1.1 What is the Purpose of this Manual?

This manual was designed to help businesses, homeowners and public agencies in Tacoma implement source control best management practices (BMPs) to prevent pollutants from contaminating stormwater runoff and entering our rivers, lakes and streams. Human and ecosystem health, safety and welfare can be at risk from polluted stormwater. The implementation of BMPs is required by several programs, which are listed in 1.3 below. Every person/business in Tacoma is required to use BMPs. You need to select BMPs from this manual to prevent stormwater pollution. Refer to Section 1.4 below for additional information on BMPs. Information on stormwater treatment BMPs can be found in Volume I, Section 1.4 and Volume 5, particularly Chapter 2.

1.2 How Do I Know Whether Any of This Applies to Me?

Because of the provisions of the federal Clean Water Act and Coastal Zone Management Act, the National Pollutant Discharge Elimination System (NPDES) municipal stormwater permit, the Puget Sound Water Quality Authority Water Quality Management Plan, and Chapter 12.08 of the City Code of Tacoma, Sewage Disposal and Drainage Regulations and Rates, Including the Industrial Wastewater Pretreatment Program, the implementation of BMPs applies to all businesses, residences and public agencies in Tacoma. It includes all permanent and temporary activities at public facilities, commercial and industrial facilities, agriculture and livestock farms, and residential dwellings. Anyone involved in a particular activity, whether as an employee, supervisor, manager, landlord, tenant, or homeowner, must take part in implementing appropriate BMPs. BMPs need to be selected from this manual.

The City of Tacoma adopted the Regional Road Maintenance Endangered Species Act – Program Guidelines in 2002. This document was developed by the Tri-County Road Maintenance ESA Technical Working Group and contains guidelines for roadway maintenance operations, utility maintenance, maintenance of stormwater facilities, and other right-of-way (ROW) structure maintenance within the ROW. The goal of the Program Guidelines is to provide a consistent, regional program that can be used by any agency wishing to limit, reduce or eliminate the prohibition on take of threatened species under the 4(d) rule of the Federal Endangered Species Act. There is some overlap between this document, Volume IV of the Surface Water Management Manual, Source Control BMPs, and the above mentioned Program Guidelines. The Surface Water Management Manual, Volume IV Source Control BMPs are required as the minimum standard for source controls. The Regional Road Maintenance Manual may contain additional requirements above the Surface Water Management Manual minimum standards.
1.3 What Type of Pollutants are we Targeting With This Manual?

Under the NPDES permit mentioned above, the City is required to show progress in eliminating virtually all non-stormwater discharges to the storm drainage system. In other words, nothing but uncontaminated stormwater may be discharged to the City of Tacoma storm drainage system. There are severe state and federal penalties for anyone violating the terms of these permits. Illicit discharges may be intentional or unintentional, but either way are not allowed. **You must keep pollutants from leaving your property and entering the City storm drainage system.**

Pollutants can be placed into several broad categories. The descriptions provided below are quite brief, but further information on a particular pollutant can be obtained by calling one of the information numbers listed in Chapter 7.

**pH**
The pH value of a substance gives you a relative measure of whether it is acidic or basic. The pH value of a body of water is vitally important, since most aquatic life can operate within a relatively narrow band of pH values (6 to 8). Some sources that can contribute to a change in pH of stormwater and waterbodies are cement in concrete pouring, paving and recycling operations, solutions from metal plating, chemicals from printing businesses and other industrial processes, and household cleaners such as bleaches and deck washes.

**Total Suspended Solids**
This represents particulate solids such as eroded soil, heavy metal precipitates, and biological solids (all considered as conventional pollutants), which can cause sedimentation in streams and turbidity in receiving surface waters. These sediments can destroy the desired habitat for fish and can impact drinking water supplies. The sediment may be carried to streams, lakes, or Puget Sound where they may be toxic to aquatic life and make dredging necessary.

**Oils and Greases**
Oils and greases can be either petroleum-based or food-related sources. Petroleum-based compounds can be immediately toxic to fish and wildlife, and if they reach our drinking water aquifers, will make us sick too. Food-based oils and greases may not be toxic to us, but they can coat fish gills and insects, and suffocate them.

**Oxygen-demanding Substances**
Degradable organic matter, such as yard, food and pet wastes, and some chemical wastes, can have a drastic effect on water quality if they are allowed to enter stormwater. As these substances are broken down by bacteria, the oxygen in the water is consumed. This stresses and can eventually kill fish and other creatures in the water.
Metals
Metals are utilized in many products important to our daily lives. Certain metals, known as heavy metals, wear off of our car brakes and tires, and come from the paint and moss-killing roof strips and herbicides we use at our homes. These metals can cause severe health and reproductive problems in fish and animals that live in water and sediments that become contaminated by runoff.

Bacteria and Viruses
Bacteria and viruses from pet wastes, failing septic systems and agricultural areas can contaminate drinking water and close down swimming and shellfish areas. A group of bacteria called fecal coliform bacteria are typically used as the indicators for pollution by more serious disease-causing microorganisms. The Washington State Department of Ecology is proposing changes to the State Water Quality Standards that will become effective in 2003. The changes include the use of new bacterial indicators; E. Coli for fresh water and enterococci for marine water will replace fecal coliform bacteria, except that fecal coliform will still be used in marine waters that contain shellfish beds.

Nutrients
In the context of water quality, nutrients are mainly compounds of nitrogen and phosphorus. When nutrients are allowed to enter waterbodies, undesirable effects such as algae overgrowth, oxygen depletion, channel clogging due to overgrowth of vegetation, and fish and animal death can occur. Sources of nutrients can include fertilizers, failing septic systems, and yard and animal wastes.

Toxic Organic Compounds
A number of organic chemicals are just plain toxic when they get into the aquatic environment. Many pesticides, herbicides, rodenticides, and fungicides are deadly to aquatic life. The same is true of compounds such as antifreeze, wood preservatives, cleansers and a host of other, more exotic organics derived from industries or past practices (such as polychlorinated biphenyls (PCBs), DDT and chlordane).

