,867	2,919	2,971	3,023	3,075	3,127
Total Revenue		69,774	76,459	79,146	81,928	84,808	87,789	90,869	94,059	97,357	100,758	104,261	107,868	111,480	115,097	118,720	122,349	126,000	129,671	133,362	137,073	140,804
Expenses																						
Yearly O&M		32,000	32,960	33,949	34,967	36,016	37,097	38,210	39,356	40,537	41,753	43,005	44,295	45,624	46,993	48,403	49,855	51,351	52,891	54,478	56,112	57,796
Total Expense		32,000	32,960	33,949	34,967	36,016	37,097	38,210	39,356	40,537	41,753	43,005	44,295	45,624	46,993	48,403	49,855	51,351	52,891	54,478	56,112	57,796
Capital Reserve																						
		37,774	70,973	105,561	141,594	179,131	216,230	251,987	285,982	318,143	348,478	376,993	403,688	428,463	451,317	472,250	491,261	508,249	523,324	536,486	547,734	557,067
CIP Projects																						
CIP 1B																						
CIP 2																						
Miscellaneous Projects																						
CIP Total		10,300	10,609	10,927	11,255	11,593	11,941	12,299	12,666	13,048	13,439	13,842	14,256	14,685	15,126	15,580	16,047	16,528	17,024	17,535	18,061	18,603
Year End Total		27,474	60,364	94,633	130,339	167,538	215,982	271,917	330,340	390,697	452,891	517,996	590,697	669,921	755,674	848,035	947,434	1,054,162	1,168,236	1,289,661	1,418,437	1,554,643
6 Month Operating Check																						

City of Soap Lake - Stormwater Comprehensive Plan
Rate Model - Scenario F

Scenario F Continued										
2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	
\$ 53,371	\$ 60,908	\$ 71,448	\$ 85,107	\$ 102,009	\$ 122,281	\$ 146,053	\$ 173,462	\$ 204,851	\$ 239,767	
	895	899	904	909	913	918	922	927	931	
\$ 13,89	\$ 14,31	\$ 14,74	\$ 15,18	\$ 15,64	\$ 16,10	\$ 16,59	\$ 17,09	\$ 17,60	\$ 18,13	
\$ 148,457	\$ 153,675	\$ 159,077	\$ 164,668	\$ 170,456	\$ 176,448	\$ 182,650	\$ 189,070	\$ 195,716	\$ 202,595	
\$ 930	\$ 958	\$ 987	\$ 1,016	\$ 1,047	\$ 1,078	\$ 1,111	\$ 1,144	\$ 1,178	\$ 1,214	
\$ 4,121	\$ 4,266	\$ 4,416	\$ 4,571	\$ 4,732	\$ 4,888	\$ 5,070	\$ 5,249	\$ 5,433	\$ 5,624	
\$ 152,578	\$ 157,941	\$ 163,483	\$ 169,239	\$ 175,188	\$ 181,346	\$ 187,720	\$ 194,319	\$ 201,149	\$ 208,219	
\$ 59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410	\$ 77,672	
\$ 59,529	\$ 61,315	\$ 63,155	\$ 65,049	\$ 67,001	\$ 69,011	\$ 71,081	\$ 73,214	\$ 75,410	\$ 77,672	
\$ 146,419	\$ 157,534	\$ 171,784	\$ 189,297	\$ 210,197	\$ 234,616	\$ 262,892	\$ 294,567	\$ 330,390	\$ 370,314	
\$ 43,186	\$ 43,186	\$ 43,186	\$ 43,186	\$ 43,186	\$ 43,186	\$ 43,186	\$ 43,186	\$ 43,186	\$ 43,186	
\$ 23,164	\$ 23,164	\$ 23,164	\$ 23,164	\$ 23,164	\$ 23,164	\$ 23,164	\$ 23,164	\$ 23,164	\$ 23,164	
\$ 19,161	\$ 19,796	\$ 20,328	\$ 20,898	\$ 21,566	\$ 22,213	\$ 22,879	\$ 23,566	\$ 24,273	\$ 25,001	
\$ 85,511	\$ 86,086	\$ 86,678	\$ 87,288	\$ 87,916	\$ 88,563	\$ 89,229	\$ 89,916	\$ 90,623	\$ 91,351	
\$ 60,908	\$ 71,448	\$ 85,107	\$ 102,009	\$ 122,281	\$ 146,053	\$ 173,462	\$ 204,851	\$ 239,767	\$ 278,963	
YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	

