

# Stormwater Site Management Plan

Briggs Village – West Residential Phase 1  
Olympia, WA

**Prepared For:**

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**Prepared By:**

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March 2018



## **Appendix IV-H2 - Corporate:**

### **Agreement to Maintain Stormwater Facilities**

(CORPORATE VERSION)

AGREEMENT TO MAINTAIN  
STORMWATER FACILITIES AND TO IMPLEMENT A  
POLLUTION SOURCE CONTROL PLAN  
BY AND BETWEEN THE CITY OF OLYMPIA  
(HEREINAFTER "THE CITY") AND  
BRIGGS RE-DEVELOPMENT, LLC, AND  
ITS HEIRS, SUCCESSORS, OR ASSIGNS  
(HEREINAFTER "OWNER")

Any and all owners are equally and fully responsible for the entire system as a more particularly described below.

The upkeep and maintenance of stormwater facilities and the implementation of pollution source control best management practices (BMPs) is essential to the protection of water resources in the City of Olympia and Puget Sound. All property owners are expected to conduct business in a manner that promotes environmental protection. This Agreement contains specific provisions with respect to maintenance of stormwater facilities and use of pollution source control BMPs. The authority to require maintenance and pollution source control is provided by ordinance.

LEGAL DESCRIPTION:

PARCEL B OF BLA-09-0124-OL AS RECORDED UNDER AUDITOR'S FILE NUMBER 4117431 AND AS CORRECTED UNDER AFFIDAVIT OF MINOR CORRECTIONS OF SURVEY FOR BOUNDARY LINE ADJUSTEMENT, AUDITORS FILE NUMBER 4162738, RECORDS OF THURSTON COUNTY, WASHINGTON.

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

OWNER SHALL:

- (1) Implement the Stormwater Facility Maintenance Program included herein as Attachment "A".
- (2) Implement the Pollution Source Control Program included herein as Attachment "B".
- (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 staff at Owner's business 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-on actions recommended. Maintenance items ("problems") listed in Attachment "A" shall be inspected on a monthly or more frequent basis as necessary. Owner is encouraged to photocopy the individual checklists in Attachment A and use them to complete its monthly

inspections. These completed checklists would then, in combination, comprise the monthly log book.

- (4) Submit an annual report to the City regarding implementation of the programs referenced in (1) and (2) above. The report must be submitted on or before May 15 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 stormwater facilities, including protected soil or vegetated areas serving a stormwater management function, and prevent them from being dismantled, revised, altered, or removed except as necessary for maintenance, repair, or replacement. Any such maintenance actions will be reported and covered under item 4 above and shall be approved of by the City of Olympia. Modifications to the stormwater quantity control and stormwater quality system must be approved in advance by The City and may require the submittal of revised design drawings, supporting calculations, modifications to maintenance agreements, and applications for permits.
- (6) Only slow release fertilizers shall be applied for the life of the development at a maximum amount of 4 lbs of nitrate as Nitrogen annually and no more than 1 lb. per application for every 1,000 square feet of turf grass. Only fertilizer formulas with a minimum of 50% water insoluble form of nitrogen are permitted for use. Approved water insoluble forms of nitrogen include sulfur and/or polymer coated fertilizers, Isobutylidene Diurea (IBDU), Methylene Urea and Ureaform, and organic fertilizers registered with Washington Department of Agriculture.

THE CITY 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 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 and program attachments with Owner and modify it as necessary.
- (4) The City will supplement maintenance of bioretention facilities installed for stormwater code compliance within the right-of-way. The City will enter bioretention facilities in the City's maintenance program after the first three (3) years of plant establishment. The Owner is

solely responsible for the first three years of plant establishment. City maintenance focuses on function, not aesthetics and includes removal of noxious weeds and rehabilitating the system should the ponded area hold water for more than 48-hours past the end of a rain event. Maintenance for aesthetic purposes is the responsibility of the adjacent property owner. *(Include this item only with developments constructing bioretention facilities associated with frontage improvements)*

#### REMEDIES:

- (1) If the City determines that maintenance or repair work is required to be done to the stormwater facility existing on the Owner property, City shall give Owner within which the drainage facility is located, and the person or agent in control of said property if different, notice of the specific maintenance and/or repair required. The City shall set a reasonable time in which such work is to be completed by the persons who were given notice. If the above required maintenance and/or repair is not completed within the time set, written notice will be sent to the persons who were given notice stating the City's intention to perform such maintenance and bill Owner for all incurred expenses. **The expenses charged to the Owner shall become a charge on the Owner's stormwater utility bill and may be collected by the City in the manner authorized for collection of such utility bills.**
- (2) If at any time the City determines that the existing system creates any imminent threat to public health or welfare, the City may take immediate measures to remedy said threat. No notice to the persons listed in (1), above, shall be required under such circumstances.
- (3) The Owner grants authority to the City for access to any and all stormwater system features for the purpose of inspection, and performing maintenance or repair as may become necessary under Remedies (1) and/or (2). A grant to the Department for the purposes of: providing pollution prevention outreach to residents, employees, and contractors. Access may include but is not limited to: interpretive sign installation, model home displays, demonstration sites, conducting interviews and surveys, observing practices, and distributing informational materials. The Department is to ensure compliance with all items described under 18.32.225 Section A.
- (4) The persons listed in (1), above, shall assume all responsibility for the cost of any maintenance and for repairs to the stormwater facility. Such responsibility shall include reimbursement to the City 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 the City will be borne by the parties responsible for said reimbursements.
- (5) The owner hereby grants to the City a lien against the above-described property in an amount equal to the cost incurred by the City to perform the maintenance or repair work described herein.

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. It shall run with 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.

Dated at \_\_\_\_\_, Washington, this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

OWNER

By: \_\_\_\_\_  
Authorized Agent for Owner  
\_\_\_\_\_

STATE OF WASHINGTON        )  
  ) ss  
COUNTY OF THURSTON        )

On this day and year above personally appeared before me, a Notary Public in and for the State of Washington duly commissioned and sworn, personally appeared \_\_\_\_\_, to me known to be the \_\_\_\_\_ of \_\_\_\_\_ and acknowledge the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that \_\_\_\_\_ is authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal the day and year first above written.

\_\_\_\_\_  
Notary Public in and for the State of  
Washington, residing in \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_

Dated at \_\_\_\_\_, Washington, this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

CITY OF OLYMPIA

By: \_\_\_\_\_  
Authorized Agent for City

STATE OF WASHINGTON     )  
  ) ss  
COUNTY OF THURSTON    )

On this day and year above personally appeared before me, \_\_\_\_\_, to me known to be acting as Authorized Agent for \_\_\_\_\_, a Municipal Corporation, who executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said Municipal Corporation for the uses and purposes therein mentioned and on oath states he is authorized to execute the said instrument.

Given under my hand and official seal this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Notary Public in and for the State of  
Washington, residing in \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

APPROVED AS TO FORM:

\_\_\_\_\_  
City Attorney

## **Appendix IV-B1:**

### **Residential Pollution Source Control Program**

## **Pollution Source Control Program**

*A Pollution Prevention Manual For Residents of*

*Briggs West Residential Phase 1*

*Date: September 2017*

### **Legal Description:**

*PARCEL B OF BLA-09-0124-OL AS RECORDED UNDER AUDITOR'S FILE NUMBER 4117431 AND AS CORRECTED UNDER AFFIDAVIT OF MINOR CORRECTIONS OF SURVEY FOR BOUNDARY LINE ADJUSTEMENT, AUDITORS FILE NUMBER 4162738, RECORDS OF THURSTON COUNTY, WASHINGTON*

**Program Operator:** *Briggs Re-Development, LLC, Gordie Gill*

**Watershed:** *Budd/Deschutes*

**Program Document Prepared by:** *Amy Head, PE, SCJ Alliance*

# Table of Contents

## Cover Sheet – Program Information

### 1.0 Introduction

About this Manual

Best Management Practices...What are they?

- Source Control BMPs
- Treatment BMPs

What's in this manual?

### 2.0 Stormwater Facilities in Your Neighborhood and on Your Lot

### 3.0 General Principles of Pollution Prevention

### 4.0 Best Management Practices for Single Family Residences

1. Automobile Washing
2. Automobile Maintenance
3. Storage of Solid Waste and Food Wastes
4. Composting
5. Swimming Pool and Spa Cleaning and Maintenance
6. Household Hazardous Material Use, Storage and Disposal
7. Pet Waste Management
8. Activities in Wetlands and Wetland Buffers
9. Illicit Discharge Detection and Elimination
10. Pests and Noxious Weeds

## 1.0 Introduction

### About this Manual

Thurston County's water resources – its streams, lakes, wetlands, groundwater, and Puget Sound – play an important role in the quality of life we enjoy. They provide us with recreation, drinking water, support tourism and salmon, and are used by industry. These waters, however, are vulnerable to pollution from a wide variety of human activities.

This manual applies to those residential properties and activities within the City of Olympia and its Urban Growth Area (UGA) that have the potential to contribute pollutants to stormwater runoff or directly to receiving waters. Stormwater runoff may seep into the ground, empty into a storm drain or a drainage ditch, or flow over the ground surface. Regardless of the way runoff leaves your site, it ends up in a stream river, lake, wetland, groundwater, or Puget Sound.

Contaminated stormwater can negatively affect every water body it enters. Therefore, this manual provides detailed information on what you can do to reduce the contamination of surface water, groundwater, and stormwater from your property.

Many of our water pollution problems are due in large part to pollutants washed off the land surface by storms. The quality of "stormwater" from residential properties is an increasing concern nationwide. Many people believe that stormwater is "clean" and does not harm water quality. This perception is understandable since the amount of pollution from any one place is not usually significant by itself. However, when all these small amounts are combined, they can cause significant pollution problems.

The federal Clean Water Act mandates that cities and counties control the quality of stormwater runoff. One way to achieve this is to implement pollution prevention measures on individual properties. By following the "Best Management Practices" described in this manual you can do your part to protect our streams, groundwater, and Puget Sound.

### Best Management Practices ... What are They?

Best Management Practices (BMPs) are a set of activities designed to reduce stormwater pollution. BMPs are separated into two broad categories: **source control** and **treatment**.

#### Source Control BMPs

**Source control BMPs** prevent contaminants from entering stormwater runoff by controlling them at the source. Some source control BMPs are operational, such as checking regularly for leaks and drips from equipment and vehicles, covering materials that have potential to add pollutants to surface water if rainwater comes in contact with the materials, cleaning up pet waste, and minimizing use of pesticides, fertilizers, and insecticides. Other source control BMPs require use of a structure to prevent rainwater from contacting materials that will contaminate stormwater runoff such as provide a covered area or berm to prevent clean stormwater from entering work or storage areas.

#### Treatment BMPs

In contrast, **treatment BMPs** are structures that treat stormwater to remove contaminants. Treatment BMPs typically require elaborate planning, engineering design, and construction. A stormwater pond for your subdivision is an example of a *treatment BMP*. No treatment BMP is capable of removing 100

percent of the contaminants in stormwater; the less contaminants in stormwater prior to the treatment BMP, the more effective the BMP is.

Also remember that, just because there is a stormwater collection system where you live, it does not necessarily mean that the stormwater is treated. Many developments were created prior to requirements to treat stormwater. The runoff from your property may go directly or indirectly to a stream or wetland without any treatment.

