SOUTH SOUND COMMERCE CENTER

TUM-21-1580

Maintenance & Source Control Manual

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Project Name: SOUTH SOUND COMMERCE CENTER

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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 South Sound Commerce Center project is located west of Center Street SW and southwest of 78th Ave SW in the City of Tumwater in Section 10, Township 17, Range 2 West, W.M. on a portion of tax parcel number 12710100000 being leased to South Sound Commerce Center. The project proposes to construct a 481,245 sf warehouse building with 628,135 sf associated parking, and required drainage, landscaping, sewer, and water service improvements.

The project proposes the use of R-tank infiltration galleries for stormwater management, with Oldcastle coalescing plate oil-water separators and Contech Filterra bioscapes for runoff treatment. The project is divided into eight onsite basins: six directed to R-tanks, along with a frontage basin which conveys runoff to a roadside bioretention swale, and a bypass basin where runoff will sheet flow same as the existing condition.

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

All stormwater facilities require maintenance. Regular maintenance ensures proper functioning and preserves visual appeal. The property owner is responsible for many of the mitigation measures discussed herein. This Maintenance and Source Control Plan is recorded against the title this property. Enforcement of the recommendations lies with the underlying jurisdictions, and the property owners should strive to incorporate them in their daily activities. All parties below shall read this Maintenance and Source Control Plan:

Specific Responsibilities

Landscape Maintenance	Developer / Maintenance Contractors / Property Owners
Common Facilities	Developer / Maintenance Contractors / Property Owners
Stormwater Facilities	Developer / Maintenance Contractors / Property Owners

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 R-tank infiltration galleries, Oldcastle coalescing plate and SA oil/water separators, Contech Peak Diversion Filterras, Oldcastle Underground Biopods, a bioretention swale, catch basins, and conveyance piping.

All stormwater facilities located in the public right-of-way are maintained by the City of Tumwater.

The property owner is responsible for the R-tank infiltration galleries and onsite oil/water separators, Filterra devices, catch basins and conveyances, and the bioretention swale.

Maintenance of all onsite stormwater facilities is necessary. Catch basins collect runoff and send it via conveyance pipes through the treatment facilities before it can be infiltrated in the R-tanks.

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 stormwater system owner(s) must review and apply the maintenance requirements contained in the Stormwater Maintenance Agreement. The owner shall inspect all stormwater facilities annually and maintain them at their own expense. The owner shall complete and file an inspection and maintenance form with the city following inspection and maintenance. When inspections indicate a maintenance need, the owner shall complete all maintenance within one year for typical maintenance of facilities, within six months for catch basins, and within two years for maintenance that requires capital construction of greater than $25,000.

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

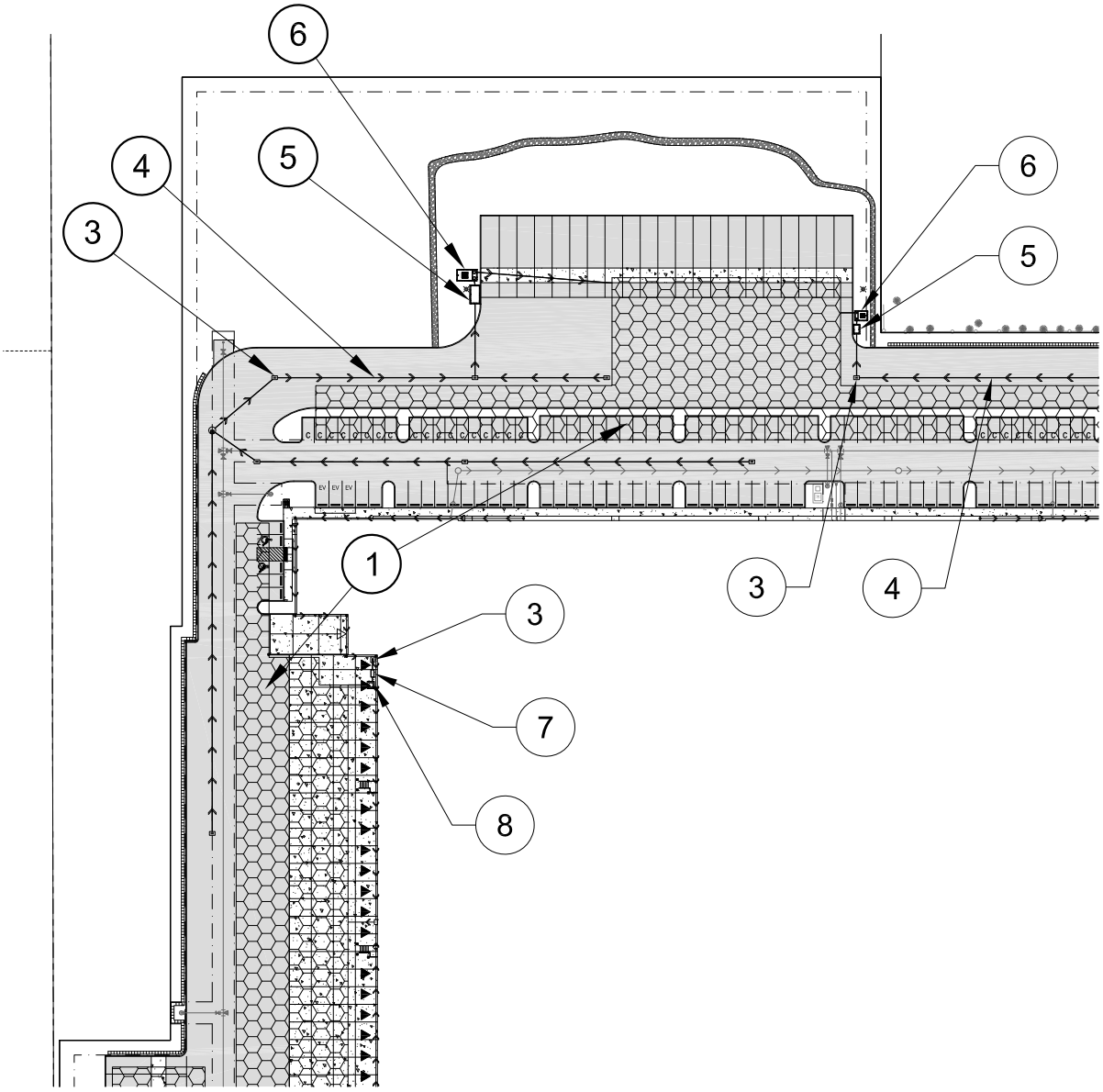
The stormwater facilities in your neighborhood are comprised of the following elements:

Type of Feature and Checklist Name	Location on Site Plan
R-tank Infiltration Gallery	1
Bioretention Swale	2
Catch Basin	3
Conveyance Piping	4
Oldcastle Coalescing Plate Oil/Water Separator	5
Contech Peak Diversion Filterra	6
Oldcastle SA Oil/Water Separator	7
Oldcastle Underground Biopod	8

SOUTH SOUND COMMERCE CENTER

7380 LINDERSON WAY SW, TUMWATER, WA

N.T.S.