Other Chemicals and Substances
There are a host of other chemicals that can cause problems if allowed to enter the aquatic environment. Common household bleach can be deadly to fish and other critters if drained directly to waterbodies. Diatomaceous earth backwash from swimming pool filters can clog gills and suffocate fish. Arsenic has been used in rat and mole killing compounds. Even those compounds classified as biodegradable or environmentally friendly can have devastating immediate effects on aquatic life.
1. 4 What Are Best Management Practices (BMPs)?

BMPs are a series of actions that are designed to reduce stormwater pollution. BMPs are separated into two broad categories, namely source control BMPs and treatment BMPs.

1.4.1 Source Control BMPs

As the name implies, source control BMPs prevent contamination from entering stormwater runoff by controlling them at the source. There are two categories of source control BMPs: operational and structural.

1. Operational source control BMPs are non-structural practices that prevent or reduce pollutants from entering stormwater. Examples include:
   - formation of a pollution prevention team,
   - good housekeeping practices,
   - preventive maintenance procedures,
   - spill prevention and cleanup,
   - employee training,
   - inspections of pollutant sources, and
   - record keeping.
   - They can also include process changes such as raw material/product changes and recycling wastes.

Operational source control BMPs are considered to be the most cost effective pollutant minimization practices.

2. Structural source control BMPs are physical, structural or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. Examples of structural source control BMPs typically include:
   - enclosing and/or covering the pollutant source, i.e., within a building or other enclosure, a roof over storage and working areas, a temporary tarp, etc.,
   - physically segregating the pollutant source to prevent run-on of uncontaminated stormwater,
   - devices that direct only contaminated stormwater to appropriate treatment BMPs, i.e., discharge to a sanitary sewer if allowed by the local sewer utility.

Structural BMPs typically cost more to construct, operate and maintain.

1.4.2 Treatment BMPs

Treatment BMPs are utilized to treat stormwater that is already contaminated. Most treatment BMPs require planning, designing, permitting and construction, and none can remove 100% of the contaminants in stormwater. These factors, added to the typical expense of treatment BMPs, makes source control BMPs the preferred choice.
There may, however, be some instances where treatment BMPs may be required. This volume identifies specific treatment BMPs that apply to particular pollutant sources, such as fueling stations, railroad yards, storage and transfer of materials, etc. After identifying the required treatment BMPs, the reader can refer to Volume I, Section 1.4 and Volume V of this manual for additional information about treatment BMPs.

1.5 Am I Exempted if I am Already Doing BMPs?

Businesses already implementing BMPs in accordance with other federal, state, or local programs usually do not have to implement additional BMPs. Persons or businesses qualifying for exemptions include:

- Businesses required to obtain a general or individual National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges must comply with the requirements of that permit. See regulatory requirement R.2 in Chapter 6 of this manual for details.

If you are on the above list, the City assumes that you are implementing the appropriate BMPs. If the City finds that you have not implemented your BMPs, or that the BMPs that you have implemented are not effectively addressing the discharge of contaminants, then you may be required to enact additional BMPs to meet requirements. Everyone must do BMPs, but how each business goes about it, and through which government program, may differ from business to business.

1.6 How Do I Get Started?

If you are a landlord, tenant or owner of a single-family residence, proceed to Chapter 3 for BMPs that are recommended for you.

If you own a business or industry, complete the worksheet in Chapter 2. If you checked off any of the activities as being performed outdoors, use the activity code on the worksheet to find the BMPs recommended for you in Chapter 4.

If you have questions, please contact the City’s Stormwater Source Control Unit at (253) 591-5588. They can provide assistance over the phone and also at your business site.

1.7 Some Important Requirements to Note

Under current state and local law, if you own commercial property and lease or rent it, you can be held responsible for water quality problems caused by your tenants. Make sure your tenants are informed of their responsibilities under the auspices of this manual.

Another important requirement is the need for an accidental spill plan if your business has the potential for a spill. If you are currently under a
Pretreatment permit for discharge to sewers, it will probably require a minor amount of effort to amend it to include stormwater. Please contact the City of Tacoma Source Control Unit at 253-591-5588 for information on developing these plans.

You are responsible for obtaining prior approval for your stormwater discharge to the City system. This means obtaining proper building and environmental permits from the City and State. Please contact the City of Tacoma Building and Land Use Services Division at 253-591-5030 or the Source Control Unit at 253-591-5588 for permit information. For State Department of Ecology permits, call 360-407-6400.
Chapter 2 – Worksheets for Commercial and Industrial Activities

This worksheet is designed for use by business and industry operators. Complete the entire worksheet by checking the appropriate boxes for all activities that take place at your work place. If you checked off any of the activities as being performed outdoors, use the activity code on the worksheet to find the BMPs recommended for you in Chapter 4.

<table>
<thead>
<tr>
<th>Activity Code</th>
<th>TYPE OF ACTIVITY</th>
<th>Are you involved in this? If so, check if it occurs:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>INDOORS</strong>¹  <strong>OUTDOORS</strong>²</td>
</tr>
</tbody>
</table>

**SECTION A1 – CLEANING AND WASHING ACTIVITIES**

**A1.1** Cleaning or washing of tools, engines and manufacturing equipment  
- This includes parts washers, and all types of manufactured equipment components.

**A1.2** Cleaning or washing of cooking equipment  
- This includes vents, filters, pots and pans, grills, and related items.

**A1.3** Washing, Pressure Washing and Steam Cleaning of Vehicles/Equipment/Building Structures  
- This covers cleaning and washing at all types of establishments, including fleet vehicle yards, car dealerships, car washes, and maintenance facilities.

**A1.4** Collection and disposal of wastewater from mobile interior washing operations  
- This includes carpet cleaners, upholstery cleaners, and drapery cleaners.