APPENDIX D

SAMPLE STORMWATER UTILITY ORDINANCES

CITY OF SOAP LAKE
ORDINANCE NUMBER _____

AN ORDINANCE RELATING TO SURFACE AND STORMWATER DRAINAGE, ESTABLISHING A STORMWATER UTILITY AND TRANSFERRING ALL RIGHTS AND INTERESTS NOW OWNED BY THE CITY AND PERTAINING TO SURFACE AND STORMWATER DRAINAGE TO THE UTILITY.

WHEREAS, the City is authorized pursuant to the general police powers, RCW 35.67.020 and RCW 35.92.020, to construct, condemn and purchase, acquire, add to, maintain, conduct and operate a storm drainage system; and

WHEREAS, pursuant to the Constitution of the State of Washington, Article 11, Section 11, cities have the power to enact regulations in the interest of the health, safety and welfare of its residents; and

WHEREAS, the City Council of the City of Soap Lake has expressed concern regarding the control and prevention of flooding, erosion, sedimentation and surface and stormwater quality degradation pursuant to an overall management plan; and

WHEREAS, after review of the various presentations made to the City Council, the City Council finds specifically that land use and development affecting surface and stormwater should be managed, regulated and controlled under the unified management of a Stormwater Utility to reduce or control flooding, erosion, sedimentation, and particulate and other pollution of surface and stormwater, danger and damage to life and property, and to protect and encourage the use of natural and efficient man-made means to these ends and that a comprehensive stormwater plan should be adopted for such purposes; and

WHEREAS, to research and correct these problems in a cost-effective manner, acceptable to the City, requires a source of revenue to pay for the associated costs; and

WHEREAS, it is the desire of the City to incorporate into the proposed utility all surface water courses the title to which is now held or in the future will be held by the City,

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SOAP LAKE, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. Definitions. The following words when used herein shall have the following meanings, unless the context clearly indicates otherwise:

- a. “Comprehensive Stormwater Plan” means a plan, developed for the purposes of mapping and analyzing the City’s surface and stormwater drainage system, identifying problem areas, and providing recommendations for capital improvements, best management practices, policy changes, and funding.

- b. “General Facility Charge” means that fee authorized by the Council and charged by the Utility to property which is developed after the effective date of this ordinance, which charge reflects a proportionate share of the Utility's capital costs attributable to the newly developed property.
- c. “Service Charge” means the monthly fee levied by the Utility upon all developed real property within the boundaries of the Utility as authorized by Sections 2 and 3 of this ordinance.
- d. “Storm Drainage System” means constructed drainage facilities and any natural surface water drainage features that provide any combination of collecting, storing, controlling, treating or conveying surface and stormwater.
- e. “Stormwater” means water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands, as well as shallow groundwater.
- f. “Utility” means the City of Soap Lake, Washington Stormwater Utility, a utility which operates and maintains the surface and stormwater drains, channels and facilities, outfalls for storm drainage and the rights and interests in property relating to the system. The boundaries of the utility are the corporate limits of the City.

Section 2. Creation of Stormwater Utility.