ENLARGED FACILITY KEY - NORTH WEST

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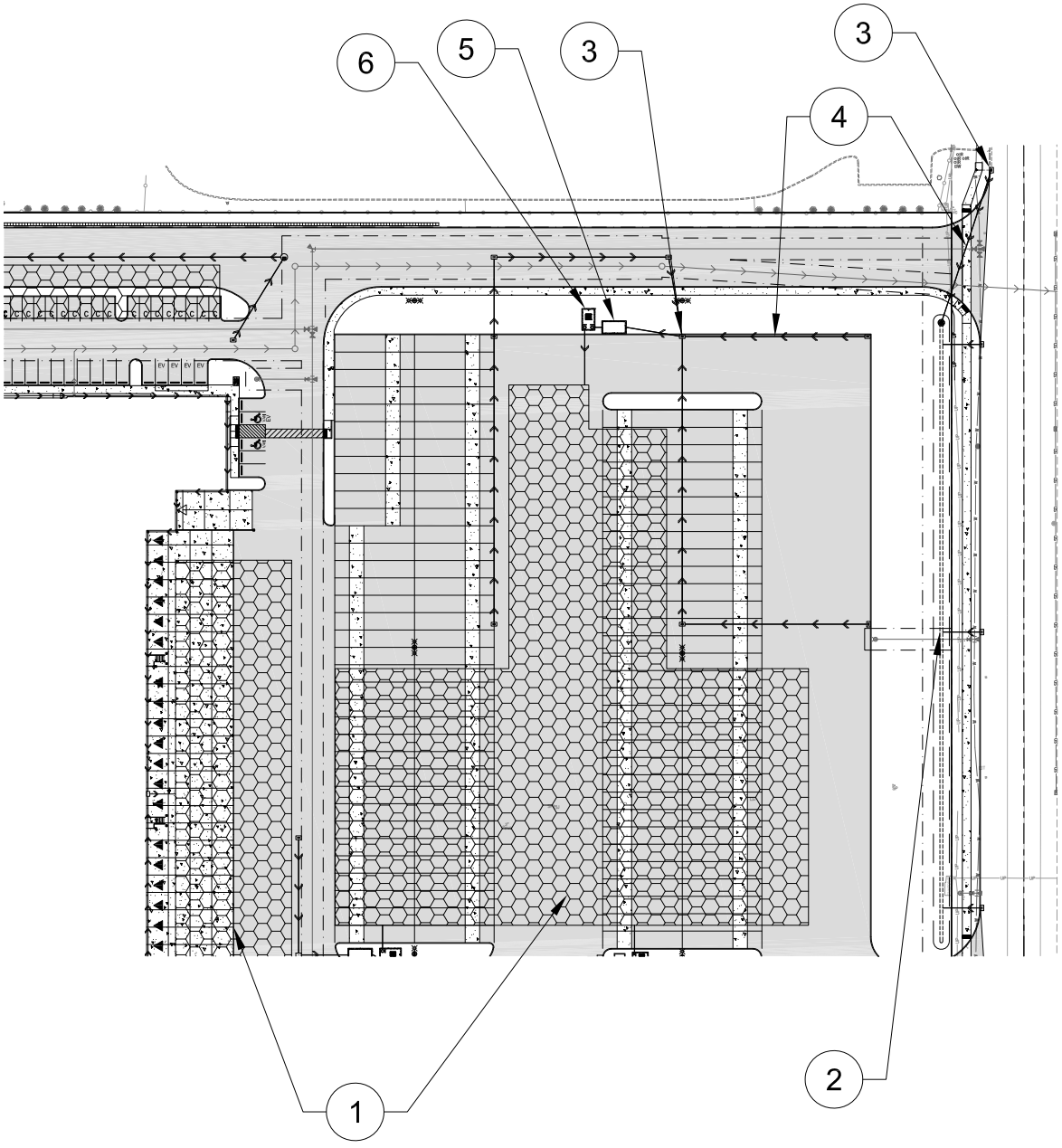

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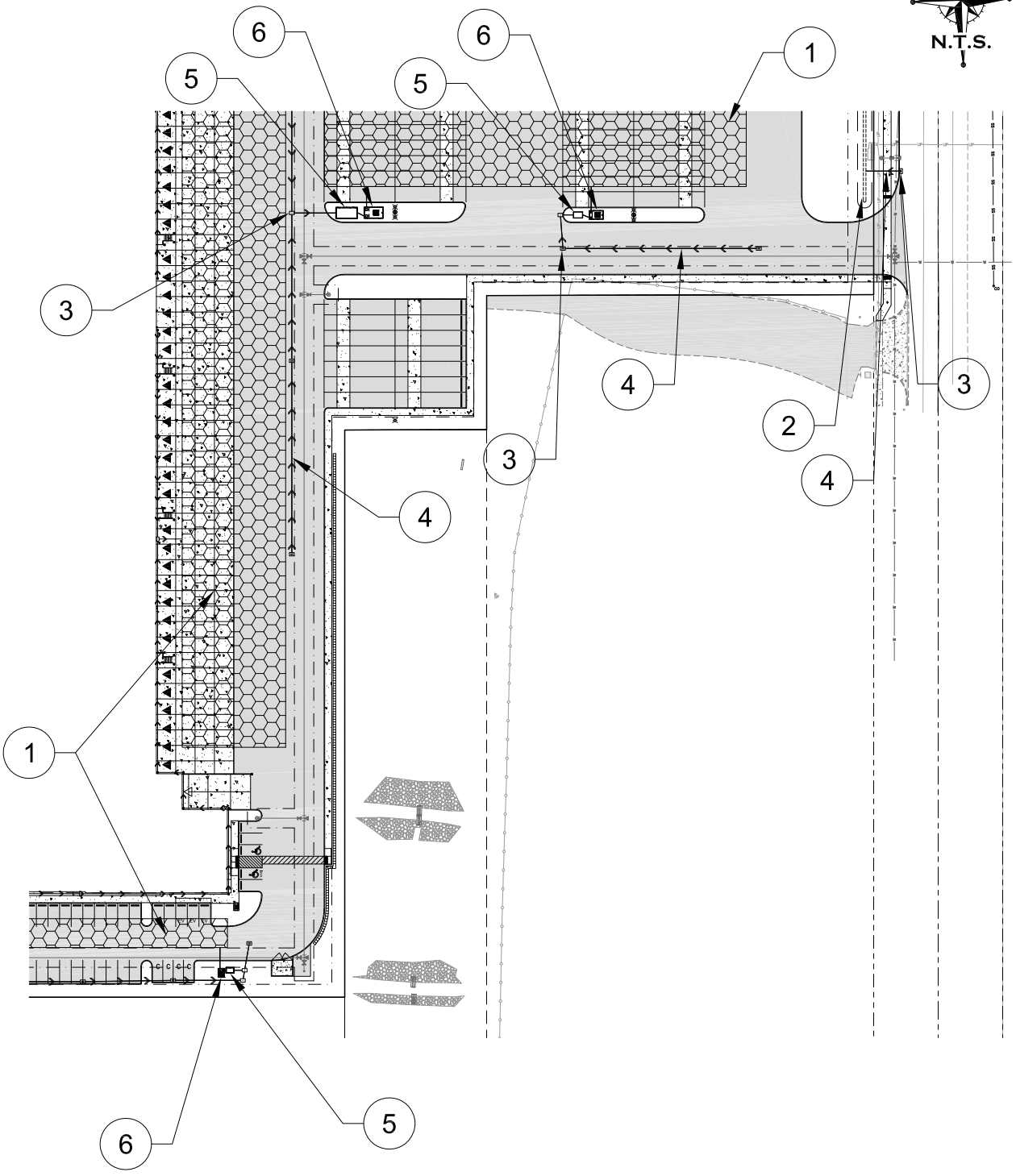