This manual will focus on *source control* BMPs applicable to the routine practices of most owners of a single-family residence.

## **What is in This Manual?**

**This manual has been developed for the owners of single-family residences. If you are trying to get a building permit to construct a new home you may be required to submit a copy of this manual, or its equivalent, as part of your permit application and then record it with the Thurston County Auditor's office prior to receiving final approval of your project.**

**The manual is divided into three sections as follows:**

- **Introduction**
- **General Principles of Pollution Prevention**
- **Best Management Practices for Single-Family Residences**

**The general principles and best management practices described are based on the requirements of the *City of Olympia Drainage Design and Erosion Control Manual, Volume IV*.**

**This plan focuses on *source control* BMPs applicable to the routine practices and activities expected for a typical single-family residence.**

## **2.0 Stormwater Facilities in Your Neighborhood and on Your Lot**

The developed site will act as a single stormwater basin with all of the stormwater generated by the site, including roof runoff, being directed to the south kettle drainage facility. A water quality treatment system of contech stormfilters is proposed only for the pollution generating impervious surfaces (PGIS); roof runoff will be tight-lined to the stormwater system located in the roadway. The proposed facilities have been sized to provide treatment per *Volume V* of the *2016 DDECM* and infiltrate 100% of stormwater runoff generated. All treatment facilities have been sized using WWHM 2012. An analysis on the south kettle was also completed in WWHM 2012.

Catch basins are located along the curb line of the roadway. Two catch basins will contain contech stormfilters in them to treat the stormwater runoff prior to being released into the kettle.

### **3.0 General Principles of Pollution Prevention**

This section describes simple pollution prevention principles that every homeowner should consider. Most of these are common sense, “housekeeping” types of solutions. With collective action by individuals throughout the City of Olympia implementing these principles, the improvement in water quality can be substantial. There are 15 general principles of pollution prevention.

#### **1. Avoid the activity or reduce its occurrence**

Avoid potentially polluting activity or do it less frequently, especially if it takes place outdoors. Apply lawn care chemicals following directions and only as needed. Do not apply herbicides right before it rains.

#### **2. Move the activity indoors**

Move a potentially polluting activity indoors out of the weather. This prevents runoff contamination and provides more control for a cleanup if a spill occurs. For example, unload and store chemicals inside a garage area or shed instead of outside. Be safe and ensure any storage area is well ventilated and required building and fire code requirements are met.

#### **3. Cleanup spills quickly**

Promptly contain and cleanup solid and liquid pollutant leaks and spills on any exposed soil, vegetation, or paved area. Use readily available absorbents such as kitty litter to absorb spills and then sweep up the material and dispose of it in the garbage. Promptly repair or replace leaking connections, pipes, hoses, valves, etc. on vehicles and equipment you own.

#### **4. Use less material**

Do not buy or use more material than you really need. Not only does this help keep potential disposal, storage, and pollution problems to a minimum, but may save money too.

#### **5. Use the least toxic materials available**

Investigate the use of materials that are less toxic. For example, replace a caustic-type detergent or solvent with a more environmentally friendly product. Even if you do switch to a biodegradable product, remember that only uncontaminated water is allowed to enter the stormwater drainage system.

#### **6. Create and maintain vegetated areas near activity locations**

Vegetation can filter pollutants out of stormwater. Route stormwater from parking and work areas through vegetated areas. Remember that wastewater other than stormwater runoff, such as wash water, must be discharged to a wastewater collection system (sewer or septic system), and may not be discharged to a storm drainage system.

#### **7. Locate activities as far as possible from surface drainage paths**

Activities located as far as possible from known drainage paths such as 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 features. This give 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. Do not forget that groundwater protection is important throughout the City of Olympia and Thurston County, no matter where the activity is located, so the actions you take on a day-to-day basis area are always important, even in dry weather.

## **8. Maintain stormwater drainage systems**

Pollutants can concentrate over time in storm drainage facilities such as catch basins, ditches, and storm drains. When a large storm event occurs, turbulent runoff can mobilize these pollutants and carry them to receiving waters. By performing regular maintenance on stormwater facilities located on your property, you can prevent this from occurring. Also, repair or replace cracked or otherwise damaged pavement in parking areas and any other drainage areas that are subject to pollutant material leaks or spills.

## **9. Reduce, reuse, and recycle as much as possible**

Look for ways to recycle instead of just disposing. This saves money and keeps hazardous and non-hazardous materials out of landfills. Contact City of Olympia Waste Resources for more information on recycling and organic disposal opportunities.

## **10. 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 manual to get them thinking about how their everyday activities affect water quality.

## **11. 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 Olympia, call the Water Resources Division of the Public Works Department at (360)753-8333 to report dumping to storm drains or ditches.

## **12. Provide oversight and training**

Talk to the members of your family, or if you are a landlord talk to your tenants, to ensure they understand the pollution prevention source control measures and BMPs described in this manual. If you are a landlord monitor the activities of your tenants to ensure that they are carrying out the principles of this manual.

## **13. Dust control**

Sweep paved parking and storage areas regularly 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 any receiving water (stream, wetland, lake, etc.). Do not use used oils or other petroleum products for dust control. Volumes of water used for light watering for dust control of dirt driveways or gravel roads should be conducted to prevent any runoff of stormwater from the surface.

## **14. Eliminate illicit connections**

A common problem with the stormwater drainage system for most communities is the existence of illicit connections of wastewater to the storm drainage system. Many businesses and residences have internal building drains, sump overflows, sump pumps, garage and outdoor sinks and showers, and even sanitary sewer and septic system pipes that were inadvertently connected to the nearby storm drainage system in the past.

Examine the plumbing system for your home 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 process treatment system. For

assistance in methods to detect and eliminate illicit connections contact the City of Olympia Public Works - Water Resources Division at (360)753-8333.

### **15. Dispose of waste properly**

Every business and residence in City of Olympia 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
- Recycling facilities
- Municipal solid waste disposal facilities
- Hazardous waste treatment, storage and disposal facilities.

Prior to disposing of any wastes to the City of Olympia sanitary sewer system, you should verify the material is not listed as a Prohibited Discharge under Olympia Municipal Code, Section 13.20.050.

## **4.0 Best Management Practices for Single Family Residences**

The actions we take each day in and around our homes have a profound effect on surface water quality and fish habitat. Stormwater goes directly to our groundwater, lakes, streams, and Puget Sound. It does not go to the wastewater treatment plant – any pollutants that get into stormwater can go directly to surface or ground water. Small amounts of pollution from many different sources can significantly affect our waterways.

Stormwater BMPs discussed in this section are practical ways to keep stormwater from becoming polluted in the first place. It is recommended that all residents in the City of Olympia use these BMPs. **Please note that some of these procedures are required by various state, county, or city laws, and are noted as required BMPs.**

This section provides a general list of activities typically conducted by homeowners and describes the BMPs that may be required or recommended to prevent stormwater pollution. The list includes brief information on applicability. More detailed information for the BMPs described in this section can be found in the City of Olympia Drainage Design and Erosion Control Manual, Volume IV or by contacting the City of Olympia Water Resources section of Public Works at (360)753-8333. BMPs for the following activities are described in this section:

1. Automobile Washing
2. Automobile Maintenance
3. Storage of Solid Wastes and Food Wastes
4. Composting
5. Yard Maintenance and Gardening
6. Swimming Pool and Spa Cleaning and Maintenance
7. Household Hazardous Material use, Storage, and Disposal
8. Pet Waste Management
9. Activities in Streams, Wetlands, and Wetlands Buffers
10. Illicit Discharge Detection and Elimination
11. Pest Management and Noxious Weeds

## 1. Automobile Washing

Many residents wash their cars in the driveway or on the street. Wash waters typically flow to a storm drain or ditch, which discharges stormwater directly to the underlying groundwater or to the nearest stream, lake, or Puget Sound. Soaps and detergents, even the biodegradable ones, can have immediate and long-term effects on aquatic life in water bodies. The grime washed off the car also contains a variety of pollutants that can harm fish and wildlife.

### Suggested BMPs

#### At Home:

- Wash your car directly over your lawn or make sure the wash water drains to a vegetated area. This allows the water and soap to soak into the ground instead of running off into a local water body.
- Ideally, no soaps or detergents should be used, but if you do use one, select one without phosphates.
- Commercial products are available that allow you to clean a vehicle without water. These were developed for areas where water is scarce, so a water saving benefit is realized, as well as reduced pollution.
- Use a hose nozzle with a shut-off valve to save water.
- Do not wash your car if rain is expected.
- Pour the bucket of soapy, dirty wash water down your sink. This way the water does not pollute surface water. Instead, it is treated at the wastewater treatment plant or by your septic system.

#### Away from Home:

- Consider not washing your car at home. Take it to a commercial car wash that has a recycle system and discharges wastewater to the sanitary sewer for treatment.

## 2. Automobile Maintenance

Many of us are “weekend mechanics”. We enjoy the cost savings of changing our own oil and antifreeze, topping off the battery with water, and generally making our car perform its best. There is a lot of potential for stormwater pollution associated with these activities; however, the following BMPs will help you minimize pollution while servicing your car, truck, van, or RV.

### Required BMPs

- Recycle all oils, antifreeze, solvents, and batteries. Many local car parts dealers and gas stations accept used oil and oil filters. The Household Hazardous Waste facilities at the Thurston County Waste and Recovery Center accept oil, oil filters, antifreeze, and solvents.
- Never dump new or used automotive fluids or solvents on the ground, in a storm drain or street gutter, or in a water body. Eventually, it will make its way to local surface waters or groundwater, including the water we drink.
- Do not mix wastes. The chlorinated solvents in some carburetor cleaners can contaminate a huge tank of used oil, rendering it unsuitable for recycling. Always keep your wastes in separate containers that are properly labeled and store them out of the weather.

### **Suggested BMPs**

- Fix all leaks, to keep the leaky material off streets and out of surface water.
- To dispose of oil filters, punch a hole in the top and let drain for 24 hours. This is where a large funnel in the top of your oil storage container will come in handy. After draining, wrap in two layers of plastic and dispose of in your regular garbage or recycle by taking it to the Thurston County Waste and Waste and Recovery Center. Call the City of Olympia Department of Public Works at (360) 753-8333 for up-to-date information on the appropriate disposal of consumer products.
- Use care in draining and collecting antifreeze to prevent accidental spills. Spilled antifreeze tastes sweet and can be deadly to animals they ingest it.
- Perform your service activities on concrete or asphalt or over a plastic tarpaulin to make spill cleanup easier. Keep a bag of kitty litter on hand to absorb spills. If there is a spill, sprinkle a good layer on the spill, let it absorb for a little while and then sweep it up. Place the contaminated litter in a plastic bag, tie it up, and dispose of it in your regular garbage. Take care not to leave kitty litter out in the rain; it will form a sticky goop that is hard to clean up.
- If you are doing body work outside, be sure to use a tarpaulin to catch material resulting from grinding, sanding, and painting. Dispose of this waste by double bagging in plastic and placing in your garbage.

### **3. Storage of Solid Wastes and Food Wastes**

Improper storage of food and solid waste at residences can lead to not only water pollution problems, but problems with neighborhood pets and vermin as well. Following the BMPs listed below can help keep your property a clean and healthy place to live.

#### **Suggested BMPs**

- Recycle as much as you can. City of Olympia residents have access to curbside pickup for yard waste and recyclable materials. Also, look under “recycling” in the phone book for firms that take other recyclables.
- All waste containers kept outside should have lids. If your lid is damaged, please call the City of Olympia Waste Resources department at (360) 753-8340
- Leaking waste containers should be replaced. If your container is damaged, please call your local solid waste hauler.
- Store waste containers under cover if possible, or on grassy areas.
- Inspect the storage area regularly to pick up loose scraps of material and dispose of them properly.
- Purchase products which have the least amount of packaging materials.
- Compost biodegradable materials such as grass clippings and vegetable scraps instead of throwing them away. Call City of Olympia Waste ReSources department at (360)753-8340 for more information on composting or information on yard waste collections. See the section on composting for BMPs relating to that activity.
- A fun alternative to traditional composting is worm composting. You can let worms do all the work for you by keeping a small vermiculture box just outside your kitchen. For more information on getting started with worms, call the number listed above.

## 4. Composting

Composting is an earth-friendly activity as long as some common sense rules outlined below are followed. If you choose to compost, the following BMPs should be utilized.

### Suggested BMPs

- Compost piles must be located on an unpaved area where runoff can soak into the ground or be filtered by grass and other vegetation. Compost piles should be located in an area of your yard not prone to water ponding during storms, and should be kept well away from wetlands, streams, lakes, and other drainage paths.
- Compost piles must be maintained and turned over regularly to work properly. Large piles of unattended compost may create odor and vermin problems.
- Avoid putting hazardous, inorganic, plastics or metal waste in the compost pile.
- Cover the compost pile (See Figure) for two reasons:
  - To keep stormwater from washing nutrients into waterways.
  - To keep excess water from cooling the pile. This slows down the rate of decomposition.
- Build bins of wood, chicken wire, or fencing material to contain compost so it can't be washed away. Visit the City of Olympia website [olympiawa.gov](http://olympiawa.gov) or contact Olympia Public Works at (360) 753-8333 to get free composter designs and materials lists.
- Building a small earthen dike around your compost pile is an effective means of preventing nutrient-rich compost drainage from reaching stormwater paths.

## 5. Yard Maintenance and Gardening

This section deals with the normal yard maintenance activities we all perform at our homes. Over watering, over fertilizing, improper herbicide application, and improper disposal of trimmings and clippings can all contribute to serious water pollution problems. Following the BMPs listed below will help alleviate pollutant runoff.

### Required BMPs

- Follow the manufacturer's directions exactly for mixing and applying herbicides, fungicides, and pesticides, and use them sparingly. Never apply when it is windy or when rain is expected. Never apply over water, within 100 feet of a well-head, or adjacent to streams, wetlands, or other water bodies. Triple-rinse empty containers, using the rinsate for mixing your next batch of spray, and then double-bag and dispose of the empty container in your regular garbage. Never dispose of grass clippings or other vegetation in or near storm drains, streams, lakes, or Puget Sound.

### Suggested BMPs

- Use natural, organic soil amendments when possible. The excellent soil conditioning properties of the organic matter aid water retention in lighter soils and help to break up and aerate heavier soils, so roots can grow better and less watering is needed. It contains both readily available and long term nitrogen and other nutrients commonly lacking in Northwest soils. The slow release of nitrogen better matches the needs of plants. Thus, there is much less potential for nitrates to leach into surface or groundwater due both to less "excess nitrogen" and less water use. Better vegetative growth can also reduce erosion and runoff.

- Follow manufacturer's directions when applying fertilizers. More is not better, either for your lawn or for local water bodies. Never apply fertilizers over water or adjacent to ditches, streams, or other water bodies. Remember that organic fertilizers have a slow release of nitrogen, and less potential to pollute than synthetic fertilizers.
- Save water and prevent pollution problems by watering your lawn sensibly. Lawns and gardens typically need the equivalent of 1 inch of rainfall per week. You can check on how you're doing by putting a wide mouth jar out where you're sprinkling, and measure the water with a small plastic ruler. Overwatering to the point of runoff can carry polluting nutrients to the nearest water body.
- Consider planting a vegetated buffer zone adjacent to streams or other water bodies on your property. Call the City of Olympia Water Resources - Environmental Services section for advice and assistance in developing a planting plan.
- Reduce the need for pesticides and fertilizers on lawns by improving the health of the soil. Aerating, thatching, and topdressing with compost will improve soil health and help desired grasses compete with weeds and moss. Contact the City of Olympia Water Resources - Environmental Services section for more information about the City's Go Green lawn care program.
- Make sure all fertilizers and pesticides are stored in a covered location. Rain can wash the labels off bottles and convert 50 pounds of boxed fertilizer into either a solid lump or a river of nutrients.
- Use a mulching mower and mow higher to improve soil/grass health and reduce or eliminate pesticide use.
- Compost all yard clippings, or use them as mulch to save water and keep down weeds in your garden. See Composting section for more information.
- Practice organic gardening and virtually eliminate the need to use pesticides and fertilizers.
- Pull weeds instead of spraying and get some healthy exercise, too. If you must spray, use the least toxic formulations that will get the job done.
- Work fertilizers into the soil instead of letting them lie on the ground surface exposed to the next rainstorm.
- Plant native vegetation that is suited to Northwest conditions, they require less water and little to no fertilizers and pesticides.
- Contact your local waste disposal company for curbside pickup and recycling of yard waste.
- Invasive weeds and insect pests are a common nuisance to for yards. Consider generating an Integrated Pest Management Plan to control weeds and pests with the least amount of pollution potential. See BMP #10 of this manual for more guidance.

## **6. Swimming Pool and Spa Cleaning and Maintenance**

Despite the fact that we immerse ourselves in it, the water from pools and spas is far from chemically clean. Nutrients, pH, and chlorine can adversely affect fish and wildlife in water bodies. Following these BMPs will ensure the cleanliness of your pool and the environment.

### **Required BMPs**

- Pool and spa water must be dechlorinated to 0.1 mg/L if it is to be emptied into a ditch or to the stormwater drainage system. Contact your pool chemical supplier to obtain the neutralizing chemicals you will need. The rate of flow into the ditch or drainage system must be regulated so that it does not cause problems such as erosion, surcharging, or flooding. Water discharged to the ground or a lawn must not cross property lines and must not produce runoff.
- If pool and spa water cannot be dechlorinated, it must be discharged to the sanitary sewer. Prior to draining, your local sewer provider must be notified to ensure they are aware of the volume of discharge and the potential effects of chlorine levels. A pool service company can help you determine the frequency of cleaning and backwash of filters.
- Diatomaceous earth used in pool filters cannot be disposed of in surface waters, on the ground, or into stormwater drainage systems or septic systems. Dry it out as much as possible, bag it in plastic, and dispose of at the landfill.

### **Suggested BMPs**

- Hire a professional pool service company to collect all pool water for proper disposal. Make sure to ask them where they will dispose of it and the kind of permits they hold to do so.

## **7. Household Hazardous Material Use, Storage and Disposal**

Once we really start looking around our houses, the amount of hazardous materials we have on site is a real eye-opener. Oil-based paints and stains, paint thinner, gasoline, charcoal starter fluid, cleaners, waxes, pesticides, fingernail polish remover, and wood preservatives are just a few hazardous materials that most of us have around the house.

When products such as these are dumped on the ground or in a storm drain, they can be washed directly to receiving waters where they can harm fish and wildlife. They can also infiltrate into the ground and contaminate drinking water supplies. The same problem can occur if they are disposed of with your regular garbage; the containers can leak at the landfill and contaminate groundwater. The same type of contamination can also occur if hazardous products are poured down a sink or toilet into a septic system. Don't pour them down the drain if you're on municipal sewers, either. Many compounds can "pass through" the wastewater treatment plant without treatment and contaminate receiving waters, or they can harm the biological process used at the treatment plant, reducing overall treatment efficiency.

With such a diversity of hazardous products present in all homes in City of Olympia, a large potential for serious environmental harm exists if improper methods of storage, usage, and disposal are employed. Using the following BMPs will help keep these materials out of our soils, sediments, and waters.

### **Required BMPs**

- Hazardous Materials must be used in accordance with the manufacturer recommendation or guidelines as shown on the label.
- Always store hazardous materials in properly labeled containers, never in food or beverage containers which could be misinterpreted by a child as something to eat or drink.
- Dispose of hazardous materials and their containers properly. Never dump products labeled as poisonous, corrosive, caustic, flammable, inflammable, volatile, explosive danger, warning, caution,

or dangerous outdoors, in a storm drain, or into sinks, toilets or drains. Call the City of Olympia Department of Public Works at (360) 753-8333 for information on disposal methods, collection events, and alternative products. Household hazardous wastes from City of Olympia residents and non-residents are accepted at the HazoHouse, at the Thurston County Waste and Recovery Center in Hawks Prairie at 2418 Hogum Bay Road NE.

### **Suggested BMPs**

- Check hazardous material containers frequently for signs of leakage. If a container is rusty and has the potential of leaking soon, place it in a secondary container before the leak occurs and prevent a cleanup problem.
- Hazardous materials should be stored out of the reach of children.
- Store hazardous materials containers under cover and off the ground. Keep them out of the weather to avoid rusting, freezing, cracking, labels being washed off, etc.
- Keep appropriate spill cleanup materials on hand. Kitty litter is good for many oil-based spills.
- Ground cloths and drip pans must be used under any work outdoors which involves hazardous materials such as oil-based paints, stains, rust removers, masonry cleaners, and others bearing label warnings as outlined above (See Figure).
- Latex paints are not a hazardous waste, but are not accepted in liquid form at the landfill. To dispose of, leave uncovered in a protected place until dry, then place in the garbage. If your can is at least half full, you can take it to the HazoHouse to be placed in Swap Shop area. If you wish to dry waste paint quickly, mix kitty litter or sawdust in the can to absorb the paint. Once paint is dry, leave the lid off when you place it in the garbage so your garbage collector can see that it is no longer liquid.
- Use less toxic products whenever possible. Ecology maintains a hotline at 1-800- RECYCLE, or see information online at <https://fortress.wa.gov/ecy/recycle/>
- If an activity involving the use of a hazardous material can be moved indoors out of the weather, then do so. Make sure you can provide proper ventilation, however.
- Follow manufacturers' directions in the use of all materials. Over-application of yard chemicals, for instance, can result in the washing of these compounds into receiving water bodies. Never apply pesticides when rain is expected.
- When hazardous materials are in use, place the container inside a tub or bucket to minimize spills and store materials above the local base flood elevation (BFE).

## **8. Pet Waste Management**

Pet waste that washes into lakes, streams or Puget Sound begins to decay, using up oxygen and releasing ammonia. Low oxygen levels and ammonia combined with warm water can kill fish. Pet waste also contains nutrients that encourage weed and algae growth in waters we use for swimming, boating and fishing. Most importantly, in many urban areas, pet and animal waste is the largest source of bacterial loading to streams. It can carry diseases that could make water unsafe for contact and lead to beach closures or affect shellfish harvest. These include:

- Campylobacteriosis—bacterial infection
- Salmonellosis—bacterial infection
- Toxocariasis—roundworm infection

- Toxoplasmosis—protozoan parasite infection
- Giardiasis—protozoan parasite infection
- Fecal Coliform—bacteria in feces, indicates contamination
- *E. coli*—bacteria in feces, may cause disease.

Cleaning up after your pet can be as simple as taking a plastic bag or pooper-scooper along on your next walk. Then choose one of the following.

### **Suggested BMPs**

- **Bag it** – Put waste in a securely closed bag and deposit it in the trash. Do not put it in your yard waste container because pet waste may carry diseases, and yard waste treatment may not kill disease organisms.
- **Bury it** – Bury waste at least 1 foot deep and cover with soil in your yard or garden (not in food-growing areas).
- **Flush it** – Only flush pet wastes if your home is served by a sanitary sewer which goes to a sewage treatment plant. Water from your toilet goes through a treatment process that removes pollutants before it is discharged into the environment. To prevent plumbing problems, don't flush debris or cat litter. Cat feces may be flushed, but used litter should be put in a securely closed bag in the trash. Septic systems are not designed to accommodate the high pollutant load of pet waste. To prevent premature failure or excessive maintenance costs do not flush pet wastes to your septic system.
- **Compost it** – waste from small animals **other than dogs and cats** (rabbits, rodents, etc.), can be put in your compost bin.

## **9. Activities in Wetlands and Wetland Buffers**

Wetlands and associated buffers are vegetated ecosystems through which water passes. These areas usually have a high water table and are often subject to periodic flooding. Wetlands can be very effective in removing sediments, nutrients and other pollutants from stormwater.

Maintaining wetlands and associated buffers helps to slow stormwater runoff, trap sediments and other pollutants and reduce the volume of runoff by allowing infiltration to occur. Reducing the velocity of runoff reduces soil erosion and increases contact time with soil and vegetation. Increasing contact of stormwater with soils and vegetation in a wetland or riparian area can be effective in removing sediments, nutrients and other pollutants from stormwater runoff.

Buffer areas are important to both the wetland and the upland areas as habitat for aquatic wetland-dependent wildlife and as buffers during extreme weather events. Other functions of buffer areas that contribute to water quality include shading, flood attenuation and shoreline stabilization.

Persons responsible for maintenance of wetland areas are encouraged to call City of Olympia Community Planning & Development (360)753-8314 prior to performing work in wetlands or their buffers.

## **Required BMPs**

- Removal by hand of manmade litter and control of noxious weeds that are included on the state noxious weed list (Washington Administrative Code [WAC] 16-750) or invasive plant species as identified by City of Olympia. Control may be conducted by clipping, pulling, over-shading with native tree and shrub species, or non-mechanized digging. Alternative methods such as mechanical excavation, barrier installation, or herbicide use may be allowed, but may require special permits with the City of Olympia.
- Check with City of Olympia Community Planning & Development on guidelines for vegetation and hazardous tree removal in critical areas.

## **Suggested BMPs**

- To prevent possible contamination, limit fertilizer and herbicide use around wetlands and their buffers.
- Limit access to wetlands and their buffers. To avoid compaction do not establish trails within the wetland areas.

## **10. Illicit Discharge Detection and Elimination**

A common problem with City of Olympia's stormwater drainage system is illegal hook-ups to the system. Many businesses and residences hooked internal building drains, sump overflows, and even sanitary sewer and septic system piped to the storm drain in the past, allowing a variety of pollutants to flow directly to receiving waters instead of the sanitary sewer or septic system. Frequently, these connections are unknown to the current owner, and do not appear on any plans for the site. Because of the pollution potential these connections represent, the Environmental Protection Agency, under the mandate of the NPDES stormwater permits, has made elimination of illegal connections a top priority.

All businesses and residences in City of Olympia must examine their plumbing systems to determine if illegal connections exist. We recommend starting with site plans to better understand what piping systems were initially installed, making piping that does not appear on the plan a priority for investigation. Wherever toilets, sinks, appliances, showers and bathtubs, floor drains, or other indoor activities are connected to the stormwater drainage system, immediately reroute them to the sanitary or septic system or holding tanks.

If sanitary facilities (such as toilets) are connected to the stormwater drainage system, you must obtain a permit from the City of Olympia and reroute them to the sanitary sewer. Contact City of Olympia Community Planning & Development for permit and connection information.

### **Dye Testing**

Dye testing with a non-toxic dye is one way to determine where a pipe or structure drains if not obvious by observations or on plans. The dye is put into the structure and flushed with some water.

Observations are then made at ends-of-pipes, drainage ditches, catch basins, and manholes to look for the color coming through. Contact City of Olympia Public Works - Wastewater Operations if you need assistance in locating structures adjacent to your property.

## **Smoke Testing**

Smoke testing can also help detect illegal connections and is best done by qualified personnel. To conduct smoke testing, shut off all indoor discharges, place a smoke bomb or other smoke-generating device in a storm drain manhole, and force air in after it. Station personnel at each suspect drain location to observe if smoke is coming out. Identify smoking drains for future rerouting.

## **Plugging or Rerouting Illicit Discharges**

Drains that are found to connect to the stormwater drainage system must either be permanently plugged or disconnected and rerouted as soon as possible. Plug unused drains with concrete or similar permanent materials. If a drainpipe is to be rerouted and a sanitary sewer services the property, then the local sewer provider must be contacted. It is the responsibility of the property owner to follow through on rerouting illicit storm drainage connections to the sanitary sewer.

If the property is not served by a sanitary sewer, alternate measures will be necessary. If the discharge is simply domestic waste, a septic system may be feasible. If it is necessary to install a septic system, the proper permits will need to be obtained from the City of Olympia Community Planning and Development. If the discharge is anything other than domestic waste, then a holding tank or onsite treatment will be necessary.

## **11. Pests and Noxious Weeds**

Invasive weeds and insect pests are a common problem for many yards and gardens in Thurston County. Effective management of these pests in the least toxic method requires careful planning and implementation. Developing an *Integrated Pest Management Plan* is often the best solution for managing pests and reducing pollution of ground and surface water bodies.

### **Introduction**

Integrated Pest and Vegetation Management (IPM) is a natural, long-term, ecologically-based systems approach to controlling pest populations. IPM is used to reduce pest populations, maintain them at levels below those causing health concerns or economic damage. The goals of IPM are to both encourage optimal selective pesticide use (away from prophylactic, broad spectrum use), and to maximize natural controls to minimize environmental side effects.

True integrated pest and vegetation management is a powerful approach that anticipates and prevents most problems through appropriate cultural practices and careful observation. Knowledge of the life cycles of host plants and both beneficial and pest organisms is also important. The integrated pest management section of this guidance is adapted from *Least Toxic Pest Management for Lawns* by Sheila Daar. Following the integrated pest management process gives you the information you need to minimize damage by weeds, diseases, and pests and to treat those problems with the least toxic approaches.

### **The IPM Process**

***Step One:*** *Correctly identify problem pests and understand their life cycle.*

Learn more about the pest. Observe it and pay attention to any damage that may be occurring. Learn about the life cycle. Many pests are only a problem during certain seasons, or can only be treated effectively in certain phases of the life cycle.

***Step Two: Establish tolerance thresholds for pests.***

Every landscape has a population of some pest insects, weeds, and diseases. This is good because it supports a population of beneficial species that keep pest numbers in check. Beneficial organisms may compete with, eat, or parasitize disease or pest organisms. Decide on the level of infestation that must be exceeded before treatment needs to be considered. Pest populations under this threshold should be monitored but don't need treatment. For instance, European crane flies usually don't do serious damage to a lawn unless there are 25 to 40 larvae per square foot feeding on the turf in February (in normal weather years). Also, most people consider a lawn healthy and well maintained even with up to 20 percent weed cover, so treatment, other than continuing good maintenance practices, is generally unnecessary.

***Step Three: Monitor to detect and prevent pest problems.***

Regular monitoring is a key practice to anticipate and prevent major pest outbreaks. It begins with a visual evaluation of the lawn or landscape's condition. Take a few minutes before mowing to walk around and look for problems. Keep a notebook, record when and where a problem occurs, then monitor for it at about the same time in future years. Specific monitoring techniques can be used in the appropriate season for some potential problem pests, such as European crane fly.

***Step Four: Modify the maintenance program to promote healthy plants and discourage pests.***

A healthy landscape is resistant to most pest problems. Lawn aeration and over-seeding along with proper mowing height, fertilization, and irrigation will help the grass out-compete weeds. Correcting drainage problems and letting soil dry out between waterings in the summer may reduce the number of crane-fly larvae that survive.

***Step Five: If pests exceed the tolerance thresholds.***

Use cultural, physical, mechanical, or biological controls first. If those prove insufficient, use the chemical controls described below that have the least non-target impact. When a pest outbreak strikes (or monitoring shows one is imminent), implement integrated pest management then consider control options that are the least toxic, or have the least non-target impact. Here are two examples of an integrated pest management approach:

- 1. Red thread disease** is most likely under low nitrogen fertility conditions and most severe during slow growth conditions. Mow and bag the clippings to remove diseased blades. Fertilize lightly to help the grass recover, then begin grasscycling and change to fall fertilization with a slow-release or natural-organic fertilizer to provide an even supply of nutrients. Chemical fungicides are not recommended because red thread cannot kill the lawn.
- 2. Crane fly damage** is most prevalent on lawns that stay wet in the winter and are irrigated in the summer. Correct the winter drainage and/or allow the soil to dry between irrigation cycles; larvae are susceptible to drying out, so these changes can reduce their numbers. It may also be possible to reduce crane fly larvae numbers by using a power de-thatcher on a cool, cloudy day when feeding is occurring close to the surface. Studies are being conducted using beneficial nematodes that parasitize the crane fly larvae; this type of treatment may eventually be a reasonable alternative.

Only after trying suitable non-chemical control methods or determining that the pest outbreak is causing too much serious damage, should chemical controls be considered. If chemical controls prove necessary, determine what products are available and choose a product that is the least toxic and has

the least non-target impact. Refer to the operational BMPs for the use of pesticides below for guidelines on choosing, storing, and using lawn and garden chemicals.

***Step Six:*** *Evaluate and record the effectiveness of the control, and modify maintenance practices to support lawn or landscape recovery and prevent recurrence.*

Keep records! Note when, where, and what symptoms occurred, or when monitoring revealed a potential pest problem. Note what controls were applied and when, and the effectiveness of the control. Monitor next year for the same problems. Review your landscape maintenance and cultural practices to see if they can be modified to prevent or reduce the problem.

A comprehensive integrated pest management program should also include the proper use of pesticides as a last resort, and vegetation/fertilizer management to eliminate or minimize the contamination of stormwater.

## **Appendix IV-I:**

### **Stormwater Facility Maintenance Program**

Attachment 'A'

# Stormwater Facility Maintenance Program

*A manual for inspecting, operating, and maintaining your stormwater system*

<b><i>Briggs West Residential Phase 1</i></b>	
<b>Located at:</b>	<i>1200 Eagle Bend Drive SE</i>
<b>Assessor's Tax Parcel Number(s) containing stormwater facilities:</b>	<i>37030000015</i>
<b>Program Operator/Property Owner:</b>	<i>Gordie Gill</i>
<b>Program Document Prepared by:</b>	<i>Amy Head, PE, SCJ Alliance</i>
<b>Date:</b>	<i>March 2018</i>

## **Table of Contents**

Cover Sheet – Program Information

1.0 Stormwater Management Site Description

1.1 What is a Stormwater Management Site?

1.2 Getting to Know Your Stormwater Facilities

1.3 Components Requiring Inspection and Maintenance

1.4 Stormwater Facility Key Map

2.0 Maintaining Stormwater Facilities and Controls

2.1 Stormwater Runoff Prevention

2.2 Collection and Conveyance Systems

2.3 Stormwater Quantity Controls

2.4 Stormwater Quality Controls

2.5 Low Impact Development Controls and Features

2.6 Soil and Vegetation Management

3.0 How to Perform Inspections and Maintenance

3.1 Inspection Frequency

3.2 Record Keeping and Reporting

4.0 Annual Cost of Maintenance

Glossary

Appendices

Appendix A – Stormwater Facility Descriptions and Checklists

Appendix B – Inspection Log Sheet

Appendix C – Annual Report Checklist

## 1.0 Stormwater Management Site Description

### 1.1 What is a Stormwater Management Site?

Within the City of Olympia, property owners are responsible for maintaining stormwater management structures and facilities that they own. These include all different types of stormwater facilities, vegetative features, and best management practices (BMPs) located on private property.

The City of Olympia Storm and Surface Water Utility employs Operation and Maintenance crews that maintain the stormwater infrastructure on public property and within public street right-of-way. Maintenance of this infrastructure (the 'utility') is funded by stormwater utility rates paid by the citizens of Olympia. Utility rates paid to the City do not cover the maintenance of your Stormwater Management Site.

A **Stormwater Management Site** is the portion of a privately owned site or development that has identified stormwater management facilities. These facilities help manage stormwater runoff from the development and may include natural areas for preservation. Stormwater management facilities are designed by a civil engineer licensed by the State of Washington. The stormwater system and associated facilities were required by City of Olympia Municipal Code, and State and Federal stormwater standards. To ensure proper function of the stormwater system, these engineered facilities require routine inspection and maintenance. If a stormwater system fails because of negligence to maintain the system, the property owner could be liable for any pollution, flooding, or damage that could result. Therefore, pollution prevention practices and stormwater system maintenance by the owners and residents are extremely important – both for the protection of property and of the environment.

A **Stormwater Site Management Plan** has been prepared for your development. The plan includes both a **Stormwater Pollution Prevention Program** and this **Stormwater Facility Maintenance Program**. The Stormwater Pollution Prevention Program is site-specific guidance for practices and behaviors that limit pollution before it comes in contact with stormwater. The responsible party for managing these programs is the **Program Operator**.

#### **Purpose of this Program:**

Owners of Stormwater Management Sites or stormwater systems should have a Stormwater Facility Maintenance Program that addresses every component of the stormwater system and other areas designated for protection. The purpose of the maintenance program is to ensure the management site and facilities do not lose their intended capability to manage stormwater.

All facilities and Best Management Practices designed and constructed for stormwater collection, conveyance, flood prevention, and water quality treatment must be inspected and maintained to comply with the federal Clean Water Act and the Washington State Department of Ecology Phase II National Pollution Discharge Elimination System (NPDES) Permit held by the City of Olympia.

## 1.2 Getting to Know Your Stormwater Facilities

The developed site will act as a single stormwater basin with all of the stormwater generated by the site, excluding roof runoff, being directed to an infiltration facility (the kettle). A water quality treatment system of Modular Wetland Systems for the pollution generating impervious surfaces (PGIS) is proposed; roof runoff is tight-lined to individual drywells located on each lot and does not enter the water quality system. The proposed facilities have been sized to provide treatment per *Volume V* of the 2016 DDECM and infiltrate 100% of stormwater runoff generated on-site. All proposed facilities have been sized using WWHM 2012.

Stormwater runoff will flow across the roadways into catch basins that convey the stormwater into one of two Modular Wetland Systems. The Modular Wetland System will be equipped with an internal bypass that will allow stormwater flows greater than the required treatment flow to bypass the treatment system and go directly into the kettle. 100% of the on-site generated stormwater runoff will be infiltrated in the kettle (roof runoff will be infiltrated through drywells located on each lot).

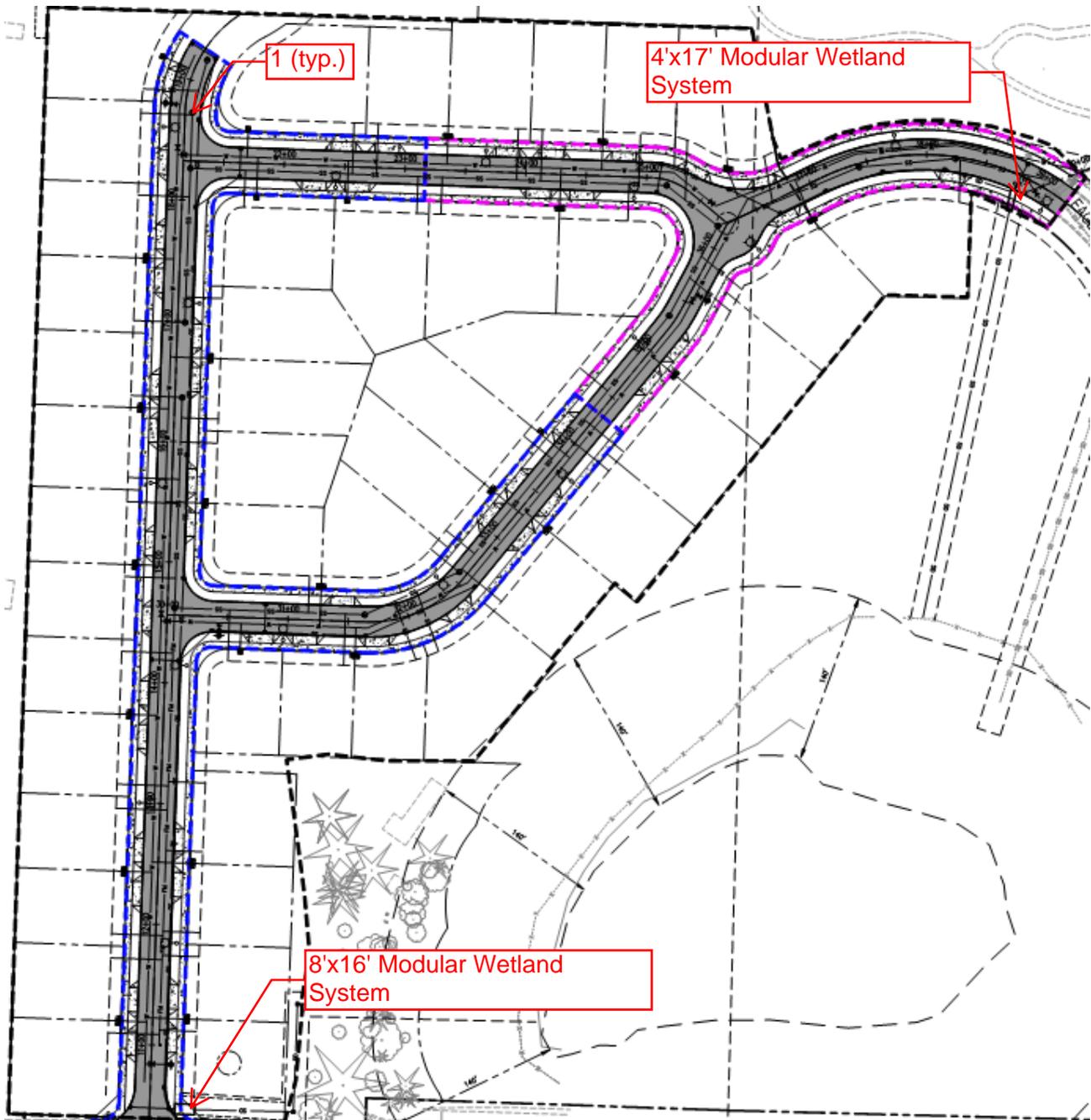
## 1.3 Components Requiring Inspection and Maintenance

It is important to know where your stormwater facilities are located and what type of maintenance they require. Some facilities may require very little maintenance and only annual inspection. Others may require frequent monitoring and upkeep to make sure they are functioning as designed.

The list of stormwater features, controls, and facilities below have been identified on your Stormwater Management Site Key Map in Section 1.4. Each of these items has specific inspection intervals and maintenance requirements. These requirements for inspection and maintenance can be found in Appendix A of this program.

Key Map ID Number	Stormwater Facility Type
1	Catch Basins
2	Modular Wetland Systems

## 1.4 Stormwater Facility Key Map



## 2.0 Maintaining Stormwater Facilities and Controls

To help understand your stormwater facility maintenance requirements, it is useful to have a general knowledge of how they function. Some maintenance needs are common to all types of facilities, while others depend on the specific facility.

Six major components of stormwater management include stormwater runoff prevention, stormwater collection/conveyance, stormwater quantity control (detention/retention), stormwater quality control (treatment), low impact development controls, and soil and vegetation management. While they are listed separately here, you should think of each of them as belonging to a larger interdependent system that works together to take care of stormwater on your site. This section describes general stormwater management theories and goals. Specific stormwater facility descriptions and maintenance requirements are provided in Appendix A.

### 2.1 Stormwater Runoff Prevention

**Stormwater runoff** can be described as the *excess* rainfall that does not immediately infiltrate into the ground or that is trapped on vegetation during a storm event. The primary practice of stormwater management focuses on managing this excess surface runoff.

Some soils are more accepting of rainfall and water infiltrates regularly – such as gravelly or sandy soils. Other soils do not allow much infiltration of rainfall – such as fine grained soils like silts and clays. Where this excess rainwater does not infiltrate, the excess *runs off* the surface. Vegetation covering a native soil landscape can aid in preventing runoff. Vegetation can intercept rainfall on its branches, leaves, and needles which prevents that water from becoming runoff. Trees and plants can also absorb a great deal of water from surrounding soils – this also prevents stormwater runoff and helps manage stormwater.

Preventing stormwater runoff or a goal of “zero discharge” means implementing site improvements that result in no off site runoff compared to predeveloped conditions. This is achieved by reducing impervious areas, implementing low impact development techniques, and preserving vegetated areas to achieve no increase in offsite runoff.

### 2.2 Collection and Conveyance Systems

Stormwater collection and conveyance systems intercept stormwater and transport it away from buildings, roadways, and other areas where accumulated water could be a nuisance. Conveyance systems typically consist of inlets that collect water and pipes or open channels (swales and ditches). Conveyance systems are in many instances the gateway to the rest of your stormwater management site – other stormwater facilities that manage the volume of water and the removal of pollutants are downstream.

Stormwater conveyance systems are designed to provide capacity for a specific maximum flow rate. Typical failures include reduced capacity due to clogged surface grates and pipes. Plugging commonly occurs due to sediment and large debris (e.g., leaves, trash, etc.) washed from adjacent surfaces. Reduced conveyance system capacity results in localized flooding and possible property damage if not corrected.

## 2.3 Stormwater Quantity Controls

The intent of stormwater *quantity* control facilities is to slow down stormwater flow discharged to the environment from developed sites. Impervious surfaces, such as roads and roofs, quicken the rate of stormwater runoff into natural streams that can create flooding. Stormwater quantity control facilities mitigate the increased runoff by providing temporary storage and controlling the release rate from the site to prevent flooding and erosion. Detention and retention facilities may be designed as ponds or underground facilities.

Detention facilities function by providing temporary storage of stormwater runoff to be released at a controlled rate. The intent of the detention facility is to match the pre-developed runoff rates for several specific storm events in the developed condition.

Retention facilities are typically located in areas where water soaks easily into the ground. Retention facilities provided temporary storage while allowing the water to soak into the ground, mimicking natural conditions. There is typically no release of stormwater to other pipes offsite or water bodies.

## 2.4 Stormwater Quality Controls

There are a several Best Management Practices (BMPs) utilized for stormwater *quality* control. These systems provide **stormwater treatment** through a combination of filtration, sediment settling, plant nutrient uptake, and physical separation. These systems range in complexity and operational needs.

The most common treatment systems include oil/water separators, biofiltration swales, grass filter strips, bioretention areas, and wetponds. There are also proprietary treatment systems that use specialize media to remove stormwater pollutants. The intent of all stormwater treatment facilities is to remove oils, chemicals, metals, nutrients (e.g. nitrogen and phosphorus), and sediment from stormwater runoff prior to being discharged to ground or surface waters. These systems are essential to protection of our environment.

Stormwater treatment facilities have a limited pollutant removal capability and are not intended to replace proper site management. The most effective technique for reducing pollutant discharge from the site is to provide good housekeeping through source control Best Management Practices (BMPs) as provided in your Stormwater Pollution Prevention Program.

## 2.5 Low Impact Development Controls and Features

As local governments in western Washington implement the Washington State Department of Ecology (Ecology) National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater permits (Permits), our region will increasingly rely on low impact development (LID) practices to protect water quality and aquatic natural resources.

LID is a stormwater and land use management strategy that strives to mimic the pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design. LID best management practices (BMPs) – such as bioretention/rain gardens and permeable pavements – are also commonly known as green stormwater infrastructure, integrated management practices, and on-site stormwater management BMPs.

If your Stormwater Management Site uses LID features to manage stormwater, they will be identified on the Key Map in this program. In many cases, LID features will seamlessly fit into the natural landscape or layout of your site. They will be vegetated areas or depressions with special soil mixes designed to capture pollutants. Because LID practices for managing stormwater are so integrated into the site, they often get overlooked for proper maintenance – yet are some of the most important components of your overall stormwater system. These systems should be identified early in your maintenance program to assure proper management.

## **2.6 Soil and Vegetation Management**

As described earlier in Section 2.1, good soil and healthy vegetation can do a lot for preventing stormwater runoff on your property. Before much of this area was populated with homes, streets, businesses, and parking lots, the amount of rainfall that turned to runoff was much less than we see today. While often overlooked when managing stormwater, protecting your exposed soils and the vegetation that covers the landscape can contribute a tremendous amount to managing stormwater and preventing issues.

If your Stormwater Management Site has a dedicated tract – a protected parcel of land – set aside for preservation of soils and natural vegetation, it will be noted on your program Key Map and the facility inventory. Additional requirements for some preservation areas may be included in a separate plan found in the Appendix. If your management site has a designated Soil and Vegetation Protection Area (SVPA) as required when your development was permitted with the City of Olympia, these areas are to be managed in accordance with the City of Olympia Urban Forestry Manual and applicable sections of the Olympia Municipal Code. For assistance in maintaining these SVPAs, contact the City of Olympia’s Urban Forester or Public Works – Environmental Services section for more information.

## **3.0 How to Perform Inspections and Maintenance**

This section provides Program Operators, property owners, and tenants with guidance on how to inspect their facilities, identify problems, perform routine maintenance, typical tools and equipment needed, and requirements for reporting maintenance activities to the City of Olympia.

### **3.1 Inspection Frequency**

Different components of your stormwater management site will require different kinds of inspections and during different times of the year. It is important to perform inspections in a manner that does not put your personal safety at risk. The facility checklists and maintenance standards found in Appendix A identify when and how frequently inspections should occur. You should note that not all components of the Stormwater Management Site may be inspected at the same time – proper inspection may need to occur on multiple occasions throughout the year to assess functionality. If you have questions about how and when to perform inspections, contact the City of Olympia Public Works – Water Resources Private Maintenance Inspection staff assigned to your site for assistance.

### 3.2 Record Keeping and Reporting

Program Operators shall keep records of inspections performed on the Stormwater Management Site and document all deficiencies found. Program Operators will need to document how corrective actions or maintenance work was completed for the site. If an outside contractor was hired to complete large tasks – such as non-routine maintenance – copies of receipts and invoices should be retained for records.

Program Operators who are responsible for executing Pollution Source Control Programs and Stormwater Facility Maintenance Programs shall submit an annual report of activities, trainings, inspections, and maintenance actions taken by May 15<sup>th</sup> of each year.

Information for reporting maintenance activities and inspections can be found on the City of Olympia website. Program Operators should work closely with City of Olympia Public Works – Water Resources inspection staff for coordination of their inspections and submittal of their annual reports.

### 4.0 Annual Cost of Maintenance

In accordance with Section 4.2.1 of Volume IV of the 2016 City of Olympia Drainage Design and Erosion Control Manual (DDECM), an estimate of the average annual cost of maintenance for the **Briggs West Residential** Stormwater Management Site has been included in this maintenance program.

Program Operators and property owners should always budget for the maintenance activities associated with their system. **Failure to maintain your system is a violation of the Agreement to Maintain Stormwater Facilities entered between the property owner, and its successors, and the City of Olympia** (see specific enforcement language for maintenance activities in the Agreement).

#### Cost of Construction

Approximately

#### Facilities Inventory

Key Map ID Number	Stormwater Facility Type	Quantity
1	Catch Basins	26 (Each)
2	Modular Wetland System	2 (Each)

#### Assumptions

- Market rate wage shall be paid for all maintenance work.
- Streets will be swept once a year
- Catch basins will be vactored once a year

**Non-Contracted Routine Inspections & Maintenance**

**MAINTENANCE SECTIONS TO BE COMPLETED BY PROPERTY OWNER AFTER CONSTRUCTION.**

**Contracted Routine Maintenance**

**Non-Routine Maintenance**

### **Facility Replacement Fund**

Establish a replacement fund to allow for future major restoration or replacement of stormwater facilities. A target for the replacement fund is to have 20% of the cost of construction available after 20 years. This amount should be set aside to provide for unexpected costs and major repair/replacement of facilities.

## Appendix A: Stormwater Facility Descriptions and Checklists

## Catch Basins, Manholes, and Grate Inlets

Catch basins are underground concrete structures typically provided with a slotted grate to collect stormwater runoff and route it through underground pipes. Catch basins can also be used as a junction in a pipe system and may have a solid lid. There are two catch basin types.

A Type 1 catch basin is a rectangular box with approximate dimensions of 3"x2"x5".

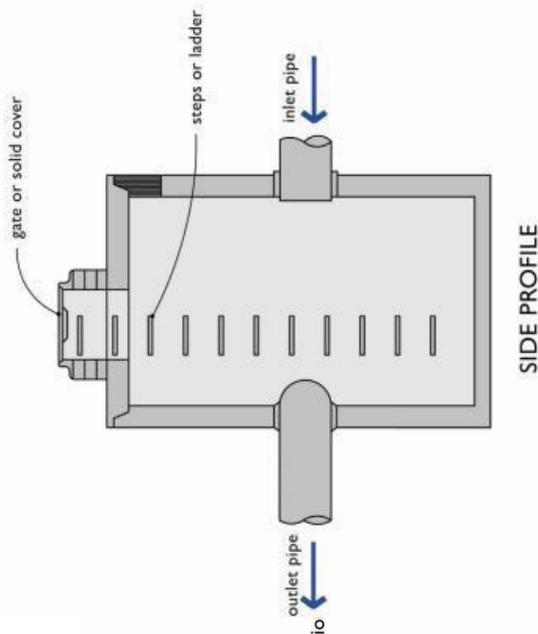
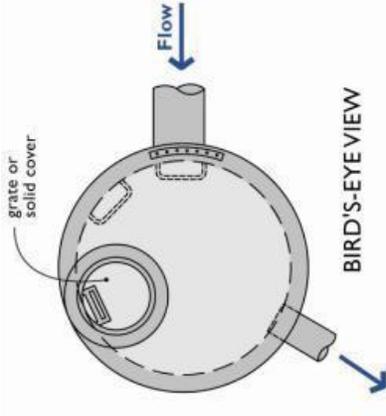
Type 1 catch basins are utilized when the connected conveyance pipes are less than 18 inches in diameter and the depth from the gate to the bottom of the pipe is less than 5 feet.

Type 2 catch basins, also commonly referred to as storm manholes, are round concrete structures ranging in diameter of 4 feet to 8 feet. Type 2 catch basins typically have manhole steps mounted on the side of the structure to allow for access.

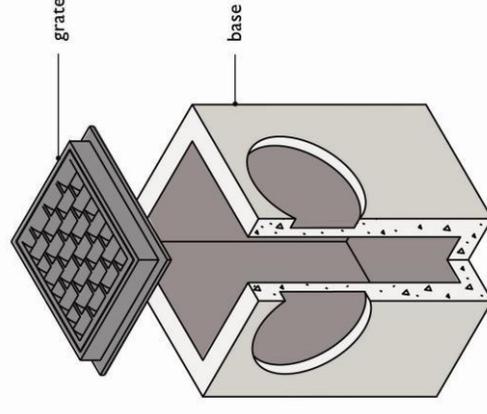
Type 2 catch basins or manholes can have either a solid access cover or a slotted grate inlet similar to a Type 1 catch basin.

Both catch basin types typically provide a storage volume (sump) below the outlet pipe to allow sediments and debris to settle out of the stormwater runoff. Some catch basins are also provided with a spill control device (inverted elbow on outlet pipe) intended to contain large quantities of grease or oils within the basin.

The most common cleaning method for catch basins is to utilize a truck with a tank and vacuum hose (vacor truck) to remove sediment and debris from the sump. Catch basins may be an enclosed space where harmful chemicals and vapors can accumulate. Therefore, if the inspection and maintenance requires entering a catch basin, it should be conducted by an individual with training and certification in working in hazardous confined spaces.



**Type 2**



**Type 1**

## Catch Basins, Manholes, and Grate Inlets

Component	Required Inspection Frequency <sup>1</sup>	Issue or Condition Requiring Maintenance (Standards)	Issue Exists?	Corrective Action (Procedures)
<b>Cleaning</b>				
Standing water	As needed	Standing water present during maintenance activities.	Yes No	Remove/dispose with other material in accordance with state and federal regulations. Do not pump to downstream stormwater system.
Trash, debris, sediment, vegetation	A2	Accumulated material within 6 inches of the bottom of the lowest pipe entering or exiting the structure or filling greater than 60 percent of the sump depth.	Yes No	Remove/dispose in accordance with state and federal regulations.
	A	Sediment, debris, or vegetation blocking 1/3 the diameter of any pipe.	Yes No	Remove/dispose in accordance with state and federal regulations.
	B, W, E	Vegetation/debris blocking 10 percent or more of inlet grate capacity.	Yes No	Clean and dispose of material
Pollution	A	Dead animals or vegetation that could generate odors and cause complaints or dangerous gases (e.g., methane).	Yes No	Remove/dispose
	A2, E	Any visible accumulation of oil, gas, paint, or other contaminant (includes concrete debris or slurry).	Yes No	Remove/dispose in accordance with state and federal regulations. If possible, identify and control source
<b>Structure</b>				
Frame and/or top slab	A	Corner extends more than 0.75 inches past curb face or street surface (where applicable).	Yes No	Repair so frame even with curb
	A	Holes greater than 2 inches or cracks greater than 0.25 inches in top slab.	Yes No	Repair to water tight condition
	A	Frame not flush with top slab (separation >0.75 inches) or not securely attached.	Yes No	Repair

## Catch Basins, Manholes, and Grate Inlets

Component	Required Inspection Frequency <sup>1</sup>	Issue or Condition Requiring Maintenance (Standards)	Issue Exists?	Corrective Action (Procedures)
Catch Basin structure	A	Cracks wider than 0.5 inches and longer than 1 foot, missing bricks, evidence of water of soil entering, or judged to be structurally unsound by maintenance personnel.	Yes No	Repair; Grout where feasible; Catch basin may require replacement where found to be structurally unsound
		Cracks wider than 0.5 inches and longer than 1 foot at pipe inlet/outlet.	Yes No	RegROUT and reseal pipe at basin wall
Cover/Grate Inlet	A	Cover/grate missing, damaged, or only partially in place.	Yes No	Repair/replace
		Grate openings are wider than 7/8 inch.	Yes No	Replace
		Cannot be opened by one person. Locking bolts missing, damaged, or have less than ½ inch of thread.	Yes No	Repair/replace
		Buried.	Yes No	Expose and restore to surface grade
Ladder	A	Ladder rungs damaged, missing, or misaligned.	Yes No	Repair/replace

<sup>1</sup> Inspection frequency:

A = Annually;

B = Biannually (twice per year);

W = Recommend that at least one inspection occur during the wet season, preferably after trees have lost their leaves;

E = Recommend that additional inspections be performed as appropriate after major events (e.g., >1 inch of precipitation in 24 hours or environmental incident which causes contaminant release).

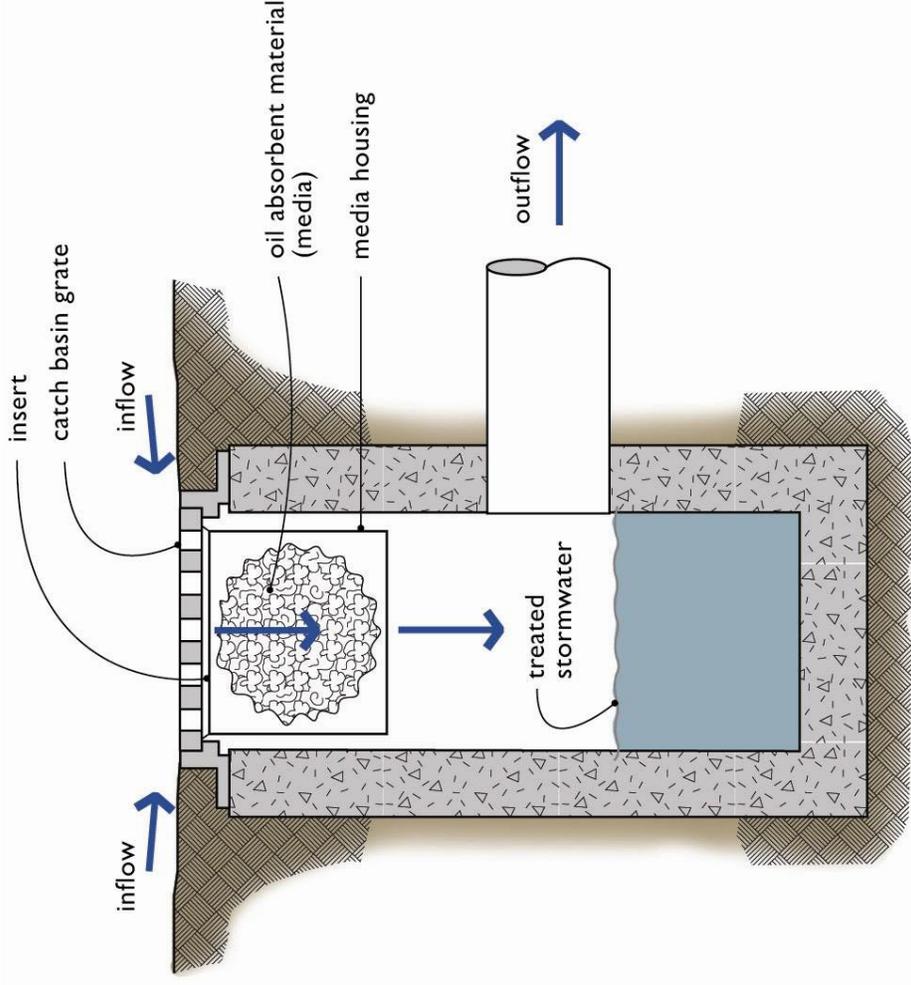
<sup>2</sup> Minimum requirement is for annual inspections. More frequent inspections and maintenance may be required depending on site conditions.

## Catch Basin Inserts

Catch basin inserts have been under development for many years in the Puget Sound Basin. Inserts are placed directly in a standard catch basin beneath the grate, and they are intended to serve as a pre-treatment device (i.e. a method for limiting the pollutant load on other downstream drainage systems or facilities). Catch basin inserts are generally maintenance intensive and require replacement of the treatment media or entire insert annually. Inspection, maintenance, and replacement intervals will vary from site to site and depend on the actual loading of pollutants entering the catch basin.

Catch basin inserts typically consist of the following components:

- A structure (screened box, brackets, etc.) which contains a pollutant removal medium
- A means of suspending the structure in a catch basin
- A filter medium such as sand, carbon, fabric, etc.
- A primary inlet and outlet for the stormwater
- A secondary outlet for bypassing flows that exceed design flow



## Catch Basin Inserts

Component	Required Inspection Frequency <sup>1</sup>	Issue or Condition Requiring Maintenance (Standards)	Issue Exists?	Corrective Action (Procedures)
<b>General</b>				
Sediment Accumulation	B <sup>2</sup> , W	When sediment forms a cap over the insert media of the insert and/or unit.	Yes No	No sediment cap on the insert media and its unit.
Trash and Debris Accumulation	B <sup>2</sup>	Trash and debris accumulates on insert unit creating a blockage/restriction.	Yes No	Trash and debris removed from insert unit. Runoff freely flows into catch basin.
Media Insert Not Removing Oil	B <sup>2</sup> , E	Effluent water from media insert has a visible sheen.	Yes No	Effluent water from media insert is free of oils and has no visible sheen.
Media Insert Water Saturated	B <sup>2</sup>	Catch basin insert is saturated with water and no longer has the capacity to absorb.	Yes No	Remove and replace media insert
Media Insert-Oil Saturated	B <sup>2</sup>	Media oil saturated due to petroleum spill that drains into catch basin.	Yes No	Remove and replace media insert.
Media Insert Use Beyond Normal Product Life	B <sup>2</sup>	Media has been used beyond the typical average life of media insert product.	Yes No	Remove and replace media at regular intervals, depending on insert product.

<sup>1</sup> Inspection frequency:

A = Annually;

B = Biannually (twice per year);

W = Recommend that at least one inspection occur during the wet season, preferably after trees have lost their leaves;

E = Recommend that additional inspections be performed as appropriate after major events (e.g., >1 inch of precipitation in 24 hours or environmental incident which causes contaminant release).

<sup>2</sup> Minimum requirement is for annual inspections. More frequent inspections and maintenance may be required depending on site conditions.

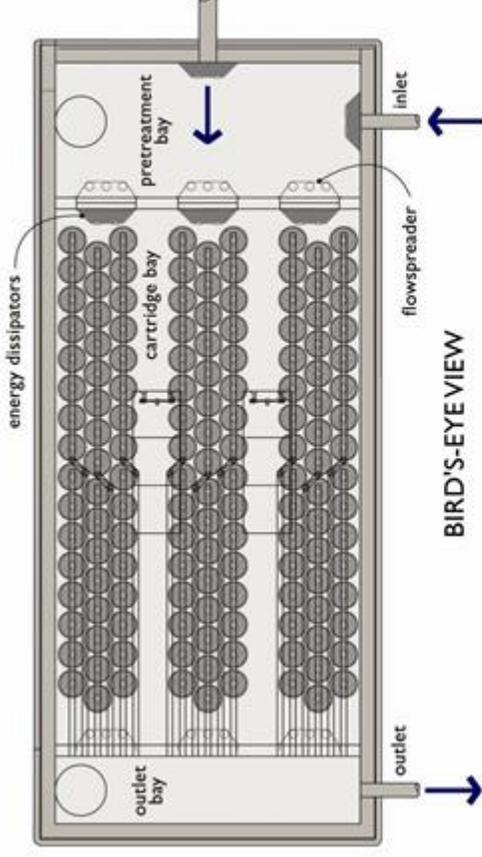
## Manufactured Media Filters

A manufactured media filter is a special device or vault that achieves removal of pollutants from stormwater using a proprietary design and special media. The media that polluted stormwater passes through and subsequently removes pollutants – can come in many forms and installations. Media can be as layers in a concrete vault, contained in vertical media cartridges, or other configurations that direct stormwater to move through the media for treatment.

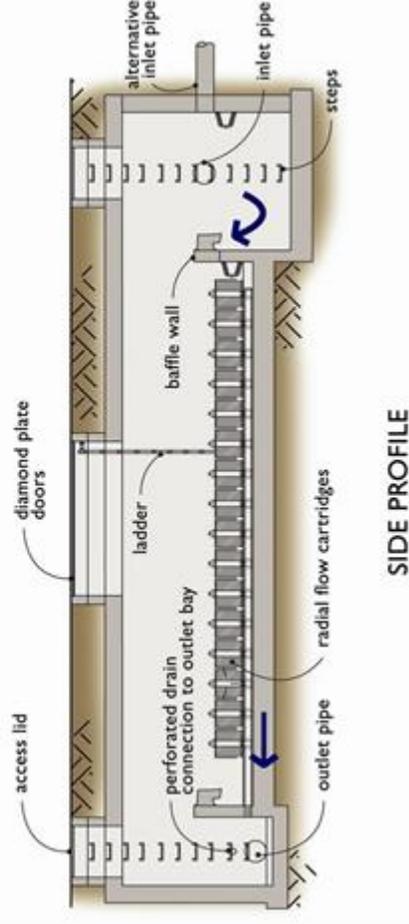
Media filters are continuously evolving and improving on past designs, and all emerging technologies for stormwater treatment must be evaluated and approved by the Washington State Department of Ecology to assure they meet minimum pollutant removal standards.

Manufactured media filter devices and vaults are sometimes preferred over conventional wetponds or swales because they save space on a development site. These technologies, however, often require more intensive maintenance schedule and have increased cost of maintenance depending on the product or configuration.

The following maintenance checklist applies to all types of manufactured media filters. Your *Stormwater Facility Maintenance Program* should include this checklist and a separate product specific checklist for the media filter(s) on your site. When replacing media or media contained in cartridges, it is important to replace them with the same media specified on the design plans/as-built drawings. Different media mixes target different pollutants for removal.



BIRD'S-EYE VIEW



SIDE PROFILE

Example of a Contech StormFilter Vault

## Manufactured Media Filters

Component	Required Inspection Frequency <sup>1</sup>	Issue or Condition Requiring Maintenance (Standards)	Issue Exists?	Corrective Action (Procedures)
<b>Below Ground Vault</b>				
Sediment Accumulation on Media.	A <sup>2</sup> , D	Sediment depth exceeds 0.25-inches.	Yes No	No sediment deposits which would impede permeability of the compost media.
Sediment Accumulation in Vault	A <sup>2</sup> , D	Sediment depth exceeds 6-inches in first chamber.	Yes No	No sediment deposits in vault bottom of first chamber.
Trash/Debris Accumulation	A	Trash and debris accumulated on compost filter bed.	Yes No	Trash and debris removed from the compost filter bed.
Sediment in Drain Pipes/Clean-Outs		When drain pipes, clean-outs, become full with sediment and/or debris.	Yes No	Sediment and debris removed.
Damaged Pipes	A	Any part of the pipes that are crushed or damaged due to corrosion and/or settlement.	Yes No	Pipe repaired and/or replaced.
Access Cover Damaged/Not Working	B	Cover cannot be opened; one person cannot open the cover using normal lifting pressure, corrosion/deformation of cover.	Yes No	Cover repaired to proper working specifications or replaced.
Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	A	Cracks wider than 1/2-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound.	Yes No	Vault replaced or repairs made so that vault meets design specifications and is structurally sound.
	A	Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Yes No	Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.

## Manufactured Media Filters

Component	Required Inspection Frequency <sup>1</sup>	Issue or Condition Requiring Maintenance (Standards)	Issue Exists?	Corrective Action (Procedures)
Baffles	A	Baffles corroding, cracking warping, and/or showing signs of failure as determined by maintenance/inspection person.	Yes No	Baffles repaired or replaced to specifications.
Access Ladder Damaged	A	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Yes No	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.
<b>Below Ground Cartridge Type</b>				
Media	A <sup>2</sup>	Drawdown of water through the media takes longer than 1 hour, and/or overflow occurs frequently.	Yes No	Media cartridges replaced.
Short Circuiting	E	Flows do not properly enter filter cartridges.	Yes No	Filter cartridges replaced.

<sup>1</sup> Inspection frequency:

A = Annually;

B = Biannually (twice per year);

W = Recommend that at least one inspection occur during the wet season, preferably after trees have lost their leaves;

E = Recommend that additional inspections be performed as appropriate after major events (e.g., >1 inch of precipitation in 24 hours or environmental incident which causes contaminant release).

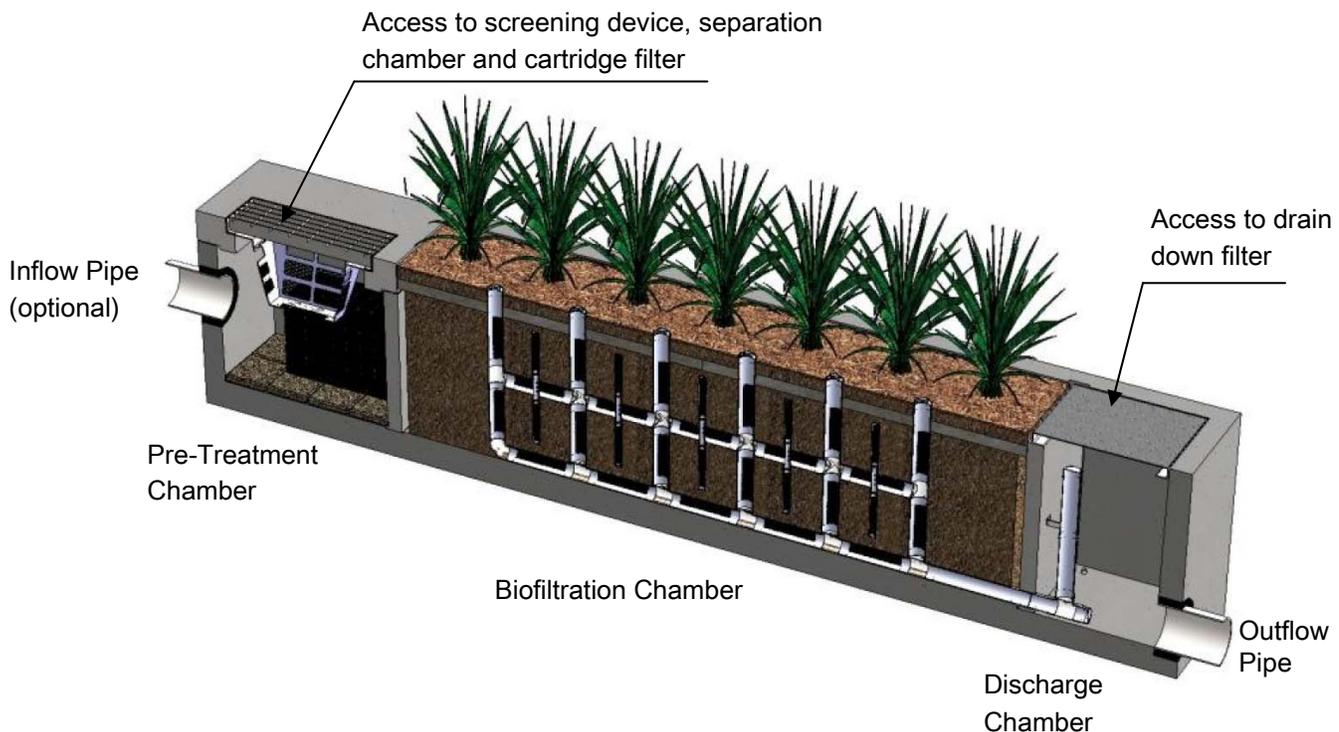
<sup>2</sup> Minimum requirement is for annual inspections. More frequent inspections and maintenance may be required depending on site conditions.

# Maintenance Guidelines for Modular Wetland System - Linear

## Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - *(5 minute average service time).*
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - *(10 minute average service time).*
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - *(10-15 minute per cartridge average service time).*
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - *(5 minute average service time).*
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - *(Service time varies).*

## System Diagram



## Maintenance Procedures

### Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

### Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

### Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

### Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.



## Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the Biofiltration Chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

## Maintenance Procedure Illustration

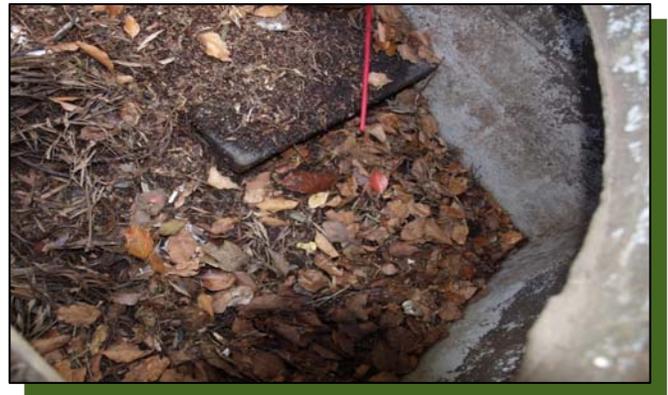
### Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.



### Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.



### **Cartridge Filters**

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.



### **Drain Down Filter**

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.



### Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.





## Inspection Form



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. [Info@modularwetlands.com](mailto:Info@modularwetlands.com)

[www.modularwetlands.com](http://www.modularwetlands.com)



# Inspection Report Modular Wetlands System



Project Name \_\_\_\_\_

Project Address \_\_\_\_\_ (city) (Zip Code)

Owner / Management Company \_\_\_\_\_

Contact \_\_\_\_\_

Phone ( ) -

Inspector Name \_\_\_\_\_

Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Time \_\_\_\_\_ AM / PM

Type of Inspection  Routine  Follow Up  Complaint

Storm

Storm Event in Last 72-hours?  No  Yes

Weather Condition \_\_\_\_\_

Additional Notes \_\_\_\_\_

For Office Use Only

(Reviewed By)

(Date)  
Office personnel to complete section to the left.

## Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): \_\_\_\_\_ Size (22', 14' or etc.): \_\_\_\_\_

Structural Integrity:	Yes	No	Comments
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
<b>Working Condition:</b>			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
<b>Other Inspection Items:</b>			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: \_\_\_\_\_

## Maintenance Report



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[www.modularwetlands.com](http://www.modularwetlands.com)



# Cleaning and Maintenance Report Modular Wetlands System



Project Name \_\_\_\_\_

Project Address \_\_\_\_\_ (city) (Zip Code)

Owner / Management Company \_\_\_\_\_

Contact \_\_\_\_\_ Phone ( ) -

Inspector Name \_\_\_\_\_ Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time \_\_\_\_\_ AM / PM

Type of Inspection  Routine  Follow Up  Complaint  Storm Storm Event in Last 72-hours?  No  Yes

Weather Condition \_\_\_\_\_ Additional Notes \_\_\_\_\_

For Office Use Only

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(Reviewed By) \_\_\_\_\_

---

(Date) \_\_\_\_\_  
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

---



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## Appendix B: Inspection Log Sheet



## Appendix C: Annual Report Checklist



# Stormwater Facility Inspection Form

*Complete and return this form to the City of Olympia (details below)*

**Site Address:** \_\_\_\_\_

**Mail Address:**  Same as site address

Street/P.O. Box: \_\_\_\_\_ City: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Owner/Manager: \_\_\_\_\_ Phone #: \_\_\_\_\_ Cell #: \_\_\_\_\_

Fax #: \_\_\_\_\_

**Contact Information:**

Owner/ Manager: \_\_\_\_\_ Position/Title: \_\_\_\_\_

Street: \_\_\_\_\_ City: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone#: \_\_\_\_\_ Cell#: \_\_\_\_\_ Fax#: \_\_\_\_\_

Email: \_\_\_\_\_

**Contractor:**

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Mobile: \_\_\_\_\_

Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

**Remember to:**

- Attach Invoices
- Fill out the Stormwater Table on back page, and return to the City of Olympia

**Questions?**

Contact Jeremy Graham at  
360.753.8097 or email  
jgraham@ci.olympia.wa.us

	Stormwater Feature	Date Cleaned
	Access Roads	
	Baffle Oil/Water Separators	
	Bioretention	
	Bioswale	
	Catch Basins    How Many? _____	
	Closed Detention Systems	
	Coalescing Plate Oil/Water Separators	
	Dry Pond	
	Dry Vault	
	Flow Control Structure	
	Swales	
	Trash Racks	
	Drywells, French Drains, or Downspouts	
	Energy Dissipaters	
	Fencing, Shrubbery Screens, Gates	
	Landscaping	
	Pipe/Culvert	
	Porous/Permeable Pavement <input type="checkbox"/> Porous Pavers <input type="checkbox"/> Porous Concrete <input type="checkbox"/> Permeable Asphalt	
	Rain Garden	
	Roof Garden	
	Sand Filters	
	Treatment type: <input type="checkbox"/> CDS <input type="checkbox"/> Urban Green/BioFilter <input type="checkbox"/> StormFilter <input type="checkbox"/> Vortech <input type="checkbox"/> Filterra <input type="checkbox"/> BaySaver <input type="checkbox"/> Kristar	
	Wet Pond	
	Wet Vaults	

**Return Completed Form to:**  
City of Olympia, Water Resources  
Attn: Jeremy Graham  
**Email:** [jgraham@ci.olympia.wa.us](mailto:jgraham@ci.olympia.wa.us)  
**Fax:** 360.709.2797  
**Mail:** P.O. Box 1967 | Olympia WA 98507-1967