**SECTION A2 – TRANSFERS OF LIQUID OR SOLID MATERIALS**

**A2.1** Loading and Unloading Areas for Liquid or Solid Material  
- Loading and unloading of materials at industrial and commercial facilities

**A2.2** Fueling at dedicated stations  
- This includes gas stations, pumps at fleet vehicle yards or shops, and other privately owned pumps.

**A2.3** Engine repair and maintenance  
- This covers oil changes and other engine fluids.

**A2.4** Mobile fueling of vehicles and heavy equipment  
- Fleet fueling, wet fueling and wet hosing
<table>
<thead>
<tr>
<th>Activity Code</th>
<th>TYPE OF ACTIVITY</th>
<th>Are you involved in this? If so, check if it occurs:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>INDOORS(^1)   OUTDOORS(^2)</td>
</tr>
</tbody>
</table>
| A3.1          | Concrete and asphalt mixing and production at stationary sites.  
                • Applies to mixing of raw materials on-site to produce concrete or asphalt. | |
| A3.2          | Concrete pouring, concrete cutting, and asphalt application at temporary sites  
                • This includes construction sites, and driveway and parking lot resurfacing. | |
| A3.3          | Manufacturing and post-processing of metal products  
                • This includes machining, grinding, soldering, cutting, welding, quenching, rinsing, etc. | |
| A3.4          | Wood treatment areas  
                • This includes wood treatment using pressure processes or by dipping or spraying. | |
| A3.5          | Commercial composting  
                • Includes commercial composting facilities operating outside. | |
| A3.6          | Landscaping and vegetation management activities, including vegetation removal, herbicide and insecticide application, fertilizer application, irrigation, watering, gardening, and lawn care.  
                • Includes businesses involved in landscaping, applying pesticides and in managing vegetation. | |
| A3.7          | Painting, finishing and coating of vehicles, boats, buildings and equipment.  
                • Includes surface preparation and the applications of paints, finishes and/or coatings. | |
| A3.8          | Commercial printing operations  
                • Includes materials used in the printing process. | |
| A3.9          | Manufacturing Activities – Outside  
                • Includes outdoor manufacturing areas. | |
<table>
<thead>
<tr>
<th>Activity Code</th>
<th>TYPE OF ACTIVITY</th>
<th>Are you involved in this?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>INDOORS¹</td>
</tr>
<tr>
<td>A4.1</td>
<td>Storage or transfer (outside) of solid raw materials, by-products or finished</td>
<td></td>
</tr>
<tr>
<td></td>
<td>products</td>
<td></td>
</tr>
<tr>
<td>A4.2</td>
<td>Storage and treatment of contaminated soils</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• This applies to contaminated soils that are excavated and left on-site.</td>
<td></td>
</tr>
<tr>
<td>A4.3</td>
<td>Temporary storage or processing of fruits or vegetables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• This includes processing activities at wineries, fresh and frozen juice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>makers, and other food and beverage processing operations.</td>
<td></td>
</tr>
<tr>
<td>A4.4</td>
<td>Storage of solid wastes and food wastes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• This includes regular garbage and all other discarded non-liquid items.</td>
<td></td>
</tr>
<tr>
<td>A4.5</td>
<td>Recyclers and scrap yards</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• This includes scrapped equipment, vehicles, empty metal drums, and assorted</td>
<td></td>
</tr>
<tr>
<td></td>
<td>recyclables.</td>
<td></td>
</tr>
<tr>
<td>A4.6</td>
<td>Treatment, storage, or disposal of dangerous wastes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Refer to Ecology and the Tacoma-Pierce County Health Department for more</td>
<td></td>
</tr>
<tr>
<td></td>
<td>information, see Chapter 6.</td>
<td></td>
</tr>
<tr>
<td>A4.7</td>
<td>Storage of liquid, food waste or dangerous waste containers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• This includes containers located outside a building and used for temporary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>storage.</td>
<td></td>
</tr>
<tr>
<td>A4.8</td>
<td>Storage of liquids in permanent above-ground tanks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Includes all liquids in above-ground tanks</td>
<td></td>
</tr>
<tr>
<td>A4.9</td>
<td>Parking and storage for vehicles and equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Includes public and commercial parking lots</td>
<td></td>
</tr>
<tr>
<td>A4.10</td>
<td>Loading and unloading areas for solid materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• (Refer to A2.1 Loading and unloading areas for liquid and solid materials.</td>
<td></td>
</tr>
<tr>
<td>Activity Code</td>
<td>TYPE OF ACTIVITY</td>
<td>Are you involved in this?</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If so, check if it occurs:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>INDOORS1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUTDOORS2</td>
</tr>
</tbody>
</table>

**SECTION A5 – CONSTRUCTION ACTIVITIES**

<table>
<thead>
<tr>
<th>A5.1</th>
<th>Clearing, grading, and preparation of construction sites.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Applies to land developing activities and to</td>
</tr>
<tr>
<td></td>
<td>residential yard clearing and grading projects.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A5.2</th>
<th>Demolition of buildings.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Applies to removal of existing buildings and</td>
</tr>
<tr>
<td></td>
<td>subsequent clearing of the rubble.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A5.3</th>
<th>Building repair, remodeling and construction.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Applies to construction of buildings, general exterior</td>
</tr>
<tr>
<td></td>
<td>building repair work and remodeling of buildings.</td>
</tr>
</tbody>
</table>

**SECTION A6 – DUST CONTROL AND SOIL AND SEDIMENT CONTROL**

<table>
<thead>
<tr>
<th>A6.1</th>
<th>Dust control at disturbed land areas and unpaved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>roadways and parking lots</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A6.2</th>
<th>Dust control at manufacturing sites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Includes grain dust, sawdust, coal, gravel, crushed rock,</td>
</tr>
<tr>
<td></td>
<td>cement and boiler fly ash.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A6.3</th>
<th>Soil erosion and sediment control at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Includes industrial activities that take place on soil.</td>
</tr>
</tbody>
</table>