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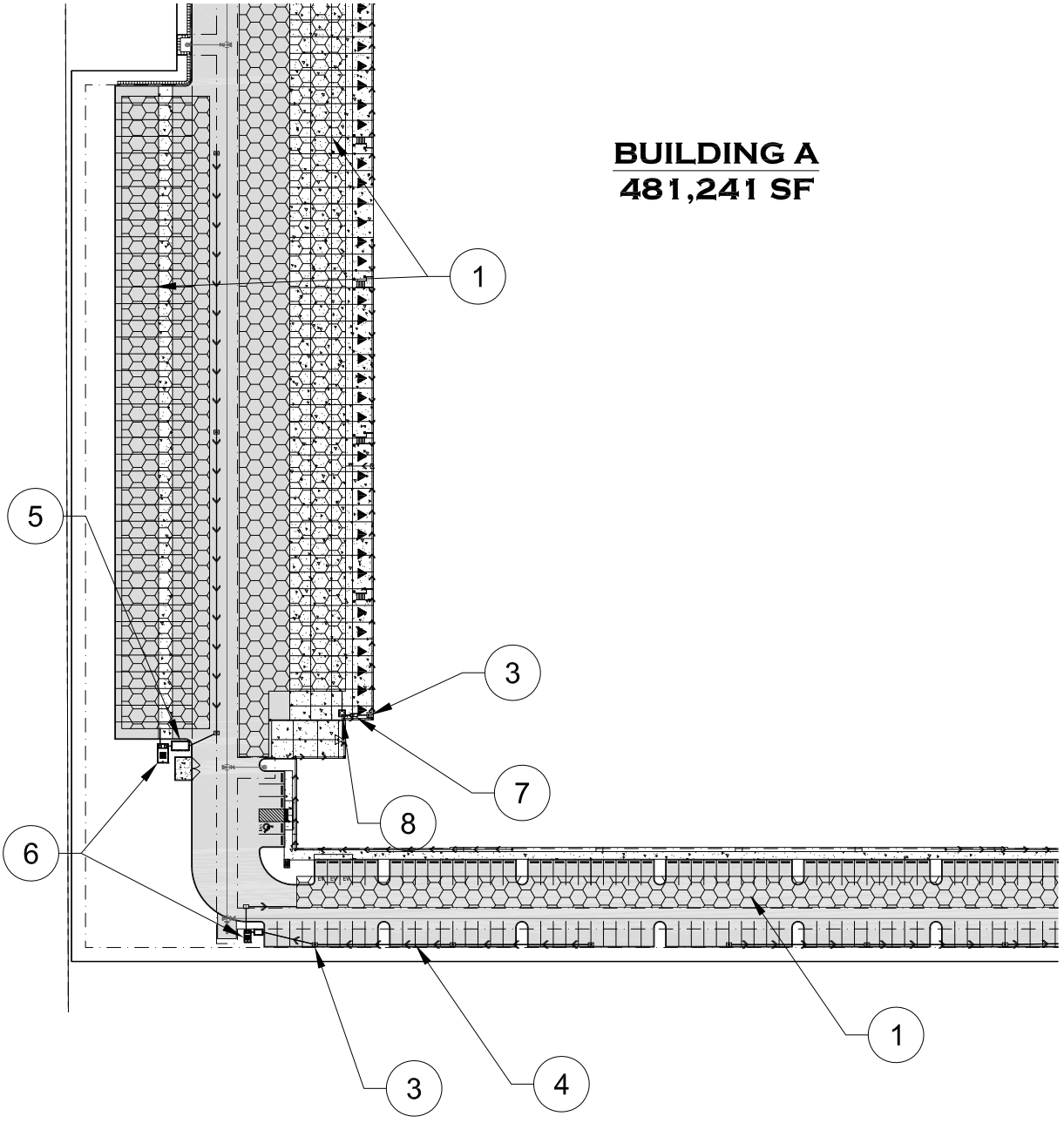

ENLARGED FACILITY KEY - SOUTH WEST

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

Tumwater Public Works Department	(360) 754-4150
City of Tumwater Spill Reporting Hotline	(360) 754-4150
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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ENGINEER'S INFORMATION

Hatton Godat Pantier (360) 943-1599
3910 Martin Way E., Suite B
Olympia, WA 98506

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, dear 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 ÷ 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 verticilium 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 Principals 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 Tumwater Wastewater Utility 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 Tumwater, call the Department of Public Works at (360) 754-4150 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

Appendix A – Maintenance Covenant

AGREEMENT TO MAINTAIN

STORM WATER FACILITIES AND TO IMPLEMENT A POLLUTION SOURCE CONTROL PLAN BY AND BETWEEN THE CITY OF TUMWATER AND

_____,

AND IT'S HEIRS, SUCCESSORS, OR ASSIGNS (HEREINAFTER "OWNER")

The upkeep and maintenance of storm water facilities and the implementation of pollution source control best management practices (BMPs) are essential to the protection of water resources in the CITY OF TUMWATER. 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 storm water facilities and use of pollution source control BMPs. The authority to require maintenance and pollution source control is provided by Tumwater Municipal Code.

LEGAL DESCRIPTION:

LOT 1 of South Sound Commerce Center. See Exhibit A.

RECITALS:

WHEREAS, OWNER is the owner of certain real property in Thurston County, Washington, described as set forth in the legal description contained herein and referred to in this agreement as the "PROPERTY"; and

WHEREAS, in connection with the OWNER'S proposed development of the PROPERTY, the CITY OF TUMWATER has required and OWNER has agreed to construct storm water facilities and to implement a pollution source control plan. The storm water facilities and pollution source control plan were prepared by Hatton Godat Pantier for the OWNER'S PROPERTY and is on file with CITY OF TUMWATER; and

WHEREAS, OWNER has constructed improvements, including but not limited to, buildings, pavement, and storm water facilities on the PROPERTY, in order to further the goals of the CITY OF TUMWATER to ensure the protection and enhancement of Tumwater's water resources, CITY OF TUMWATER and OWNER hereby enter into this Agreement. The responsibilities of each party to this Agreement are identified below.

OWNER SHALL:

(1) Implement the storm water facility maintenance program located in Appendix "C" of Volume V of the City's 2010 Drainage Design and Erosion Control Manual.

(2) Comply with Pollution Source Control Requirements located in Volume IV of the City's 2010 Drainage Design and Erosion Control Manual.

(3) Maintain a record (in the form of a log book) of steps taken to implement the programs referenced in (1) and (2) above. The log book shall be available for

inspection by CITY OF TUMWATER at _____ _____ 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 actions recommended. Maintenance items ("problems") listed in Item (1) above shall be inspected as specified in the instructions or more frequently if necessary. OWNER is encouraged to photocopy the individual checklists in Item (2) above and use them to complete its monthly inspections. These completed checklists would then, in combination, comprise the log book.

(4) Submit an annual report to CITY OF TUMWATER regarding implementation of the programs referenced in (1) and (2) above. The report must be submitted on or before May 15th of each calendar year and shall contain, at a minimum, the following:

(a) Name, address, and telephone number of the business, the person, 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) and (2) 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 OWNER, include a copy of the invoice for services.

(d) An outline of planned activities for the next year.

(5) 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 item (4) above and shall be approved by the CITY OF TUMWATER. Modifications to the storm water quantity control and storm water quality system must be approved in advance by CITY OF TUMWATER and may require the submittal of revised design drawings, supporting calculations, modifications to maintenance requirements, and applications for permits.

CITY OF TUMWATER WILL, AS RESOURCES ALLOW:

(1) Provide technical assistance to 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, as CITY OF TUMWATER time and resources permit and at no charge to OWNER.

(2) Review the annual report and conduct occasional site visits to discuss performance and problems with OWNER.

(3) Review this agreement with OWNER and modify it as necessary.

REMEDIES:

(1) If the CITY OF TUMWATER determines that maintenance or repair work is required to be done to the storm water facility existing on the OWNER'S PROPERTY, CITY OF TUMWATER shall give OWNER, and the person or agent in control of said PROPERTY if different, notice of the specific maintenance and/or repair required. CITY OF TUMWATER 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 CITY OF TUMWATER, written notice will be sent to the persons who were given notice stating CITY OF TUMWATER'S intention to perform such maintenance and bill the OWNER for all incurred expenses. CITY OF TUMWATER may also adjust storm water utility charges if required maintenance is not performed.

(2) If at any time CITY OF TUMWATER determines that the existing system creates any imminent threat to public health, welfare or water quality CITY OF TUMWATER may take immediate measures to remedy said threat. No notice to the persons listed in Remedies (1), above, shall be required under such circumstances. All other responsibilities shall remain in effect.

(3) OWNER grants unrestricted authority to CITY OF TUMWATER for access to any and all storm water system features for the purpose of routine inspections and/or performing maintenance, repair and/or retrofit as may become necessary under Remedies (1) and/or (2).

(4) OWNER shall assume all responsibility for the cost of any maintenance and for repairs to the storm water facility. Such responsibility shall include reimbursement to CITY OF TUMWATER within 30 days of the receipt of the invoice for any such work performed. Overdue payments will require payment of interest at the current legal rate for liquidated judgments. If legal action ensues, any costs or fees incurred by CITY OF TUMWATER will be borne by the OWNER.

(5) OWNER hereby grants to the CITY OF TUMWATER a lien against the above-described PROPERTY in an amount equal to the cost incurred by CITY OF TUMWATER to perform the maintenance or repair work described herein, including interest and fees described in Remedies (4), above.