- A. There is hereby created and established a surface and stormwater utility which shall be known as the "City of Soap Lake, Washington, Stormwater Utility" (the "Utility"), for the purposes set forth in Section 2. B.
- B. The City shall exercise, through the Utility where possible, all the lawful powers necessary and appropriate to the construction, condemnation and purchase, acquisition, addition to, maintenance, conduct and operation, management, regulation and control of the surface and stormwater within the boundaries of the City, as necessary to protect the health, safety, and welfare of the citizens of the City; including, without limitation, all the lawful powers to fix, alter, regulate and control the rates, charges and conditions for the use thereof, to purchase and condemn property on behalf of the Utility, to regulate actions taken with respect to public and private property which affect the flow of surface and stormwater and the use of drainage facilities, and to adopt, alter, and amend a plan adopted as necessary to implement the policies of the City pertaining to surface and stormwater drainage.
- C. It is not the purpose of this ordinance to create a duty of the City or its Utility to insure or protect individual persons or property against water drainage.

Section 3. Administrator of Utility. The Public Works Director or the official designated by the Public Works Director shall be administrator of the Utility and shall report directly to the Public Works Director.

Section 4. Stormwater Utility Fund.

- A. There is hereby created a fund which shall be known as the "Stormwater Utility Fund". All revenues, assessments, and other charges collected by the Utility, or otherwise received for drainage purposes or attributable to the operation and maintenance of the Utility, and all loans to or grants or funds received for its construction, improvement and operation, shall be deposited in the Stormwater Utility Fund. All disbursements for costs of data collection, planning, designing, constructing, acquiring, maintaining, operating, and improving the drainage utility facilities, whether such facilities are natural, constructed or both, and administering the Utility shall be made from the Stormwater Utility Fund.
- B. The City may create, at such time or times as it deems appropriate, any other funds necessary to the administration of the Stormwater Utility and may designate the revenues to be placed therein and the purpose or purposes of such funds which may be the same as one, some or all of the purposes designated in this section as the purposes of the Stormwater Utility Fund created herein, and such purposes shall then be transferred to such newly created fund.

Section 5. Authority to Establish Rates and Charges. The City shall establish by ordinance rate classifications, service charges, general facilities charges, inspection, permitting, application, and such other fees and charges necessary and sufficient in the opinion of the City Council to pay for the following:

- a. The costs associated with the development and adoption of a comprehensive stormwater plan;
- b. The costs, including debt service and related financing expenses, for the construction, and reconstruction of storm drainage facilities necessary or useful for the handling of surface and stormwater within the City, but not presently in existence;
- c. The operation, repair, maintenance, improvement, replacement and reconstruction of storm drainage facilities within the City which presently exist;
- d. The acquisition of real property interests, which may be useful or necessary for the storm drainage system in the City including but not limited to land necessary for the installation and construction of storm drainage facilities, and all other facilities, including retention and detention facilities, which are reasonably required for proper and adequate handling of stormwater within the City;
- e. The costs of monitoring, inspection, enforcement and administration of the Utility including but not limited to water quality surveillance, private drainage facility maintenance inspection, construction inspection and other activities which are reasonably required for the proper and adequate implementation of the City's surface and stormwater policies;
- f. The construction and subsequent maintenance of those future facilities as required by the Utility; and

- g. Creation and implementation of ordinances, policies, standards, and procedures for the purposes of gaining compliance with state or federal rules and regulations.

The fees and charges to be paid and collected pursuant hereto shall not be used for general or other governmental or proprietary purposes of the City, except to pay for the equitable share of the costs of accounting, management, legally levied taxes, and government thereof incurred on behalf of the Utility.

Section 6. Limitation of Liability. This ordinance, any drainage code to be adopted by the City Council to implement this ordinance, and any guidelines, rules, standards, specifications, requirements, regulations and procedures established pursuant to any section of such code are intended to provide the authority and processes to achieve cost-effective surface and stormwater management in accordance with reasonable standards for such management in the City as necessary to protect the health, safety, and welfare of the citizens and of the City. No City liability shall be inferred, implied, or interpreted by the adoption and application of this ordinance for damages to individual persons or properties which result from existing conditions or which occur subsequent to the date of this Ordinance. There shall be no liability associated with the Utility's approval of any privately constructed portion of the storm drainage system and/or privately maintained portion of the storm drainage system unless the City accepts the same as part of its publicly owned and/or maintained system.