**SECTION A7 – OTHER ACTIVITIES**

<table>
<thead>
<tr>
<th>A7.1</th>
<th>Commercial animal handling areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• This includes kennels, fenced pens, veterinarians and</td>
</tr>
<tr>
<td></td>
<td>businesses that board animals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A7.2</th>
<th>Log sorting and handling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Applies to log yards typically located at sawmills,</td>
</tr>
<tr>
<td></td>
<td>ports and pulp mills.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A7.3</th>
<th>Boat building, mooring, maintenance, and repair</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• This includes all types of maintenance, repair, and</td>
</tr>
<tr>
<td></td>
<td>building operations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A7.4</th>
<th>Logging</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Applies to logging activities that fall under Class IV</td>
</tr>
<tr>
<td></td>
<td>general forest practices.</td>
</tr>
<tr>
<td>Activity Code</td>
<td>TYPE OF ACTIVITY</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>A7.5</td>
<td>Mining and quarrying of sand, gravel, minerals, peat, clay, rock, and other materials</td>
</tr>
<tr>
<td></td>
<td>• This does not include excavation at construction sites.</td>
</tr>
<tr>
<td>A7.6</td>
<td>Swimming pool and spa cleaning and maintenance</td>
</tr>
<tr>
<td></td>
<td>• This includes every swimming pool and spa not at a single family residence.</td>
</tr>
<tr>
<td></td>
<td>• Commercial pool cleaners are included here for all pools.</td>
</tr>
<tr>
<td>A7.7</td>
<td>Deicing and anti-icing operations for airports and streets</td>
</tr>
<tr>
<td></td>
<td>• Includes aircraft, runways/taxiways, streets and highways.</td>
</tr>
<tr>
<td>A7.8</td>
<td>Roof and building drains at manufacturing and commercial buildings</td>
</tr>
<tr>
<td></td>
<td>• These sites will be referred to the Puget Sound Clean Air Agency.</td>
</tr>
<tr>
<td>A7.9</td>
<td>Urban streets</td>
</tr>
<tr>
<td></td>
<td>• Includes recommended BMPs.</td>
</tr>
<tr>
<td>A7.10</td>
<td>Railroad yards</td>
</tr>
<tr>
<td>A7.11</td>
<td>Maintenance of public and private utility corridors and facilities</td>
</tr>
<tr>
<td></td>
<td>• Includes public and private utility maintenance activities.</td>
</tr>
<tr>
<td>A7.12</td>
<td>Maintenance of roadside ditches</td>
</tr>
<tr>
<td>A7.13</td>
<td>Maintenance of stormwater drainage and treatment facilities</td>
</tr>
<tr>
<td>A7.14</td>
<td>Spills of oil and hazardous substances</td>
</tr>
</tbody>
</table>

¹If you checked off any of these activities as occurring indoors at your business, then you are exempt from implementing BMPs, provided no indoor drains or processes can ultimately contact stormwater or be transported to surface waters such as rivers, lakes and streams. You must ensure that liquids, powders, dusts and fine granular materials stay confined indoors, otherwise you will be subject to all of the BMP requirements.

²If you checked off any of these activities as occurring outdoors at your business, then use the activity code to find the appropriate BMPs described in Chapter 4.

The actions we take each day in and around our homes have a profound effect on surface water quality and fish habitat in this region. Stormwater goes directly to our 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 water. Small amounts of pollution from many different sources can significantly affect our waterways. Yard maintenance, waste storage, car washing and maintenance, and pool cleaning are some of the activities that can adversely impact water quality. The best management practices (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 Tacoma use these BMPs. Please note that some of these procedures are required by various state, or city laws, and are noted as required BMPs.

Here’s a general list of best management practices (BMPs) for citizens. The list includes brief information on applicability. For more information on the following BMPs, refer to the information in Sections 3.1 through 3.7 of this chapter.

**Automobile Washing (3.1)**
At Home: Wash your car on grass or gravel. Use a nozzle on your hose. Use soaps and detergents that are biodegradable and that don't contain phosphates. Pour the bucket of dirty water down your sink so it goes to the wastewater treatment plat.

Away from Home: Use a commercial car wash or go to a fund raising car wash that uses a City of Tacoma Clean Bay Car Wash loaner kit. Reserve your own Clean Bay Car Wash loaner kit for your fundraising car wash.

**Automobile Maintenance (3.2)**
Fix leaks. Recycle all oils, antifreeze, solvents, contaminated gasoline, and batteries. Don’t mix wastes. Don't dump anything on the ground or down a storm drain!

**Storage of Solid Wastes and Food Wastes (3.3)**
Recycle as much as you can. Purchase products which have the lease amount of packaging material. Keep your waste area clean.

**Composting (3.4)**
Locate compost piles on unpaved areas and away from wetlands, streams and drainage paths. Cover the compost pile.

**Yard Maintenance and Gardening (3.5)**
Follow the exact directions when using pesticides, herbicides and fertilizers. Don’t apply in the wind or when rain is expected. Don’t apply within 100 feet of streams, lakes and wetlands. Use the City’s curbside yard waste recycling program.
Consider “Green Gardening” practices such as using a mulching mower and mowing higher which helps improve soil/grass health and reduces the need for fertilizers and pesticides. Consider planting vegetation suited to the Northwest climate.

**Swimming Pool and Spa Cleaning and Maintenance (3.6)**

Pool and spa water must be dechlorinated before the pool or spa is emptied, or else it must go the sanitary sewer. Hire a professional pool service company for help if you need it. Store all hazardous materials out of the reach of children, and in a manner that prevents chemical reactions.

**Household Hazardous Material, Use, Storage and Disposal (3.7)**

Recycle! Use the City’s Household Hazardous Waste facility located at the landfill. Store all hazardous materials out of the reach of children. Follow the manufactures’ directions for use of all materials.