This Agreement is intended to protect the value and desirability of the real PROPERTY described above and to benefit all the citizens of the CITY OF TUMWATER. It shall run with the land, and touch and concern the land, and be binding on all parties having or acquiring from OWNER or their successors any right, title, or interest in the PROPERTY or any part thereof, as well as their title, or interest in the PROPERTY or any part thereof, as well as their heirs, successors, and assigns. 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 OF TUMWATER.

Dated at _____, Washington, this _____ day of _____, 20___.

OWNER:

_____
Signature
Name: _____
Title:_____
Address:_____

State of Washington)
)ss
County of _____)

I certify that I know or have satisfactory evidence that _____is the person who appeared before me, and said person acknowledged that (he/she) signed this instrument, on oath stated that (he/she) was authorized to execute the instrument and acknowledged it as the ___ _____of _____to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated:_____ _____
(Signature)
Notary Public in and for the State of Washington. (Seal or Stamp)
My appointment expires _____.

CITY OF TUMWATER:

APPROVED as to form only:

_____
City Attorney

ACCEPTED BY:

_____
Public Works Director

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 10 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.*

Stormwater Facilities Maintenance Standards

Group 1 – Flow Control and Treatment Facilities

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**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General	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 Thurston County Noxious Weeds List <http://www.co.thurston.wa.us/tcweeds/weed-list.htm>.		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. *(Coordinate with Thurston County Health Department.)* 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.) *Complete eradication of noxious weeds may not be possible.*	

Infiltration Ponds, Trenches, and Galleries

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
General (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. *Report and coordinate source control, removal, and/or cleanup with City of Tumwater Spill Reporting Hotline 360-754-4150, Moderate Risk Waste Program at Thurston County Environmental Health 360-754– 4111, and/or Dept. of Ecology Spill Response 800-424-8802.*	
	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. *(Coordinate with Thurston County Health Department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)*	
	Beaver Dam	Beaver dam results in an adverse change in the functioning of the facility.		Return facility to design function. (*Contact WDFW Region 6 to identify the appropriate Nuisance Wildlife Control Operator.)*	
	Insects	Insects such as wasps and hornets interfering with maintenance activities, or mosquitoes becoming a nuisance.		Remove insects. For mosquito control, eliminate stagnant water. *Apply insecticides in compliance with adopted integrated pest management policies.*	
	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.	

Infiltration Ponds, Trenches, and Galleries					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General (continued)	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.	
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.	

Infiltration Ponds, Trenches, and Galleries

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
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.	
Ponds	Vegetation	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 Tumwater for assistance. *If erosion is occurring on compacted berms, a professional engineer should be consulted to resolve source of erosion.*	
Dikes or Berms	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. *If settlement is significant, a professional engineer should be consulted to determine the cause of the settlement.*	
	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. *Recommend a geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.*	

Infiltration Ponds, Trenches, and Galleries

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
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.		Remove trees on berms. *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.*	
Emergency Overflow Spillway	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.		Remove trees on emergency spillway. *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.*	
	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.		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 Tumwater for assistance. *If erosion is occurring on compacted berms, a professional engineer should be consulted to resolve source of erosion.*	

Infiltration Ponds, Trenches, and Galleries					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
Emergency Overflow Spillway (continued)	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.		Replace screen if it is not attached. Remove any trash or debris and dispose of properly. Clean out the end pipe if necessary.	
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 Tumwater for guidance.	
Drain Rock	Water Ponding	If water enters the facility from the surface, inspect to see if water is ponding at the surface during storm events. If buried drain rock, observe drawdown through observation port or cleanout.		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.	

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

1m. Bioretention Cells, Swales, and Planter Boxes

Bioretention areas are shallow stormwater systems with a designed soil mix and plants adapted to the local climate and soil moisture conditions. They are designed to mimic a forested condition by controlling stormwater through detention, infiltration, and evapotranspiration. Most routine maintenance procedures are typical landscape care activities.

Bioretention Cells, Swales, and Planter Boxes					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General	Trash	Trash and debris present.		No trash and debris present. Remove and properly dispose of all trash and debris.	
Concrete Sidewalls	Cracks or Failure in Concrete Planter Reservoir	Cracks wider than 0.5 inch or maintenance/inspection personnel determine that the planter is not structurally sound.		Concrete repaired or replaced.	
Rockery Sidewalls	Unstable Rockery	Rock walls are insecure.		Rockery sidewalls are stable (may require consultation with professional engineer, particularly for walls 4 feet or greater in height).	
Earthen Side Slopes and Berms	Failure in Earthen Reservoir (embankments, dikes, berms, and side slopes)	Erosion (gullies/rills) greater than 2 inches around inlets, outlet, and alongside slopes.		Source of erosion eliminated and damaged area stabilized (regrade, rock, vegetation, erosion control blanket). For deep channels or cuts (over 3 inches in ponding depth), temporary erosion control measures are in place until permanent repairs can be made.	
		Erosion of sides causes slope to become a hazard.		The hazard is eliminated and slopes are stabilized.	
		Settlement greater than 3 inches (relative to undisturbed sections of berm).		The design height is restored with additional mulch.	

Bioretention Cells, Swales, and Planter Boxes

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
Earthen Side Slopes and Berms (continued)	Failure in Earthen Reservoir (embankments, dikes, berms, and side slopes) (continued)	Downstream face of berm or embankment wet, seeps or leaks evident.		Holes are plugged and berm is compacted. May require consultation with professional engineer, particularly for larger berms.	
		Any evidence of rodent holes or water piping around holes if facility acts as dam or berm.		Rodents (see "Pests: Insects/Rodents") removed and berm repaired/compacted.	
Ponding Area	Sediment or Debris Accumulation	Accumulation of sediment or debris to extent that infiltration rate is reduced (see "Ponded water") or surface storage capacity significantly impacted.		Sediment cleaned out to restore facility shape and depth. Damaged vegetation is replaced and mulched. Source of sediment identified and controlled (if feasible).	
	Leaf Accumulation	Accumulated leaves in facility.		No leaves clogging outlet structure or impeding water flow.	
	Basin Inlet via Surface Flow	Soil is exposed or signs of erosion are visible.		Erosion sources repaired and controlled.	
Curb Cut Inlet	Sediment or Debris Accumulation	Sediment, vegetation, or debris partially or fully blocking inlet structure.		Curb cut is clear of debris. Source of the blockage is identified and action is taken to prevent future blockages.	
Splashblock Inlet	Water Not Properly Directed to Facility	Water is not being directed properly to the facility and away from the inlet structure.		Blocks are reconfigured to direct water to facility and away from structure.	
	Erosion	Water disrupts soil media.		Splashblock is reconfigured/repaired.	
Inlet/ Outlet Pipe	Damaged Pipe	Pipe is damaged.		Pipe is repaired/replaced. No cracks more than 0.25 inch wide at the joint of inlet/outlet pipes exist.	
	Clogged Pipe	Pipe is clogged.		Pipe is clear of roots or debris. Source of the blockage is identified and action is taken to prevent future blockages.	
Inlets/ Outlet and Access Pathways	Blocked Access	Maintain access for inspections.		Vegetation is cleared within 1 foot of inlets and outlets. Access pathways are maintained.	

Bioretention Cells, Swales, and Planter Boxes

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
Ponding Area	Erosion	Water disrupts soil media.		No eroded or scoured areas in bioretention area. Cause of erosion or scour addressed. A cover of rock or cobbles or other erosion protection measure maintained (e.g., matting) to protect the ground where concentrated water enters or exits the facility (e.g., a pipe, curb cut, or swale).	
Trash Rack	Trash or Debris Accumulation	Trash or debris present on trash rack.		No trash or debris on trash rack. Clean and dispose trash.	
	Damaged Trash Rack	Bar screen damaged or missing.		Barrier repaired or replaced to design standards.	
Check Dams and Weirs	Sediment or Debris Accumulation	Sediment, vegetation, or debris accumulated at or blocking (or having the potential to block) check dam, weir, or orifice.		Blockage is cleared. Identify the source of the blockage and take actions to prevent future blockages.	
	Erosion	Erosion and/or undercutting is present.		No eroded or undercut areas in bioretention area. Cause of erosion or undercutting addressed. Check dam or weir is repaired.	
	Unlevel Top of Weir	Grade board or top of weir damaged or not level.		Weir restored to level position.	
Flow Spreader	Sediment Accumulation	Sediment blocks 35 percent or more of ports/notches or, sediment fills 35 percent or more of sediment trap.		Sediment removed and disposed of.	
	Damaged or Unlevel Grade Board/Baffle	Grade board/baffle damaged or not level.		Board/baffle removed and reinstalled to level position.	

Bioretention Cells, Swales, and Planter Boxes

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
Overflow/ Emergency Spillway	Sediment or Debris Accumulation	Overflow spillway is partially or fully plugged with sediment or debris.		No sediment or debris in overflow.	
	Erosion	Native soil is exposed or other signs of erosion damage are present.		Erosion repaired and surface of spillway stabilized.	
	Missing Spillway Armament	Spillway armament is missing.		Armament replaced.	
Underdrain	Blocked Underdrain	Plant roots, sediment or debris reducing capacity of underdrain. Prolonged surface ponding (see “Bioretention Soil”).		Underdrains and orifice are free of sediment and debris.	
Bioretention Soil	Ponded Water	Excessive ponding water: Water overflows during storms smaller than the design event or ponded water remains in the basin 48 hours or longer after the end of a storm.		Cause of ponded water is identified and addressed: 1. Leaf or debris buildup is removed 2. Underdrain is clear 3. Other water inputs (e.g., groundwater, illicit connections) investigated 4. Contributing area verified If steps #1–4 do not solve the problem, imported bioretention soil is replaced and replanted.	
	Protection of Soil	Maintenance requiring entrance into the facility footprint.		Maintenance is performed without compacting bioretention soil media.	
Vegetation	Bottom Swale and Upland Slope Vegetation	Less than 75 percent of swale bottom is covered with healthy/surviving vegetation.		Plants are healthy and pest free. Cause of poor vegetation growth addressed. Bioretention area is replanted as necessary to obtain 75 percent survival rate or greater. Plant selection is appropriate for site growing conditions.	

Bioretention Cells, Swales, and Planter Boxes

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
Trees and Shrubs	Causing Problems for Operation of Facility	Large trees and shrubs interfere with operation of the basin or access for maintenance.		Trees and shrubs do not hinder facility performance or maintenance activities. Prune or remove large trees and shrubs.	
	Dead Trees and Shrubs	Standing dead vegetation is present.		Trees and shrubs do not hinder facility performance or maintenance activities. Dead vegetation is removed and cause of dead vegetation is addressed. Specific plants with high mortality rate are replaced with more appropriate species.	
Trees and Shrubs Adjacent to Vehicle Travel Areas (or areas where visibility needs to be maintained)	Safety Issues	Vegetation causes some visibility (line of sight) or driver safety issues.		Appropriate height for sight clearance is maintained. Regular pruning maintains visual sight lines for safety or clearance along a walk or drive. Tree or shrub is removed or transplanted if presenting a continual safety hazard.	
Emergent Vegetation	Conveyance Blocked	Vegetation compromises conveyance.		Sedges and rushes are clear of dead foliage.	
Mulch	Lack of Mulch	Bare spots (without much cover) are present or mulch covers less than 2 inches.		Facility has a maximum 3-inch layer of an appropriate type of mulch and mulch is kept away from woody stems.	
Vegetation	Accumulation of Clippings	Grass or other vegetation clippings accumulate to 2 inches or greater in depth.		Clippings removed.	
	Weeds	Weeds are present (unless on edge and providing erosion control).		Weed material removed and disposed of. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.	

Bioretention Cells, Swales, and Planter Boxes

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
Noxious Weeds	Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to the public. Any evidence of noxious weeds as defined in the Thurston County Noxious Weeds List <http://www.co.thurston.wa.us/tcweeds/weed-list.htm>.		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. *(Coordinate with Thurston County Health Department.)* 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.) *Complete eradication of noxious weeds may not be possible.*	
Excessive Vegetation	Adjacent Facilities Compromised	Low-lying vegetation growing beyond facility edge onto sidewalks, paths, or street edge poses pedestrian safety hazard or may clog adjacent permeable pavement surfaces due to associated leaf litter, mulch, and soil.		Vegetation does not impede function of adjacent facilities or pose as safety hazard. Groundcovers and shrubs trimmed at facility edge. Excessive leaf litter is removed.	
	Causes Facility to Not Function Properly	Excessive vegetation density inhibits stormwater flow beyond design ponding or becomes a hazard for pedestrian and vehicular circulation and safety.		Pruning and/or thinning vegetation maintains proper plant density and aesthetics. Plants that are weak, broken, or not true to form are removed or replaced in-kind. Appropriate plants are present.	
Irrigation (if any)	NA	Irrigation system present.		Manufacturer's instructions for O&M are met.	
Plant Watering	Plant Establishment	Plant establishment period (1–3 years).		Plants are watered as necessary during periods of no rain to ensure plant establishment.	

Bioretention Cells, Swales, and Planter Boxes

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
Summer Watering (after establishment)	Drought Period	Longer term period (3+ years).		Plants are watered as necessary during drought conditions and trees are watered up to 5 years after planting.	
Spill Prevention and Response	Spill Prevention	Storage or use of potential contaminants in the vicinity of facility.		Spill prevention measures are implemented whenever handling or storing potential contaminants.	
	Spill Response	Any evidence of contaminants such as oil, gasoline, concrete slurries, paint, etc.		Spills are cleaned up as soon as possible to prevent contamination of stormwater. No contaminants or pollutants present. *(Coordinate source control, removal, and/or cleanup with City of Tumwater Spill Reporting Hotline 360-754-4150, Moderate Risk Waste Program at Thurston County Environmental Health 360-754–4111, and/or Dept. of Ecology Spill Response 800-424-8802.)*	
Safety	Safety (slopes)	Erosion of sides causes slope to exceed 1:3 or otherwise becomes a hazard.		Actions taken to eliminate the hazard.	
	Safety (hydraulic structures)	Hydraulic structures (pipes, culverts, vaults, etc.) become a hazard to children playing in and around the facility.		Actions taken to eliminate the hazard (such as covering and securing any openings).	
Aesthetics	Aesthetics	Damage/vandalism/debris accumulation.		Facility restored to original aesthetic conditions.	
	Edging	Grass is starting to encroach on swale.		Edging repaired.	
Pest Control	Pests: Insects/ Rodents	Pest of concern is present and impacting facility function.		Pests removed and facility returned to original functionality. Do not use pesticides or *Bacillus thuringiensis israelensis (Bti).*	

Bioretention Cells, Swales, and Planter Boxes					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
Pest Control (continued)	Mosquitoes	Standing water remains in the basin for more than three days following storms.		All inlets, overflows and other openings are protected with mosquito screens. No mosquito infestation present.	

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**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General	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 Thurston County Noxious Weeds List <http://www.co.thurston.wa.us/tcweeds/weed-list.htm>.		Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.	
Fences	Damaged Parts	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.	

Fencing/Shrubbery Screen/Other Landscaping					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
Fences (continued)	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.	

1w. Proprietary or Manufactured Products

- As with other stormwater BMPs in this guide, 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 guide 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 Tumwater will inspect proprietary products in accordance with the applicable inspection standards to ensure that maintenance is performed properly.

Group 2 – Structures and Pretreatment

2b. Catch Basins

These structures are typically located in the streets. The City of Tumwater 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**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General	Trash and Debris	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.	

Catch Basins

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
General (continued)	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.	
	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.	
	Fractures or Cracks in Basin Walls/ Bottom	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 re-grouted 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	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. *Report and coordinate source control, removal, and/or cleanup with City of Tumwater Spill Reporting Hotline 360-754-4150, Moderate Risk Waste Program at Thurston County Environmental Health 360-754–4111, and/or Dept. of Ecology Spill Response 800-424-8802.*	

Catch Basins

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
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 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.	
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.	
Metal Grates (if applicable)	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 inlet 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.	

2f. Coalescing Plate Oil/Water Separators

An underground vault or tank designed to separate oil from runoff water via gravity.