Section 7. Severability. If any portion of this ordinance as now or hereafter amended, or its application to any person or circumstances, is held invalid or unconstitutional, such adjudication shall not affect the validity of the ordinance as a whole, or any section, provision or part thereof not adjudged to be invalid or unconstitutional, and its application to other persons or circumstances shall not be affected.

Section 8. Effective Date. This Ordinance shall take effect and be in force five (5) days after its passage, approval and publication according to law.

PASSED BY THE CITY COUNCIL OF THE CITY OF SOAP LAKE THIS ____ DAY OF _____, 2018; AND SIGNED IN AUTHENTICATION OF ITS PASSAGE THIS ____ DAY OF _____, 2018.

Raymond Gravelle, Mayor

ATTESTED BY:

Anita Richardson, Deputy Clerk

APPROVED AS TO FORM:

, City Attorney

AYES:
NAYS:
ABSENT:
EXCUSED:

**CITY OF SOAP LAKE
ORDINANCE NUMBER _____**

AN ORDINANCE ESTABLISHING A RATE STRUCTURE POLICY FOR THE STORMWATER UTILITY OF THE CITY OF SOAP LAKE, WASHINGTON, ESTABLISHING SERVICE CHARGES FOR SUCH UTILITY, PROVIDING AUTHORITY FOR THE COLLECTION THEREOF.

WHEREAS, the City of Soap Lake, Washington (the "City"), created a Stormwater Utility to implement and administer its Stormwater Management Program; and

WHEREAS, the City is authorized pursuant to the general police powers, RCW 35.67.020 and RCW 35.92.020, to fix, alter, regulate and control the rates and charges for use of said Utility and the Stormwater Management Program of the City; and

WHEREAS, the City Council finds that it is now necessary to establish rates and charges for the payment of the cost and expense of operating said Utility; and

WHEREAS, the City Council finds that all developed real property within the boundaries of the Utility benefits from the Stormwater Utility of the City and should participate financially in the payment of all expenses for maintenance, operation and improvement of said storm drainage system and for administration of the Utility;

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF SOAP LAKE, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. Definitions. The following words when used herein shall have the following meanings, unless the context clearly indicates otherwise:

- a. "Best Management Practices" ("BMPs") means the best available and reasonable physical, structural, managerial, or behavioral activities, that when used singly or in combination, eliminate or reduce the contamination of surface and/or ground water.
- b. "Commercial Properties" include commercial, multifamily residential – 3 units or greater, industrial and institutional properties.
- c. "Developed" means that condition of real property altered from its natural state by the addition to or construction on such property of impervious ground surface or other manmade physical improvements such that the drainage characteristics of the property or portion thereof is affected.
- d. "Duplex" means any structure which contains no more than 2 residences or 2 residential units which are within a single structure and are used primarily for residential purposes.

- e. “Dwelling Unit – Single-family” means a structure consisting of one detached building in which there are facilities for the living accommodations of one family.
- f. “Equivalent Residential Unit” (“ERU”) means and shall be equal to 3,200 square feet of Impervious Surface and is the measure of Impervious Surface to be used by the Utility in assessing Service Charges and General Facility Charges against each parcel of property.
- g. “General Facility Charge” means that fee authorized by the Council and charged by the Utility to property which is developed after the effective date of this ordinance, which charge reflects a proportionate share of the Utility’s capital costs attributable to the newly developed property.
- h. “Impervious Surface” means a hard surface area which either prevents or retards the entry of water into the soil mantle as it entered under natural conditions prior to development, or a hard surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roofs, sidewalks, walkways, patios, concrete or asphalt paving, driveways, parking lots, storage areas, areas which are paved, graveled, or made of packed earthen materials and other surfaces which similarly impede the natural infiltration of surface and storm water. Open, uncovered flow control or water quality treatment facilities shall not be considered as impervious surfaces.
- i. “Manual” means the most recently adopted technical drainage manual that describes the requirements for drainage review, drainage plan and report submittal, hydrologic analysis and design, flow control design, water quality design, and other technical requirements.
- j. “Natural Surface Water Drainage System” means such landscape features as rivers, streams, lakes and wetlands.
- k. “Parcel” means the smallest separately segregated unit or plot of land having an identified owner, boundaries and surface area which is documented for property tax purposes and given a tax lot number by the Grant County assessor.
- l. “Person” means any individual, firm, company, association, corporation or governmental agency.
- m. “Program” means the Stormwater Management Program.
- n. “Service Charge” means the monthly fee levied by the Utility upon all developed real property within the boundaries of the Utility as authorized by Sections 2 and 3 of this ordinance.
- o. “Storm Drainage System” means constructed drainage facilities and any natural surface water drainage features that do any combination of collecting, storing, controlling, treating or conveying surface and stormwater.
- p. “Stormwater” means water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands, as well as shallow groundwater.
- q. “Stormwater Management Program” means the services provided by the City relating to surface and stormwater drainage, including but not limited to, basin planning, facilities operations and maintenance, regulation, financial administration, public involvement, drainage investigation and enforcement,

