

CARPENTER ROAD APARTMENTS
Agency #22-07
Maintenance & Source Control Manual

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TABLE OF CONTENTS

Introduction	1
What Is Stormwater Runoff?	1
What Is a Storm Drain System and How Does It Work?.....	1
What Does Stormwater Runoff Have to Do With Water Quality?	1
Section 1 – Project Description	1
Section 2 – Maintenance Importance and Intent	2
Section 3 – Responsible Parties	2
Section 4 – Facilities Requiring Maintenance	2
Section 5 – Maintenance Instructions	3
How to Use the Stormwater Facility Maintenance Guide.....	3
Included in This Guide.....	3
Facility Key	4
Site Plan	5
Quick List.....	6
Resource Listing.....	7
Section 6 – Vegetation Management	8
Landscape Design and Maintenance.....	8
Pest Control.....	11
Pesticide Management.....	11
Section 7 – Pollution Source Control Measures	13
Purpose	13
Materials Used and Wastes Generated	13
General Principals of Pollution Prevention	13
Section 8 – Annual Cost of Maintenance	17
Appendix A – Maintenance Covenant	18
Appendix B – Maintenance Checklists	35
Log Sheet	60
Appendix C – Stormwater Pollution Source Control Checklist & Worksheet	61

Introduction

What Is Stormwater Runoff?

When urban and suburban development covers the land with buildings, streets and parking lots, much of the native topsoil, duff, trees, shrubs and grass are replaced by asphalt and concrete. Rainfall that would have soaked directly into the ground instead stays on the surface as *stormwater runoff* making its way into storm drains (including man-made pipes, ditches or swale networks), stormwater ponds, surface and groundwater and, eventually, to Puget Sound.

What Is a Storm Drain System and How Does It Work?

The storm drain system for most developments includes measures to *carry, store, cleanse and release* the stormwater. Components work together to reduce the impacts of development on the environment. Impacts can include *flooding* that results in property damage and blocked emergency routes, *erosion* that can cause damage to salmon spawning habitat and *pollution* that harms fish and/or drinking water supplies.

The storm drain system provides a safe method to carry stormwater to the treatment and storage area. Filter Strips and ponds filter pollutants from the stormwater by *physically* settling out particles, *chemically* binding pollutants to pond sediments and *biologically* converting pollutants to less harmful compounds. Ponds also store treated water, releasing it gradually to a nearby stream or to groundwater.

What Does Stormwater Runoff Have to Do With Water Quality?

Stormwater runoff must be treated because it carries litter, oil, gasoline, fertilizers, pesticides, pet wastes, sediments and anything else that can float, dissolve or be swept along by moving water. Left untreated, polluted stormwater can reach nearby waterways where it can harm and even kill aquatic life. It can also pollute groundwater to the extent that it requires treatment before it is suitable for drinking. Nationally, stormwater is recognized as a major threat to water quality. Remember to keep everything out of stormwater systems except the rainwater they are designed to collect.

Section 1 – Project Description

The Carpenter Road Apartments project is located Southwest of intersection of Carpenter Road SE and 14th Avenue SE in the City of Lacey in Section 22, Township 18N, Range 1W West, W.M. on tax parcel numbers 11822240201 and 11822240202. The project proposes to construct a 78-unit multifamily apartment complex consisting of 3 apartment buildings, an office building and associated parking and utilities. The project will also include frontage improvements along Carpenter Road SE and will retain approximately 18,270 square feet of native area in designated tree tracts.

The stormwater mitigation measures have been designed in accordance with the City of Lacey 2022 Storm Water Design Manual (SDM). Specific Storm Measures proposed for the project include two Old Castle BioPods to provide runoff treatment, and R-tank infiltration trench to provide

a majority of the stormwater infiltration, and improvements to an existing regional depression to serve as an overflow infiltration pond.

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 facilities designed for this site continue to fully function. For this site these include:

- Maintain designed stormwater infiltration capacity
- Maintain designed stormwater detention/retention volume
- Maintain ability of storm facility to attenuate flow rates
- Maintain ability to safely convey design stormwater flows
- Maintain ability to treat stormwater runoff quality
- 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

The intent of this section and manual is to pass on to the responsible party(s) all the information critical to understand the design of the system, risks and considerations for proper use, suggestions for maintenance frequencies, and cost so that realistic budgets can be established.

Section 3 – Responsible Parties

The responsible parties for the maintenance, inspection and operation of the stormwater facilities is the owner Carpenter Road Partners, LLC. The stormwater facilities described in this maintenance plan are, roof drywells, infiltration trenches, swales and conveyance structures. Section 5 of this manual describes the necessary procedures to successful long-term operation of the stormwater facilities. This manual is to be kept at the Carpenter Road Partners, LLC., 3633 Market Place West University Place, WA 98466. The Maintenance and Source Control Manual must be made available for inspection by the City of Lacey upon request.

Section 4 – Facilities Requiring Maintenance

This Maintenance and Source Control Manual was designed to explain how stormwater facilities work and provide user-friendly, straightforward guidance on facility maintenance.

Stormwater facilities on this site include; catch basins, conveyance pipes, R-tank (gravel trench), infiltration basin and two biopods®.

All stormwater facilities located in the public right-of-way are maintained by *jurisdiction the City of Lacey*. This includes *catch basins and storm pipe*.

The property owner is responsible for roof down spouts, Catch basins, storm pipes, gravel trench and infiltration pond.

The stormwater mitigation measures have been designed in accordance with the City of Lacey 2022 Storm Water Design Manual (SDM). Specific Storm Measures proposed for the project include two Old Castle BioPods to provide runoff treatment, and R-tank infiltration trench to provide a majority of the stormwater infiltration, and improvements to an existing regional depression to serve as an overflow infiltration pond.

Proper maintenance of the storm system ensures infiltration system will not clog and require expensive repairs.

See the Drainage Report submitted as part of the Drainage Control Plan for a more detailed explanation of the onsite stormwater facility design and operation.

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 the 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.

How to Use the Stormwater Facility Maintenance Guide

This Maintenance & Source Control Manual includes a Site Plan specific to your development and a Facility Key that identifies the private stormwater facilities you are responsible for maintaining. A "Quick List" of maintenance activities has also been included to help you identify the more routine needs of your facility.

Included in This Guide

- Comprehensive Maintenance Checklists that provide specific details on required maintenance located in Appendix B
- Pollution Prevention Tips that list ways to protect water quality and keep storm drain systems functioning smoothly
- Resources to provide more information and technical assistance

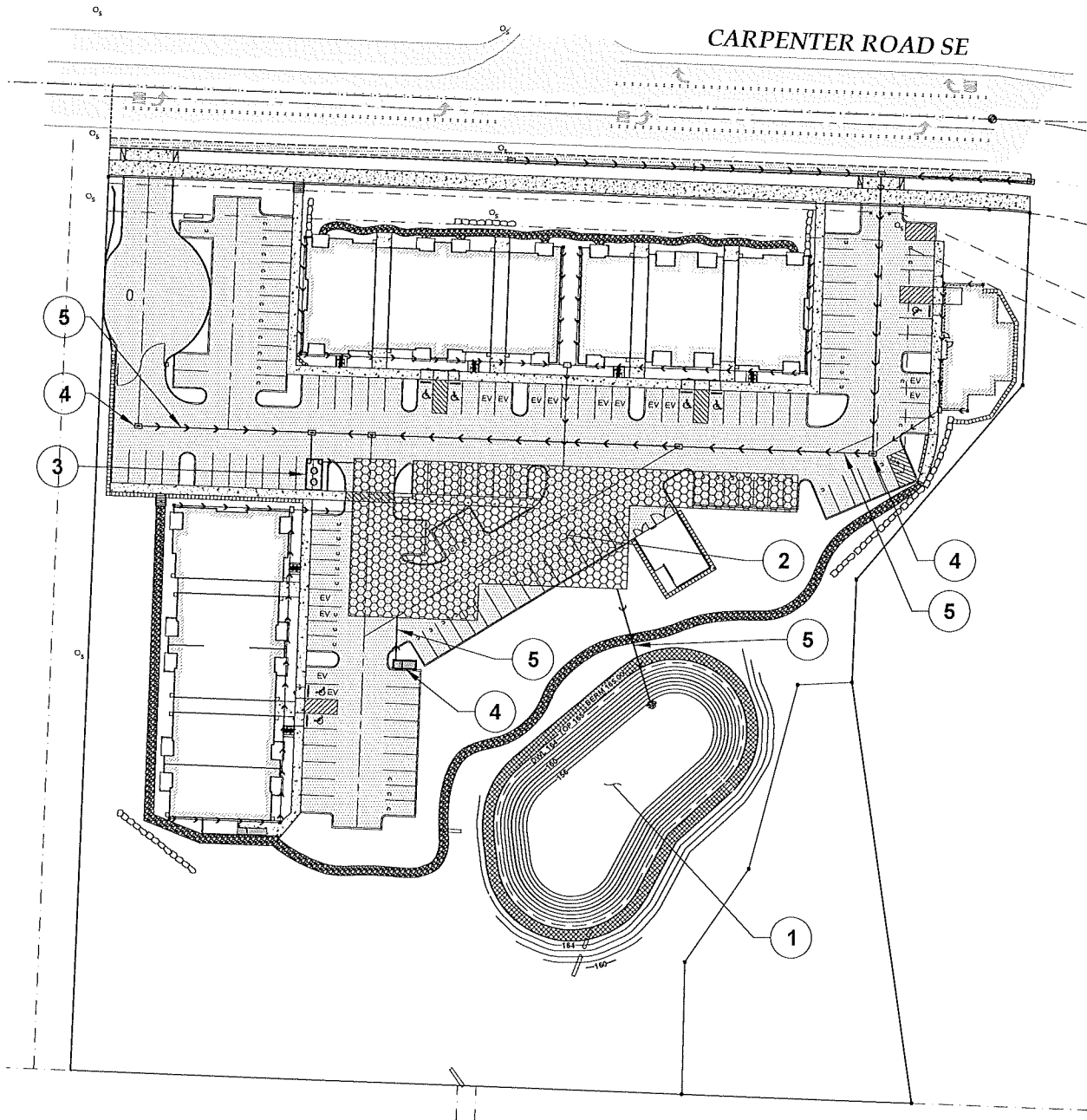
Facility Key

The stormwater facilities in development are comprised of the following elements:

Type of Feature and Checklist Name	Location on Site Plan
<i>Infiltration Pond</i>	1
<i>R-tank (Gravel trench)</i>	2
<i>BioPod (stormwater treatment)</i>	3
<i>Catch basins</i>	4
<i>Storm pipes</i>	5

CARPENTER ROAD APARTMENTS

6511 CARPENTER RD SE, LACEY, WA 98503



MAINTENANCE FACILITY KEY

Quick List

The following is an abbreviated checklist of the most common types of maintenance required. Please go over this checklist after heavy rains. The list represents minimum maintenance to be performed and should be completed in conjunction with the other checklists for an effective maintenance program. More comprehensive maintenance checklists specific to each onsite stormwater facility are included in Appendix B.

- Inspect catch basin grates to see that they are not clogged or broken. Remove twigs, leaves or other blockages. Contact the local jurisdiction to replace the grate if it is broken.
- Inspect inlet and outlet pipes for blockages. Clear all blockages.
- Inspect filter strip, swale and pond walls for erosion or caved in areas.
- Inspect riprap (rocks) at the inlets and outlets of culverts and other pipes. If they are silted in or eroded away, replace them.

Resource Listing

If you suspect a problem exists, please contact your local jurisdiction at one of the numbers below and ask for Technical Assistance.

CONTACT NUMBERS

City of Lacey Public Works Department	(360) 491-5600
City of Lacey Spill Response Team	(360) 491-5644
Thurston County Environmental Health – Hazardous Waste Disposal	(360) 754-4111
Thurston County Environmental Health – Solid Waste Disposal	(360) 789-5136
WSU Thurston Co. Extension	(360) 786-5445

DEVELOPER INFORMATION

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Section 6 – Vegetation Management

The property owners and Landscape Maintenance Contractors are responsible for applying integrated pest management control techniques to maintain landscaped areas. This includes pest control, pesticide management, and watering. Reference the construction drawings in the Drainage Control Plan for detailed information on landscaping throughout the site.

Landscape Design and Maintenance

The following techniques shall be applied:

1. **Native Plants:** One of the best methods of reducing impacts to water resources is by using landscaping materials that do not require extensive care. Native plants have adapted themselves to our region, particularly their root structure and water needs. These plants have also built tolerances over the centuries to local pests and disease. By using native plants in the landscape, we are less likely to need fertilizers, herbicides, and pesticides. Native plants are also more tolerant of drought conditions and typically require less water. The Developer shall install the native plant materials called out on the Landscape Plan. Additional plantings may be installed by individual homeowners/property owners.

Native plants come in all shapes and sizes so there is probably one that will fit into your landscape plans. There are deciduous and evergreen varieties of trees, shrubs and groundcovers. Some suggested species of native plants are listed below. Contact your local garden supply store for more ideas on use of native plants in your garden.

Evergreen Plants:

Trees: Western red cedar, Douglas-fir, Western hemlock

Shrubs: rhododendron, evergreen huckleberry, tall Oregon-grape

Ferns: lady fern, sword fern, deer fern

Groundcover: manzanita, kinnikinnik, common juniper

Deciduous Plants:

Trees: big leaf maple, Pacific dogwood, bitter cherry

Shrubs: western azalea, Nootka rose, red huckleberry

2. **Grasses for Lawns:** Both the developer and individual homeowners/property owners will install lawns. The lawn is a major component of the landscape. Selection of a grass well suited to our area is an important step in reducing the impact to water resources. The *National Turfgrass Evaluation* studies various types of grasses for their resistance to insects, drought tolerance, seasonal appearance, density, the strength of their sod and leaf texture. Based upon these characteristics, specific grass types are recommended for specific areas throughout the country. Fescue and perennial rye grass are recommended for this area.
3. **Mulching:** Use of native plants will greatly reduce the need for fertilizer. Use of mulch may eliminate the need altogether. Mulch acts as a physical barrier to weeds and is an excellent alternative to herbicides. Mulch can be compost, bark or wood chips, or leaves and grass clippings. It should be spread around the base of plants and within flowerbeds.

The recommended depth of mulch varies between plant varieties but should typically be 2- to 4 inches.

4. **Use of Fertilizers:** Proper use of fertilizers yields better plants and reduces negative impacts to our water resources. Fertilizers typically contain high levels of nitrogen and phosphorus, both of which can damage ground and surface waters. The following are a few tips to optimize the use of fertilizers in your garden.
5. **Soil Testing:** The first step in fixing a problem is to know what that problem is. Therefore, before applying any fertilizer, test your soil. Existing soil conditions, particularly nitrogen, phosphorus, potassium and pH levels, can be easily determined by using kits available at garden stores or from the WSU Cooperative Extension. Applying fertilizer before knowing the components of the soil could lead to over loading certain areas that may impact our water resources.
6. **Proper Fertilization:** Proper fertilization is important in maintaining a healthy lawn that resists environmental stress, including competition with weeds and moss and drought stress. Because Spring and Fall are periods of optimal growth, these are the most important times to fertilize. The use of slow release fertilizers is recommended. Natural organic and synthetic organic fertilizers (such as IBDU, sulfur or polymer coated urea, or methylene urea) behave similarly once they are applied to the soil.

Although some people feel that natural organic fertilizers provide added benefits to soil health, research has not shown this to be true as a general rule. The natural organic nutrient sources in these products are often supplemented with synthetic plant nutrients anyway. The most important thing to remember is to use a slow release fertilizer. Extensive research around the country has shown that when these materials are applied properly there is very little risk of surface or groundwater contamination, and they provide an even feeding, which is better for your lawn. Remember to sweep granules off pavement to prevent washing into storm drains.

Many soils can benefit from the use of organic fertilizers such as compost or peat. These substances add nutrients to soil and increase the porosity of the soil as well as its ability to hold water.

For lots with additional restrictions regarding phosphorus contamination to stormwater runoff, phosphorus-free fertilizers must be used for all lawn and landscaping activities.

7. **Fertilizing the Lawn:** Turf fertilization practices for the entire year are built around what is done in the fall. Apply fertilizer in early to mid-September to promote regrowth from summer stress. Another application in November is important in keeping the grass competitive with moss through the winter. If you fertilize in November, you probably don't need an early spring fertilization. If not, your lawn will probably be ready for fertilizer in the spring. Again, use a slow release fertilizer so that you don't promote a big flush of growth. Fertilize again in early June so that the grass has the nutrients it needs to grow at a moderate rate through the summer stress period.

If you want to maintain a lawn of moderate quality, a minimum of three fertilizations through the year is needed. Additional light fertilizations can be added if you are looking for a higher quality lawn. In general, you should apply no more than one pound of actual

fertilizer nitrogen per 1000 square feet at a time, although this rate can be increased to 1.5 pounds in the fall when using slow release products. (If the fertilizer analysis is 24-4-12, for example, it contains 24% nitrogen. To apply 1 pound of Nitrogen per 1,000 square feet, apply 4.2 pounds of fertilizer: $1 \div 0.24 = 4.2$).

Return clippings (grasscycle) when you mow to recycle nutrients into the lawn. Use mulching mowers to return grass clippings directly to the lawn. Essential nutrients from the decomposed grass can then be retained in the soil thereby reducing the need for fertilizer.

8. **Water Before Fertilizing:** Water plants and lawns before fertilizing. Water enough to dampen the ground thoroughly, but not enough to cause surface runoff. Dampening the soil prevents fertilizer from being washed from the surface of dry soil in the first rain or watering after application.
9. **Proper Watering:** Proper watering can help build strong plants resistant to drought, pests and disease. Water infrequently but enough to dampen soil down to 10 inches. Be careful not to water so rapidly that water runs off the surface. Infrequent watering promotes shallow root depths making the plants susceptible to damage during periods of drought. Unhealthy plants are easy targets for pests and disease. Also, water during early morning hours rather than during the day or at night. Irrigating during the day loses a sizable amount of water to the atmosphere through evaporation. Watering at night can lead to mold and fungi growth on plants left damp over a cool night.

The irrigation system should be programmed to provide about 1" of water per week during the growing season. This includes normal precipitation. The system shall be provided with rain sensors which can suspend watering, and soil moisture sensors which can automatically adjust watering intervals and run times (e.g. Cycle-Soak).

10. **Weed Control:** Use of mechanical means for weed control is typically less attractive due to the cost. However, non-chemical controls for transient and invasive weed problems shall be emphasized in the IPM program in efforts to reduce overall environmental impacts. The quick establishment of a thick, healthy, native or ornamental groundcover planting will reduce the need for weed control. Implement measures to reduce this establishment time by increasing plant spacing, adding/replacing groundcovers, and using groundcover species that are spreading or widely-mounding. Reduce compaction to mulch to encourage groundcover establishment and cover-rate.

The initial establishment of groundcovers may require more weed control. When the need for chemical treatment is necessary over woody groundcovers, carefully determine the target broadleaf or grass species, and choose a selective herbicide that specifically labeled for application over the type of planting. Use labeled rates and ensure proper training for applicators and handlers for proper coverage.

Reduce the need for selective broadleaf herbicide treatments in lawn areas by using clean soil amendment and turf seed, proper installation, and appropriate nutrient applications for the lawn area. Use selective mechanical measures to remove broadleaf weeds in newly seeded lawn areas. Proper watering and mowing height will increase vigor and reduce broadleaf pressure in lawn areas established with turf.

Pest Control

Some of the tactics that can be used to decrease or eliminate the use of pesticides include:

1. Use of Natural Predators or Pathogens: Because chemical sprays generally kill many beneficial insects instead of just the target pest, it may be necessary to introduce natural predators back into the garden. Ladybugs, lacewings, predatory wasps and nematodes are all commercially available. Garter snakes and toads are also predators and should not be eliminated from the garden.

There are some bacteria, viruses and insect parasites that are specific to pests and will not harm other insects or animals. A commonly used bacterium in the Puget Sound area is *Bacillus thuringiensis* (Bt), which is intended to control infestations of tent caterpillars.
2. Habitat Changes: Many times a change of habitat can control pest infestations. Removal of any item that will pond water, like buckets or tires, can cut down on the mosquito population by removing a convenient location for them to breed in. Removing last year's leaves from under rose bushes can cut down on the incidence of mildew and blackspot, as these fungi overwinter in dead leaves.
3. Timing: Crops that can overwinter (such as leeks or carrots) should be planted in the fall. This gives them time to become established before pests arrive in the spring.
4. Mechanical: Many eggs, larvae, cocoons and adult insects can be removed by hand. Be sure that the insect is properly identified prior to removing it so those beneficial insects are not destroyed in error. Drowning insects in plain water or spraying them with soapy water are alternatives to squashing them.
5. Resistant Plants: Plants that are native to this area are often more resistant to pests and tolerant of the climate than are introduced plants. Many plant cultivars have been developed which are resistant to such diseases as verticillium wilt and peach leaf curl. Grass seed mixes are also available for lawns that need much less watering, mowing and chemical use.
6. Growing Conditions: Plants, such as hostas, that require some shade are more susceptible to pests when they are growing in the sun. Improperly fertilized or watered plants are less vigorous in growth and tend to attract pests. Plants that prefer an acid soil, such as azaleas, will perform better and be less susceptible to pests when they are grown in soil with the proper pH.
7. Chemicals: Chemicals are a small part of the IPM plan and should be applied only as needed after reviewing all other alternatives. Avoid the use of broad-spectrum pesticides which may kill beneficial insects.

Pesticide Management

When use of a chemical is the best or only option, follow the basic guidelines below. Maintenance Contractors shall be licensed commercial applicators and shall always follow the Pesticide Label.

1. Know your target pest before spraying. Use the pesticide according to the manufacturer's instructions and buy only the needed quantity. Many pesticides have a limited shelf life and

may be useless or degrade into even more toxic compounds if stored for extended periods of time.

2. Do not apply more than the specified amount. Overuse can be dangerous to your health as well as the health of wildlife and the environment. If more than one chemical can be used to control the pest, choose the least toxic. The word "caution" on the label means that the chemical is less toxic than one that is labeled "warning".
3. Do not spray on windy days, in the morning of what will be a very hot day or when rain is likely. Herbicides can drift and injure valuable ornamental plants. Do not water heavily after application. Plants should be lightly watered before application to prevent burning of the foliage and to help evenly spread the chemical.
4. Never apply pesticides near streams, ponds or wetlands (exception: approved applications for aquatic weeds). Do not apply pesticides to bare eroded ground. Many pesticides bind to soil particles and can be easily carried into a stream or storm drain.
5. Pesticides should be stored well away from living areas. Ideally, the storage area should have a cement floor and be insulated from temperature extremes. Always keep pesticides in their original containers with labels intact. Labels often corrode and become illegible in this climate and may have to be taped onto the container.
6. Federal law now requires that all pesticides be labeled with the appropriate disposal method. Leftovers should never be dumped anywhere, including a landfill. Take unwanted pesticides to Hazo House located at the former landfill at 2420 Hogum Bay Road NE, Lacey. Call the Thurston County Hazardous Waste Section at (360) 867-2664 for more information.
7. Empty pesticide containers should be triple rinsed, and the rinse water used in the same manner as the product. Once containers are rinsed, they can be disposed of as regular garbage.
8. If a pesticide is spilled onto pavement, it can be absorbed using kitty litter or sawdust. The contaminated absorbent should be bagged, labeled and taken to Hazo House.
9. If the pesticide is spilled onto dirt, dig up the dirt, place it in a plastic bag and take it to Hazo House.
10. Many pest control companies and licensed applicators have access to pesticides that are more toxic than those available to the consumer. Check with the company before they spray indoors or outdoors to find out what spray they will be using and what precautions, if any, are necessary after the operator leaves.

Section 7 – Pollution Source Control Measures

Purpose

Pollution source controls are actions taken by a person or business to reduce the contamination of stormwater runoff at its source. Controls, also called “best management practices” (BMPs) include:

- Altering the activity (e.g., substitute non-toxic products, recycle used oil, route floor drains to sanitary sewer rather than 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., a wastewater treatment facility, sanitary sewer, or stormwater treatment area)

A Stormwater Pollution Source Control Checklist and Worksheet has been completed and is included in Appendix C of this Maintenance & Source Control Manual. The Stormwater Pollution Source Control Checklist and Worksheet identifies all of the activities that will occur at the project site as well as the source control BMPs which will be implemented to manage source contamination.

Materials Used and Wastes Generated

Generally, drives and parking areas are of particular concern. Because of heavy vehicle usage, the concentration of oil and grease in stormwater may exceed the Ecology guidelines of 10 mg/L. Although there are no local data to confirm this view, limited research in the San Francisco Bay area found the mean concentration of oil and grease in stormwater to exceed 10 mg/L.

General Principles of Pollution Prevention

This section describes the basic pollution prevention principles that every business and homeowner must consider. Most of these are common sense “housekeeping” types of solutions. With collective action by individuals and businesses throughout the region in implementing each of these principles, the improvement in water quality could be substantial. Although most of these principles are aimed at commercial or industrial activities, many items apply to individual residents as well.

AVOID THE ACTIVITY OR REDUCE ITS OCCURRENCE

If possible, avoid the activity or do it less frequently. Is there a substitute process or a different material available to get the job done? Can a larger run of a process be performed at one time, thus reducing the number of times per week or month it needs to be repeated? For instance, raw materials could be delivered close to the time of use instead of being stockpiled and exposed to the weather. Perhaps the site could avoid one solvent-washing step altogether. Apply lawn care chemicals following directions and only as needed. Many lawns are excessively fertilized. Do not apply herbicides right before it rains. Ecology or the Thurston County Department of Public Health and Social Services can provide pollution prevention assistance.

MOVE ACTIVITIES UNDER SHELTER

Sometimes it is fairly easy to move an activity indoors out of the weather. The benefits of this are twofold; preventing runoff contamination, and providing 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 International Building Code (IBC), the International Fire Code or local ordinances.

CLEAN UP SPILLS QUICKLY

Promptly contain and clean up solid and liquid pollutant leaks and spills on any exposed soil, vegetation, or paved area. Commercial spill kits are available, but readily available absorbents such as kitty litter also work well in many cases. Promptly repair or replace all leaking connections, pipes, hoses, valves, etc., which can contaminate stormwater.

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 money, too.

USE THE LEAST TOXIC MATERIALS AVAILABLE

Investigate the use of materials that are less toxic than what is used now. Perhaps a caustic-type detergent or a solvent could be replaced with a more environmentally friendly product. Such a change might allow the site to discharge process water to the sanitary sewer instead of paying for expensive disposal (contact the City of Lacey Wastewater Utility or the LOTT Clean Water Alliance to find out about allowable sanitary sewer discharges and pretreatment permits). Remember that even if using a biodegradable product, nothing but uncontaminated water is allowed to enter the stormwater drainage system.

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 the 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 a site.

LOCATE ACTIVITIES AS FAR AS POSSIBLE FROM SURFACE DRAINAGE PATHS

Activities located as far as possible from known drainage paths, ditches, streams, other water bodies, and storm drains will be less likely to pollute, since it will take longer for material to reach the drainage feature. This gives more time to react to 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 protection is important throughout the region, 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.

MAINTAIN STORMWATER DRAINAGE SYSTEMS

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 facilities (e.g., detention ponds, oil/water separators, vegetated swales). Clean oils, debris, sludge, etc., from all BMP systems regularly, including catch basins, settling/detention basins, oil/water separators, boomed areas, and conveyance systems, to prevent the contamination of stormwater.

Promptly repair or replace all substantially cracked or otherwise damaged paved secondary containment, high-intensity parking, and any other drainage areas that are subjected to pollutant material leaks or spills. Also repair or replace all leaking connections, pipes, hoses, valves, etc., which can contaminate stormwater.

Requirements for cleaning stormwater facilities are discussed in Volume IV of the 2014 Ecology Manual, specifically BMP S417. Maintenance standards can be found in Chapter 3, Appendix 3B.

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. Learn more about other businesses that have made process changes allowing recycling of chemicals by calling Ecology at 1-800-RECYCLE and requesting publications No. 92-45 and No. 90-22.

Another unique recycling opportunity for businesses is available through the Industrial Materials Exchange. This free service acts as a waste or surplus "matchmaker," helping one company's waste become another company's asset. For instance, waste vegetable oil can become biofuel for another business. Call Industrial Materials Exchange at (206) 625-6232 to list potentially usable solid or chemical waste in their publication.

BE AN ADVOCATE FOR STORMWATER POLLUTION PREVENTION

Help friends, neighbors, 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 chapter to get them thinking about how their everyday activities effect water quality.

REPORT PROBLEMS

We all must do our part to protect water, fish, wildlife, and our own health by implementing proper BMPs, and reporting water quality problems that we observe. In the City of Lacey, call the Department of Public Works at (360) 491-5644 to report dumping to sewers and to report spills and other incidents involving storm drains or ditches. Also contact Ecology's Southwest Regional Office at (360) 407-6300.

PROVIDE OVERSIGHT AND TRAINING

Assign one or more individuals at your place of business to be responsible for stormwater pollution control. Hold regular meetings to review the overall operation of BMPs. Establish

responsibilities for inspections, operation and maintenance (O&M), documentation, and availability for emergency situations. Train all team members in the operation, maintenance, and inspection of BMPs and reporting procedures.

DUST CONTROL

Sweep paved material handling and storage areas regularly as needed, to collect and dispose of dust and debris that could contaminate stormwater. Do not hose down pollutants from any area to the ground, storm drain, conveyance ditch, or receiving water.

ELIMINATE ILLICIT CONNECTIONS

An illicit connection is formally defined in the city's NPDES Municipal Stormwater Permit, but generally includes any connection to the city stormwater system that is not intended, permitted, or used for collecting and conveying stormwater. A common problem with the stormwater drainage system for most communities is the existence of illicit connections of wastewater to the storm drainage system. Wastewater other than stormwater runoff, such as wash water, must be discharged to a wastewater collection system, and may not be discharged to a storm drainage system (the storm drainage system does not drain to a wastewater treatment plant). Many businesses and residences have internal building drains, sump overflows, process wastewater discharges, and even sanitary sewer and septic system pipes that were connected to the nearby storm drainage system in the past as a matter of course.

All businesses and residences must examine their plumbing systems to determine if illicit connections exist. Any time it is found that toilets, sinks, appliances, showers and bathtubs, floor drains, industrial process waters, and/or other indoor activities are connected to the stormwater drainage system, these connections must be immediately rerouted to the sanitary or septic system, holding tanks, or a process treatment system.

DISPOSE OF WASTE PROPERLY

Every business and residence in the city must dispose of solid and liquid wastes and contaminated stormwater properly. There are generally four options for disposal depending on the type of materials. These options include:

- Sanitary sewer and septic systems
- Recycling facilities
- Municipal solid waste disposal facilities
- Hazardous waste treatment, storage, and disposal facilities

Section 8 – Annual Cost of Maintenance

Introduction

To be completed with final Maintenance and Source Control Manual submittal.

Appendix A – DRAFT Maintenance Covenant

After recording return document to:

City of Lacey
Public Works
420 College St. SE
Lacey, WA 98509-3400

Document Title: Stormwater Maintenance Agreement (Commercial Individual)
Chapter 3B of the *Stormwater Design Manual for Lacey* and Appendix
'Q' of the *Development Guidelines & Public Works Standards*

Owner(s) (Last name first, then first name and initials):

1. Carpenter Road Partners, LLC
2.
3. Additional name(s) on page _____ of document.

City: City of Lacey

Abbreviated Legal Description (i.e. lot, block, plat or section, township, range):

Section 22 Township 18 Range 01 W Quarter SE NW SS170006LA LT 2 Document 4644067

Actual legal is on page _____ of document.

Assessor's Property Tax Parcel Number: 11822240201

Section, Township, Range: S 22, T 18 N, R 1W, W.M.

Fronting Street: Carpenter Road SE

Cross Street: 14th Avenue SE

Project Name: Carpenter Road Apartments

Project HTE #: 22-07

**COMMERCIAL AGREEMENT TO MAINTAIN STORMWATER FACILITIES AND TO
IMPLEMENT A POLLUTION SOURCE CONTROL PLAN**

**By and between the CITY OF LACEY, a Municipal Corporation, hereinafter called the CITY,
and**

Carpenter Road Partners, LLC

Their heirs, successors, or assigns, hereinafter called the OWNER,

The upkeep and maintenance of stormwater facilities and the implementation of pollution source control best management practices (BMPs) is essential to the protection of water resources in the City's jurisdiction. All property owners are expected to conduct business in a manner that promotes environmental protection. This "Agreement" contains specific provisions with respect to maintenance of stormwater facilities and use of pollution source control BMPs.

LEGAL DESCRIPTION:

PARCEL 2 AND "TREE TRACT" OF CITY OF LACEY SHORT SUBDIVISION NO. SS17-0006LA, AS RECORDED AUGUST 23, 2018 UNDER RECORDING NO. 4644067;
IN THURSTON COUNTY, WASHINGTON.

Whereas, the OWNER has constructed improvements, including but not limited to buildings, pavement, and stormwater facilities on the legally described above "Property". In order to further the goals of the CITY to ensure the protection and enhancement of the City's water resources, the CITY and the OWNER hereby enter into this Agreement. The responsibilities of each party to this Agreement are identified below.

The OWNER shall:

- 1) Implement the stormwater facility maintenance program included herein as Attachment "A".
- 2) Maintain a record, in the form of a log book, of steps taken to implement the programs referenced in (1) above. The log book shall be available for inspection by City staff at the OWNER'S residence during normal business hours. The log book shall catalog the action taken, who took it, when it was done, how it was done, and any problems encountered or follow-up on actions recommended. Maintenance items ("problems") listed in Attachment "A" shall be inspected as specified in the attached instructions or more often if necessary. The OWNER is encouraged to photocopy the individual checklists in Attachment "A" and use them to complete its inspections. These completed checklists would then, in combination, comprise the log book.

- 3) Submit an annual report to the CITY regarding implementation of the programs referenced in (1) above. The report must be submitted on or before August 15th of each calendar year and shall contain, at a minimum, the following:
 - a) Name, address, and telephone number of the association, businesses, persons, or the firm responsible for plan implementation, and the person completing the report.
 - b) Time period covered by the report.
 - c) A chronological summary of activities conducted to implement the programs referenced in (1) above. A photocopy of the applicable sections of the log book, with any additional explanation needed, shall normally suffice. For any activities conducted by paid parties not affiliated with the OWNER, include a copy of the invoice for services.
 - d) An outline of planned activities for the next year.
- 4) Prevent any unauthorized modifications to the drainage system and prevent it from being dismantled, revised, altered or removed except as necessary for maintenance, repair or replacement. Any such actions will be covered under items 3 above and shall be approved of by the CITY. Modifications to the stormwater quantity control and stormwater quality system must be approved in advance by the CITY and may require the submittal of revised design drawings, supporting calculations, modifications to maintenance requirements and applications for permits.

THE CITY SHALL, AS RESOURCES ALLOW:

- 1) Provide technical assistance to the OWNER in support of its operation and maintenance activities conducted pursuant to its maintenance and source control programs. Said assistance shall be provided upon request at no charge to the OWNER.
- 2) Review the annual report and conduct occasional site visits to discuss performance and problems with the OWNER.
- 3) Review this Agreement with the OWNER and modify it as necessary.

REMEDIES:

- 1) If the CITY determines that maintenance or repair work is required to be done to the stormwater facilities located on the OWNER's Property, the CITY shall give the OWNER of the Property notice of the specific maintenance and/or repair required. The CITY shall set a reasonable time in which such work is to be completed by the persons who were given notice. If the above required maintenance and/or repair is not completed within the time set by the CITY, written notice will be sent to the persons who were given notice stating the CITY's intention to perform such maintenance and bill the OWNER for all incurred expenses. The CITY may also revoke stormwater utility rate credits (if applicable) if required maintenance is not performed.
- 2) If at any time the CITY determines that the existing system creates any imminent threat to public health or welfare, the CITY may take immediate measures to remedy said threat. However, the CITY shall also take reasonable steps to immediately notify either the Property Owner or the person in control of said Property of such imminent threat in order to enable such owner or person in control to take such immediate measures either independently or in cooperation with the CITY.
- 3) The OWNER hereby grants authority to the CITY for access to the stormwater system features, only for the purpose of performing maintenance, repair or inspection pursuant to the terms of this Agreement. The City is to be responsible, as provided by law, for any damage to the OWNER through its negligence in the construction, maintenance and operation of the stormwater facilities. Furthermore, the CITY agrees that: (a) any activities of the CITY on the Property shall not unreasonably interfere with OWNER's use of the Property; and (b) all work completed by the CITY pursuant to the rights granted hereunder shall be completed in a good and workmanlike manner and in accordance with all applicable laws, ordinances and codes.
- 4) Following any construction, installation, repair, replacement, improvement or reasonable enlargement of the capacity of the stormwater facilities, the CITY shall restore those portions of the Property affected by the CITY's construction, to the condition they were in immediately prior to such work, unless said work is at the express request of the OWNER, in which case the OWNER shall be responsible for restoration. All restoration that is the responsibility of CITY shall be performed as soon as reasonably possible following completion of any work, and shall be coordinated with OWNER so as to cause the minimum amount of disruption to the OWNER's use of the Property.
- 5) The City agrees to indemnify, defend, and hold harmless the OWNER from and against any and all liability incurred by the OWNER arising from or in any way related to the CITY's breach of any of its covenants, agreements, or obligations set forth in this Agreement, or from the CITY's negligence, intentional misconduct, or misuse of the stormwater facilities, but nothing herein shall require the CITY to indemnify the OWNER for that portion of any such liability attributable to the negligence of the OWNER.

- 6) The OWNER shall be responsible for the cost of maintenance and repair of the stormwater facility. Such responsibility shall include reimbursement to the CITY within 30 days of the receipt of an invoice for work performed by the CITY in maintaining or repairing such facility pursuant to the terms of this Agreement. Overdue payments will require the payment of interest at the current legal rate for liquidated judgements. The CITY shall have a lien for all unpaid charges together with such interest. However, notice of such lien shall not be filed by the CITY for a period of 60 days following mailing of the invoice for charges due. During such 60 days, the Property Owner or other person or agent in control of the Property shall have the right to appeal such charges to the CITY's Land Use Hearings Examiner for a final decision. Such appeal may challenge either the necessity of the maintenance or repairs performed by the CITY or the amount of the charges rendered for such maintenance or repair. Notice of such lien shall not be filed during the pendency of such appeal until final decision is rendered by the Land Use Hearings Examiner. The lien shall be foreclosed in the same manner specified by state statute for foreclosure of a mechanic's or materialman's lien. In any legal action to foreclose such lien or otherwise collect such charges, the prevailing party shall be entitled to an award for its attorney fees and costs incurred.

This Agreement is intended to protect the value and desirability of the Property described above and to benefit all the citizens of the CITY. This Agreement shall run with the land and be binding on all parties having or acquiring any right, title, or interest, or any part thereof, of real property in the subdivision. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of all citizens of the CITY.

Accepted by the City of Lacey, Washington. this _____ day of _____, 20____.

BY: _____

Scott Egger
Director of Public Works

STATE OF WASHINGTON)
) ss
COUNTY OF THURSTON)

On this day and year above, personally appeared before me, **Scott Egger**, to me known to be the Public Works Director of the City of Lacey, a Municipal Corporation, who executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said Municipal Corporation for the uses and purposes therein mentioned and on oath states he is authorized to execute the said instrument.

Given under my hand and seal this _____ day of _____, 20____.

Notary Public in and for the
State of Washington, residing
at

My commission expires: _____

Appendix B – Maintenance Checklists

The Maintenance Checklists in this packet are for your use when inspecting the stormwater facilities on your property. This packet has been customized so that only the checklists for your facilities are included. If you feel you are missing a checklist, or you have additional facilities not identified or addressed in this packet, please contact your local jurisdiction.

The checklists are in tabular format for ease of use. Each describes the area to inspect, inspection frequency, what to look for and what action to take. A log sheet is included after the appropriate maintenance checklists to help you track maintenance of your storm drainage system.

Although it is not intended for the maintenance survey to involve anything too difficult or strenuous, there are a few tools that will make the job easier and safer including:

- A flashlight
- A long pole or broom handle
- Some kind of pry bar or lifting tool for pulling manhole and grate covers
- Gloves

A resource list is included on page 7 of this Maintenance & Source Control Manual. There you will find the phone numbers of the agencies referenced in the tables, as well as the contractors and consultants who designed and constructed your facilities.



SAFETY WARNING: In keeping with OSHA regulations, you should never stick your head or any part of your body into a manhole or other type of confined space. When looking into a manhole or catch basin, stand above it and use the flashlight to help you see. Use a long pole or broom handle to check sediment depths in confined spaces. *NO PART OF YOUR BODY SHOULD BREAK THE PLANE OF THE OPEN HOLE.*

Group 1

Flow Control & Treatment

1b. Infiltration Ponds, Trenches, and Galleries

Infiltration ponds, trenches, and galleries are earthen excavations or underground structures that are “dry” except during and after rains, when they contain stormwater temporarily. Infiltration ponds, trenches, and galleries store water while gradually percolating water into the ground.

Infiltration Ponds, Trenches, and Galleries					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
	Trash and Debris	Accumulated trash and debris. Dumping of yard wastes such as grass clippings and branches into pond. Presence of glass, plastic, metal, foam, or paper. In general, there should be no visual evidence of dumping.		No trash or debris present. Remove and properly dispose all trash and debris.	
	Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to the public (such as Scotch broom or blackberry vines, poison oak, tansy ragwort, stinging nettles, or devil’s club). Any evidence of noxious weeds as defined in the <u>Thurston County Noxious Weeds List</u> .		Eliminate danger of poisonous vegetation where maintenance personnel or the public might normally be. Completely remove invasive, noxious, or nonnative vegetation in accordance with applicable regulations. <i>(Coordinate with Thurston County Health Department.)</i> Do not spray chemicals on vegetation without guidance or city approval. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality. (Apply requirements of adopted integrated pest management policies for the use of herbicides.) <i>Complete eradication of noxious weeds may not be possible.</i>	
	Contamination and Pollution	Presence of contaminants such as oil, gasoline, concrete slurries, paint, obnoxious color, odor, or sludge.		Locate the source of the pollution and remove contaminants or pollutants present. <i>Report and coordinate source control, removal, and/or cleanup with City of Lacey Spill Response Team (360) 491-5644, Moderate Risk Waste Program at Thurston County Environmental Health (360) 754-4111, and/or Dept. of Ecology Spill Response (800) 424-8802.</i>	

Infiltration Ponds, Trenches, and Galleries

Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
General (continued)	Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm. Water should not be able to flow through the rodent holes.		Remove rodents and repair the dam or berm. <i>(Coordinate with Thurston County Health Department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)</i>	
	Beaver Dam	Beaver dam results in an adverse change in the functioning of the facility.		Return facility to design function. <i>(Contact WDFW Region 6 to identify the appropriate Nuisance Wildlife Control Operator.)</i>	
	Insects	Insects such as wasps and hornets interfering with maintenance activities, or mosquitoes becoming a nuisance.		Remove insects. For mosquito control, eliminate stagnant water. <i>Apply insecticides in compliance with adopted integrated pest management policies.</i>	
	Hazard Trees	If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements).		Remove hazard trees.	
	Tree Growth and Dense Vegetation	Tree growth and dense vegetation, which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).		Trees and vegetation do not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood).	
Storage Area	Water Not Infiltrating	Check for water ponding in infiltration basin after rainfall ceases and appropriate time allowed for infiltration. Treatment basins should infiltrate Water Quality Design Storm Volume within 48 hours, and empty within 24 hours after cessation of most rain events. (Maintenance is required if a percolation test pit or test of facility indicates facility is only working at 90 percent of its designed capabilities, or if 2 inches or more sediment is present, remove).		Facility infiltrates as designed. Sediment is removed and/or facility is cleaned so that infiltration system works according to design.	
Filter Bags (if applicable)	Filled with Sediment and Debris	Maintenance is required if sediment and debris fill bag more than one-half full.		Replace filter bag or redesign system. Filter bag must be less than one-half full.	

Infiltration Ponds, Trenches, and Galleries

Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.		Replace gravel in rock filter if needed. Water must flow through filter.	
Trenches	Observation Well (use surface of trench if well is not present)	Water ponds at surface during storm events. Less than 90 percent of design infiltration rate.		Remove and replace/clean rock and geomembrane.	
Galleries	Chambers	Check inlet and outlets and interior of chambers for deficiencies, cracks, debris, and sediment.		Remove any debris and sediment and replace or restore chambers as needed.	
		Exceeds 18 inches.		Mow grass or groundcover to a height no greater than 6 inches.	
		Bare spots.		Revegetate and stabilize immediately. No bare spots should be present.	
Side Slopes	Erosion	Maintenance is needed where eroded damage is over 2 inches deep and where there is potential for continued erosion or where any erosion is observed on a compacted berm embankment. Check all pond areas, particularly around inlets and outlets, as well as at berms for signs of sliding or settling.		Try to determine what has caused the erosion and fix it. Stabilize slopes by using appropriate erosion control measure(s); e.g., reinforcing the slope with rock, planting grass, or compacting the soil. Contact the City of Lacey for assistance. <i>If erosion is occurring on compacted berms, a professional engineer should be consulted to resolve source of erosion.</i>	
	Settlement	Any part of the dike or berm that has settled more than 4 inches lower than designed.		Build the dike or berm back to the design elevation. <i>If settlement is significant, a professional engineer should be consulted to determine the cause of the settlement.</i>	
	Seepage	Check for water flowing through the pond berm and ongoing erosion with potential for erosion to continue.		Repair berm to eliminate seepage and erosion. <i>Recommend a geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.</i>	

Infiltration Ponds, Trenches, and Galleries

Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
Dikes or Berms (continued)	Tree Growth	Tree growth on berms over 4 feet in height may lead to piping through the berm, which could lead to failure of the berm.		<p>Remove trees on berms.</p> <p><i>If root system is small (base less than 4 inches) the root system may be left in place. Otherwise, the roots should be removed and the berm restored. A professional engineer should be consulted for proper berm/spillway restoration.</i></p>	
	Rocks Missing	Check to see that the riprap protective area is intact. Maintenance is need if only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil at the top of outflow path of spillway.		Restore rocks and pad depth to design standards. (Riprap on inside slopes need not be replaced.) If any native soil is exposed, cover soil with rock riprap.	
	Tree Growth	Check emergency spillways for tree growth that creates blockage problems and may cause failure of the berm due to uncontrolled overtopping.		<p>Remove trees on emergency spillway.</p> <p><i>If root system is small (base less than 4 inches) the root system may be left in place. Otherwise, the roots should be removed and the berm restored. A professional engineer should be consulted for proper berm/spillway restoration.</i></p>	
	Erosion	Maintenance is needed where eroded damage is over 2 inches deep and where there is potential for continued erosion. Maintenance is needed where any erosion is observed on a compacted berm embankment. Check all pond areas, particularly around inlets and outlets, as well as at berms for signs of sliding or settling.		<p>Try to determine what has caused the erosion and fix it. Stabilize slopes by using appropriate erosion control measure(s); e.g., reinforcing the slope with rock, planting grass, or compacting the soil. Contact the City of Lacey for assistance.</p> <p><i>If erosion is occurring on compacted berms, a professional engineer should be consulted to resolve source of erosion.</i></p>	
	Screen Clogged or Missing	The bar screen over the outlet should be intact and clear of debris. Water should flow freely through the outlet pipe.		<p>Replace screen if it is not attached.</p> <p>Remove any trash or debris and dispose of properly. Clean out the end pipe if necessary.</p>	

Infiltration Ponds, Trenches, and Galleries					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
Presettling Ponds and Vaults	Facility or Sump Filled with Sediment and/or Debris	6 inches or designed sediment trap depth of sediment.		Remove sediment. No sediment should be present in presettling pond or vault.	
	Inadequate Sediment Settling Area	Stormwater should not enter the infiltration area without some method of settling-out solids.		Add a sediment trapping area by constructing a sump or berm for settling of solids. This area should be separate from the rest of the facility. Contact City of Lacey for guidance.	
Drain Rock	Water Ponding	<p>If water enters the facility from the surface, inspect to see if water is ponding at the surface during storm events.</p> <p>If buried drain rock, observe drawdown through observation port or cleanout.</p>		<p>Clear piping through facility when ponding occurs. Replace rock material/sand reservoirs as necessary. Tilling of subgrade below reservoir may be necessary (for trenches) prior to backfill. No water ponding should be present on surface during storm events.</p>	

For manufactured infiltration galleries, designers must review and apply the most current manufacturer guidelines and recommendations for facility operation and maintenance.

10. Trees

When designed in accordance with this Manual, trees can provide flow control via interception, transpiration, and increased infiltration. Most routine maintenance procedures are typical landscape care activities.

Trees					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
	Excess or Unhealthy Growth	Health of tree at risk, or tree in conflict with other infrastructure.		Tree pruned according to industry standards to promote tree health and longevity.	
	NA	Young tree (i.e., within first 3 years).		Tree provided with supplemental irrigation and fertilization (as needed) during first three growing seasons.	
	NA	Evidence of pest activity affecting tree health.		Pest management activities implemented to reduce or eliminate pest activity, and to restore tree health.	
	Dead or Declining	Dead, damaged or declining.		Tree is replaced per planting plan or acceptable substitute.	

1u. Fencing/Shrubbery Screen/Other Landscaping

Fencing, shrubbery screening, and landscaping provide flow control via interception, transpiration, and increased infiltration as well as slope protection. Most routine maintenance procedures are typical landscape care activities.

Fencing/Shrubbery Screen/Other Landscaping					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
	Missing or Broken Parts/Dead Shrubbery	Any defect in the fence or screen that permits easy entry to a facility.		Fence is mended or shrubs replaced to form a solid barrier to entry.	
	Erosion	Erosion has resulted in an opening under a fence that allows entry by people or pets.		Soil under fence replaced so that no opening exceeds 4 inches in height.	
	Unruly Vegetation	Shrubbery is growing out of control or is infested with weeds. See also <u>Thurston County Noxious Weeds List</u> .		Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.	
		Posts out of plumb more than 6 inches.		Posts plumb to within 1.5 inches of plumb.	
		Top rails bent more than 6 inches.		Top rail free of bends greater than 1 inch.	
		Any part of fence (including posts, top rails, and fabric) more than 1 foot out of design alignment.		Fence is aligned and meets design standards.	
		Missing or loose tension wire.		Tension wire in place and holding fabric.	
		Missing or loose barbed wire that is sagging more than 2.5 inches between posts.		Barbed wire in place with less than 0.75-inch sag between posts.	
		Extension arm missing, broken, or bent out of shape more than 1.5 inches.		Extension arm in place with no bends larger than 0.75 inch.	
	Deteriorated Paint or Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.		Structurally adequate posts or parts with a uniform protective coating.	
	Openings in Fabric	Openings in fabric are such that an 8-inch-diameter ball could fit through.		No openings in fabric.	

1v. Manufactured Media Filters

Manufactured media filters are installed below grade and usually consist of a two-chambered vault that include a presettling basin and a filter bed with sand or filter media. This filter is accessed through a manhole. **DO NOT ENTER ANY TANK OR VAULT** without proper training, certification and equipment.

Manufactured Media Filters					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
	Sediment Accumulation on Top of Filter Cartridges	Sediment accumulation exceeds 0.25 inches on top of cartridges.		No sediment deposits on top of cartridges. Sediment on cartridges likely indicates that cartridges are plugged and require maintenance.	
	Sediment Accumulation	Sediment accumulation in vault exceeds 6 inches. Look for other indicators of clogged cartridges or overflow.		No sediment accumulation in vault. <i>Sediment in vault should be removed. Cartridges should be checked and replaced or serviced as needed.</i>	
	Trash and Floatable Debris Accumulation	Trash and floatable debris accumulation in vault.		No trash or other floatable debris in filter vault.	
	Filter Cartridges Submerged	Filter vault does not drain within 24 hours following storm. Look for evidence of submergence due to backwater or excessive hydrocarbon loading.		Filter media checked and replaced if needed. <i>If cartridges are plugged with oil additional treatment or source control BMP may be needed.</i>	
	Sediment Accumulation	Sediment accumulation exceeds 6 inches or 33 percent (one third) of the available sump.		Sediment accumulation less than 6 inches.	
	Trash and Floatable Debris Accumulation	Trash and/or floatable debris accumulation.		No trash or other floatable debris accumulation in forebay. Trash and/or floatable debris should be removed during inspections. <i>Significant oil accumulation may indicate the need for additional treatment or source control.</i>	
Drain Pipes/ Cleanouts	Sediment in Drain Pipes/ Cleanouts	Accumulated sediment that exceeds 20 percent of the diameter.		No sediment or debris in drainpipes or cleanouts. Sediment and debris removed.	
Below ground Vault	Access Cover Damaged/ Not working	One maintenance person cannot remove lid after applying 80 pounds of lift, corrosion or deformation of cover.		Cover repaired to proper working specifications or replaced.	

Manufactured Media Filters					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
Below ground Vault (continued)	Damaged Pipes	Any part of the pipes are crushed or damaged due to corrosion and/or settlement.		Pipe repaired or replaced.	
		Cracks wider than 0.5 inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.		Vault repaired or replaced so that vaults meets design specifications and is structurally sound.	
		Cracks wider than 0.5 inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.		Vault repaired so that no cracks exist wider than 0.25 inch at the joint of inlet/outlet pipe.	
	Baffles	Baffles corroding, cracking, warping, and/or showing signs of failure as determined by maintenance/inspection person.		Baffles repaired or replaced to design specifications.	
	Ladder Rungs Unsafe	Maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks. Ladder must be fixed or secured immediately.		Ladder meets design standards and allows maintenance persons safe access.	
	Media	Drawdown of water through the media takes longer than 1 hour, and/or overflow occurs frequently.		Media cartridges replaced.	
	Short Circuiting	Flows do not properly enter filter cartridges.		Filter cartridges replaced.	

Designers must also review the most current manufacturer guidelines for any updates or additions to the following operation and maintenance requirements.

1w. Proprietary or Manufactured Products

- As with other stormwater BMPs in this appendix, proper maintenance of proprietary products such as media filters or vegetation-based treatment technologies is critical to proper facility performance. Regular maintenance ensures proper functioning and keeps the facility aesthetically appealing. Many of the same inspection and maintenance procedures outlined for the facilities described in this appendix also apply to proprietary technologies.
- Designers must review and apply the most current manufacturer guidelines and recommendations for facility operation and maintenance.
- The City of Lacey will inspect proprietary products in accordance with the applicable inspection standards to ensure that maintenance is performed properly.

Group 2

Structures & Pretreatment

2b. Catch Basins

These structures are typically located in the streets. The City of Lacey is responsible for routine maintenance of the pipes and structures in the public rights-of-way, while the property owner or homeowners association is responsible for maintenance of pipes and catch basins in private areas and for keeping the grates clear of debris in all areas.

Catch Basins					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
		Trash, leaves or debris which is located immediately in front of the catch basin opening or is blocking inflow capacity of the basin by more than 10 percent.		Remove trash, leaves and debris located directly in front of catch basin or on grate.	
		Trash or debris (in basin) that exceeds 60 percent of the sump depth as measured from 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 of clearance from the debris surface to the invert of the lowest pipe.		No trash or debris present. Remove and properly dispose of all trash and debris.	
		Trash or debris in any inlet or outlet pipe blocking more than 33 percent (one-third) of its height.		Inlet and outlet pipes free of trash or debris. Remove and properly dispose of all trash and debris.	
		Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).		Remove dead animals, etc., present within the catch basin.	
	Sediment	Sediment (in basin) exceeds 60 percent of sump depth as measured from the bottom of basin to invert of lowest pipe into or out of basin, but in no case less than a minimum of 6 inches of clearance from the sediment surface to the invert of 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 0.25 inch (intent is to make sure no material is running into basin).		Top slab is free of holes and cracks.		

Catch Basins

Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
General (continued)	Structure Damage to Frame and/or Top Slab (continued)	Frame not sitting flush on top slab, i.e., separation of more than 0.75 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.	
		Maintenance person determines structure is unsound.		Basin replaced or repaired to design standard	
		Grout fillet has separated or cracked wider than 0.5 inch and longer than 1 foot at the joint of any inlet/outlet pipe, or any evidence of soil entering basin.		Pipe regouted and secure at basin wall.	
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.		Replaced or repair to design standards.	
		Vegetation growing across and blocking more than 10 percent of the basin opening.		Remove vegetation blocking opening to basin.	
		Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.		No vegetation or root growth present.	
	Contamination and Pollution	Presence of contaminants such as oil, gasoline, concrete slurries, paint, obnoxious color, odor, or sludge.		Locate the source of the pollution and remove contaminants or pollutants present. <i>Report and coordinate source control, removal, and/or cleanup with City of Lacey Spill Response Team (360) 491-5644, Moderate Risk Waste Program at Thurston County Environmental Health (360) 754-4111, and/or Dept. of Ecology Spill Response (800) 424-8802.</i>	
	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.		Catch basin cover is in place and secured.	
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 0.5 inch of thread.		Mechanism opens with proper tools.	
Catch Basin Cover (continued)	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.	

Catch Basins

Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
Ladder	Ladder Rungs Unsafe	Maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks. Ladder must be fixed or secured immediately.		Ladder meets design standards and allows maintenance persons safe access.	
	Grate Opening Unsafe	Grate with opening wider than 0.875 (7/8) inch.		Grate opening meets design standards.	
	Trash and Debris	Trash and debris that is blocking more than 20 percent of grate surface inletting capacity.		Grate free of trash and debris. Remove and properly dispose of all trash and debris.	
	Damaged or Missing	Grate missing or broken member(s) of the grate.		Grate is in place and meets design standards.	