Coalescing Plate Oil/Water Separators					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General	Dirty Discharge Water	Inspect discharge water for obvious signs of poor water quality.		Effluent discharge from vault should be clear with no thick visible sheen.	
	Sediment Accumulation	Sediment depth in bottom of vault exceeds 6 inches in depth and/or visible signs of sediment on plates.		Remove sediment deposits on vault bottom and plate media that would impede flow through the vault and reduce separation efficiency.	
	Trash and Debris	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.		No trash or debris present. Remove and properly dispose of all trash and debris from vault and inlet/outlet piping.	
	Oil Accumulation	Oil accumulation at the water surface.		Oil is extracted from vault using vactoring methods. Dispose of in accordance with state and local rules and regulations. Coalescing plates are cleaned by thoroughly rinsing and flushing. Direct wash-down effluent to the sanitary sewer system where permitted. There should be no visible oil depth on water.	
Structure	Damaged Coalescing Plates	Plate media broken, deformed, cracked and/or showing signs of failure.		A portion of the media pack or the entire plate pack is replaced depending on severity of failure.	
	Damaged Pipes	Inlet or outlet piping damaged or broken or in need of repair.		Pipe repaired and or replaced.	
	Baffles	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.		Baffles repaired or replaced to specifications.	

Coalescing Plate Oil/Water Separators

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
Structure (continued)	Vault Structure Damage – Includes Cracks. Damage to Frame and/or Top Slab	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 replaced or repairs made so that vault meets design specifications and is structurally sound.	
	Vault Structure Damage – Includes Cracks. Damage to Frame and/or Top Slab	Cracks wider than 0.5 inch at the joint of any inlet/outlet pipe or soil particles entering through the cracks.		Vault repaired so that no cracks exist wider than 0.25 inch at the joint of the inlet/outlet pipe.	
	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.		Replace or repair ladder so it meets specifications and is safe to use as determined by inspection.	

2h. Sumps

Sumps are typically located within other structures, such as a catch basin or vault. Sumps collect sediment and debris in a location convenient for cleaning. The City of Tumwater is responsible for routine maintenance of structures and sumps in the public rights-of- way, while the property owner or homeowners' association is responsible for maintenance of structures and sumps in private areas.

Sumps					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General	Trash and Debris	Trash or debris (in sump) that exceeds 60 percent of the sump depth as measured from bottom of sump to invert of the lowest pipe into or out of the sump, 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 sump.	
	Sediment	Sediment (in sump) 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 sump.	

Sumps

Drainage System Feature	Problem or Defect	Conditions to Check For	Maintenance Required (Y/N)	What To Do for Desired Condition	Date Maintenance Completed
General (continued)	Structure Damage to Frame and/or Top Slab (if applicable)	Top slab has holes larger than 2 square inches or cracks wider than 0.25 inch.		Top slab is free of holes and cracks.	
	Fractures or Cracks in Basin Walls/ Bottom	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 sump.		Pipe re-grouted and secure at sump wall.	
	Settlement/ Misalignment	If failure of sump has created a safety, function, or design problem.		Replaced or repair to design standards.	
	Vegetation	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. *Report and coordinate source control, removal, and/or cleanup with City of Tumwater Spill Reporting Hotline 360-754-4150, Moderate Risk Waste Program at Thurston County Environmental Health 360-754– 4111, and/or Dept. of Ecology Spill Response 800-424-8802.*	
Sump Cover (if applicable)	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.		Sump 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.	

Sumps					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
Sump Cover (if applicable) (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.	
Ladder (if applicable)	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.	
Metal Grates (if applicable)	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 inlet 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.	

Group 3 – Miscellaneous Facilities and 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**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
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.	
Open Ditches	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.	
Open Ditches and Swales	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.	

Conveyance Pipes, Culverts, Ditches, and Swales					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
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.	
	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.	

3b. Access Roads and Easements

These features provide access to drainage facilities for inspection and/or maintenance.

Access Roads and Easements					
Drainage System Feature	**Problem or Defect**	**Conditions to Check For**	**Maintenance Required (Y/N)**	**What To Do for Desired Condition**	**Date Maintenance Completed**
General	Access	Check to determine if there is adequate access to your stormwater facilities for maintenance vehicles.		If there is not adequate access, check with the city to determine whether an easement exists. If so, a maintenance road may need to be constructed there.	
Access Road	Blocked Roadway	Debris that could damage vehicle tires (glass or metal).		Clear all potentially damaging material.	
	Blocked Roadway	Any obstructions that reduce clearance above and along the road to less than the required width (minimum of 15 feet).		Clear above and along roadway so there is enough clearance.	
Road Surface	Bad Road Conditions	Check for potholes, ruts, mushy spots, or woody debris that limits access by maintenance vehicles.		Add gravel or remove wood as necessary.	
Shoulders and Ditches	Erosion	Check for erosion along roadway.		Repair erosion with additional soil or gravel.	

Contech Filterra Maintenance Details:

Routine Maintenance Guidelines

With proper routine maintenance, the biofiltration media within the Filterra system should last as long as traditional bioretention media. Routine maintenance is included by the manufacturer on all Filterra systems for the first year after activation. This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation. More information is provided in the Operations and Maintenance Guidelines. Some Filterra systems also contain pretreatment or outlet bays. Depending on site pollutant loading, these bays may require periodic removal of debris, however this is not included in the first year of maintenance, and would likely not be required within the first year of operation.

These services, as well as routine maintenance outside of the included first year, can be provided by certified maintenance providers listed on the Contech website. Training can also be provided to other stormwater maintenance or landscape providers.

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons to maintain are:

- Avoiding legal challenges from your jurisdiction's maintenance enforcement program.
- Prolonging the expected lifespan of your Filterra media.
- Avoiding more costly media replacement.
- Helping reduce pollutant loads leaving your property.

Simple maintenance of the Filterra is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living biofilter system. The unit will recycle and accumulate pollutants within the biomass, but is also subjected to other materials entering the inlet. This may include trash, silt and leaves etc. which will be contained above the mulch layer. Too much silt may inhibit the Filterra's flow rate, which is the reason for site stabilization before activation. Regular replacement of the mulch stops accumulation of such sediment.

When to Maintain?

Contech includes a 1-year maintenance plan with each system purchase. Annual included maintenance consists of a maximum of two (2) scheduled visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated.

Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required; regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency; e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented may require additional maintenance visits.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Supplier and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the (maintenance) Supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance to the Supplier (i.e. no pruning or fertilizing) during the first year.

Exclusion of Services

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra (where the cleaned runoff drains to, such as drop inlet) and block off the throat of the Filterra. The Supplier should be informed immediately.

Maintenance Visit Summary

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of Filterra and surrounding area
2. Removal of tree grate and erosion control stones
3. Removal of debris, trash and mulch
4. Mulch replacement
5. Plant health evaluation and pruning or replacement as necessary
6. Clean area around Filterra
7. Complete paperwork

Maintenance Tools, Safety Equipment and Supplies

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes. A T-Bar or crowbar should be used for moving the tree grates (up to 170 lbs ea.). Most visits require minor trash removal and a full replacement of mulch. See below for actual number of bagged mulch that is required in each media bay size. Mulch should be a double shredded, hardwood variety. Some visits may require additional Filterra engineered soil media available from the Supplier.

Box Length	Box Width	Filter Surface Area (ft^2)	Volume at 3" (ft^3)	# of 2 ft^3 Mulch Bags
4	4	4	4	2
6	4	6	6	3
8	4	8	8	4
6	6	9	9	5
8	6	12	12	6
10	6	15	15	8
12	6	18	18	9
13	7	23	23	12

Exclusion of Services

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra (where the cleaned runoff drains to, such as drop inlet) and block off the throat of the Filterra. The Supplier should be informed immediately.

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Box Length	Box Width	Filter Surface Area (ft^2)	Volume at 3" (ft^3)	# of 2 ft^3 Mulch Bags
4	4	4	4	2
6	4	6	6	3
8	4	8	8	4
6	6	9	9	5
8	6	12	12	6
10	6	15	15	8
12	6	18	18	9
13	7	23	23	12

4. Mulch replacement

- Add double shredded mulch evenly across the entire unit to a depth of 3".
- Refer to Filterra Mulch Specifications for information on acceptable sources.
- Ensure correct repositioning of erosion control stones by the Filterra inlet to allow for entry of trash during a storm event.
- Replace Filterra grates correctly using appropriate lifting or moving tools, taking care not to damage the plant.

5. Plant health evaluation and pruning or replacement as necessary

- Examine the plant's health and replace if necessary.
- Prune as necessary to encourage growth in the correct directions

Record on Maintenance Report the following:

Height above Grate	_____ (ft)
Width at Widest Point	_____ (ft)
Health	healthy | unhealthy
Damage to Plant	yes | no
Plant Replaced	yes | no

6. Clean area around Filterra

- Clean area around unit and remove all refuse to be disposed of appropriately.

7. Complete paperwork

- Deliver Maintenance Report and photographs to appropriate location (normally Contech during maintenance contract period).
- Some jurisdictions may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

Maintenance Checklist

Drainage System Failure	Problem	Conditions to Check	Condition that Should Exist	Actions
Inlet	Excessive sediment or trash accumulation.	Accumulated sediments or trash impair free flow of water into Filterra.	Inlet should be free of obstructions allowing free distributed flow of water into Filterra.	Sediments and/or trash should be removed.
Mulch Cover	Trash and floatable debris accumulation.	Excessive trash and/or debris accumulation.	Minimal trash or other debris on mulch cover.	Trash and debris should be removed and mulch cover raked level. Ensure bark nugget mulch is not used.
Mulch Cover	"Ponding" of water on mulch cover.	"Ponding" in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils.	Stormwater should drain freely and evenly through mulch cover.	Recommend contact manufacturer and replace mulch as a minimum.
Vegetation	Plants not growing or in poor condition.	Soil/mulch too wet, evidence of spill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact manufacturer for advice.
Vegetation	Plant growth excessive.	Plants should be appropriate to the species and location of Filterra.		Trim/prune plants in accordance with typical landscaping and safety needs.
Structure	Structure has visible cracks.	Cracks wider than 1/2 inch or evidence of soil particles entering the structure through the cracks.		Vault should be repaired.
Maintenance is ideally to be performed twice annually.				

Filterra Inspection & Maintenance Log

Filterra System Size/Model: _____ Location: _____

Date	Mulch & Debris Removed	Depth of Mulch Added	Mulch Brand	Height of Vegetation Above Grate	Vegetation Species	Issues with System	Comments
1/1/17	*5 – 5 gal Buckets*	*3"*	*Lowe's Premium Brown Mulch*	*4'*	*Galaxy Magnolia*	*- Standing water in downstream structure*	*- Removed blockage in downstream structure*

CONTECH ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra® Maintenance Steps

1. Inspection of Filterra and surrounding area

2. Removal of tree grate and erosion control stones

3. Removal of debris, trash and mulch

4. Mulch replacement

5. Clean area around Filterra

6. Complete paperwork and record plant height and width

Contech has created a network of Certified Maintenance Providers (CCMP's) to provide maintenance on Filterra systems. To find a CCMP in your area please visit www.conteches.com/maintenance

Oldcastle Biopod Maintenance Details:

Oldcastle Infrastructure™
A CRH COMPANY

BIOPOD™ SYSTEM

WITH STORMMIX™ MEDIA

Inspection and Maintenance Guide

Water

BioPod™ Biofilter with StormMix™ Biofiltration Media

Description

The BioPod™ Biofilter System (BioPod) is a stormwater biofiltration treatment system used to remove pollutants from stormwater runoff. Impervious surfaces and other urban and suburban landscapes generate a variety of contaminants that can enter stormwater and pollute downstream receiving waters unless treatment is provided. The BioPod system uses proprietary StormMix™ biofiltration media to capture and retain pollutants including total suspended solids (TSS), metals, nutrients, gross solids, trash and debris as well as petroleum hydrocarbons.

Function

The BioPod system uses engineered, high-flow rate filter media to remove stormwater pollutants, allowing for a smaller footprint than conventional bioretention systems. Contained within a compact precast concrete vault, the BioPod system consists of a biofiltration chamber and an optional integrated high-flow bypass with a contoured inlet rack to minimize scour. The biofiltration chamber is filled with horizontal layers of aggregate (which may or may not include an underdrain), biofiltration media and mulch. Stormwater passes vertically down through the mulch and biofiltration media for treatment. The mulch provides pretreatment by retaining most of the solids or sediment. The biofiltration media provides further treatment by retaining finer sediment and dissolved pollutants. The aggregate allows the media bed to drain evenly for discharge through an underdrain pipe or by infiltration.

Configuration

The BioPod system can be configured with either an internal or external bypass. The internal bypass allows both water quality and bypass flows to enter the treatment vault. The water quality flows are directed to the biofiltration chamber while the excess flows are diverted over the bypass weir without entering the biofiltration chamber. Both the treatment and bypass flows are combined in the outlet area prior to discharge from the structure. BioPod units without an internal bypass are designed such that only treatment flows enter the treatment structure. When the system has exceeded its treatment capacity, ponding will force bypass flows to continue down the gutter to the nearest standard catch basin or other external bypass structure.

The BioPod system can be configured as a tree box filter with tree and grated inlet, as a planter box filter with shrubs, grasses and an open top, or as an underground filter with access risers, doors and a subsurface inlet pipe. The optional internal bypass may be incorporated with any of these configurations. In addition, an open bottom configuration may be used to promote infiltration and groundwater recharge. The configuration and size of the BioPod system is designed to meet the requirements of a specific project.

Inspection & Maintenance Overview

State and local regulations require all stormwater management systems to be inspected on a regular basis and maintained as necessary to ensure performance and protect downstream receiving waters. Without maintenance, excessive pollutant buildup can limit system performance by reducing the operating capacity of the system and increasing the potential for scouring of pollutants during periods of high flow.

Some configurations of the BioPod may require periodic irrigation to establish and maintain vegetation. Vegetation will typically become established about two years after planting. Irrigation requirements are ultimately dependent on climate, rainfall and the type of vegetation selected.

Maintenance Frequency

Periodic inspection is essential for consistent system performance and is easily completed. Inspection is typically conducted a minimum of twice per year, but since pollutant transport and deposition varies from site to site, a site-specific maintenance frequency should be established during the first two or three years of operation.

Inspection Equipment

The following equipment is helpful when conducting BioPod inspections:

- Recording device (pen and paper form, voice recorder, iPad, etc.)
- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure

Inspection Procedures

BioPod inspections are visual and are conducted without entering the unit. To complete an inspection, safety measures including traffic control should be deployed before the access covers or tree grates are removed. Once the covers have been removed, the following items should be checked and recorded (see form provided on page 6) to determine whether maintenance is required:

- If the BioPod unit is equipped with an internal bypass, inspect the contoured inlet rack and outlet chamber and note whether there are any broken or missing parts. In the unlikely event that internal parts are broken or missing, contact Oldcastle Infrastructure at (800) 579-8819 to determine appropriate corrective action.
- Note whether the curb inlet, inlet pipe, or – if the unit is equipped with an internal bypass – the inlet rack is blocked or obstructed.
- If the unit is equipped with an internal bypass, observe, quantify and record the accumulation of trash and debris in the inlet rack. The significance of accumulated trash and debris is a matter of judgment. Often, much of the trash and debris may be removed manually at the time of inspection if a separate maintenance visit is not yet warranted.
- If it has not rained within the past 24 hours, note whether standing water is observed in the biofiltration chamber.
- Finally, observe, quantify and record presence of invasive vegetation and the amount of trash and debris and sediment load in the biofiltration chamber. Erosion of the mulch and biofiltration media bed should also be recorded. Sediment load may be rated light, medium or heavy depending on the conditions. Loading characteristics may be determined as follows:
  - Light sediment load – sediment is difficult to distinguish among the mulch fibers at the top of the mulch layer; the mulch appears almost new.
  - Medium sediment load – sediment accumulation is apparent and may be concentrated in some areas; probing the mulch layer reveals lighter sediment loads under the top 1" of mulch.
  - Heavy sediment load – sediment is readily apparent across the entire top of the mulch layer; individual mulch fibers are difficult to distinguish; probing the mulch layer reveals heavy sediment load under the top 1" of mulch.

Often, much of the invasive vegetation and trash and debris may be removed manually at the time of inspection if a separate maintenance visit is not yet warranted.

Maintenance Indicators

Maintenance should be scheduled if any of the following conditions are identified during inspection:

- The concrete structure is damaged or the tree grate or access cover is damaged or missing.
- The curb inlet or inlet rack is obstructed.
- Standing water is observed in the biofiltration chamber more than 24 hours after a rainfall event (use discretion if the BioPod is located downstream of a storage system that attenuates flow).
- Trash and debris in the inlet rack cannot be easily removed at the time of inspection.
- Trash and debris, invasive vegetation or sediment load in the biofiltration chamber is heavy or excessive erosion has occurred.

Maintenance Equipment

The following equipment is helpful when conducting DVS maintenance:

- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Rake, hoe, shovel and broom
- Bucket
- Pruners
- Vacuum truck (optional)

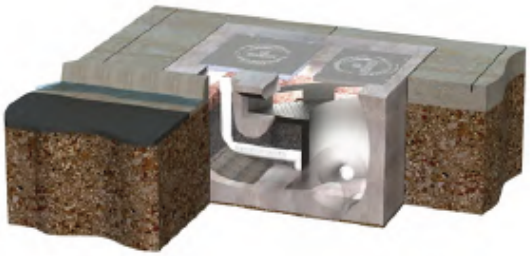
Maintenance Procedures

Maintenance should be conducted during dry weather when no flows are entering the system. All maintenance may be conducted without entering the BioPod structure. Once safety measures such as traffic control are deployed, the access covers may be removed and the following activities may be conducted to complete maintenance:

- Remove all trash and debris from the curb inlet and inlet rack manually or by using a vacuum truck as required.
- Remove all trash and debris and invasive vegetation from the biofiltration chamber manually or by using a vacuum truck as required.
- If the sediment load is medium or light but erosion of the biofiltration media bed is evident, redistribute the mulch with a rake or replace missing mulch as appropriate. If erosion persists, rocks may be placed in the eroded area to help dissipate energy and prevent recurring erosion.
- If the sediment load is heavy, remove the mulch layer using a hoe, rake, shovel and bucket, or by using a vacuum truck as required. If the sediment load is particularly heavy, inspect the surface of the biofiltration media once the mulch has been removed. If the media appears clogged with sediment, remove and replace one or two inches of biofiltration media prior to replacing the mulch layer.
- Prune vegetation as appropriate and replace damaged or dead plants as required.
- Replace the tree grate and/or access covers and sweep the area around the BioPod to leave the site clean.
- All material removed from the BioPod during maintenance must be disposed of in accordance with local environmental regulations. In most cases, the material may be handled in the same manner as disposal of material removed from sumped catch basins or manholes.

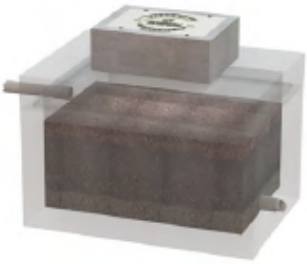
Natural, shredded hardwood mulch should be used in the BioPod. Timely replacement of the mulch layer according to the maintenance indicators described above should protect the biofiltration media below the mulch layer from clogging due to sediment accumulation. However, whenever the mulch is replaced, the BioPod should be visited 24 hours after the next major storm event to ensure that there is no standing water in the biofiltration chamber. Standing water indicates that the biofiltration media below the mulch layer is clogged and must be replaced. Please contact Oldcastle Infrastructure at (800) 579-8819 to purchase the proprietary StormMix™ biofiltration media.

BioPod Tree Module



BioPod Media Module

BioPod Planter Module



BioPod Media Vault

BioPod Inspection & Maintenance Log

BioPod Model_____ Inspection Date_____

Location_____

Condition of Internal Components Notes:

☐ Good ☐ Damaged ☐ Missing

Curb Inlet or Inlet Rack Blocked Notes:

☐ Yes ☐ No

Standing Water in Biofiltration Chamber Notes:

☐ Yes ☐ No

Trash and Debris in Inlet Rack Notes:

☐ Yes ☐ No

Trash and Debris in Biofiltration Chamber Notes:

☐ Yes ☐ No

Invasive Vegetation in Biofiltration Chamber Notes:

☐ Yes ☐ No

Sediment in Biofiltration Chamber Notes:

☐ Light ☐ Medium ☐ Heavy

Erosion in Biofiltration Chamber Notes:

☐ Yes ☐ No

Maintenance Requirements

☐ **Yes - Schedule Maintenance** ☐ **No - Schedule Re-Inspection**

Log Sheet

Use log sheets to track maintenance checks and what items, if any, are repaired or altered. Make copies of this page; use a fresh copy for each inspection. The completed sheets will serve as a record of maintenance activity and will provide valuable information about how your facilities are operating. Log sheets should be kept in a dry, readily accessible place.

INSPECTION DATE: _____

PERFORMED BY: _____

PHONE NUMBER: _____ **ADDRESS:** _____

POSITION ON HOA: _____ **CITY, ST, ZIP:** _____

PART OF FACILITY INSPECTED	OBSERVATIONS (LIST REQUIRED MAINTENANCE ACTIVITIES)	ACTION TAKEN	DATE OF ACTION

Exhibit A:

THAT PORTION THE WEST HALF OF SECTION 10, TOWNSHIP 17 NORTH, RANGE 2 WEST, W.M. DESCRIBED AS FOLLOWS:
COMMENCING AT A POINT ON THE EAST LINE OF SAID WEST HALF A DISTANCE OF 2,099.85 FEET NORTH 01° 57’ 21” EAST OF THE SOUTHEAST CORNER THEREOF; THENCE NORTH 88° 02’ 39” WEST 50.00 FEET TO THE WEST RIGHT OF WAY OF CENTER STREET SW AND THE TRUE POINT OF BEGINNING; THENCE NORTH 88° 02’ 39” WEST 723.00 FEET; THENCE NORTH 01° 57’ 21” EAST 174.00 FEET; THENCE NORTH 88° 02’ 39” WEST 476 FEET; THENCE NORTH 88° 02’ 39” W 8 FEET; THENCE SOUTH 01° 57’ 21” WEST 282 FEET; THENCE NORTH 88° 02’ 39” WEST 75.50 FEET TO THE EAST LINE OF JOHN CORNELL DONATION LAND CLAIM NO. 40 IN SAID TOWNSHIP 17 NORTH; THENCE SOUTH 01° 57’ 21” WEST ALONG SAID EAST LINE 638.76 FEET; THENCE SOUTH 88° 02’ 39” EAST 872.50 FEET TO A POINT ON THE WEST LINE OF THE EAST 460.00 FEET OF SAID WEST HALF A DISTANCE OF 980.00 FEET NORTHERLY, AS MEASURED AT THAT ANGLES TO THE SOUTH LINE OF SAID WEST HALF; THENCE NORTH 01° 57’ 21” EAST ALONG SAID WEST LINE 439.79 FEET TO THE NORTH LINE OF THE SOUTH 1,420.00 FEET OF SAID WEST HALF; THENCE SOUTH 88° 11’ 11” EAST ALONG SAID NORTH LINE 110.00 FEET TO THE WEST LINE OF THE EAST 350.00 FEET OF SAID WEST HALF; THENCE NORTH 01° 57’ 21” EAST ALONG SAID WEST LINE 104.00 FEET TO THE NORTH LINE OF THE SOUTH 1,524.00 FEET OF SAID WEST HALF; THENCE SOUTH 88° 11’ 11” EAST ALONG SAID NORTH LINE 300.00 FEET TO THE WEST RIGHT OF WAY OF CENTER STREET SW; THENCE NORTH 01° 57’ 21” EAST ALONG SAID WEST RIGHT OF WAY 575.97 FEET TO THE TRUE POINT OF BEGINNING
CONTAINING 29.17 ACRES
ALSO KNOW AS LEASE AREA FOR SOUTH SOUND COMMERCE CENTER.