aquatic resource restoration, surface and stormwater quality and environmental monitoring, natural surface water drainage system planning, intergovernmental relations and facility design and construction.

- r. “Undeveloped Parcel” means any parcel, which has not been altered from its natural state by the construction, creation or addition of impervious surface.
- s. “Utility” means the City of Soap Lake, Washington Stormwater Utility, a utility which operates and maintains the surface and storm water drains, channels and facilities, outfalls for storm drainage and the rights and interests in property relating to the system. The boundaries of the utility are the corporate limits of the City.
- t. “Water Quality Treatment Facility” means a drainage facility designed to reduce pollutants once they are already contained in surface and storm water runoff. Water quality treatment facilities are the structural component of BMPs. When used singly or in combination, water quality treatment facilities reduce the potential for contamination of surface and/or ground water.

Section 2. Rate Structure.

- A. It shall be the policy of the City that the rate structure to be applied in establishing the amount of Service Charges and General Facility Charges assessed against each parcel of developed real property within the boundaries of the Utility shall be based upon the amount of Impervious Surface contained within each parcel of property as set forth below.
- B. The City shall determine the service charge for each parcel within the service area by the following methodology:
 - 1. All single-family dwelling units and accessory uses thereof are deemed to contain one (1) Equivalent Residential Unit.
 - 2. Each dwelling unit of a duplex structure is deemed to contain one (1) Equivalent Residential Unit.
 - 3. All other developed real properties within the Utility boundaries, the Utility shall determine the number of Equivalent Residential Units by dividing the number of square feet of Impervious Surface on each property by 3,200 square feet per ERU; the total thus obtained will be rounded to the nearest half representing the Equivalent Residential Units contained on such property. Each developed parcel of property shall be deemed to comprise a minimum of one Equivalent Residential Unit.
- C. Property Exempt from Service Charges. The following special categories of property are exempt from Service Charges and General Facility Charges:
 - 1. City street rights-of-way;
 - 2. Washington State rights-of-way; and
 - 3. Undeveloped parcels.

Section 3. Service Charge Rates. In accordance with the rate structure set forth in Section 2 of this ordinance, there is hereby levied upon all developed real property within the boundaries of the Utility the following Service Charges which shall be collected from the owners of such properties:

- a. For all single-family dwelling units and accessory uses thereof, (One Equivalent Residential Unit), the monthly Service Charge shall be \$_____ per month.
- b. For all other developed property within the boundaries of the Utility, unless exempt as set forth above, the monthly Service Charge shall be \$_____ per month per ERU multiplied by the number of Equivalent Residential Units determined by the Utility to be contained in such parcel.

Section 5. General Facilities Charge

- A. Beginning on the effective date of the ordinance codified in this section, and thereafter in addition to other fees required by ordinance or pursuant to agreement, there is imposed upon the owners of property seeking to connect to the City's stormwater system a general facility charge. This general facility charge is determined as the product of \$500.00 times the number of equivalent residential units (ERU) (\$500.00 x ERU).
- B. The general facility charge shall be paid and collected at the time of permit issuance for development and prior to actual development.
- C. Applicants for development shall be required to pay the stormwater general facility charge in effect at the time the permit is issued.

