ATTACHMENT "A"

OPERATIONS AND MAINTENACE MANUAL FOR DRAINAGE FACILITIES

FOR

Olson Brothers Storage
Puyallup, Washington

December 2022

Prepared for:
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Project#20083

Section 1 – Project Description

Site Address:	601 30th Ave SW Puyallup, WA 98373
Developer Address:	PO Box 73310 Puyallup, WA 98373
Tax Parcel Numbers:	0419041012
Ownership/Maintenance:	Homeowner

The Olson Brothers Storage project proposes the remodel of an existing commercial industrial building and portable building on a 0.93-acre site comprised of two parcels (2105200180 and 2105200192) zoned Limited Manufacturing (ML). The property has frontage along Inter Ave which provides access with a new commercial driveway approach. Improvements are proposed along Inter Ave which include curb, gutter and sidewalk extended across the property's frontage. The project site proposes approximately 35,480 sq.ft. of paving, that does not include overlaying the existing asphalt, across onsite and offsite improvements and 11,472 sq.ft. of landscaping; therefore, according to Figure 2.4.1 and 2.4.2 of Volume I of the Manual, the project must evaluate all minimum requirements for the new and replaced surfaces; see Section 5 of this report for a detailed discussion of the minimum requirements. The project proposes permeable pavement for flow control of the newly paved and landscaped surfaces. Runoff treatment is provided by the native soils underlying the permeable pavement since they meet the CEC and organic requirements. All disturbed areas which are not converted to impervious surface will apply soil amendments per BMP T5.13. The average annual cost for maintenance is approximated to be $10,000.00.

Section 2 – Maintenance Importance and Intent

"The importance of maintenance for the proper functioning of stormwater control facilities cannot be over-emphasized. A substantial portion of failures (clogging of filters, resuspension of sediments, loss of storage capacity, etc.) are due to inadequate maintenance. Stormwater BMP maintenance is essential to ensure that BMPs function as intended throughout their full life cycle.

The fundamental goals of maintenance activities are to ensure the entire flow regime and treatment train designed for this site continue to fully function. For this site these include:

- Maintain the ability of storm facility to attenuate flows.
- Maintain ability to safely convey design stormwater flows.
- Preserve soil and plant health, as well as stormwater flow contact with plant and soil systems.
- Clearly identify systems so they can be protected
- Keep maintenance costs low
- Prevent large-scale or expensive stormwater system failures
- Prevent water quality violations or damage to downstream properties.

Section 3 – Responsible Parties

Stormwater drainage facilities will be installed, constructed, and maintained with documentation of maintenance by the homeowner. This maintenance plan shall be kept onsite and must be made available for inspection by the City of Puyallup upon request.

Section 4 – Facilities Requiring Maintenance

The following stormwater facilities/Best Management Practices require maintenance:

- Permeable Pavement
- Conveyance Pipes and Catch Basins.

- Amended Soils

Section 5 – Maintenance Instructions

"The parties responsible for maintenance must review and apply the maintenance requirements contained herein. These maintenance instructions outline conditions for determining if maintenance actions are required, as identified through inspection. However, they are not intended to be measures of the facility's required condition at all times between inspections. Exceedance of these conditions at any time between inspections or maintenance activity does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance presented in these checklists shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action. For facilities not owned and maintained by the City, a log of maintenance activity that indicates what actions were taken must be kept on site and be available for inspection by the City."

The following pages contain maintenance needs for most of the components that are part of your drainage system, as well as for some components that you may not have. Let the City know if there are any components that are missing from these pages. Ignore the requirements that do not apply to your system. You should plan to complete a checklist for all system components on the following schedule:

1. Monthly from November through April.
2. Once in late summer (preferably in September).
3. After any major storm (use 1-inch in 24-hours as a guideline).

Using photocopies of the checklist pages check off the problems that you looked for each time you did an inspection. Add comments on problems found and actions taken. Keep these "checked" sheets in your files, as they will be used to write your annual report. Some items do not need to be looked at every time an inspection is done. Use the suggested frequency at the left of each item as a guideline for your inspection.

Section 6 – Vegetation Maintenance

Plant material affecting the storm water system consists of grass, leaves, and yard debris. Maintenance checklists on the following pages and instructions listed above address appropriate maintenance requirements.

REQUIRED ACTIONS: The following actions shall be taken to ensure that pollution generated on site shall be minimized:

1. Warning signs (e.g., "Dump No Waste-Drains to Stream") shall be painted or embossed on or adjacent to all storm drain inlets. They shall be repainted as needed.

2. Sediment removed from the catch basins and storm system shall be disposed of in a proper manner. Contact the City of Puyallup for instruction prior to completing this task.

ATTACHMENT "A"

MAINTAINANCE PROGRAM
COVER SHEET

Inspection Period: _____

Number of Sheets Attached: _____

Date Inspected: _____

Name of Inspector: _____

Inspector's Signature: _____

No. 5 – Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%.	No Trash or debris located immediately in front of catch basin or on grate opening.
		Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
		Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
		Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (Intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
		Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is regrouted and secure at basin wall.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening.	No vegetation blocking opening to basin.
		Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation or root growth present.
	Contamination and Pollution	See "Detention Ponds" (No. 1).	No pollution present.

No. 5 – Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

No. 22 - Maintenance Standards and Procedures for Permeable Pavement.

Note that the inspection and routine maintenance frequencies listed below are recommended by Ecology. They do not supersede or replace the municipal stormwater permit requirements for inspection frequency required of municipal stormwater permittees for "stormwater treatment and flow control BMPs/facilities."

Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Surface/Wearing Course				
Permeable Pavements, all	A, S		Runoff from adjacent pervious areas deposits soil, mulch or sediment on paving	• Clean deposited soil or other materials from permeable pavement or other adjacent surfacing • Check if surface elevation of planted area is too high, or slopes towards pavement, and can be regraded (prior to regrading, protect permeable pavement by covering with temporary plastic and secure covering in place) • Mulch and/or plant all exposed soils that may erode to pavement surface
Porous asphalt or pervious concrete		A or B	None (routine maintenance)	Clean surface debris from pavement surface using one or a combination of the following methods: • Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves) • Vacuum/sweep permeable paving installation using: ○ Walk-behind vacuum (sidewalks) ○ High efficiency regenerative air or vacuum sweeper (roadways, parking lots) ○ ShopVac or brush brooms (small areas) • Hand held pressure washer or power washer with rotating brushes Follow equipment manufacturer guidelines for when equipment is most effective for cleaning permeable pavement. Dry weather is more effective for some equipment.
	A[b]		Surface is clogged: Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)	• Review the overall performance of the facility (note that small clogged areas may not reduce overall performance of facility) • Test the surface infiltration rate using ASTM C1701 as a corrective maintenance indicator. Perform one test per installation, up to 2,500 square feet. Perform an additional test for each additional 2,500 square feet up to 15,000 square feet total. Above 15,000 square feet, add one test for every 10,000 square feet. • If the results indicate an infiltration rate of 10 inches per hour or less, then perform corrective maintenance to restore permeability. To clean clogged pavement surfaces, use one or combination of the following methods: • Combined pressure wash and vacuum system calibrated to not dislodge wearing course aggregate. • Hand held pressure washer or power washer with rotating brushes • Pure vacuum sweepers Note: If the annual/biannual routine maintenance standard to clean the pavement surface is conducted using equipment from the list above, corrective maintenance may not be needed.
	A		Sediment present at the surface of the pavement	• Assess the overall performance of the pavement system during a rain event. If water runs off the pavement and/or there is ponding then see above. • Determine source of sediment loading and evaluate whether or not the source can be reduced/eliminated. If the source cannot be addressed, consider increasing frequency of routine cleaning (e.g., twice per year instead of once per year).
	Summer		Moss growth inhibits infiltration or poses slip safety hazard	• Sidewalks: Use a stiff broom to remove moss in the summer when it is dry • Parking lots and roadways: Pressure wash, vacuum sweep, or use a combination of the two for cleaning moss from pavement surface. May require stiff broom or power brush in areas of heavy moss.
	A		Major cracks or trip hazards and concrete spalling and raveling	• Fill potholes or small cracks with patching mixes • Large cracks and settlement may require cutting and replacing the pavement section. Replace in-kind where feasible. Replacing porous asphalt with conventional asphalt is acceptable if it is a small percentage of the total facility area and does not impact the overall facility function. • Take appropriate precautions during pavement repair and replacement efforts to prevent clogging of adjacent porous materials

[a] Frequency: A= Annually; B= Biannually (twice per year); S = Perform inspections after major storm events (24-hour storm event with a 10-year or greater recurrence interval).

[b] Inspection should occur during storm event.

No. 22 (continued) - Maintenance Standards and Procedures for Permeable Pavement.

Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Surface/Wearing Course (cont'd)				
Interlocking concrete paver blocks and aggregate pavers		A or B	None (routine maintenance)	Clean pavement surface using one or a combination of the following methods: • Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves) • Vacuum/sweep permeable paving installation using: ○ Walk-behind vacuum (sidewalks) ○ High efficiency regenerative air or vacuum sweeper (roadways, parking lots) ○ ShopVac or brush brooms (small areas) • Note: Vacuum settings may have to be adjusted to prevent excess uptake of aggregate from paver openings or joints. Vacuum surface openings in dry weather to remove dry, encrusted sediment.
	A [b]		Surface is clogged: Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)]	• Review the overall performance of the facility (note that small clogged areas may not reduce overall performance of facility) • Test the surface infiltration rate using ASTM C1701 as a corrective maintenance indicator. Perform one test per installation, up to 2,500 square feet. Perform an additional test for each additional 2,500 square feet up to 15,000 square feet total. Above 15,000 square feet, add one test for every 10,000 square feet. • If the results indicate an infiltration rate of 10 inches per hour or less, then perform corrective maintenance to restore permeability. • Clogging is usually an issue in the upper 2 to 3 centimeters of aggregate. Remove the upper layer of encrusted sediment, and fines, and/or vegetation from openings and joints between the pavers by mechanical means and/or suction equipment (e.g., pure vacuum sweeper). • Replace aggregate in paver cells, joints, or openings per manufacturer's recommendations
	A		Sediment present at the surface of the pavement	• Assess the overall performance of the pavement system during a rain event. If water runs off the pavement and/or there is ponding, then see above. • Determine source of sediment loading and evaluate whether or not the source can be reduced/eliminated. If the source cannot be addressed, consider increasing frequency of routine cleaning (e.g., twice per year instead of once per year).
	Summer		Moss growth inhibits infiltration or poses slip safety hazard	• Sidewalks: Use a stiff broom to remove moss in the summer when it is dry • Parking lots and roadways: Vacuum sweep or stiff broom/power brush for cleaning moss from pavement surface
	A		Paver block missing or damaged	Remove individual damaged paver blocks by hand and replace or repair per manufacturer's recommendations
	A		Loss of aggregate material between paver blocks	Refill per manufacturer's recommendations for interlocking paver sections
	A		Settlement of surface	May require resetting
Open-celled paving grid with gravel		A or B	None (routine maintenance)	• Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves) • Follow equipment manufacturer guidelines for cleaning surface.
	A [b]		Aggregate is clogged: Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)]	• Use vacuum truck to remove and replace top course aggregate • Replace aggregate in paving grid per manufacturer's recommendations
	A		Paving grid missing or damaged	• Remove pins, pry up grid segments, and replace gravel • Replace grid segments where three or more adjacent rings are broken or damaged • Follow manufacturer guidelines for repairing surface.
	A		Settlement of surface	May require resetting
	A		Loss of aggregate material in paving grid	Replenish aggregate material by spreading gravel with a rake (gravel level should be maintained at the same level as the plastic rings or no more than 1/4 inch above the top of rings). See manufacturer's recommendations.
		A	Weeds present	• Manually remove weeds • Presence of weeds may indicate that too many fines are present (refer to Actions Needed under "Aggregate is clogged" to address this issue)

[a] Frequency: A= Annually; B= Biannually (twice per year); S = Perform inspections after major storm events (24-hour storm event with a 10-year or greater recurrence interval).

[b] Inspection should occur during storm event.

No. 22 (continued) - Maintenance Standards and Procedures for Permeable Pavement.

Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Surface/Wearing Course (cont'd)				
Open-celled paving grid with grass		A or B	None (routine maintenance)	• Remove sediment, debris, trash, vegetation, and other debris deposited onto pavement (rakes and leaf blowers can be used for removing leaves) • Follow equipment manufacturer guidelines for cleaning surface.
	A [b]		Aggregate is clogged: Ponding on surface or water flows off the permeable pavement surface during a rain event (does not infiltrate)]	• Rehabilitate per manufacturer's recommendations.
	A		Paving grid missing or damaged	• Remove pins, pry up grid segments, and replace grass • Replace grid segments where three or more adjacent rings are broken or damaged • Follow manufacturer guidelines for repairing surface.
	A		Settlement of surface	• May require resetting
	A		Poor grass coverage in paving grid	• Restore growing medium, reseed or plant, aerate, and/or amend vegetated area as needed • Traffic loading may be inhibiting grass growth; reconsider traffic loading if feasible
		As needed	None (routine maintenance)	• Use a mulch mower to mow grass
		A	None (routine maintenance)	• Sprinkle a thin layer of compost on top of grass surface (1/2" top dressing) and sweep it in • Do not use fertilizer
		A	Weeds present	• Manually remove weeds • Mow, torch, or inoculate and replace with preferred vegetation
Inlets/Outlets/Pipes				
Inlet/outlet pipe	A		Pipe is damaged	Repair/replace
	A		Pipe is clogged	Remove roots or debris
Underdrain pipe	Clean pipe as needed	Clean orifice at least biannually (may need more frequent cleaning during wet season)	Plant roots, sediment or debris reducing capacity of underdrain (may cause prolonged drawdown period)	• Jet clean or rotary cut debris/roots from underdrain(s) • If underdrains are equipped with a flow restrictor (e.g., orifice) to attenuate flows, the orifice must be cleaned regularly
Raised subsurface overflow pipe	Clean pipe as needed	Clean orifice at least biannually (may need more frequent cleaning during wet season)	Plant roots, sediment or debris reducing capacity of underdrain	• Jet clean or rotary cut debris/roots from underdrain(s) • If underdrains are equipped with a flow restrictor (e.g., orifice) to attenuate flows, the orifice must be cleaned regularly
Outlet structure	A, S		Sediment, vegetation, or debris reducing capacity of outlet structure	• Clear the blockage • Identify the source of the blockage and take actions to prevent future blockages

[a] Frequency: A= Annually; B= Biannually (twice per year); S = Perform inspections after major storm events (24-hour storm event with a 10-year or greater recurrence interval).

[b] Inspection should occur during storm event.

No. 22 (continued) - Maintenance Standards and Procedures for Permeable Pavement.

Component	Recommended Frequency [a]		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Inlets/Outlets/Pipes (cont'd)				
Overflow	B		Native soil is exposed or other signs of erosion damage are present at discharge point	Repair erosion and stabilize surface
Aggregate Storage Reservoir				
Observation port	A, S		Water remains in the storage aggregate longer than anticipated by design after the end of a storm	If immediate cause of extended ponding is not identified, schedule investigation of subsurface materials or other potential causes of system failure.
Vegetation				
Adjacent large shrubs or trees		As needed	Vegetation related fallout clogs or will potentially clog voids	• Sweep leaf litter and sediment to prevent surface clogging and ponding • Prevent large root systems from damaging subsurface structural components
		Once in May and Once in September	Vegetation growing beyond facility edge onto sidewalks, paths, and street edge	Edging and trimming of planted areas to control groundcovers and shrubs from overreaching the sidewalks, paths and street edge improves appearance and reduces clogging of permeable pavements by leaf litter, mulch and soil.
Leaves, needles, and organic debris		In fall (October to December) after leaf drop (1-3 times, depending on canopy cover)	Accumulation of organic debris and leaf litter	Use leaf blower or vacuum to blow or remove leaves, evergreen needles, and debris (i.e., flowers, blossoms) off of and away from permeable pavement

[a] Frequency: A= Annually; B= Biannually (twice per year); S = Perform inspections after major storm events (24-hour storm event with a 10-year or greater recurrence interval).

[b] Inspection should occur during storm event.

BMP T5.13: Post-Construction Soil Quality and Depth

Purpose and Definition

Naturally occurring (undisturbed) soil and vegetation provide important stormwater functions including: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant biofiltration; water interflow storage and transmission; and pollutant decomposition. These functions are largely lost when development strips away native soil and vegetation and replaces it with minimal topsoil and sod. Not only are these important stormwater functions lost, but such landscapes themselves become pollution generating pervious surfaces due to increased use of pesticides, fertilizers and other landscaping and household/industrial chemicals, the concentration of pet wastes, and pollutants that accompany roadside litter.

Establishing soil quality and depth regains greater stormwater functions in the post development landscape, provides increased treatment of pollutants and sediments that result from development and habitation, and minimizes the need for some landscaping chemicals, thus reducing pollution through prevention.

Applications and Limitations

Establishing a minimum soil quality and depth is not the same as preservation of naturally occurring soil and vegetation. However, establishing a minimum soil quality and depth will provide improved on-site management of stormwater flow and water quality.

Soil organic matter can be attained through numerous materials such as compost, composted woody material, biosolids, and forest product residuals. It is important that the materials used to meet the soil quality and depth BMP be appropriate and beneficial to the plant cover to be established. Likewise, it is important that imported topsoils improve soil conditions and do not have an excessive percent of clay fines.

This BMP can be considered infeasible on till soil slopes greater than 33 percent.

Design Guidelines

- Soil retention. Retain, in an undisturbed state, the duff layer and native topsoil to the maximum extent practicable. In any areas requiring grading remove and stockpile the duff layer and topsoil on site in a designated, controlled area, not adjacent to public resources and critical areas, to be reapplied to other portions of the site where feasible.
- Soil quality. All areas subject to clearing and grading that have not been covered by impervious surface, incorporated into a drainage facility or engineered as structural fill or slope shall, at project completion, demonstrate the following:
    1. A topsoil layer with a minimum organic matter content of 10% dry weight in planting beds, and 5% organic matter content in turf areas, and a pH from 6.0 to 8.0 or matching the pH of the undisturbed soil. The topsoil layer shall have a minimum depth of

eight inches except where tree roots limit the depth of incorporation of amendments needed to meet the criteria. Subsoils below the topsoil layer should be scarified at least 4 inches with some incorporation of the upper material to avoid stratified layers, where feasible.

2. Mulch planting beds with 2 inches of organic material
3. Use compost and other materials that meet these organic content requirements:

   a. The organic content for "pre-approved" amendment rates can be met only using compost meeting the compost specification for Bioretention (BMP T7.30), with the exception that the compost may have up to 35% biosolids or manure.

      The compost must also have an organic matter content of 40% to 65%, and a carbon to nitrogen ratio below 25:1.

      The carbon to nitrogen ratio may be as high as 35:1 for plantings composed entirely of plants native to the Puget Sound Lowlands region.

   b. Calculated amendment rates may be met through use of composted material meeting (a.) above; or other organic materials amended to meet the carbon to nitrogen ratio requirements, and not exceeding the contaminant limits identified in Table 220-B, Testing Parameters, in WAC 173-350-220.

The resulting soil should be conducive to the type of vegetation to be established.

- Implementation Options: The soil quality design guidelines listed above can be met by using one of the methods listed below:

  1. Leave undisturbed native vegetation and soil, and protect from compaction during construction.
  2. Amend existing site topsoil or subsoil either at default "pre-approved" rates, or at custom calculated rates based on tests of the soil and amendment.
  3. Stockpile existing topsoil during grading, and replace it prior to planting. Stockpiled topsoil must also be amended if needed to meet the organic matter or depth requirements, either at a default "pre-approved" rate or at a custom calculated rate.
  4. Import topsoil mix of sufficient organic content and depth to meet the requirements.

  More than one method may be used on different portions of the same site. Soil that already meets the depth and organic matter quality standards, and is not compacted, does not need to be amended.

Planning/Permitting/Inspection/Verification Guidelines & Procedures	• Local governments are encouraged to adopt guidelines and procedures similar to those recommended in *Guidelines and Resources For Implementing Soil Quality and Depth BMP T5.13 in WDOE Stormwater Management Manual for Western Washington*. This document is available at: http://www.soilsforsalmon.org/pdf/Soil_BMP_Manual.pdf
Maintenance	• Establish soil quality and depth toward the end of construction and once established, protect from compaction, such as from large machinery use, and from erosion. • Plant vegetation and mulch the amended soil area after installation. • Leave plant debris or its equivalent on the soil surface to replenish organic matter. • Reduce and adjust, where possible, the use of irrigation, fertilizers, herbicides and pesticides, rather than continuing to implement formerly established practices.
Runoff Model Representation	Areas meeting the design guidelines may be entered into approved runoff models as "Pasture" rather than "Lawn." Flow reduction credits can be taken in runoff modeling when BMP T5.13 is used as part of a dispersion design under the conditions described in: BMP T5.10B Downspout Dispersion BMP T5.11 Concentrated Flow Dispersion BMP T5.12 Sheet Flow Dispersion BMP T5.18 Reverse Slope Sidewalks BMP T5.30 Full Dispersion (for public road projects)

ATTACHMENT "B"

POLLUTION SOURCE CONTROL MANUAL FOR COMMERCIAL / INDUSTRIAL ACTIVITIES

FOR

Olson Brothers Storage
Puyallup, Washington

December 2022

Prepared for:
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Approved By:

Daniel Smith, P.E., Project Manager

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Project#20083

Pollution Source Control Program for Commercial/Industrial Activities

Pollution source controls are actions taken by a person or business to reduce the amount of pollution reaching the surface and ground waters. Controls, also called "best management practices" or (BMPs), include:

- Altering the activity (e.g., substitute non-toxic products, recycle used oil, reroute floor drains to sanitary sewer from storm sewer)
- Enclosing or covering the activity (e.g., building a roof)
- Segregating the activity (e.g., diverting runoff away from an area that is contaminated)
- Routing runoff from the activity to a treatment alternative (e.g., to a wastewater treatment facility, sanitary sewer, or stormwater treatment area)

Pollution source controls are needed because of the contamination found in runoff from commercial areas and the effect of this contamination on aquatic life and human health.

BMPs to Consider for all Activities

Before we get to the list of activity specific BMPs, here is a summary of items that each business should consider. Most of these are common sense, housekeeping types of solutions, but if each business would take some action on each of these, the improvement in water quality would be substantial.

1. **Avoid the activity or reduce its occurrence.** If you can, avoid the activity or do it less frequently. Is there a suitable process or a different material you can use to get the job done? Can you do a larger run of a process at one time? For instance, raw materials could be delivered close to the time of use instead of being stockpiled and exposed to the weather. Perhaps you could avoid one solvent-washing step altogether. The department of Ecology or the Tacoma-Pierce County Health Department can provide pollution prevention assistance.
2. **Move the activity indoors.** Sometimes it is fairly easy to move an activity out of the weather. The benefits of this are twofold; you prevent runoff contamination, and you provide for easier, more controlled cleanup if a spill occurs. An example would be unloading and

storing barrels of chemicals inside a garage area instead of doing it outside. Please be aware that moving storage areas indoors may require installation of fire suppression equipment or other building modifications as required by the Uniform Building Code, the Uniform Fire Code, local ordinances.

3. **Use less material.** Don't buy or use more material than you really need. This not only helps keep potential disposal, storage and pollution problems to a minimum, but will probably save you money, too.

4. **Use the least toxic materials available.** Investigate the use of materials that are less toxic than what you use now. Perhaps a caustic-type detergent or a solvent could be replaced with a more environmentally friendly product. Such a change might allow you to discharge process water to the sanitary sewer instead of paying for expensive disposal (contact Pierce County Utilities at 565-3013 to find out about allowable sanitary discharges and pretreatment permits). Remember that even if you do switch to a biodegradable product, nothing but uncontaminated water is allowed to enter the storm drain system.

5. **Create and maintain vegetated areas near activity locations.** Vegetation of various kinds can help filter pollutants out of stormwater, so it is advisable to route stormwater through vegetated areas located near your activity. For instance, many parking lots contain grassy islands, typically formed in a "hump". By creating those islands as depressions instead of humps, they can be used to treat runoff from the parking lot or roof. Also, don't forget the erosion control benefits of vegetation at your site.

6. **Locate activities as far as possible from surface drainage paths.** Activities located as far as possible from known drainage paths, ditches, streams, and drains will be less likely to pollute, since it will take longer for material to reach the drainage feature. This gives you more time to react in the event of a spill, or if it is a "housekeeping" issue, may protect the local waters long enough for you to clean up the area around the activity. Don't forget that groundwater issues are always prominent, no matter where the activity is located, so the actions taken on your site on a day-to-day basis are always important, even in dry weather.

7. **Keep storm drain systems clean.** Pollutants can concentrate over time in storm drainage structures such as catch basins, ditches and storm drains. When a large storm event occurs, it can mobilize these pollutants and carry them to receiving waters. Develop and implement

maintenance practices, inspections, and schedules for treatment devices (e.g., detention ponds, oil/water separators, vegetated swales, etc.).

8. **Reduce, reuse and recycle as much as possible.** Always look for ways to recycle instead of just disposing. This can save money as well as keep both hazardous and non-hazardous materials out of the landfills. You can learn more about other businesses that have made process changes allowing recycling of chemicals by calling the DOE at 1-800-RECYCLE and requesting publication #92-45 and 90-22. Another unique recycling opportunity for businesses is available through the Industrial Materials Exchange (IMEX). This free service acts as a waste or surplus "matchmaker", helping one company's waste become another company's asset. For instance, waste peach pits from a cannery become potpourri ingredients to another business. Call IMEX at 206625-6232 to list your potentially usable solid or chemical waste in their publication.
9. **Be an advocate for stormwater pollution prevention.** Help friends, partners and business associates find ways to reduce stormwater pollution in their activities. Most people want clean water, and do not pollute intentionally. Share your ideas and the BMPs in this manual to get them thinking about how their everyday activities affect water quality.
10. **Report violators.** Allowing anyone to pollute our water resources is wrong. We all must do our part to protect water, fish, wildlife and our own health, by employing proper BMPs, and reporting those who are causing pollution. In Pierce County, call Pretreatment Inspections at 565-3013 to report dumping to sewers, and Surface Water Management at 798-2725 to report incidents involving storm drains or ditches.

Site specific BMPs are to include, but are not limited to:

1. Pressure Washing of Building Facades, Rooftops, Pavement, Boats and other Large Objects

This activity applies to businesses and public agencies engaged in pressure washing of large objects such as building facades, fences and masonry, rooftops and boats on a site- to-site basis. Pressure washing can contribute directly to water quality degradation since the runoff from such operations typically travels straight into the storm drainage system. Pressure washing of boats in boatyards, marinas and drydock areas requires a National Pollutant Discharge Elimination System (NPDES) permit. Contact the Department of Ecology to apply for this permit. Businesses

already covered by an NPDES permit are not required to enact the BMPs listed below, since they will be meeting other requirements as specified by Ecology.

Pollutants of Concern: Suspended solids, heavy metals, Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), nutrients.

Required BMPS

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in pressure washing of large objects:

- Employees must be educated in measures to control pollution from pressure washing operations.
- All runoff must be collected and disposed of properly or filtered to remove pollutants. No runoff should leave the site, either overland or by entering the storm drainage system. Temporary curbs, dikes or berms can be used to direct the water to one or more collection areas, where it can then be sucked up and removed off site to be disposed of in the sanitary sewer (provided it is not considered a hazardous waste). Catch basin covers can help facilitate collection. An alternative would be to use catch basin filters to remove pollutants from the wash water before it enters the storm drainage system.
- If the pressure washing wastewater does not collect in a centralized area, such as when the area is very flat, or you are on a grassed area, a tarp or sheet must be placed under the washing area to collect paint chips and other debris that is loosened by the spray.
- Pressure washing of boats (not at boatyards, marinas or drydocks) must be done on land where runoff control can be achieved.

Suggested BMPs

The following BMPs are not required, but can provide additional pollution protection:

- If detergents or cleaners must be used, use the least toxic ones that will still do the job. Use detergents that contain no phosphorus.
- Spread filter fabric underneath the object being washed to trap particulates for later disposal. This is in addition to collecting the runoff for disposal.
- Limit the amount of water you use.

2. Landscaping and Vegetation Management Activities, Including Vegetation Removal, Herbicide and Insecticide Applications, Fertilizer Applications, Irrigation, Watering, Gardening and Lawn Care

This broad activity applies to all aspects of landscaping and vegetation management, from small-scale yard maintenance to large-scale commercial landscaping businesses to municipalities maintaining public parks and roadside ditches. It includes practices aimed at controlling unwanted vegetation growth, such as herbicide spraying, cutting or pulling. This can occur on lawns, in gardens and other landscaped areas, as well as roadside ditches. It also applies to all practices aimed at enhancing the growth of vegetation. Fertilizers and insecticides are typically used in this context, as is extensive watering. This activity also covers leaf raking, lawn mowing, shrub and tree pruning and a variety of other lawn care practices.

Businesses involved in pesticide application must comply with Tacoma-Pierce County Health Department regulations and Washington State Department of Agriculture regulations regarding pesticide usage. The BMPs listed below are intended to complement other regulatory requirements. Pierce County maintenance departments for parks, utilities and roads have procedures that utilize these BMPs.

Pollutants of Concern: Toxic organic compounds, heavy metals, Chemical oxygen demand (COD), Biochemical oxygen demand (BOD), suspended solids, nutrients, oils, bacteria

Required BMPs

The following BMPs or equivalent measures are required of all businesses and public agencies performing landscaping and vegetation management activities:

- Employees must be educated about the pollution potential of improper pesticide usage, improper disposal of lawn clippings, over fertilization and over watering. Emphasis on proper storage, handling, application and disposal practices is a must.
- Herbicide, insecticide and fungicide application must not be conducted within 100 feet of surface waters such as lakes, ponds, wetlands and streams. This buffer distance is specified in the Washington State Department of Ecology Stormwater Management Manuel for the Puget Sound Basin. All applications must follow manufacturers' recommendations. Pesticides must

not be applied when raining or windy. The use of aquatic herbicides requires a permit from the Department of Ecology on a site-by-site basis.

- Pesticide containers and fertilizers, whether in open piles or bags, must be stored in protected places when not in use.
- Areas where soils are temporarily stripped bare for more than two weeks must comply with the requirements in Section 8.5 from The Pierce County Stormwater Management Manual. Call Pierce County Surface Water Management at (253) 798-2725 for a copy.
- Avoid Planting noxious plant species, such as reed canary grass, purple loosestrife or tansy, particularly near lakes, wetlands and riparian areas. Contact Pierce County/WSU Cooperative Extension at 798-7980 or the Pierce County Weed Control Board at 798 -7263 for information on noxious plants.

Suggested BMPs

The following BMPs are not required but can provide additional pollution protection:

- When watering. you should attempt to minimize the amount of water used. Never water to the point of runoff.
- Grass clippings, leaves, sticks and other collected vegetation should be composted, ground and used as mulch, or disposed as garbage. Never pile or dump clippings in or near storm drains, streams, lakes, drainage ways, or other water bodies. Several local companies take landscaping and land clearing waste and convert it to a high-quality compost product suitable for landscaping use. See Recycling Services in the yellow pages of your phone book for companies nearest you. Vegetation cutting near open waters and in drainage ditches should be done carefully so that the cut material can be collected. Burning of cut vegetation is no longer an option in the urbanized area of Tacoma and Pierce County due to air quality regulations.
- Where possible, fertilizer should be worked into the soil rather than dumped on the surface.
- Sweep driveways, gutters and storm drains to remove accumulations of grass, leaves and twigs after trimming. Dispose of the material by composting, mulching, or recycling.

- Integrated pest management (1PM) is a comprehensive approach to the use of pesticides. IPM minimizes pesticide application and stresses selection of proper products and tailored application rates. It is a sensible long-term strategy rather than a hit-and-run operation, and as such is probably the most effective BMP measure that can be practiced for herbicide, insecticide, and fungicide use.
- Fertilizers should be applied carefully. Soils should be tested to determine the proper application rate, type of fertilizer and timing for the type of soil and vegetation involved.
- Use mechanical methods of vegetation removal rather than apply herbicides.
- One of the most effective measures that can be taken to reduce the necessity for pesticide use, excessive watering, and removal of dead vegetation involves careful soil mixing and layering prior to planting. Quite often, the native vegetation is cleared, leaving the mineral soil exposed underneath. Many people tend to plant directly into this, and then cover with bark mulch. This practice usually results in heavy plant mortality and excessive water usage. By using a topsoil mix or composted organic matter that is mixed into the soil, a transition layer is created that allows for healthier, deeper root development. This can improve the health of the plants, resulting in better disease and insect resistance, and reduced water demand.
- Mulching mowers are highly recommended. They add organic matter and nutrients directly back to lawns with no disposal hassles.

3. Storage of Liquid Chemicals, Waste Oils, Solvents or Petroleum Products in Portable Containers

This activity applies to businesses and public agencies that store any type of liquid chemicals, waste oils, solvents or petroleum products in portable containers (such as drums). This activity covers permanent storage as well as temporary storage areas at temporary sites. This activity does not apply to businesses that are permitted by the Department of Ecology to treat, store or dispose of dangerous wastes. Storage of all types of flammable liquids must comply with the fire code. Businesses involved in storage of petroleum products must comply with EPA, Ecology and Tacoma-Pierce County Health Department regulations regarding spill control and prevention.

Pollutants of Concern: Toxic organic compounds, oils and greases, heavy metals, pH, nutrients, Chemical oxygen demand (COD)

Required BMPs

The following BMPs or equivalent measures are required of all businesses and public agencies storing liquid chemicals, waste oils, solvents or petroleum products in portable containers:

- Liquid chemicals, waste oils and petroleum products shall be stored in such a manner and location that if the container is ruptured or toppled the contents will not discharge, flow, be washed or fall into the storm drainage system, surface waters or groundwater. This may be accomplished by designating a container storage area and providing portable or stationary containment berms or dikes, providing a spill containment sump, secondary containment or other similarly effective measure.
- Do not store containers in direct contact with the ground.
- Leaking, cracked, corroded or otherwise deteriorating storage containers must be replaced with containers in good condition. If the liquid chemicals are corrosive, containers made of compatible materials must be used instead of metal drums.
- Employees must be trained to check for leaks and spills and trained in safe handling techniques.
- Appropriate cleanup materials must be available in a plainly labeled location near the container storage area, and employees must be trained in proper spill cleanup procedures.
- Tight-fitting lids must be present on all stored containers. Containers in active use (such as a used oil barrel with a funnel) must be protected from rain.
- If storm drains could potentially be impacted, use storm drain covers or equivalent containment devices during filling or removal of containers. Collect and recycle, or dispose of properly, all liquids that accumulate before removing the storm drain cover.

Suggested BMPs

The following BMPs are not required but can provide additional pollution protection:

- Cover the designated storage area.

- Drip pans or absorbent materials should be used beneath all mounted container taps, and also at all potential drip and spill locations during filling and unloading of containers. Any collected liquids or soiled absorbent materials must be recycled or properly disposed of
- To minimize spills, use funnels to pour liquids into storage containers.
- Separate funnels should be designated and labeled for different liquids, if applicable.
- The storage area should be swept and cleaned weekly, but never hosed down to a storm drain.
- If a sump or holding tank is used for spill containment (not required), sump drains must be inspected weekly to determine if spilled materials need to be pumped.
- In addition to covering, the designated area should be paved and sloped to a drain, and a sump or holding tank provided to capture all of the drainage.
- Reuse and recycle waste oils and excess liquids. Check your phone book for the numbers of local waste oil recyclers. For other liquids, call the Industrial Materials Exchange (IMEX) to advertise your waste, which may be someone else's asset. Contact IMEX at (206) 296-4899 or use the IMEX computer bulletin board modem access number at 1 -800-858-6625.
- Use one or a combination of the following treatment BMPs:

  -Filtration with media designed for removal of petroleum products, if they are the only type of liquid stored.

  -Constructed wetlands.

  -Oil/water separators are highly recommended for treatment of runoff from areas used for storage of petroleum products.

4. Building Repair, Remodeling, Painting and Construction

This activity refers to activities associated with construction of buildings and other structures, remodeling of existing buildings and houses, painting of building exteriors, and general exterior building repair work. Concrete pouring is covered under A3.2 Concrete Pouring and Asphalt Application at Temporary Sites.

Pollutants of Concern: Toxic hydrocarbons, toxic organics, suspended solids, heavy metals, pH, oils and greases

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in building repair, remodeling, painting and construction:

- Employees must be educated about the need to control site activities to prevent stormwater pollution, and also trained in spill cleanup procedures.
- Spill cleanup materials, appropriate to the chemicals being used on site, must be available at the work site at all times.
- The work site must be cleaned up at the end of each workday, with materials such as paints and solvents put away indoors or covered and secured so that vandals will not have access to them.
- The area must be swept daily to collect loose litter, paint chips, grit, and dirt.
- Absolutely no substance can be dumped on pavement, on the ground, in or toward storm drains, regardless of its content. unless it is water only.
- Ground or drop cloths must be used underneath outdoor painting. scraping. and sandblasting work. Ground cloths, buckets, or tubs must also be used anywhere that work materials are laid down.
- Paint brushes and other tools that are covered with water-based paints must be cleaned in sinks connected to sanitary sewers or in portable containers that can subsequently be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents for recycling or proper disposal.
- Storm drain covers or similarly effective devices must be used if dust, grit, wash water, or other pollutants may escape the work area. This is particularly necessary on rainy days. The cover or containment device shall be placed over the storm drain at the beginning of the workday and accumulated dirty runoff and solids must be collected and disposed of before removing the cover at the end of the day.

Suggested BMPs

The following BMPs are not required but can provide additional pollution protection:

- Recycle materials whenever possible.
- Light spraying of water on the work site can control some of the dust and grit that can blow away. Oils must never be used for dust control. Never spray to the point of runoff from the site.
- Activities such as paint mixing, and tool cleaning should occur over a ground cloth or within a containment device such as a tub.
- Catch basin filter inserts should be considered if work will be ongoing for an extended period of time or if significant amounts of hydrocarbons, oils and greases, heavy metals, or suspended solids are expected in site runoff.

5. Vehicle and Equipment Parking and Storage

This activity applies to all types of parking lots (commercial, public and private), fleet vehicle lots and yards (including rental car lots and car dealerships), equipment sale and rental lots, and driveways. Because this activity is so difficult to manage in terms of pollution control, the BMPs listed below, if used throughout the County and City, will give a cumulative large benefit in terms of pollution protection.

Pollutants of Concern: Toxic hydrocarbons, toxic organics, oils and greases, heavy metals, nutrients, suspended solids, pH

Required BMPs

The following BMPs or equivalent measures are required of all businesses and public agencies with parking lots and driveways:

- The use of soaps or detergents to wash vehicles or equipment in any area that drains to a storm drain, ditch, stream, or other water body is not allowed. Soapy wash waters must discharge to the sanitary sewer or suitable treatment system. Call Pierce County Water Resources Permits at 798-2737 for information on connecting to the sewer.

- Parking areas, storage areas, and driveways shall be swept (not hosed to a storm drain) at least once per month to collect dirt, litter and debris. Make sure to dispose of these materials properly.
- Gutters, drains and catch basins must be checked frequently for evidence of dirt and debris, and cleaned as needed. Storm drain inlets and gutters on the property must be cleaned at least once per month, without hosing sediments and other debris into the storm drain. Catch basins should be cleaned a minimum of twice per year, and more frequently if needed.
- An oil/water separator or oil absorbent pillow insert for catch basins or other treatment BMP must be installed for treatment of runoff if other measures do not sufficiently reduce the problem of contaminated runoff.

Suggested BMPs

The following BMPs are not required but can provide additional pollution protection:

- Garbage cans with lids should be provided to reduce parking lot litter.
- Divert runoff to vegetated areas near the parking lot.
- Through the use of incentives and discounts, businesses should encourage employees and customers to carpool and use public transit.
- Implement one of the following stormwater treatment BMPs:

  -Catch basin filter insert

  -Infiltration basin

  -Wet pond or vault

  -Constructed wetland

  -Vegetated biofilter

  -Filtration