2d. Energy Dissipaters

Typically a rock splash pad at a pipe end or other discharge location, to reduce the velocity and energy of flowing water and prevent erosion. Other means of energy dissipation include drop manholes, stilling basins, and check dams.

Energy Dissipaters					
Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
External:					
	Missing or Moved Rock	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.		Rock pad replaced to design standards.	
	Erosion	Soil erosion in or adjacent to rock pad.		Rock pad replaced to design standards.	
	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20 percent of the design depth.		Pipe cleaned/flushed so it matches design.	
	Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.		Trench redesigned or rebuilt to standards. Water discharges from feature by sheet flow.	
	Perforations Plugged	Over half of perforations in pipe are plugged with debris and sediment.		Perforated pipe cleaned or replaced. Perforations freely discharge flow.	
	Water Flows Out Top of "Distributor" Catch Basin	Maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.		Facility rebuilt or redesigned to standards. No flow discharges from distributor catch basin.	
	Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.		No danger of landslides.	
Internal:					
Manhole/ Chamber	Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to 50 percent of original size or any concentrated worn spot exceeding 1 square foot, which would make structure unsound.		Structure replaced to design standards. Structure in no danger of failing.	

Energy Dissipaters

Drainage System Feature	Problem or Defect	Conditions To Check For	✓ Check	What To Do for Desired Condition	✓ Done
Manhole/ Chamber (continued)	Trash and Debris	Trash or debris (in basin) that exceeds 60 percent of the sump depth as measured from 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-inch clearance from the debris surface to the invert of the lowest pipe.		No trash or debris present. Remove and properly dispose of all trash and debris.	
		Trash or debris in any inlet or outlet pipe blocking more than 33 percent of its height.		Inlet and outlet pipes free of trash or debris. Remove and properly dispose of all trash and debris.	
		Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).		Remove dead animals, etc., present within the catch basin.	
	Sediment	Sediment (in basin) exceeds 60 percent of sump depth as measured from the bottom of basin to invert of lowest pipe into or out of basin, but in no case less than a minimum of 6-inch clearance from the sediment surface to the invert of lowest pipe.		No sediment in the catch basin.	
		Top slab has holes larger than 2 square inches or cracks wider than 0.25 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 0.75 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.	
		Maintenance person determines structure is unsound.		Basin replaced or repaired to design standard	
		Grout fillet has separated or cracked wider than 0.5 inch and longer than 1 foot at the joint of any inlet/outlet pipe, or any evidence of soil entering basin.		Pipe regouted and secure at basin wall.	
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.		Replaced or repair to design standards.	

Energy Dissipaters

Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
Manhole/ Chamber (continued)	Contamination and Pollution	Presence of contaminants such as oil, gasoline, concrete slurries, paint, obnoxious color, odor, or sludge.		Locate the source of the pollution and remove contaminants or pollutants present. <i>Report and coordinate source control, removal, and/or cleanup with City of Lacey Spill Response Team (360) 491-5644, Moderate Risk Waste Program at Thurston County Environmental Health (360) 754-4111, and/or Dept. of Ecology Spill Response (800) 424-8802.</i>	
	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.		Catch basin cover is in place and secured.	
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 0.5 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.	

Group 3

Miscellaneous Facilities & Features

3a. Conveyance Pipes, Culverts, Ditches, and Swales

These features contain and direct the flow of water from one location to another.

Conveyance Pipes, Culverts, Ditches, and Swales					
Drainage System Feature	Problem or Defect	Conditions To Check For	✓ Check	What To Do for Desired Condition	✓ Done
Pipes	Sediment, Debris, and Vegetation	Accumulated sediment should not exceed 20 percent of the diameter of the pipe. Vegetation should not reduce free movement of water through pipes. Ensure that the protective coating is not damaged or rusted. Dents should not significantly impede flow. Pipe should not have major cracks or flaws allowing water to leak out.		Clean out pipes of all sediment and debris. Remove all vegetation so that water flows freely through pipes. Repair or replace pipe.	
	Trash and Debris	There should not be any yard waste or litter in the ditch.		No trash or debris present. Remove and properly dispose of all trash and debris.	
	Sediment Buildup	Accumulated sediment should not exceed 20 percent of the depth of the ditch.		Clean out ditch of all sediment and debris.	
	Overgrowth of Vegetation	Check for vegetation (e.g., weedy shrubs or saplings) that reduces the free movement of water through ditches or swales.		Clear blocking vegetation so that water moves freely through the ditches. Grassy vegetation should be left alone.	
	Erosion	Check around inlets and outlets for signs of erosion. Check slopes for signs of sloughing or settling. Action is needed where eroded damage is over 2 inches deep and where there is potential for continued erosion.		Eliminate causes of erosion. Stabilize slopes by using the appropriate erosion control procedure (e.g., compact the soil, plant grass, reinforce with rock).	
	Missing Rocks	Native soil beneath the rock splash pad, check dam, or lining should not be visible.		Replace rocks to design standard.	
Swales	Vegetation	Grass cover is sparse and weedy, or areas are overgrown with woody vegetation.		Aerate soils and re-seed and mulch bare areas. Keep grass less than 8 inches high. Remove woody growth, re-contour and re-seed as necessary.	

Conveyance Pipes, Culverts, Ditches, and Swales

Drainage System Feature	Problem or Defect	Conditions To Check For	√ Check	What To Do for Desired Condition	√ Done
Swales (continued)	Homeowner Conversion	Swale has been filled in or blocked by shed, woodpile, shrubbery, etc.		Speak with the homeowner and request that the swale area be restored. Contact the city to report the problem if not rectified voluntarily.	
	Swale Does Not Drain	Water stands in the swale, or flow velocity is very slow. Stagnation occurs.		A survey may be needed to check grades. Grades should be in 1 to 5 percent range if possible. If grade is less than 1 percent, underdrains may need to be installed.	

Appendix C – Stormwater Pollution Source Control Checklist & Worksheet

CITY OF LACEY

STORMWATER POLLUTION SOURCE CONTROL CHECKLIST

Project Name: Carpenter Road Apartments

Check all activities that will occur at proposed project.

•	Boat/Ship Building, Repair or Maintenance (see BMP S401)
•	Commercial Animal Handling (see BMP S402)
•	Commercial Composting (see BMP S403)
•	Commercial Printing Operations (see BMP S404)
•	De-Icing and Anti-Icing Operations- Airport and Streets (see BMP S405)
•	Streets/ Highways (see BMP S406)
•	Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots (see BMP S407)
•	Dust Control at Manufacturing Areas (see BMP S408)
•	Fueling at Dedicated Stations (see BMP S409)
X	Landscaping and Lawn/Vegetation Maintenance (see BMP S411)
•	Loading and Unloading of potential pollutants (see BMP S412)
•	Log Sorting and Handling (see BMP S413)
•	Maintenance and Repair of Vehicles and Equipment (see BMP S414)
•	Maintenance of Public and Private Utility Corridors and Facilities (see BMP S415)
•	Maintenance of Roadside Ditches (see BMP S416)
X	Maintenance of Stormwater Drainage and Treatment Systems (see BMP S417)
•	Manufacturing Activities- Outside (see BMP S418)
•	Mobile Fueling of Vehicles and Heavy Equipment (see BMP S419)
•	Painting/Finishing/Coating of Vehicles/Boats/Buildings/Equipment (see BMP S420)
X	Parking and Storage of Vehicles and Equipment (see BMP S421)
•	Railroad Yards (see BMP S422)
•	Recyclers/Scrap Yards (see BMP S423)
X	Roof/Building Drains at Manufacturing and Commercial Buildings (see BMP S424)
•	Erosion and Sediment Control at Commercial or Industrial Sites (see BMP S425)
•	Potential Spills of Oil or Hazardous Substances (see BMP S426)
•	Storage of Liquids, Food Waste, or Dangerous Waste Containers (see BMP S427)

•	Storage of Liquids in Permanent Aboveground Tanks (see BMP S428)
•	Storage or Transfer (Outside) of Solid Raw Materials, By-products or Finished Products (see BMP S429)
•	Urban Streets (see BMP S430)
•	Washing and Steam Cleaning Vehicles/Equipment/Building Structures (see BMP S431)
•	Wood Treatment Areas (see BMP S432)
•	Spas, Pools, Hot Tubs, and Fountains (see BMP S433)