Section 6. Rate Adjustments and Appeals.

- A. Any person billed for service charges may file a "request for rate adjustment" with the City within two years of the date from which the bill was sent. Rate adjustment request forms shall be available at the City Clerks' office. However, filing of such request does not extend the period for payment of the charge.
- B. Requests for rate adjustment may be granted or approved by the City Finance Manager (residential and commercial accounts) or Public Works Director (industrial accounts) only when at least one of the following conditions exist:
 1. The service charge bill was otherwise not calculated in accordance with this ordinance.
- C. The property owner shall have the burden of proving that the rate adjustment sought should be granted.

- D. Decisions on requests for rate adjustments shall be made by the City Finance Director or Public Works Director based on information submitted by the applicant within thirty days of the adjustment request except when additional information is needed. The applicant shall be notified in writing of the City's decision. If an adjustment is granted which reduces the charge for the current year or two prior years, the applicant shall be refunded the amount overpaid in the current and two prior years.
- E. If the City Finance Director finds that a service charge bill has been undercharged, then an amended bill shall be issued which reflects the increase in the service charge. The City may include in the bill the amount undercharged for two previous billing years in addition to the current bill.
- F. Decisions of the City Finance Director, on requests for rate adjustments shall be final unless within thirty days of the date the decision was mailed, the applicant submits in writing to the City Finance Director a notice of appeal setting forth a brief statement of the grounds for appeal and requesting a hearing before the City Council.

Section 7. Billing Procedure and Collection.

- A. All property subject to charges of the program shall be billed based on the property characteristics existing one month prior billing. All property is billed bi-monthly beginning January 1st of each year.
- B. All Service Charges, General Facility Charges and all other fees or charges hereafter established by the City Council by ordinance shall be deemed to be levied upon real property.
- C. The City shall have a lien for all delinquent and unpaid charges and fees for storm drainage purposes, including without limitation Service Charges and General Facility Charges, assessed against all parcels to which service was furnished, which lien shall have the superiority established by RCW §35.67.200 and shall be foreclosed in the manner provided in RCW §35.67.220 et seq.
- D. Service charges shall be deemed delinquent if not paid by the end of the month of the billing date. A late charge equal to 10 percent or \$5, whichever is greater, of the delinquent service charge shall be imposed at the time of such delinquency and interest at the rate of 12 per cent per annum shall be charged on all delinquent service charges and late charges. If the delinquent service charge or imposed interest is usurious under Washington law, then the maximum charge and/or interest rate allowable by law will be imposed.

Section 8. Annual Review of Charges and Fees. The charges and fees established by this ordinance and any other ordinances of the City Council establishing charges and fees for the Utility may be reviewed annually by the City Council.

Section 9. Effective Date of Service Charge. The Service Charge herein established shall apply to on or after January 1, 2019 and shall be billed beginning in January 2019.

Section 10. Severability. If any portion of this ordinance as now or hereafter amended, or its application to any person or circumstances, is held invalid or unconstitutional, such adjudication shall not affect the validity of the ordinance as a whole, or any section, provision or part thereof not adjudged to be invalid or unconstitutional, and its application to other persons or circumstances shall not be affected.

Section 11. Effective Date. This Ordinance shall take effect and be in force five (5) days after its passage, approval and publication according to law.

PASSED BY THE CITY COUNCIL OF THE CITY OF SOAP LAKE THIS _____ DAY OF _____, 2018; AND SIGNED IN AUTHENTICATION OF ITS PASSAGE THIS _____ DAY OF _____, 2018.

Raymond Gravelle, Mayor

ATTESTED BY:

Anita Richardson, Deputy Clerk

APPROVED AS TO FORM:

, City Attorney

AYES:
NAYS:
ABSENT:
EXCUSED: