

THURSTON COUNTY  
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DEVELOPMENT SERVICES

**OAK SPRINGS**

**Integrated Pest Management Plan**

**Prepared for:**

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**October 14, 2013**

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**Project No: 13-046**

**Project Name: OAK SPRINGS**

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# **I. INTRODUCTION**

## **Background**

When urban development covers the land with buildings, houses, streets and parking lots, much of the native topsoil, duff, trees, shrubs and grasses are replaced by homes, asphalt, concrete and landscaping. Along with the development, people come bringing the potential for contamination to area lakes, streams and groundwater supplies.

Much of Thurston County is classified as an "Aquifer Sensitive" area. That is to say that the groundwater resource, upon which the vast majority of Thurston County residents rely for water, is vulnerable to contamination from land activities. Many of the aquifers serving Thurston County are relatively shallow and largely unprotected by intervening impermeable layers of soil. Consequently, activities on the surface can have an impact on the water supply.

This Integrated Pest Management Plan (IPMP) seeks to address potential sources of contamination of both surface and groundwater. Moreover, it provides guidance to future homeowners of this project to identify actions and activities mitigated to reduce the potential for contamination.

## **Responsibility**

All property owners within this subdivision are members of the Homeowners' Association (HOA). The HOA is responsible for many of the mitigation measures discussed herein. However, most of the responsibility for protection of our water resources lies with each individual property owner. This IPMP is attached to and a part of the Covenants, Conditions and Restrictions for this subdivision and, as such, is recorded against the title for all properties within the subdivision. Enforcement of the recommendations of this IPMP lies with the HOA, but responsibility rests with each property owner.

## **Project Description**

This project proposes to sub-divide 20.02 acres into an 89 lot plat. This project site is located in the Lacey Urban Growth Area of Thurston County, south of 28<sup>th</sup> Way SE off of Marvin Road SE. (See Vicinity Map in Appendix B.) This project is located on Tax Parcel Number 11825240000 in the northeast quarter of Section 25, Township 18 North, Range 1 West, Willamette Meridian, Olympia, Washington.

The project will extend Accalia Drive SE and 28<sup>th</sup> Way SE, public streets constructed as part of the Evergreen Heights subdivision to the north. Internal roadways include curb, gutter, sidewalks, planter strips and street lighting. The project also includes several open space areas.

Stormwater runoff from the developed areas of the proposed plat will be collected by catch basin and conveyed through piping to wet ponds located in Tract A, for treatment, prior to overflowing into retention ponds for infiltration. The ponds have been sized using the standards established in the 2009 Thurston County Drainage Design and Erosion Control Manual. It is anticipated that all stormwater runoff from roofs will be directed to the stormwater ponds due to the limited infiltration

potential found in the upper portion of the site. Individual drywells may be provided in portions of the site as suitable soils will allow.

Terrain at the site generally slopes down from north to south and west to east with an elevation difference of approximately 90 feet. The upper portion of the site is gently rolling to an area in the middle of the site that contains steeper slopes at approximately 30%. The lower portion of the site to the southeast contains more gradual slopes near the proposed stormwater pond. There is no off-site contributing area since the properties north and west manage their own stormwater runoff, and the properties to the south and east are downgradient.

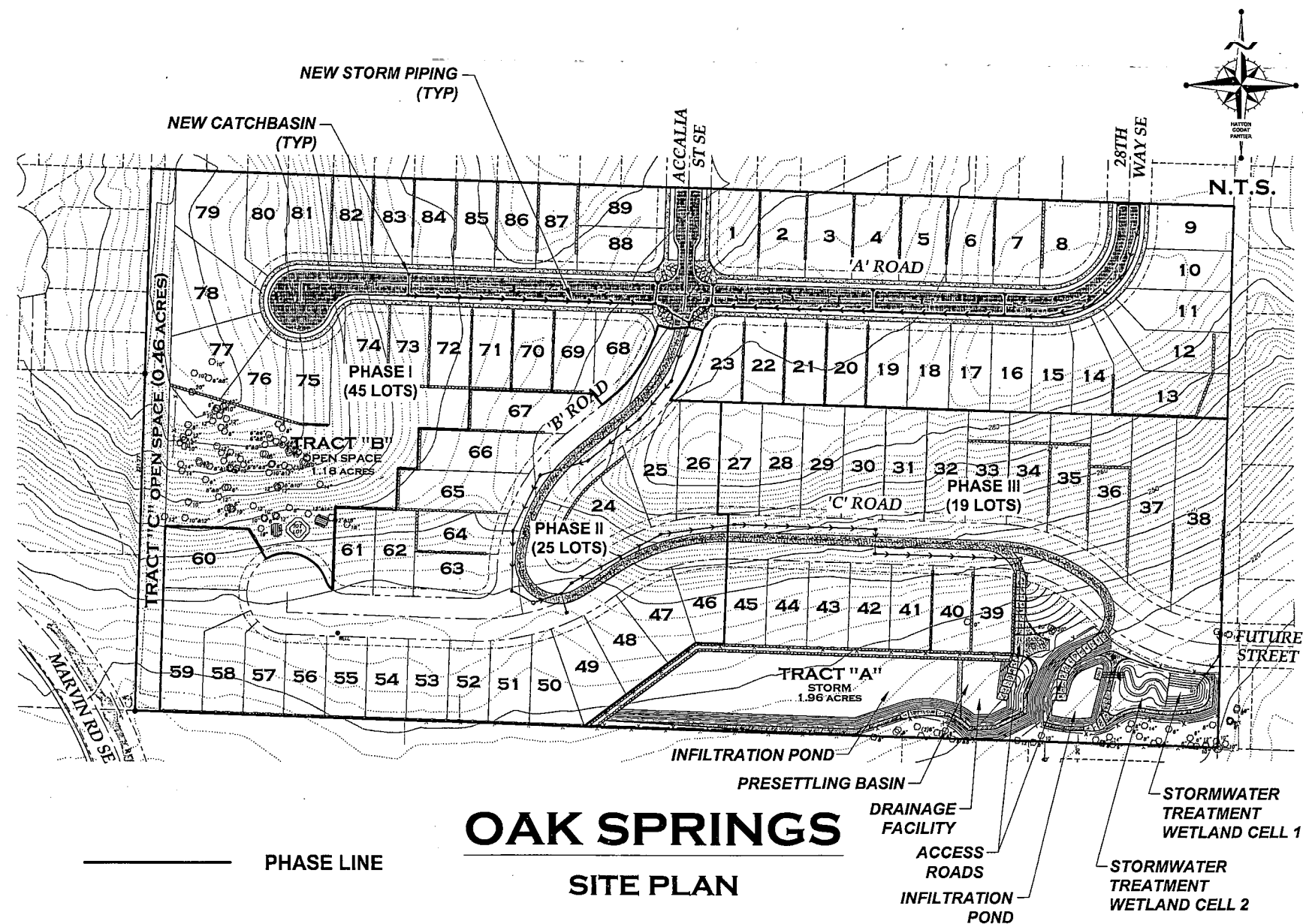
The vegetation onsite includes Scots broom, brush and shrubs, second-growth forest and oaks as identified on the site plan. There is an existing house, mobile home, garage, and barn located on the southwest corner of the site.

Adjacent parcels to the north and west are currently developed as single family residential (Evergreen Heights Division 1 and 2). The parcel to the southwest is a single family home and the parcels south and east are currently undeveloped.

The soil survey of Thurston County by the US SCS indicates onsite soils are Alderwood gravelly sandy loam on the upper portion of the site, and Spanaway gravelly sandy loam on the lower portion of the site. A soils report prepared by the Insight Geologic, Inc. confirms the site consists of the Alderwood gravelly sandy loam and Spanaway gravelly sandy loam. A copy of the soils report is provided with the application materials.

All above ground stormwater facilities will be hydroseeded upon completion. In addition, the water quality wet pond will be planted with a variety of wetland species both in the permanent pool and along the fringes of the permanent water surface. Additional landscaping shall also be provided throughout the project in conformance with the approved landscaping and tree restoration plan, as applicable, and as otherwise required by the approving authority.

This site lies in an area mapped by Thurston County as an aquifer sensitive area. Residents can reduce the risk of contaminating the aquifers in this area by following the provisions established within this report.



## **II. COMMON HAZARDS TO WATER RESOURCES**

### **General**

Many products and practices commonly used in and around the home are hazardous both to the environment and to us. Many of these products end up in our stormwater systems and groundwater. This document gives alternatives, where possible, for those types of products and practices. The Best Management Practices (BMPs) described herein include "good housekeeping" practices that everyone can use.

It has been said that the average home today contains more chemicals than the average chemical lab of 100 years ago. When used industrially, many of these chemicals are subject to various health and safety standards; yet these same substances are used freely and often carelessly in our homes.

Typical residential pollutant sources are classified as either "point" or "non-point" sources. A point source pollutant is one in which the contaminant can be traced to a specific location or locations. Non-point pollutants are more difficult to locate. Stormwater is a good example wherein tiny bits of contaminant collect over many acres of runoff, eventually reaching a single point. However, the source of the pollutant is anything but a "point" source.

### **Point Sources of Pollutants**

#### **Household products**

Many of the cleaning agents, solvents, polishes, etc. commonly used in the home are considered hazardous. These products may be toxic, corrosive, reactive, flammable and/or carcinogenic. It is critical that these products are handled with care and are disposed of properly. A list of common household hazardous materials is presented in Table 1.

In addition, many hazardous household chemicals persist for long periods of time in the environment. Manufacturers may truthfully state that a product is "biodegradable"; most products are biodegradable, but what is important is the rate at which they break down and the products into which they dissolve. The term "biodegradable" on its own is misleading at best, unless the product is rapidly degraded into harmless substances.

It is important to note here that the term "biodegradable" currently has no legal definition in this state. This means that any product can use this term according to the manufacturer's own definition. This definition may not be at all similar to the consumer's perception.

#### **Automotive Care Products**

Common automotive fluids such as oil, gas, antifreeze, degreasers, etc, are easily spread by small amounts of water and can cause significant damage to area ground and surface waters. Table 1 presents a list of these common items and Table 2 suggests alternatives or handling tips to reduce the potential for negative environmental impacts.

## Non-Point Sources of Pollutants

### Yard Care Products

Pesticides\* and fertilizers are commonly used, and often overused, by homeowners. These chemicals are often overused. Many times, homeowners apply too much chemical or apply the right amount but at the wrong time, such as before heavy rains or any time the plants will not be able to absorb the chemicals. Excess chemicals are easily introduced into stormwater runoff and can cause algae blooms (fertilizers) or kill off aquatic organisms (pesticides) in surface waters. Large quantities of fertilizer can negatively impact nitrate levels in drinking water supplies as well.

### Stormwater Runoff

Stormwater runoff needs to be treated because it carries litter, oil, gasoline, fertilizers, pesticides, pet waste, sediments and anything else that can float, dissolve or be swept along by moving water. Left untreated, polluted stormwater can reach nearby waterways where it can harm or kill aquatic life. Untreated stormwater can pollute groundwater in similar ways. Nationally, stormwater is recognized as a major threat to water quality. Remember to keep everything out of stormwater systems except the rainwater they are designed to collect.

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\* As used here, the word pesticide can mean any herbicide, insecticide, rodenticide, miticide or other chemicals used in a similar manner.

### III. REDUCING IMPACTS ON WATER RESOURCES

#### General

The following ideas should help you reduce the risks of stormwater and groundwater contamination from many common products or practices. From a waste management standpoint, automobile maintenance is best done by professionals at facilities designed to handle, store and dispose of the waste products properly. Many of these facilities do an excellent job of dealing with waste oils, antifreezes, other fluids, batteries and tires. They often charge a small fee to cover the added expenses, but it's worth it. However, if you repair your car at home, please consider the tips presented in this plan.

Fertilizing a lawn can be done in an environmentally sensitive manner. Also, rather than bringing out the sprayer whenever a pest infestation occurs in the garden, consider using other alternatives. Evaluate all factors that might affect the garden, including environmental effects, before chemicals are applied. Pesticides should only be used as a last resort. Some of the tactics that can be used to decrease or eliminate the use of pesticides are discussed below.

#### Household Operations

1. Read product labels before purchasing. Toxic product labels will carry many warnings. Either bypass such products or purchase in small quantities. If you cannot use the entire product, try to give it away instead of disposing of it. Thurston County periodically facilitates product exchanges for leftover paints and other hazardous wastes. Call the Thurston County Health Department at (360) 754-4111 for more information.
2. Buy only those detergents that contain little or no phosphorus. Phosphorus can cause algae blooms if washed into lakes or streams. Most detergents that are low in phosphates or phosphate free are labeled as such.
3. Use no more than the manufacturer's suggested amount of any cleanser. More is not necessarily better.
4. Products such as oven cleanser, floor wax, furniture polish, drain cleaners and spot removers often contain toxic chemicals. Buy the least toxic product available or use a non-toxic substitute if one can be found. For example, ovens can be cleaned by applying table salt to spills then scrubbing with a solution of baking soda and water. Table 2 lists substitutes for many commonly used household products.

If it is necessary to use a product that contains toxic chemicals, use the product only as directed. Do not combine products, as they may become more dangerous when mixed (e.g., mixing chlorine bleach and ammonia produces dangerous gases). Use eye protection and rubber gloves as appropriate.

Contact the Hazardous Substance Hotline at 1-800-633-7585 if you have any questions regarding disposal of a product or empty container. The County has both hazardous waste collection days and permanent facilities where residents can bring hazardous wastes. Call the Thurston County Health Department at (360) 754-4111 for more information.



5. Chemicals left over from activities such as photography and auto repair are hazardous and should not be flushed down the sink. This is especially important if your home is hooked up to a septic system. Toxic chemicals can kill the beneficial bacteria in the tank used to treat sewage and can pollute water supply wells.
6. Be sure all containers are clearly labeled.
7. Common batteries (not automobile) are one of the largest sources of heavy metals (such as lead, nickel, cadmium and mercury) found in landfills. Instead of throwing them away, dispose of them at a hazardous waste collection site.

## Automotive Care and Maintenance

1. Cars should be serviced regularly. Leaky lines or valves should be replaced.
2. Dumping oil, degreasers, antifreeze and other automotive liquids into a stream or a storm drain violates city, county and state laws or ordinances. Do not dump them onto the ground because they will end up in stormwater runoff or in groundwater. Do not use oil to reduce dust levels on unpaved areas. Instead, recycle used oil and antifreeze. Keep them in separate containers. Call the Recycling Hotline at 1-800-RECYCLE or call the Thurston County Health Department for the location of the nearest recycling center, or inquire whether your local automotive service center recycles oil. Some may also take used oil filters.
3. Wrap empty oil or antifreeze containers in several layers of newspaper, tie securely and place in a covered trashcan. Antifreeze is sweet tasting but poisonous to people, fish, pets and wildlife.
4. Sweep your driveway instead of hosing it down. Fluids and heavy metals associated with automobiles can build up on driveway surfaces and be washed into local surface or groundwater when driveways are hosed down.
5. When washing vehicles, do so over your lawn or where you can direct soapsuds onto the lawn or another vegetated area to keep the soap from washing into the storm drain system or local surface water. Your stormwater pond cannot cleanse soapy water.
6. Small spills of oil and other fluids can be absorbed with materials such as kitty litter or sawdust. Wrap the used absorbent and any contaminated soil in a plastic bag and place in the garbage.

If a spill reaches surface water, you must notify the nearest regional office of the Department of Ecology immediately! The Southwest Regional Office phone number is (360) 407-6300, or call 911. There are fines for failure to notify the appropriate agency when a spill occurs.

7. De-icing chemicals (various types of salt) can harm concrete less than three years of age, burn vegetation and be corrosive to cars and other metal objects. De-icing chemicals and their additives can be toxic. (Cyanide is formed from the breakdown of a common anti-caking agent used in de-icing chemicals.)

Urea salts are an alternative to other types of salt de-icers, but great care must be used in applying them. These salts contain large quantities of nitrogen, which can severely burn plants and encourage algae growth if over-applied.

The use of these chemicals should be minimized or avoided. Instead, shovel walks clear and apply a dusting of sand to improve footing.

## Landscape Design and Maintenance

1. **Use of Native Plants:** One of the best methods of reducing impacts to water resources is by using landscaping materials that do not require extensive care. Native plants have adapted themselves to our region, particularly their root structure and water needs. These plants have also built tolerances over the centuries to local pests and disease. By using native plants in the landscape, we are less likely to need fertilizers, herbicides and pesticides. Native plants are also more tolerant of drought conditions and typically require less water.

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

### Evergreen Plants

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

Shrubs: rhododendron, evergreen huckleberry, tall Oregon-grape

Ferns: lady fern, sword fern, deer fern

Groundcover: manzanita, kinnikinnik, common juniper

### Deciduous Plants:

Trees: big leaf maple, Pacific dogwood, bitter cherry

Shrubs: western azalea, Nootka rose, red huckleberry

2. **Grasses for Lawns:** The lawn is a major component of the landscape. Selection of a grass well suited to our area is an important step in reducing the impact to water resources. The *National Turfgrass Evaluation* studies various types of grasses for their resistance to insects, drought tolerance, seasonal appearance, density, the strength of their sod and leaf texture. Based upon these characteristics, specific grass types are recommended for specific areas throughout the country. Fescue and perennial rye grass are recommended for this area.
3. **Mulching:** Use of native plants will greatly reduce the need for fertilizer. Use of mulch may eliminate the need altogether. Mulch acts as a physical barrier to weeds and is an excellent alternative to herbicides. Mulch can be compost, bark or wood chips, or leaves and grass clippings. It should be spread around the base of plants and within flowerbeds. The recommended depth of mulch varies between plant varieties but should typically be 2- to 4 inches.
4. **Use of Fertilizers:** Proper use of fertilizers yields better plants and reduces negative impacts to our water resources. Fertilizers typically contain high levels of nitrogen and

phosphorus, both of which can damage ground and surface waters. The following are a few tips to optimize the use of fertilizers in your garden.

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

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

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

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

If you want to maintain a lawn of moderate quality, a minimum of three fertilizations through the year is needed. Additional light fertilizations can be added if you are looking for a higher quality lawn. In general, you should apply no more than one pound of actual fertilizer nitrogen per 1,000 square feet at a time, although this rate can be increased to 1.5 pounds in the fall when using slow release products. (If the fertilizer analysis is 24-4-12, for example, it contains 24% nitrogen. To apply 1 pound of Nitrogen per 1,000 square feet, apply 4.2 pounds of fertilizer:  $1 \div 0.24 = 4.2$ ).

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

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

## Pest Control

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

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

There are some bacteria, viruses and insect parasites that are specific to pests and will not harm other insects or animals. A commonly used bacterium in the Puget Sound area is *Bacillus thuringiensis* (Bt), which is intended to control infestations of tent caterpillars. Products containing Bt are available at your nursery.

2. **Habitat Changes:** Many times a change of habitat can control pest infestations. Removal of old tires can cut down on the mosquito population by removing a convenient water-filled location for them to breed in. Crop rotation, even in a small garden, can reduce the number of pest infestations. Removing last year's leaves from under rose bushes can cut down on the incidence of mildew and blackspot, as these fungi overwinter in dead leaves.
3. **Timing:** Crops that can overwinter (such as leeks or carrots) should be planted in the fall. This gives them time to become established before pests arrive in the spring.
4. **Mechanical:** Many eggs, larvae, cocoons and adult insects can be removed by hand. Be sure that the insect is properly identified prior to removing it so those beneficial insects are not destroyed in error. Drowning insects in plain water or spraying them with soapy water are alternatives to squashing them.
5. **Resistant Plants:** Plants that are native to this area are often more resistant to pests and tolerant of the climate than are introduced plants. Many plant cultivars have been developed which are resistant to such diseases as verticillium wilt and peach leaf curl. Grass seed mixes are also available for lawns that need much less watering, mowing and chemical use.
6. **Growing Conditions:** Plants, such as hostas, that require some shade are more susceptible to pests when they are growing in the sun. Improperly fertilized or watered

plants are less vigorous in growth and tend to attract pests. Plants that prefer an acid soil, such as azaleas, will perform better and be less susceptible to pests when they are grown in soil with the proper pH.

7. Chemicals: Chemicals are a small part of the IPM plan and should be applied only as needed after reviewing all other alternatives.

## Pesticide Management

When use of a chemical is the best or only option, follow these simple guidelines:

1. Know your target pest before spraying. Use the pesticide according to the manufacturer's instructions, and buy only the needed quantity. Many pesticides have a limited shelf life and may be useless or degrade into even more toxic compounds if stored for extended periods of time.
2. Do not apply more than the specified amount. Overuse can be dangerous to your health as well as the health of wildlife and the environment. If more than one chemical can be used to control the pest, choose the least toxic. The word "caution" on the label means that the chemical is less toxic than one that is labeled "warning".
3. Do not spray on windy days, in the morning of what will be a very hot day or when rain is likely. Herbicides can drift and injure valuable ornamental plants. Do not water heavily after application. Plants should be lightly watered before application to prevent burning of the foliage and to help evenly spread the chemical.
4. Never apply pesticides near streams, ponds or wetlands (exception: approved applications for aquatic weeds). Do not apply pesticides to bare eroded ground (exception: use of low toxicity herbicides such as Round-Up to allow growth of desired planting in small areas). Many pesticides bind to soil particles and can be easily carried into a stream or storm drain.
5. Pesticides should be stored well away from living areas. Ideally, the storage area should have a cement floor and be insulated from temperature extremes. Always keep pesticides in their original containers with labels in tact. Labels often corrode and become illegible in this climate and may have to be taped onto the container.
6. Federal law now requires that all pesticides be labeled with the appropriate disposal method. Leftovers should never be dumped anywhere, including a landfill. Take unwanted pesticides to the County's hazardous waste collection days or Hazo House at the landfill.
7. Empty containers should be triple-rinsed and the rinse water used as spray. Once containers are triple-rinsed, they are not considered hazardous waste and may be disposed of in most landfills. However, call your local landfill before putting the container in the garbage.
8. If a pesticide is spilled onto pavement, it can be absorbed using kitty litter or sawdust. The contaminated absorbent should be bagged, labeled and taken to Hazo House.
9. If the pesticide is spilled onto dirt, dig up the dirt, place it in a plastic bag and take it to Hazo House.

10. Many pest control companies and licensed applicators have access to pesticides that are more toxic than those available to the consumer. Check with the company before they spray indoors or outdoors to find out what spray they will be using and what precautions, if any, are necessary after the operator leaves.

## Stormwater Control

Your neighborhood has a stormwater control system that includes wet ponds to treat stormwater runoff and infiltration ponds to store and infiltrate stormwater runoff into the ground. Both facilities require certain types of maintenance to assure that they function as intended. A Stormwater Maintenance Agreement has been recorded with the title on all properties within your subdivision, binding the Homeowners Association to implementing the specified maintenance. A copy of the maintenance agreement is included in the covenants filed with the plat and should be included as part of the title policy on your lot.

Precipitation falling on roads, alleys, driveways and sidewalks can become contaminated with automotive fluids, deicers, and other road grime. Precipitation falling on lawns can become contaminated with lawn chemicals and pesticides. These areas are considered pollutant generating surfaces (PGS). Stormwater runoff from PGS, precipitation that accumulates and drains above ground during rainy weather may be the largest source of pollutants to nearby water resources, and needs to be treated before being discharged to surface waters or infiltrated to underground aquifers. Precipitation falling on undeveloped areas and home roof tops isn't likely to become contaminated with the above mentioned contaminants. These areas are considered non-pollutant generating surfaces (NPGS). Stormwater runoff from NPGS does not require treatment unless mixed with runoff from PGS prior to discharge. The stormwater control system features designed into your development include wet ponds to treat stormwater runoff from PGS and infiltration ponds to store and infiltrate stormwater runoff into the ground.

Stormwater runoff from the PGS in your development will be collected and conveyed by catch basins and piping to wet ponds. As the runoff moves through the wet ponds, larger sized particles and attached pollutants settle out. In addition, the plant life in the wet ponds will remove a portion of the pollutants through biological processes. Stormwater will then pass from the wet ponds into the infiltration ponds to be infiltrated into the ground.

Stormwater runoff from the roof tops in your development does not need treatment and will be routed through the gutters on your home to individual infiltration trench/drywells located on each lot.

All stormwater control systems require regular maintenance. Each portion of the system (catch basins, culverts, roof drains (gutters), piping, wet ponds, infiltration ponds, etc) has a maintenance checklist found in Appendix A. These maintenance tasks should be performed at the frequency shown in the checklists. Care must be taken when using pesticides, fertilizers, and other household hazardous substances so as not to contaminate the stormwater runoff that leaves your property.

## IV. RELATED DOCUMENTS

### Resource Listing

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

#### CONTACT NUMBERS

Thurston County (Storm & Surface Water)	(360) 754-4681
Washington State University (WSU) Cooperative Extension	(360) 786-5445

#### DEVELOPER INFORMATION

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#### ENGINEER'S INFORMATION

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### Reference Material

Puget Sound Water Quality Authority, Managing Nonpoint Pollution - an Action Plan for Puget Sound Watersheds, 88-31, June 1989.

Washington State Dept. of Ecology, Water Quality Guide - Recommended Pollution Control practices for Homeowners and Small Farm Operators 87-30, revised June 1991.

Washington State Dept. of Ecology, Hazardous Waste Pesticides, 89-41, August 1989.

Gardening with Native Plants of the Pacific Northwest by Arthur Kruckeberg

### Toxic and Alternative Products Lists

Table 1: Hazardous Household Substances List

Table 2: Non- or Less Toxic Alternatives to Toxic Products

**Table 1 Hazardous Household Substances List**

<b>Auto, Boat and Equipment Maintenance</b>	<b>Repair and Remodeling</b>	<b>Cleansing Agents</b>
Batteries	Adhesives, glues, cements	Oven cleaners
Waxes and cleansers	Roof coatings, sealants	Degreasers and spot removers
Paints, solvents and thinners	Caulking and sealants	Toilet, drain and septic tank cleaners
Additives	Epoxy resins	Polishes, waxes and strippers
Gasoline	Solvent-based paints	Deck, patio and chimney cleaners
Flushes	Solvents and thinners	Solvent cleaning fluids
Auto repair materials	Paint removers and strippers	
Motor oil		
Diesel oil		
Antifreeze		
<b>Pesticides</b>	<b>Hobby and Recreation</b>	<b>Miscellaneous</b>
Insecticides	Paints, thinners and solvents	Ammunition
Fungicides	Chemicals (photo and pool)	Asbestos
Rodenticides	Glues and cements	Fireworks
Molluscicides	Inks and dyes	
Wood preservatives	Glazes	
Moss retardants	Chemistry sets	
Herbicides	Bottled gas	
Fertilizers	White gas	
	Charcoal starter fluid	

Source: Guidelines for Local Hazardous Waste Planning, Ecology, No. 87-18 1987.



**Table 2 Non- or Less Toxic Alternatives to Toxic Products**

<b>Hazardous Product</b>	<b>Alternative(s)</b>
Air fresheners	Set out a dish of vinegar; simmer cinnamon or cloves in water; set out herbal bouquets or potpourri in open dishes; burn scented candles.
Bleach	Borax or oxygen bleaches or reduce bleach by ½ and add ¼ - ½ C baking soda; line dry clothes.
Brass polish	Worcestershire sauce
Chrome polish	Apple cider vinegar; a paste of baking soda and water; a lemon
Coffee pot cleaner	Vinegar; remove coffee stains with moist salt paste.
Copper cleaner	Mixture of lemon juice and salt or tomato catsup.
Drain cleaner	Use a plunger followed by ½ C baking soda mixed with ½ C vinegar. Let sit 15 minutes; pour into drain followed by 2 qt. boiling water.
Furniture polish	Linseed, olive or almond oils; a mixture of 3 parts olive oil to 1 part white vinegar; a mixture of 1 T lemon oil and 1 pint mineral oil
Garbage disposal deodorizer	Lemon rind or baking soda.
Glass cleaner	Mixture of 2 T vinegar and 1 quart water
Grease remover	Paste of borax and water on damp cloth
Ink stain remover	Spray with non-aerosol hairspray before washing.
Laundry soap	Borax; baking soda; washing soda
Linoleum floor cleaner	Mixture of 1 C white vinegar and 2 gallons water
Mildew remover	Equal parts vinegar and salt
Mothballs	Cedar chips or blocks; dried tansy, lavender or peppercorns
Oil spills	Kitty litter; sawdust
Oil stain remover	White chalk rubbed into stain prior to washing
Oven cleaner	Cover fresh spills with salt; scrape off after the oven cools. A soda water solution will cut grease. Paint ammonia on spills with a paintbrush, then rinse off.
Paint brush softener	Hot vinegar
Paint stripper	Use mechanical sanding instead of chemical strippers.
Paint or grease remover	Wear gloves or try baby oil
Pet odor remover	Cider vinegar
Pitch or sap remover	Butter, margarine or vegetable shortening.
Porcelain stain remover	Baking soda
Refrigerator deodorizer	Open box of baking soda
Rug/carpet cleaner	(General) Use a soap-based non-aerosol rug shampoo; vacuum when dry. (Spots) Pour club soda or sprinkle cornmeal or cornstarch on the rug; let sit for at least 30 minutes; vacuum.
Rust remover	Lemon juice and sunlight
Rusty bolt remover	Carbonated beverage
Scorch mark remover	Grated onion
Scouring powder	Baking soda or non-chlorine scouring powder.
Silver polish	Soak silver in warm water with 1 T soda, 1 T salt and a piece of aluminum foil.
Stainless steel polish	Mineral oil
Toilet bowl cleaner	Paste mixture of borax and lemon juice
Tub and tile cleaner	¼ C soda and ½ C white vinegar mixed with warm water
Upholstery spot remover	Club soda
Water mark remover	Toothpaste

## Glossary

BEST MANAGEMENT PRACTICE (BMP) - Structures, conservation practices or regulations that improve quality of runoff or reduce the impact of development on the quantity of runoff.

BIOFILTER (SWALE) - A wider and flatter vegetated version of a ditch over which runoff flows at uniform depth and velocity. Biofilters perform best when vegetation has a thick mat of roots, leaves and stems at the soil interface (such as grass).

BIOFILTRATION - The process through which pollutant concentrations in runoff are reduced by filtering runoff through vegetation.

BUFFER - The zone that protects aquatic resources by providing protection of slope stability, attenuation of runoff and reduction of landslide hazards. An integral part of a stream or wetland ecosystem, it provides shading, input of organic debris and coarse sediments to streams. It also allows room for variation in stream or wetland boundaries, habitat for wildlife and protection from harmful intrusion.

CATCH BASIN - An inlet for stormwater set into the ground, usually rectangular, made of concrete and capped with a grate that allows stormwater to enter.

CHECK DAM - A dam (e.g., rock, earthen, log) used in channels to reduce water velocities, promote sediment deposition and/or enhance infiltration.

COMPOST STORMWATER FILTER - A treatment facility that removes sediment and pollutants from stormwater by percolating water through a layer of specially prepared big leaf maple compost.

CONSTRUCTED WETLAND - A wet pond with dead storage at varied depths and planted with wetland plants to enhance its treatment capabilities.

CONTROL STRUCTURE (FLOW RESTRICTOR) - A manhole and/or pipe structure with a flow-regulating or metering device such as a weir or plates with small holes known as orifices. This structure controls the rate at which water leaves the pond.

CONVEYANCE - A mechanism or device for transporting water including pipes, channels (natural and man-made), culverts, gutters, manholes, etc.

CRITICAL AREA - Areas, such as wetlands, streams and steep slopes, defined by ordinance or resolution of the jurisdiction. Also known as "environmentally sensitive areas."

CULVERT - A conveyance device (e.g., concrete box, pipe) that conveys water from a ditch, swale or stream under (usually across) a roadway or embankment.

DEAD STORAGE - The volume of storage in a pond below the outlet that does not drain after a storm event. This storage area provides treatment of the stormwater by allowing sediments to settle out.

DETENTION FACILITY - A facility (e.g., pond, vault, pipe) in which surface and stormwater is temporarily stored.

DETENTION POND - A detention facility in the form of an open pond.

DISPERSION TRENCH - An open-top trench filled with riprap or gravel that takes the discharge from a pond, spreads it out and spills (bubbles) the flow out along its entire length. Dispersion

trenches are used to simulate "sheet flow" of stormwater from an area and are often used to protect sensitive adjacent areas, such as wetlands.

DRAINAGE SYSTEM - The combination of Best Management Practices (BMPs), conveyances, treatment, retention, detention and outfall features or structures on a project.

DROP STRUCTURE - A structure for dropping water to a lower elevation and/or dissipating energy. A drop may be vertical or inclined.

DRY POND - A detention facility that drains completely after a storm. This type of pond has a pipe outlet at the bottom.

EASEMENT - A right afforded a person to make limited use of another's real property. Typical easements are for pipes or access to ponds; they may be 15 to 20 feet wide.

EMERGENCY OVERFLOW OR SPILLWAY - An area on the top edge of the pond that is slightly lower in elevation than areas around it. This area is normally lined with riprap. The emergency overflow is used only if the primary and secondary outlets of the pond fail, in the event of extreme storms or if the infiltration capability of the pond becomes significantly diminished. If the emergency overflow ever comes into play, it may indicate the pond needs to be upgraded.

ENERGY DISSIPATER - A rock pad at an outlet designed to slow the water's velocity, spread out the water leaving the pipe or channel and reduce the potential for erosion.

FREEBOARD - The vertical distance between the design high water mark and the elevation of the top of the pond. Most ponds have one to two feet of freeboard to prevent them from overflowing.

INFILTRATION - The soaking of water through the soil surface into the ground (percolation). (Many ponds are designed to fully infiltrate stormwater and thus do not have a regularly used discharge pipe.)

INFILTRATION FACILITY (or STRUCTURE) - A facility (pond or trench) that retains and percolates stormwater into the ground, having no discharge (to any surface water) under normal operating conditions.

JUNCTION - Point where two or more drainage pipes or channels converge (e.g., a manhole).

JURISDICTION - Olympia, Lacey, Tumwater or Thurston County (as applicable).

LINED POND or CONVEYANCE - A facility, the bottom and sides of which have been made impervious (using, for example, a plastic liner or clay/silt soil layer) to the transmission of liquids.

LIVE STORAGE - The volume of storage in a pond above the outlet that drains after a storm event. This storage area provides flood control and habitat protection for nearby streams.

MANHOLE - A larger version of a catch basin, often round, with a solid lid. Manholes allow access to underground stormwater pipes for maintenance.

NATURAL CHANNEL - Stream, creek, river, lake, wetland, estuary, gully, swale, ravine or any open conduit where water will concentrate and flow intermittently or continuously.

OIL-WATER SEPARATOR - A structure or device used to remove oil and greasy solids from water. They operate by using gravity separation of liquids that have different densities. Many catch basins have a downturned elbow that provides some oil-water separation.

OUTFALL - The point where water flows from a man-made conduit, channel or drain into a water body or other natural drainage feature.

RETENTION FACILITY - An infiltration facility.

RETENTION POND - A retention facility that is an open pond.

REVELEMENTS - Materials such as rock or keystones used to sustain an embankment, such as in a retaining wall.

RIPRAP - Broken rock, cobbles or boulders placed on earth surfaces, such as on top of a berm for the emergency overflow, along steep slopes or at the outlet of a pipe, for protection against the action of water. Also used for entrances to construction sites.

RUNOFF - Stormwater.

SAND FILTER - A treatment facility that removes sediment and pollutants from stormwater by percolating water through a layer of sand.

STORMWATER - That portion of precipitation that falls on property and that does not naturally percolate into the ground or evaporate but flows via overland flow, channels or pipes into a defined surface water channel or a constructed infiltration facility. Stormwater includes washdown water and other wastewater that enters the drainage system.

SWALE - A shallow drainage conveyance with relatively gentle side slopes, generally with flow depths less than one foot. This term is used interchangeably with "BIOFILTER".

TRASH RACK or BAR SCREEN - A device (usually a screen or bars) that fits over a pipe opening to prevent large debris such as rocks or branches from entering and partially blocking the pipe.

WET POND - A stormwater treatment pond designed with a dead storage area to maintain a continuous or seasonal static water level below the pond outlet elevation.

## **Appendix A   Stormwater Facility Maintenance Guide**

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**(RESIDENTIAL SUBDIVISION VERSION)**

**AGREEMENT TO MAINTAIN  
STORMWATER FACILITIES AND TO IMPLEMENT A  
POLLUTION SOURCE CONTROL PLAN  
BY AND BETWEEN THURSTON COUNTY, AND  
Conwell Investments, LLC, AND  
ITS HEIRS, SUCCESSORS, OR ASSIGNS  
(HEREINAFTER "OWNER")**

The upkeep and maintenance of stormwater facilities and the implementation of pollution source control best management practices (BMPs) are essential to the protection of water resources in Thurston County. 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 Thurston County Code.

**LEGAL DESCRIPTION:**

*Parcel "A"*

*The south half of the southeast quarter of the northwest quarter of Section 25, Township 18 North, Range 1 West, W.M.;*

*Excepting therefrom that portion, if any lying in the right-of-way of county road known as Marvin Road, in Thurston County, Washington,*

*Parcel "B"*

*An easement for ingress, egress and utilities over, under, upon and through a 40 foot wide portion of land as described in instrument recorded December 3, 2007 under Recording No. 3980798 in Thurston County, Washington.*

**RECITALS**

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

and

WHEREAS, In connection with the OWNER'S proposed development of the Property, Thurston County has required and OWNER has agreed to construct stormwater facilities and to implement a pollution source control plan. The stormwater facilities and pollution source control plan were prepared by Hatton Godat Pantier, Inc for the OWNER'S property and is on file with Thurston County.

and

WHEREAS, OWNER has constructed improvements, including but not limited to, buildings, pavement, and stormwater facilities on the Property, in order to further the goals of Thurston County to ensure the protection and enhancement of Thurston County's water resources, THURSTON COUNTY

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 THURSTON COUNTY at 2415 Carpenter Road SE, Lacey, WA 98503 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 as specified in the attached instructions or more frequently if 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 log book.
- (4) Submit an annual report to THURSTON COUNTY regarding implementation of the programs referenced in (1) and (2) above. The report must be submitted on or before August 31 of each calendar year and shall contain, at a minimum, the following:
  - (a) Name, address, and telephone number of the business, the person, or the firm responsible for plan implementation, and the person completing the report.
  - (b) Time period covered by the report.
  - (c) A chronological summary of activities conducted to implement the programs referenced in (1) and (2) above. A photocopy of the applicable sections of the log book, with any additional explanation needed, shall normally suffice. For any activities conducted by paid parties not affiliated with OWNER, include a copy of the invoice for services.
  - (d) An outline of planned activities for the next year.
- (5) Prevent any unauthorized modifications to the drainage system and prevent it from being dismantled, revised, altered or removed except as necessary for maintenance, repair or replacement. Any such actions will be covered under item 4 above and shall be approved of by THURSTON COUNTY. Modifications to the stormwater quantity control and stormwater quality system must be approved in advance by THURSTON COUNTY and may require the submittal of revised design drawings, supporting calculations, modifications to maintenance requirements, and applications for permits.

THURSTON COUNTY WILL, AS RESOURCES ALLOW:



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

**REMEDIES:**

(1) If THURSTON COUNTY determines that maintenance or repair work is required to be done to the stormwater facility existing on the OWNER'S property, THURSTON COUNTY shall give OWNER, and the person or agent in control of said property if different, written notice in accordance with the Notice Section of this Agreement, of the specific maintenance and/or repair required. THURSTON COUNTY shall set a reasonable time in which such work is to be completed by the persons who were given notice. If the above required maintenance and/or repair is not completed within the time set by THURSTON COUNTY, written notice will be sent to the persons who were given notice stating THURSTON COUNTY'S intention to perform such maintenance and bill the owner for all incurred expenses. THURSTON COUNTY may also adjust stormwater utility charges if required maintenance is not performed.

(2) If at any time THURSTON COUNTY determines that the existing system creates any imminent threat to public health, welfare or water quality THURSTON COUNTY may take immediate measures to remedy said threat. No notice to the persons listed in Remedies (1), above, shall be required under such circumstances, however, THURSTON COUNTY shall take reasonable steps to immediately notify OWNER of such imminent threat to the public health and welfare. All other responsibilities shall remain in effect.

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

(4) OWNER shall assume all responsibility for the cost of any maintenance and for repairs to the stormwater facility. Such responsibility shall include reimbursement to THURSTON COUNTY 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 THURSTON COUNTY will be borne by the parties responsible for said reimbursements.

(5) OWNER hereby grants to the THURSTON COUNTY a lien against the above-described property in an amount equal to the cost incurred by THURSTON COUNTY to perform the maintenance or repair work described herein.

**NOTICE:**

Whenever a party is required or permitted under this Agreement to provide the other party with any notice, request, demand, consent, or approval ("Notice"), such Notice will be given in writing and will be delivered to the other party at the address or facsimile number set forth below: (a) personally; (b) by a reputable overnight courier service; (c) by certified mail, postage prepaid, return receipt requested; or (d) by e-mail or facsimile transmission. A party may change its address for Notice by written notice to the other party delivered in the manner set forth above. Notice will be deemed to have been duly given: (i) on the date personally delivered; (ii) one (1) business day after delivery to an overnight courier service

with next-day service requested; (iii) on the third (3rd) business day after mailing, if mailed using certified mail; or (iv) on the date sent when delivered by facsimile or e-mail (so long as the sender sends such facsimile or email on a business day and receives electronic confirmation of receipt and a copy of the Notice is sent by one of the other means permitted hereunder on or before the next business day). The initial addresses for Notice are as follows:

IF TO OWNER:

Conwell Investments, LLC  
2415 Carpenter Road SE  
Lacey, WA 98503

\_\_\_\_\_  
\_\_\_\_\_  
Telephone: (360) 438-0525  
Fax: \_\_\_\_\_  
E-mail: user772574@aol.com

IF TO THURSTON COUNTY:

Thurston County  
Storm and Surface Water Utility  
929 Lakeridge Dr SW  
Bldg. 4, Room 100  
Olympia, WA 98502  
Telephone: (360) 754-4681  
Fax: (360) 754-4682  
Web:  
<http://www.co.thurston.wa.us/stormwater/>

Date \_\_\_\_\_

**Attachment "A"**  
**Stormwater Facilities Maintenance Program**

# STORMWATER FACILITY MAINTENANCE GUIDE

## Introduction

### What Is Stormwater Runoff?

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

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

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

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

### What Does Stormwater Runoff Have to Do With Water Quality?

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

### Stormwater Facilities

Different types of ponds are designed for different purposes. For example, wet ponds primarily provide treatment of stormwater. Dry ponds or infiltration ponds are designed to provide storage for stormwater and allow for its gradual release downstream or into the ground.

### Who Is Responsible for Maintaining Stormwater Facilities?

All stormwater facilities require maintenance. Regular maintenance ensures proper functioning and preserves visual appeal. This Stormwater Facility Maintenance Guide was designed to explain how stormwater facilities work and provide user-friendly, straightforward guidance on facility maintenance. You are responsible for regularly maintaining privately owned ponds, catch basins, pipes and other drainage facilities on your property. Stormwater facilities located in public rights-of-way are maintained by local governments.

## How to Use the Stormwater Facility Maintenance Guide

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

### Included in This Guide

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

## A Regional Approach to Stormwater Management

The Cities of Lacey, Olympia and Tumwater together with Thurston County are taking steps to educate and involve area residents in water quality issues and stormwater management. Stormwater runoff is a widespread cause of water quality impairment and stream degradation. The jurisdictions are working together with residents, businesses, community groups and schools to address this problem. This guide focuses on providing information on ways that you can reduce stormwater impacts through pollution prevention and proper facility maintenance.

## Your Stormwater Facilities

This section consists of two parts that are to be used together: the **Facility Key** and the **Site Plan**. Review the site plan and identify the numbers denoting a feature of the system. Then check the facility key for the feature type and checklist name.

### Facility Key

The stormwater facility in your neighborhood is comprised of the following elements:

Type of Feature and Checklist Name	Location on Site Plan
Stormwater Wetland (BMP WP.01)	1
Infiltration Basins (BMP IN.01)	2
Post Construction Soil Quality and Depth (LID.02)	3
Catch Basins and Inlets	4
Fencing and Gates	5
Access Roads and Easements	6
Conveyance Pipes and Ditches	7
Trash Racks	8
Grounds and Landscaping	9



## Quick List

The following is an abbreviated checklist of the most common types of maintenance required. Please go over this checklist after heavy rains. The list represents minimum maintenance to be performed and should be completed in conjunction with the other checklists for an effective maintenance program.

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



## Maintenance Checklists

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

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

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

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

A resource list is included in the next chapter. There you will find the phone numbers of the agencies referenced in the tables, as well as the contractors and consultants who designed and constructed your facilities.



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

Table C-3B. Maintenance Checklist for Stormwater Wetland (BMP WP.01)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris buildup in pond or wetland.	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	Remove trash and debris and dispose as prescribed by Thurston County Department of Resource Stewardship.
M,S			Trash rack plugged or missing	Bar screen over outlet more than 25% covered by debris or missing.	Replace screen. Remove trash and debris and dispose as prescribed by City Waste Management Section.
M			Poisonous Vegetation	Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, poison ivy, stinging nettles, devilsclub.	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the County. Contact Thurston County Noxious Weeds program.
M,S			Fire hazard or pollution	Presence of chemicals such as natural gas, oil, and gasoline, obnoxious color, odor, or sludge noted.	Find sources of pollution and eliminate them. Water is free from noticeable color, odor, or contamination.
M			Vegetation not growing or is overgrown	Plants are sparse or invasive species are present.	Hand-plant nursery-grown wetland plants in baser areas. Contact the Thurston County Noxious Weed program for direction on invasive species such as purple loosestrife and reed canary grass. Pond bottoms shall have uniform dense coverage of desired plant species.
M			Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents destroyed and dam or berm repaired. Contact the Thurston County Public Health and Social Services Department for guidance.
M			Insects	When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects destroyed or removed from site. Contact Cooperative Extension Service for guidance.

**THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL**

Frequency	Drainage Systems Feature	✓	Problem	Conditions to Check For	Conditions that Shall Exist
A			Tree Growth	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, or equipment movements). If trees are not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood. Remove species that are not part of recorded planting plan.
M	Side Slopes of Pond		Erosion on berms or at entrance/exit	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
A	Internal berm or embankment		Settlements	Any part of dike which has settled 4 inches lower than the design elevation.	Dike is built back to the design elevation.
			Irregular surface on internal berm	Top of berm not uniform and level.	Top of berm graded flat to design elevation.
A	Emergency Overflow/ Spillway		Rock Missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Replace rocks to design standards.
One time			Overflow Missing	Side of pond has no area with large rocks to handle emergency overflows.	Contact County for guidance.
A	Pond Areas		Sediment accumulation (first cell / forebay)	Sediment accumulations in pond bottom that exceeds the depth of sediment storage (1 foot) plus 6 inches.	Sediment storage contains no sediment.
A			Sediment accumulation (wetland cell)	Accumulated sediment that exceeds 10% of the designed pond depth.	Sediment cleaned out to designed pond shape and depth.
A			Liner damaged (if applicable)	Liner is visible or pond does not hold water as designed.	Liner repaired or replaced.
A			Water level (first cell / forebay)	Cell does not hold 3 feet of water year round.	3 feet of water retained year round.
A			Water level (wetland cell)	Cell does not retain water for at least 10 months of the year or wetland plants are not surviving.	Water retained at least 10 months of the year or wetland plants are surviving.

**THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL**

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Algae mats (first cell / forebay)	Algae mats develop over more than 10% of the water surface should be removed.	Algae mats removed (usually in the late summer before Fall rains.
A			Vegetation	Vegetation dead, dying, or overgrown (cattails) or not meeting original planting specifications.	Plants in wetland cell surviving and not interfering with wetland function.
A	Gravity Drain		Inoperable valve	Valve will not open and close	Valve opens and closes normally.
A			Valve won't seal	Valve does not seal completely.	Valve completely seals closed.
A	Inlet/Outlet pipe		Sediment accumulation	Sediment filling 20% or more of the pipe.	Inlet/outlet pipes clear of sediment.
A			Trash and debris	Trash and debris accumulated in inlet/outlet pipes (includes floatables and non-floatables).	No trash or debris, in pipes.
A			Damaged	Cracks wider than ½ inch at the joint of the inlet / outlet pipe or any evidence of soil entering at the joints of the inlet / outlet pipes.	No cracks more than ¼ inch wide at the joint of the inlet/outlet pipe.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

**Key:**

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

**Table C-4. Maintenance Checklist for Infiltration Basins (BMP IN.01); Infiltration Trenches (BMP IN.02), and Bioinfiltration Swale (BMP IN.03)**

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris buildup in pond	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	Remove trash and debris and dispose as prescribed by Thurston County Department of Resource Stewardship.
M			Poisonous Vegetation	Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, stinging nettles, devilsclub.	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the County.
A			Tree Growth	Tree growth in pond or swale bottoms, side slopes and maintenance access areas.	Trees removed from facility bottom, side slopes and maintenance access areas. Remove species that are not part of recorded planting plan.
M,S			Fire Hazard or Pollution	Presence of chemicals such as natural gas, oil, and gasoline, obnoxious color, odor, or sludge noted.	Find sources of pollution and eliminate them. Water is free from noticeable color, odor, or contamination.
M			Vegetation not growing or is overgrown	Grass cover is sparse and weedy or is overgrown. Plants are sparse or invasive species are present.	Selectively thatch, aerate, and reseed ponds. Grass cutting unnecessary unless dictated by aesthetics. Contact the Thurston County Noxious Weed program for direction on invasive species such as purple loosestrife and reed canary grass. Pond bottoms shall have uniform dense coverage of desired plant species.
M			Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents destroyed and dam or berm repaired. Contact the Thurston County Public Health and Social Services Department for guidance.

**THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL**

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M			Insects	When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects destroyed or removed from site. Contact Cooperative Extension Service for guidance.
A	Storage Area		Sediment buildup in system	A soil texture test indicates facility is not working at its designed capabilities or was incorrectly designed.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design. A sediment trapping area is installed to reduce sediment transport into infiltration area.
A			Storage area drains slowly (more than 48 hours) or overflows	A soil texture test indicates facility is not working at its designed capabilities or was incorrectly designed.	Additional volume is added through excavation to provide needed storage. Soil is aerated and rototilled to improve drainage. Contact the County for information on its requirements regarding excavation.
M			Sediment trapping area	Any sediment and debris filling area to 10 percent of depth from sump bottom to bottom of outlet pipe or obstructing flow into the connector pipe.	Clean out sump to design depth.
One time			Sediment trapping area not present	Stormwater enters infiltration area directly without treatment.	Add a trapping area by constructing a sump for settling of solids. Segregate settling area from rest of facility. Contact County for more guidance.
M	Rock filters		Sediment and debris	By visual inspection little or no water flows through filter during heavy rain storms.	Replace gravel in rock filter.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

**Table C-8. Maintenance Checklist for Compost Amended Soil for Post-Construction Soil Quality and Depth (BMP LID.02) and Compost-Amended Vegetated Filter Strip (BMP BF.06)**

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	General		Soil media (maintain high organic soil content)	Vegetation not fully covering ground surface.	Re-mulch landscape beds with 2-3 inches of mulch until the vegetation fully closes over the ground surface
Ongoing				None. Preventative maintenance.	Return leaf fall and shredded woody materials from the landscape to the site as mulch.
Ongoing				None. Preventative maintenance.	On turf areas, "grasscycle" (mulch-mow or leave the clippings) to build turf health
Ongoing				None. Preventative maintenance.	Avoiding broadcast use of pesticides (bug and weed killers) like "weed & feed," which damage the soil life.
A				None. Preventative maintenance.	Where fertilization is needed (mainly turf and annual flower beds), a moderate fertilization program which relies on natural organic fertilizers (like compost) or slow release synthetic balanced fertilizers.
A			Compaction	Soils become waterlogged, do not appear to be infiltrating.	To remediate, aerate soil, till or further amend soil. If drainage is still slow, consider investigating alternative causes (e.g., high wet-season groundwater levels, low permeability soils). Also consider land use and protection from compacting activities. If areas are turf, aerate compacted areas and top dress them with 1/4 to 1/2 inch of compost to renovate them.

**THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL**

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Erosion/scouring	Areas of potential erosion are visible.	Take steps to repair or prevent erosion. Identify and address the causes of erosion.
A			Grass/vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions (e.g., remove/replace plants)
M			Noxious weeds	Listed noxious vegetation is present. See Pierce County noxious weed list.	By law, noxious weeds must be removed and disposed immediately. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Q			Weeds	Weeds are present.	Remove and dispose of weed material. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

**Key:**

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms.

Q = Quarterly



Table C-13. Maintenance Checklist for Catch Basins and Inlets

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris	Trash, debris, and sediment in or on basin	No trash or debris located immediately in front of catch basin opening. Grate is kept clean and allows water to enter.
M				Sediment or debris (in the basin) that exceeds 1/3 the depth (1-ft minimum storage remaining) from the bottom of basin to invert of the lowest pipe into or out of the basin.	No sediment or debris in the catch basin. Catch basin is dug out and clean.
M,S				Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
M			Structural Damage to Frame and/or Top Slab	Corner of frame extends more than 3/4 inch past curb face into the street (if applicable).	Frame is even with curb.
M				Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
M				Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached.	Frame is sitting flush on the riser rings or top slab and firmly attached.
A			Cracks in Basin Walls/ Bottom	Cracks wider than 1/2 inch and longer than 3 feet, any evidence of soil particles entering catch basin through cracks, or maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A				Cracks wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	No cracks more than 1/4 inch wide at the joint of inlet/outlet pipe.

Frequency	Drainage Systems Feature	✓	Problem	Conditions to Check For	Conditions that Shall Exist
A			Settlement/ Misalignment	Basin has settled more than 1 inch or has rotated more than 2 inches out of alignment.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A			Illicit discharges to Catch Basin	Look for connections from adjacent businesses, residences that are not part of drainage plan. If detected identify source of connection and notify Thurston County.	No connections to Catch Basins are allowed that are not part of the approved plans or authorized by permit from Thurston County.
M			Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.
M			Vegetation	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-15. Maintenance Checklist for Fencing

Frequency	Drainage Systems Feature	✓	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Missing or broken parts/dead shrubbery	Any defect in the fence or screen that permits easy entry to a facility.	Fence is mended or shrubs replaced to form a solid barrier to entry.
M,S			Erosion	Erosion has resulted in an opening under a fence that allows entry by people or pets.	Replace soil under fence so that no opening exceeds 4 inches in height.
M			Unruly Vegetation	Shrubbery is growing out of control or is infested with weeds.	Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.
A	Wire Fences		Damaged Parts	Posts out of plumb more than 6 inches.	Posts plumb to within 1.5 inches of plumb.
A				Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
A				Any part of fence (including posts, top rails, and fabric) more than 1 foot out of design alignment.	Fence is aligned and meets design standards.
A				Missing or loose tension wire.	Tension wire in place and holding fabric.
A				Missing or loose barbed wire that is sagging more than 2.5 inches between posts.	Barbed wire in place with less than 3/4 inch sag between posts.
A				Extension arm missing, broken, or bent out of shape more than 1.5 inches.	Extension arm in place with no bends larger than 3/4 inch.
A			Deteriorated Paint or Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Structurally adequate posts or parts with a uniform protective coating.
M			Openings in Fabric	Openings in fabric are such that an 8-inch diameter ball could fit through.	No openings in fabric.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-16. Maintenance Checklist for Gates

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Damaged or Missing Components	Gate is broken, jammed, or missing.	Pond has a functioning gate to allow entry of people and maintenance equipment such as mowers and backhoe. If a lock is used, make sure the county field staff have a key.
M				Broken or missing hinges such that gate cannot be easily opened and closed by one maintenance person.	Hinges intact and lubed. Gate is working freely.
A				Gate is out of plumb more than 6 inches and more than 1 foot out of design alignment.	Gate is aligned and vertical.
A				Missing stretcher bar, stretcher bands, and ties.	Stretcher bar, bands, and ties in place.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

**Key:**

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-17. Maintenance Checklist for Access Roads/Easements

Frequency	Drainage Systems Feature	✓	Problem	Conditions to Check For	Conditions that Shall Exist
One Time	General		No access road exists	If ponds or other drainage system features needing maintenance by motorized equipment are present, either an access road or access from public streets is required.	Determine whether an easement to drainage feature exists. If yes, obtain County permits and construct gravel (or equal) access road. If not report lack of easement to County attention.
M			Block roadway	Debris which could damage vehicle tires (glass or metal)	Roadway free of debris which could damage tires.
A				Any obstructions which reduce clearance above road surface to less than 14 feet.	Roadway overhead clear to 14 feet high.
A				Any obstructions restricting access to less than 15 feet width.	Obstruction removed to allow at least a 15 foot wide access.
A	Easement Markers		Easement Not Clearly Identified	Check that easement markers are in place identifying limits of easement	Easement markers installed at 100-ft intervals and changes in direction along easement lines.
A,S	Road surface		Settlement, potholes, mush spots, ruts	When any surface exceeds 6-inches in depth and 6 square feet in area. In general, any surface defect which hinders or prevents maintenance access.	Road surface uniformly smooth with no evidence of settlement, potholes, mush spots, or ruts. Occasionally application of additional gravel or pit run rock will be needed.
M			Vegetation in road surface	Woody growth that could block vehicular access. Excessive weed cover.	Remove woody growth at early stage to prevent blockage. Cut back weeds if they begin to encroach on road surface.
M,S	Shoulders and ditches		Erosion damage	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep	Shoulder free of erosion and matching the surrounding road.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-18. Conveyance Pipes and Ditches

Frequency	Drainage Systems Feature	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	Pipes	Sediment & Debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
M		Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely through pipes.
A		Damaged (rust, bent, or crushed)	Protective coating is damaged, rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
M			Any dent that significantly impedes flow (i.e. decreases the cross section area of pipe by more than 20%)	Pipe repaired or replaced
M			Pipe has major cracks or tears allowing groundwater leakage.	Pipe repaired or replaced.
M,S	Open ditches	Trash & debris	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam and coated paper.	Remove trash and debris and dispose as prescribed by solid waste regulations.
M		Sediment buildup	Accumulated sediment that exceeds 20% of the design depth.	Ditch cleared of all sediment and debris so that it matches design.
A		Vegetation	Vegetation (e.g. weedy shrubs or saplings) that reduces free movements of water through ditches.	Water flows freely through ditches. Grass vegetation should be left alone.
M		Erosion on	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
A		Rock lining out of place or missing (if applicable)	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standard.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-19. Debris Barriers (E.G. Trash Racks)

Frequency	Drainage Systems Feature	✓	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	Site		Trash and debris	Trash and debris plugging more than 20% of the area of the barrier.	Barrier clear to receive capacity flow.
A			Sediment accumulation	Sediment accumulation of greater than 20% of the area of the barrier	Barrier clear to receive capacity flow
A	Structure		Cracked, broken or loose	Structure with bars attached to is damaged – pipe is loose or cracked or concrete structure is cracked, broken or loose.	Structure barrier attached to is sound.
A	Bars		Bar spacing	Bar spacing exceeds 6-inches	Bars have at most 6-inches spacing
A			Damaged or missing bars	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than ¾ inch.
A				Bars are missing or entire barrier missing.	Bars in place according to design.
A				Bars are loose and rust is causing 50% deterioration to any part of barrier.	Repair or replace barrier to design standards.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

Table C-20. Maintenance Checklist for Grounds (Landscaping)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Weeds (non poisonous)	Weeds growing in more than 20% of the landscaped area (trees and shrubs only)	Weeds present in less than 5% of the landscaped area.
M			Safety hazard	Any presence of poison ivy, poison oak or other poisonous vegetation or insect nests.	No poisonous vegetation or insect nests present in landscaped area.
M,S			Trash or litter	Trash/debris exceeds 5 cubic feet (this is about equal to the amount of trash in one standard garbage can) per 1,000 square feet. In general there should be no evidence of visual dumping.	Remove/dispose of waste in accordance with solid waste regulations.
M,S			Erosion of ground surface	Noticeable rills are seen in landscaped areas.	Causes of erosion are identified and steps taken to slow down/spread out the water. Eroded areas are filled, contoured, and seeded.
A	Trees and shrubs		Damage	Limbs or parts of trees or shrubs that are split or broken which affect more than 25% of the total foliage of the tree or shrub.	Trim trees/shrubs to restore shape. Replace trees/shrubs with severe damage.
M				Tree or shrubs that have been blown down or knocked over.	Replant tree, inspecting for injury to stem or roots. Replace if severely damaged.
A				Tree or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.	Place stakes and rubber-coated ties around young trees/shrubs for support.
M,S	Shoulders and ditches		Erosion damage	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep	Shoulder free of erosion and matching the surrounding road.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms



## Resource Listing

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

### CONTACT NUMBERS

Thurston County (Storm & Surface Water)	(360) 754-4681
Washington State University (WSU) Cooperative Extension	(360) 786-5445

### DEVELOPER INFORMATION

Conwell Investments, LLC  
2415 Carpenter Road SE  
Lacey, WA 98503  
(360) 438-0525

### ENGINEER'S INFORMATION

HATTON GODAT PANTIER  
3910 Martin Way E., Suite B  
Olympia, WA 98506  
(360) 943-1599

## Log Sheet

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

INSPECTION DATE: _____			
PERFORMED BY: _____			
PHONE NUMBER: _____		ADDRESS: _____	
POSITION ON HOA: _____		CITY, ST, ZIP: _____	

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

**Attachment "B"**  
**Pollution Source Control Program**

THURSTON COUNTY, WASHINGTON

**RESIDENTIAL STORMWATER POLLUTION  
PREVENTION SOURCE CONTROL  
MANUAL**

**Grantor(s)** (Last, First and Middle Initial)

\_\_\_\_\_

**Grantee(s)** (Last, First and Middle Initial)

PUBLIC

\_\_\_\_\_

**Legal Description** (abbreviated form: i.e. lot, block, plat or section, township, range, quarter/quarter)

\_\_\_\_\_

\_\_\_\_\_

**Assessor's Property Tax Parcel/Account Number**

\_\_\_\_\_

The Auditor/Recorder will rely on the information provided on this form. The staff will not read the document to verify the accuracy or completeness of the indexing information provided herein.

**As-Built Drainage Plan Attached ?**

☐

Yes

☐

No

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# 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 and 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 in unincorporated Thurston County that have the potential to contribute pollutants to stormwater runoff or directly to receiving waters. Stormwater runoff may seep into the ground, drain to a storm drain or a drainage ditch, or flow over the ground. 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 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. But 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.

*Source control BMPs prevent contaminants from entering stormwater by controlling them at the source.*

## **Treatment BMPs**

In contrast, *treatments* BMPs are structures that treat stormwater to remove contaminants. Treatment BMPs typically require elaborate planning, 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 and the less contaminants in the 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.

*Keep in mind that 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'S 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 *Thurston County Drainage Design and Erosion Control Manual*, Volume IV – *Source Control*.

# General Principles of Pollution Prevention

*There are 15 general principles of pollution prevention that every homeowner should consider.*

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 county in 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**

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

## **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.



*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 gives more time to react to a spill, or if it is a "housekeeping" issue, may protect the local waters long enough for you to cleanup the area around the activity. Don't forget that groundwater protection is important throughout Thurston County, no matter where the activity is located, so the actions you take on a day-to-day basis are always important, even in dry weather.

*Don't forget that groundwater protection is important throughout Thurston County.*

#### **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 the Thurston County Solid Waste Division at (360) 357-2491 for more information on recycling opportunities at the Thurston County Waste and Recover Center.

#### **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 Thurston County, call the Water Resources Division of the Resource Stewardship Department at (360) 754-4681 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.

*Do not hose down pollutants from any area to the ground, storm drain, conveyance ditch or any receiving water (stream, wetland, lake, etc.)*

## **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 Water Resources Division at (360) 754-4681.

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

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

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

*Every business and residence in Thurston County must dispose of solid and liquid wastes and contaminated stormwater properly.*

# Best Management Practices for Single Family Residences

*Stormwater goes directly to our groundwater, lakes, streams and to Puget Sound. It does not go to the wastewater treatment plant.*

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 to Puget Sound. It does not go to the wastewater treatment plant. Any pollutants that get into the stormwater go directly to surface or groundwater. 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 Thurston County use these BMPs. **Please note that some of these procedures are required by various state, or county laws, and are noted as required BMPs.**

This section provides a general list of activities typically conducted by home owners 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 Thurston County Drainage Design and Erosion Control Manual, Volume IV or by contacting the Thurston County Water Resources Division of the Resource Stewardship Department at (360) 754-4681. 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. *On-Site Sewage Maintenance and Operation*
10. *Activities in Wetlands and Wetlands Buffers*
11. *Illicit Discharge Detection and Elimination*

# 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 doesn't pollute surface water. Instead, it's 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 which are properly labeled and store them out of the weather.

*Never dump new or used automotive fluids or solvents on the ground, in a storm drain or street gutter...*

### 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 2 layers of plastic and dispose of in your regular garbage or recycle by taking it to the Thurston County Waste and Recovery Center. Call the Thurston County Department of Public Works at (360) 754-4581 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 that 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.

*Spilled antifreeze tastes sweet and can be deadly to animals that ingest it.*

### 3

## Storage of Solid Wastes and Food Wastes

Improper storage of food and solid waste at residences can lead not only to 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. Most Thurston County residents have access to curbside pickup for yard waste and recyclable materials. Also, look under "recycling" in the phone book for firms which take other recyclables.
- All waste containers kept outside should have lids. If your lid is damaged, please call your local solid waste hauler to get the lid repaired or replaced. The Thurston County web site lists haulers for your neighborhood: [www.co.thurston.wa.us/wwm/](http://www.co.thurston.wa.us/wwm/)
- 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. Your flowerbeds will love the finished compost, and you'll be helping to conserve limited landfill space. Call Thurston County Department of Public Works at (360) 754-4581 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.



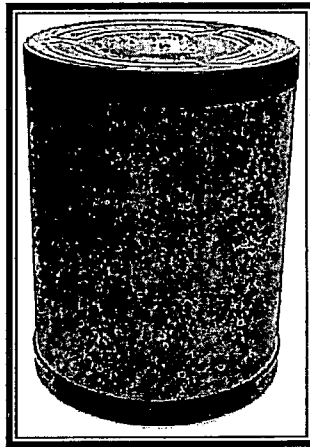
## 4

# 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. More information can be found on-line at: [www.co.thurston.wa.us/wwm/](http://www.co.thurston.wa.us/wwm/)

### 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 pile.
- Cover the compost pile (See Figure) for two reasons:
  1. To keep stormwater from washing nutrients into waterways.
  2. To keep excess water from cooling the pile—this slows down the rate of decomposition.



(photo courtesy of Green Culture)

**Figure: Covered Compost Bin.**

- Build bins of wood, chicken wire, or fencing material to contain compost so it can't be washed away. You can purchase reduced price compost bins through Thurston County's web-site or find information on building your own bins. Call Thurston County Department of Public Works at (360) 754-4581 to get free composter designs and materials lists or see: [www.co.thurston.wa.us/wwm/](http://www.co.thurston.wa.us/wwm/).
- Building a small earthen dike around your compost pile is an effective means of preventing nutrient-rich compost drainage from reaching stormwater paths.

*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.*

## 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.

*Use natural, organic soil amendments when possible...The slow release of nitrogen better matches the needs of plants.*

- 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.

*Lawns and gardens typically need the equivalent of 1 inch of rainfall per week.... Put a wide mouth jar out when sprinkler, and measure the water with a small plastic ruler.*

- Consider planting a vegetated buffer zone adjacent to streams or other water bodies on your property. Call the Thurston County Conservation District at (360) 754-3588 for advice and assistance in developing a planting plan. The Stream Team program (360) 754-4681 at the County may even be able to help you plant it!
- 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.
- Make sure all fertilizers and pesticides are stored in a covered location. Rain can wash the labels off of 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.

*Aerating, thatching, and topdressing with compost will improve soil health and help desired grasses compete with weeds and moss.*

- Practice organic gardening and virtually eliminate the need to use pesticides and fertilizers. Contact Thurston County Cooperative Extension at (360) 786-5445 for information and classes on earth-friendly gardening.
- 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. The Master Gardener program listed above can help advise you on which spray to use.
- Work fertilizers into the soil instead of letting them lie on the ground surface exposed to the next rain storm.
- Plant native vegetation which 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.

## 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 Thurston County, 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.

*Don't pour them down the drain... Many compounds can "pass through" the wastewater treatment plant without treatment and contaminate receiving waters.*

### Required BMPs

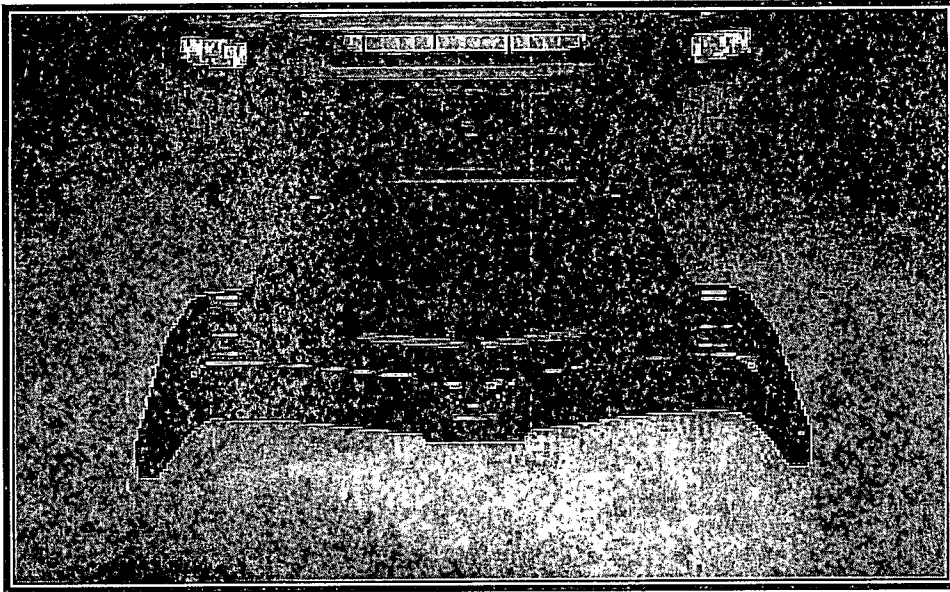
- Hazardous Materials must be used in accordance with the manufacturer recommendation or guidelines as shown on the label.
- Always store hazardous materials in properly labeled containers, never in food or beverage containers which could be misinterpreted by a child as something to eat or drink.
- Dispose 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 Thurston County Department of Public Works at (360) 754-4581 for information on disposal methods, collection events, and alternative products. Household hazardous wastes from Thurston County 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.

*Household hazardous wastes from Thurston County residents and non-residents are accepted at the HazoHouse, at the Thurston County Waste and Recovery Center in Hawks Prairie...*

### **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.



**Drip Pan for Capturing Spills and Drips During Engine Repair and Maintenance.**

- 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).

*Latex paints are not a hazardous waste... leave uncovered in a protected place until dry, then place in the garbage.*



## 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 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.

*Pet waste is the largest source of bacterial loading in streams. It can carry diseases that could make water unsafe for contact and lead to beach closures or affect shellfish harvest.*

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.

*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

# On-Site Sewage Maintenance and Operation

Thurston County is responsible for ensuring that stormwater discharged from stormwater management systems we operate does not harm or impair the use of the receiving waters (creeks, rivers, lakes, groundwater or Puget Sound). Sample tests of stormwater discharges and receiving water occasionally indicate high levels of fecal coliform bacteria.

One potential source of bacteria in surface water is malfunctioning onsite sewage systems (septic systems). Septic tank failures have been documented on private property in Thurston County.

Septic systems vary widely in their design and complexity. Owners of septic systems should contact the Thurston County Department of Public Health and Social Services (Environmental Health Division) at (360) 754-4111 to request an as-built of their system. As-built requests are also available at the Development Review counter at 2000 Lakeridge Drive SW, Olympia. More information is available at: <[www.co.thurston.wa.us/permitting](http://www.co.thurston.wa.us/permitting)>.

In its simplest design the septic tank is the first stage of a private sewage disposal system. The septic tank is a water-tight tank below ground that is usually made of concrete but may be fiberglass, plastic or steel. Septic tanks have one or two access ports for inspection and maintenance which are usually buried a few inches below the ground.

The tank receives household wastewater through an inlet pipe at one end, settles out larger material to the bottom, breaks down waste material with bacteria present in the tank and delivers the partially treated wastewater out another pipe on the opposite end of the tank to the disposal field.

The disposal field is the second stage of the private sewage disposal system and completes the final breakdown of wastewater with organisms in the soil.

The disposal field consists of narrow trenches filled with gravel and perforated pipes that distribute the wastewater to the field. With proper maintenance, a well designed system can last a long time; however, disposal fields will clog if forced to handle large particles that should settle out in the bottom of the septic tank.

*One potential source of bacteria in surface water is malfunctioning onsite sewage systems.*

## Required BMPs

Owners of septic systems must follow all of the requirements of the Thurston County Department of Public Health and Social Services, Environmental Health Division. They can be contacted at Thurston County Health Department at (360) 754-3355 extension 6518 for further information and specific requirements applicable to your system.

## Suggested BMPs

- **Regular Inspection and Maintenance**  
Septic tanks require regular inspection and maintenance. Inspections should be done to measure accumulated sludge every 3 to 5 years. Pumping frequency can vary depending on tank size, family size and garbage disposal use. Failure to remove sludge periodically will result in reduced settling capacity and eventual overloading of the disposal field, which can be difficult and expensive to remedy. Maintenance is required on complex systems, those serving more than one single family residence, and commercial establishments.
- **Eliminate or Restrict Garbage Disposal Use**  
Eliminating or restricting garbage disposals can significantly reduce the loading of solids to the septic tank thus reducing the pumping frequency.
- **Reduce and Spread Water Use Out Over the Day**  
Septic tanks are limited in their ability to handle rapid large increases in the amount of water discharged into them. Excess wastewater flow can cause turbulence in the tank flushing accumulated solids into the disposal field. Over time this will impair the ability of the disposal field to function. Limit water using appliances to one at a time. Do one load of clothes a day rather than several in one day. Practice water conservation at home.
- **Chemical Use**  
Septic systems are to be used for the disposal of household wastewater only. Never dispose of excess or unwanted chemicals into the septic system. Occasional use of household cleaners in accordance with the manufacturers' recommendations should not harm your septic system. There is little evidence that products advertised for use as septic system cleaners and substitutes for pumping actually work as advertised.

For additional information on proper operation of your septic system or to report a failing septic system in your neighborhood, contact Thurston County Environmental Health at (360) 786-5490 or at: [www.co.thurston.wa.us/health/ehoss/index.html](http://www.co.thurston.wa.us/health/ehoss/index.html).

## 10

# Activities in Wetlands and Wetlands 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.

*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-dependant 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 Thurston County Development Services at (360)786-5490 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 Thurston County. 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 if acceptable to the Department of Resource Stewardship and acquisition of any necessary permits, per Thurston County Code Title 17 *Environment*, 17.15 - *Critical Areas*.
- Check with Thurston County Development Services and Planning 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

# 11

## Illicit Discharge Detection and Elimination

A common problem with Thurston County'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 pipes 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 Thurston County 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.

*All businesses and residences in Thurston County must examine their plumbing systems to determine if illegal connections exist.*

If sanitary facilities (such as toilets) are connected to the stormwater drainage system, you must obtain a permit from your local sewer utility and reroute them to the sanitary sewer. If sanitary service is not available, contact the Thurston County Public Health and Social Services Department at (360) 786-5581 for septic permits.

### 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 Thurston County Department of Resource Stewardship, Water Resources Unit (360) 754-4681 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 which 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 drain pipe 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.

*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 Thurston County Public Health and Social Services Department at (360) 786-5581. If the discharge is anything other than domestic waste, then a holding tank or onsite treatment will be necessary. Contact LOTT Alliance Industrial Pretreatment Program at (360) 528-5708 or your local sewer service provider for specific directions for installation and disposal.