### 3.1 Automobile Washing

Most residents wash their cars in the driveway or on the street. Washwaters typically flow to a storm drain or ditch, which discharges stormwater directly to the nearest stream, lake or to Puget Sound. Soaps and detergents, even the biodegradable ones, can have immediate and long-term effects on critters living in waterbodies. 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 waterbody.

- Ideally, no soaps or detergents should be used, but if you do use one, select one without phosphates.

- Sweep driveways and street gutters **before** washing vehicle to clean up dirt, leaves, trash and other materials that may flow to the storm drain along with your wash water. This helps reduce storm drain maintenance costs as well as protect water quality.

- 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 washwater down your sink. This way the water doesn’t pollute surface water. Instead, it’s treated at the wastewater treatment plant.

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.

• Go to fundraising car washes where sponsors use Tacoma’s Clean Bay Car Wash loaner kits. Look for the Clean Bay Car Wash logo. Use a Clean Bay Car Wash loaner kit. If your group is planning a car wash in Tacoma, call 253-502-2120 to reserve a Clean Bay Car Wash loaner kit.

3.2 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.

Required BMPs

• Recycle all oils, antifreeze, solvents and batteries. Many local car parts dealers and gas stations accept used oil. The Household Hazardous Waste facility at the Tacoma Landfill accepts oil, oil filters, antifreeze and solvents. Old batteries can actually be worth money. Call shops listed under Batteries in the Yellow Pages of the phone book to find out if they are paying for used batteries. Use the numbers listed in Chapter 7 to call for more information.

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

Suggested BMPs

• Fix all leaks, to keep the leaky material off the streets and out of the 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 Tacoma Landfill, Household Hazardous Waste facility. Pending State law may make disposal in your home garbage illegal, so please call the Hazardous Waste line at 1-800-287-6429 for up-to-date information.

Use care in draining and collecting antifreeze to prevent accidental spills. Spilled antifreeze can be deadly to cats and dogs that ingest it.

Perform your service activities on concrete or asphalt or over a plastic tarp to make spill clean-up easier. Keep a bag of kitty litter on hand to absorb spills. 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 goo that is hard to clean up.

If you are doing body work outside, be sure to use a tarp to catch material resulting from grinding, sanding and painting. Dispose of this waste by double bagging in plastic and placing in your garbage.

### 3.3 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

- All waste containers kept outside should have lids. If your lid is damaged, please call Tacoma Solid Waste Management at 591-5543 to get the lid repaired or replaced.

- Leaking waste containers should be replaced. If your container is damaged, please call Tacoma Solid Waste Management at 253-591-5543.

- Store waste containers under cover if possible, or on grassy areas.

- Use the Tacoma Call-2-Haul program to pick up bulky materials and excess waste material. Call 253-573-2468 for more information and details, or to set up an appointment for waste pickup.

- Inspect the storage area regularly to pick up loose scraps of material and dispose of them properly.
• Recycle as much as you can. Tacoma offers curbside recycling. Also, look under "Recycling" in the phone book for firms which take other recyclables.

• 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 we won't fill up our landfills so quickly. Call Tacoma Solid Waste Utility Recycling and Composting at 253-565-5955 for more information on composting. 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.

3.4 Composting

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

Suggested BMPs

• Compost piles must be located on an unpaved area where runoff can soak into the ground or be filtered by grass and other vegetation. Compost piles should be located in an area of your yard not prone to water ponding during storms, and should be kept well away from wetlands, streams, lakes and other drainage paths.

• Compost piles must be maintained and turned over regularly to work properly. Large piles of unattended compost may create odor and vermin problems.

• Avoid putting hazardous or non-decomposable waste in the pile.

• Cover the compost pile for two reasons:
  1. To keep stormwater from washing nutrients into waterways.
  2. To keep excess water from cooling down the pile, which will slow down the rate of decomposition.

• Build bins of wood, chicken wire or fencing material to contain compost so it can't be washed away. Call Tacoma Solid Waste Utility Recycling and Composting at 565-5955 to get free composter designs and materials lists.
• Building a small earthen dike around your compost pile is an effective means of preventing nutrient-rich compost drainage from reaching stormwater paths.

3.5 Yard Maintenance and Gardening

This section deals with the normal yard maintenance activities we all perform at our homes. Overwatering, overfertilizing, 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 waterbodies. 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 like Tacoma's TAGRO Mix. TAGRO Mix is a 100% recycled blend of de-watered, Class A, “Exceptional Quality” biosolids, mixed with sawdust and sand. 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 ground water due both to less "excess nitrogen" and also less water use. Better vegetative growth can also reduce erosion and runoff.

• Use an integrated pest management program (IPM), which is a natural, long-term, ecologically based approach to controlling pest populations. See Chapter 4, Activity A3.6 Landscaping and Lawn/Vegetation Management and Appendix IV-B Example of an Integrated Best Management Program.

• Follow manufacturer's directions when applying fertilizers. More is not better, either for your lawn or for local waterbodies. 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" 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 waterbody.

- Consider planting a vegetated buffer zone adjacent to streams or other water bodies on your property. Call the Pierce County Conservation District at 253-845-2973 for advice and assistance in developing a planting plan. The Stream Team at the Conservation District 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. Aeration, thatching and topdressing with compost will improve soil health and help wanted 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 lbs. of fertilizer into either a solid lump or a river of nutrients.

- Use a mulching mower and mow higher to improve soil/grass health and to reduce or eliminate pesticide use.

- Compost all yard clippings, or use them as mulch to save water and keep down weeds in your garden. See Composting section for more information.

- Practice organic gardening and virtually eliminate the need to use pesticides and fertilizers. Contact Pierce County Cooperative Extension at 591-7180 or the Ask-A-Master Gardener program at 591-7170 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 vegetation suited to Northwest conditions because they require less water and fewer to no fertilizers and pesticides.

- Tacoma has a curbside yard waste recycling program. Call 253-565-5955 for more information.
3.6 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 waterbodies. Following these BMPs will ensure the cleanliness of your pool and the environment.

Required BMPs

• Pool and spa water must be dechlorinated if it is to be emptied into a ditch, on the ground, or a lawn or to the storm 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 wastewater treatment plant 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, into storm 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.

3.7 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 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 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 will "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 Tacoma, a large potential for serious environmental harm exists if improper methods of storage, usage and disposal are employed. Using the following BMPs will help keep these materials out of our soils, sediments and waters.

**Required BMPs**

- **Hazardous materials must be stored out of the reach of children.** Never transfer to or store these materials 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 Household Hazardous Waste Facility at (253) 591-5418 or the Hazardous Waste Line at 1-800-287-6429 for information on disposal methods, collection events, and alternative products. Household hazardous wastes from City of Tacoma residents are accepted at the Tacoma Landfill.

**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 clean-up problem.

- **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.**
- Latex paints are not a hazardous waste, but are not accepted in liquid form at the landfill. To dispose, leave uncovered in a protected place until dry, then place in the garbage. If you wish to dry waste paint quickly, just pour kitty litter 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. The Hazardous Waste Line at 1-800-287-6429, and the Washington Toxics Coalition at 206-632-1545 have information detailing alternatives to toxic products.

- If an activity involving the use of a hazardous material can be moved indoors out of the weather, then do so. Make sure you can provide proper ventilation, however.

- Follow manufacturers’ directions in the use of all materials. Over-application of yard chemicals, for instance, can result in the washing of these compounds into receiving waterbodies. Never apply pesticides when rain is expected.

- When hazardous materials are in use, place the container inside a tub or bucket to minimize spills.

- Purchase only the amount of product that’s needed.
Chapter 4 – Best Management Practices for Commercial and Industrial Activities

4.1 Begin with Chapter 2, Worksheet for Commercial and Industrial Activities

This chapter coordinates with the worksheet that you completed in Chapter 2. That worksheet and the BMPs are organized by the different activities that businesses perform. If you perform the listed activity indoors, controlling all discharges from the activity (e.g., process water, wash water, lubricants, solvents, fugitive dust, granular material, blowdown waste, etc.) such that no exposure to stormwater occurs, then you do not have to institute new BMPs for that activity. However, if you checked the column for activities performed outdoors, match the number from the worksheet to the activities listed in this section to find the suggested BMPs you should utilize.

If you have questions, please contact the City’s Stormwater Source Control Unit at 253-591-5588. They can provide assistance over the phone and are also available for consultations at your business site.

4.2 Explanation of Required BMPs

Every person/business in Tacoma is required to use BMPs. You need to select BMPs from this manual. The required BMPs are in bold text. Please note that in some instances there are required BMPs that are mandated by various federal, state, or city laws. You are encouraged to utilize additional BMPs to further protect our water quality. For instance, if only one BMP is required, you may wish to couple it with another BMP to prevent pollution from ever getting into stormwater in the first place.

Some businesses are or will be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges. These permits are issued and regulated by the Washington State Department of Ecology. Businesses that are regulated under the NPDES stormwater program are exempt from implementing the BMPs outlined in this manual, since they will be implementing BMPs required by the state. Refer to Volume I, Section 1.6.5 and Section 6.5 of this Volume for more information about NPDES permits for industries.

The BMPs outlined in this manual are focused on source control: that is, using methods to prevent pollution from ever getting into stormwater in the first place. Many of these BMPs are common sense and "housekeeping" issues. For instance, you can sweep an indoor or outdoor work area instead of hosing it into a storm drain or other drainage conveyance. The use of source control BMPs is always the first line of defense in stormwater pollution prevention efforts for several reasons:
In the majority of cases, source control BMPs are all that is needed to correct stormwater pollution problems.

Most source control BMPs are relatively inexpensive and easy to implement.

Treatment BMPs are utilized after pollution has entered stormwater. These BMPs are expensive, and can never remove 100% of the pollution in stormwater. It is far better to use source control BMPs where possible and prevent the pollution in the first place. This volume identifies specific treatment BMPs that apply to particular pollutant sources, such as fueling stations, railroad yards, storage and transfer of materials, etc. Additional information about treatment BMPs are found in Volume V of this manual.

(NOTE: At times, the type of pollutants present or the condition of a site could mean treatment BMPs are required.)

The minimum requirements for stormwater source control are contained in Volume I, Minimum Technical Requirements and Site Planning, Chapter 3, Section 3.5.3 Minimum Requirement #3 Source Control of Pollution. In accordance with this minimum requirement, all known, available and reasonable source control BMPs shall be applied to all projects. Chapter 5 of this volume contains details on many source control BMPs, with references to appropriate documents for others.

4.2.1 Stormwater Treatment

Stormwater treatment may also be required for certain types of businesses, based on the information provided in this volume and in Volume I, Minimum Technical Requirements and Site Planning, Chapter 3, Minimum Requirements for New Development and Redevelopment, Section 3.5.6 Minimum Requirement #6 Runoff Treatment and in Volume 5, Runoff Treatment BMPs. Volume 5, Runoff Treatment BMPs, contains detailed information about stormwater treatment BMPs.

4.3 BMPs To Consider for all Activities

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

1. Avoid the activity or reduce its occurrence

If you can, avoid the activity or do it less frequently. Is there a substitute process or a different material you can use to get the job done? Can you do a larger run of a process at one time, thus reducing the number of times per week or month it needs to be repeated? For instance, raw
materials could be delivered close to the time of use instead of being stockpiled and exposed to the weather. Perhaps you could avoid one solvent-washing step altogether. The City’s Source Control staff, the Department of Ecology or the Tacoma-Pierce County Health Department can provide pollution prevention assistance.

2. Move the activity indoors

Sometimes it is fairly easy to move an activity indoors out of the weather. The benefits of this are twofold; you prevent runoff contamination, and you provide for easier, more controlled cleanup if a spill occurs. An example would be unloading and storing barrels of chemicals inside a garage area instead of doing it outside. Please be aware that moving storage areas indoors may require installation of fire suppression equipment or other building modifications as required by the Uniform Building Code, the Uniform Fire Code, or local ordinances.

3. Spills

Promptly contain and clean up solid and liquid pollutant leaks and spills including oils, solvents, fuels, and dust from manufacturing operations on any exposed soil, vegetation, or paved area.

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 than what you use now. Perhaps a caustic-type detergent or a solvent could be replaced with a more environmentally friendly product. Such a change might allow you to discharge process water to the sanitary sewer instead of paying for expensive disposal (contact the Tacoma Sanitary Source Control Unit at 253-591-5588 to find out about allowable sanitary discharges and pretreatment permits). Remember that even if you do switch to a biodegradable product, nothing but uncontaminated water is allowed to enter the storm drain system.

6. Create and maintain vegetated areas near activity locations

Vegetation of various kinds can help filter pollutants out of stormwater, so it is advisable to route stormwater through vegetated areas located near your activity. For instance, many parking lots contain grassy islands, typically formed in a "hump". By creating those islands as depressions instead of humps, they can be used to treat runoff from the parking lot or roof. For high use sites, conveyance to an oil removal system may be required. For more information on high use sites, refer to Volume I,
Section 4.2, Step V, Step 2. Also, don’t forget the erosion control benefits of vegetation at your site.

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

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

8. Keep storm drain systems clean

Pollutants can concentrate over time in storm drainage structures such as catch basins, ditches and storm drains. When a large storm event occurs, it can mobilize these pollutants and carry them to receiving waters. Develop and implement maintenance practices, inspections, and schedules for treatment devices (e.g., detention ponds, oil/water separators, vegetated swales, etc.). Requirements for cleaning catch basins will be discussed later in the specific BMP S.9.

9. Reduce, reuse and recycle as much as possible

Always look for ways to recycle instead of just disposing. This can save money as well as keep both hazardous and non-hazardous materials out of the landfills. You can learn more about other businesses that have made process changes allowing recycling of chemicals by calling the DOE at 1-800-RECYCLE and requesting publication #92-45 and 90-22. Another unique recycling opportunity for businesses is available through the Industrial Materials Exchange (IMEX). This free service acts as a waste or surplus “matchmaker”, helping one company's waste become another company's asset. For instance, waste peach pits from a cannery become potpourri ingredients to another business. Call IMEX at 206-625-6232 to list your potentially usable solid or chemical waste in their publication.

10. Be an advocate for stormwater pollution prevention

Help friends, partners and business associates find ways to reduce stormwater pollution in their activities. Most people want clean water, and do not pollute intentionally. Share your ideas and the BMPs in this manual to get them thinking about how their everyday activities affect water quality.
11. Report violators

Allowing anyone to pollute our water resources is wrong. We all must do our part to protect water, fish, wildlife and our own health, by employing proper BMPs, and reporting those who are causing pollution. Call the City of Tacoma’s Source Control Unit at 253-591-5588 to report incidents involving sewers or storm drains.

12. Oversight and Training

Assign one or more individuals to be responsible for stormwater pollution control. Hold regular meetings to review the overall operation of the BMPs. Establish responsibilities for inspections, operation and maintenance, and availability for emergency situations. Train all team members in the operation, maintenance and inspections of BMPs, and reporting procedures.

13. Dust Control

Sweep paved material handling and storage areas regularly as needed, for the collection and disposal of dust and debris that could contaminate stormwater. Do not hose down pollutants from any area to the ground, storm drain, conveyance ditch, or receiving water unless necessary for dust control purposes to meet air quality regulations and unless the pollutants are conveyed to a treatment system approved by the City.

14. Maintenance

- Clean oils, debris, sludge, etc. from all BMP systems regularly, including catch basins, settling/detention basins, oil/water separators, boomed areas, and conveyance systems, to prevent the contamination of stormwater.
- Promptly repair or replace all substantially cracked or otherwise damaged paved secondary containment, high-intensity parking and any other drainage areas, which are subjected to pollutant material leaks or spills.
- Promptly repair or replace all leaking connections, pipes, hoses, valves, etc. which can contaminate stormwater.

Maintenance standards can be found in Volume 3, Chapter 3 and in Volume 5, Chapter 4 of this manual.
A1.1 CLEANING OR WASHING OF TOOLS, ENGINES AND MANUFACTURING EQUIPMENT

Description of Pollutant Sources: This activity applies to businesses and public agencies that clean manufacturing equipment such as saws, grinders, screens, and other processing devices outside of buildings, and to businesses engaged in pressure washing of engines, equipment and portable objects.

Pollutant sources include toxic hydrocarbons, organic compounds, oils and greases, nutrients, heavy metals, pH, suspended solids, biochemical oxygen demand (BOD), and chemical oxygen demand (COD).

Pollutant Control Approach: The preferred approach is to cover and/or contain the cleaning activity, or conduct the activity inside a building, to separate the uncontaminated stormwater from the pollutant sources. Washwater must be conveyed to a sanitary sewer after approval by the City of Tacoma, temporarily stored before proper disposal, or recycled, with no discharge to the ground, to a storm drain, or to surface water. Washwater may be discharged to the ground after proper treatment in accordance with Ecology guidance WQ-R-95-56, “Vehicle and Equipment Washwater Discharges,” June 1995. The quality of any discharge to the ground after proper treatment must comply with Ecology’s Ground Water Quality Standards, Chapter 173-200 WAC. Contact the local Ecology Regional Office for an NPDES Permit application for discharge of washwater to surface water or to a storm drain after on-site treatment.

Required BMPs

The following BMPs, or equivalent measures, are required of all businesses and public agencies engaged in cleaning or washing of tools, engines, equipment and portable objects:

- Illicit connections to the storm drainage system must be eliminated. See BMP S.1 in Chapter 5 for detailed information.

- Employees should be educated to control washing operations to prevent stormwater contamination.

- All washwater must discharge to a holding tank, process treatment system, or sanitary sewer, never to the storm drain system. See BMP S.3 in Chapter 5 for detailed information on how this must be accomplished.

- Pressure washing must be done in a designated area (such as a wash pad) provided with a sump drain and stormwater run-on prevention. See BMPs S.6 and S.7 in Chapter 5 for information on sumps (or holding tanks) and run-on prevention. Contact the Tacoma Sanitary Source Control Unit at 591-5588 for washing operation policy.
Recommended BMPs

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

- If soaps or detergents are used, use the least toxic cleaner capable of doing the job. Use non-phosphate detergent, if possible, to reduce loadings at your local wastewater treatment plant.

- Limit the amount of water used in washing activities to reduce the potential of runoff carrying pollutants beyond the designated wash pad or capture system.

- Recycle wash water for subsequent washings.

- Implement one or more of the following stormwater treatment BMPs in addition to the Required BMPs:
  - Oil/water separator (Do not use an oil/water separator for washwaters containing soaps or detergents.)
  - Wet vault for settling.
  - Infiltration basin.
  - Filtration with media designed for the pollutants present.
  - Catch basin with a filter insert for pressure washing to collect suspended solids.

- Catch basin filters and/or sorbent inserts should be selected based on the type of contaminants in the stormwater.

For discharging washwaters containing soaps and detergents, the use of infiltration, biofiltration, wet ponds and wetlands must not result in the violation of groundwater quality standards.
A1.2 CLEANING OR WASHING OF COOKING EQUIPMENT

Description of Pollutant Sources: This activity applies to businesses that clean cooking equipment such as vent filters, grills and grease traps outside of buildings.

Pollutants of concern consist of oil and grease, nutrients, suspended solids, biochemical oxygen demand (BOD) and chemical oxygen demand (COD)

Pollutant Control Approach: Businesses engaged in this activity that cannot connect discharges to a sanitary sewer, holding tank, or process water treatment system must contact the Department of Ecology and obtain a National Pollutant Discharge Elimination System (NPDES) wastewater permit.

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in cleaning or washing of cooking equipment:

- Illicit connections to the storm drainage system must be eliminated. See BMP S.1 in Chapter 5 for detailed requirements.
- Employees must be educated about the need to prevent stormwater contamination from washing operations.
- Washwater cannot be discharged to the storm drainage system.
- Paved washing areas must be swept daily to collect loose solid materials for proper disposal.
- Greasy buildup on cooking equipment must be removed and properly disposed of prior to washing to reduce the amount of material that can potentially contaminate runoff.
- Move the activity indoors, either in an existing building or in a newly constructed building or shed, with drainage to a sanitary sewer, holding tank, or process treatment system. See BMP S.3 in Chapter 5 for further information on drainage alternatives. Any connection to the sanitary sewer requires the approval of the Tacoma Sanitary Source Control Unit at 591-5588.

OR

Use a tub or similar device to contain washwater. This water must be recycled for subsequent washing, or disposed into a holding tank or sanitary sewer.

OR

If the washing activity cannot be moved indoors or contained in a tub, then the washing area must drain to a sanitary sewer, holding tank, or process treatment system, and provisions must be made to prevent stormwater run-on onto the washing area. See BMP S.3 in Chapter 5 for detailed drainage requirements, and BMP S.7 for
run-on prevention schemes. If discharging to a sanitary sewer, permits must be obtained from the Tacoma Sanitary Source Control Unit at (253) 591-5588.

- If a holding tank is used for storage of washwater, the contents must be pumped out before it is full and disposed of appropriately to a sanitary sewer or wastewater treatment system.

Recommended BMPs

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

- A cover should be placed over a designated wash area to keep rain from falling on dirty equipment and producing contaminated runoff.

- Implement one or more of the following treatment BMPs in addition to the required BMPs:
  - Oil/water separator.
  - Wet vault for settling.
  - Infiltration basin with pretreatment.
  - Filtration with media designed for the pollutants present.

For discharging washwaters containing soaps and detergents, the use of infiltration, biofiltration, wet ponds and wetlands must not result in the violation of groundwater quality standards.
A1.3 WASHING, PRESSURE WASHING AND STEAM CLEANING OF VEHICLES/EQUIPMENT/BUILDING STRUCTURES

Description of Pollutant Sources: Vehicles, aircraft, vessels, carpet cleaning, and industrial equipment, and large buildings may be commercially cleaned with low or high pressure water or steam. This includes frequent “charity” car washes at gas stations and commercial parking lots. The cleaning can include hand washing, scrubbing, sanding, etc. Washwater from cleaning activities can contain oil and grease, suspended solids, heavy metals, soluble organics, soaps, and detergents that can contaminate stormwater.

Pollutant Control Approach: The preferred approach is to cover and/or contain the cleaning activity, or conduct the activity inside a building, to separate the uncontaminated stormwater from the pollutant sources. Washwater must be conveyed to a sanitary sewer after approval by the City of Tacoma, temporarily stored before proper disposal, or recycled, with no discharge to the ground, to a storm drain, or to surface water. Washwater may be discharged to the ground after proper treatment in accordance with Ecology guidance WQ-R-95-56, “Vehicle and Equipment Washwater Discharges,” June 1995. The quality of any discharge to the ground after proper treatment must comply with Ecology’s Ground Water Quality Standards, Chapter 173-200 WAC. Contact the local Ecology Regional Office for an NPDES Permit application for discharge of washwater to surface water or to a storm drain after on-site treatment.

Required BMPs:

Conduct vehicle/equipment washing in one of the following locations:

- At a commercial washing facility in which the washing occurs in an enclosure and drains to the sanitary sewer, or
- In a building constructed specifically for washing of vehicles and equipment, which drains to a sanitary sewer.

Conduct outside washing operation in a designated wash area with the following features:

- In a paved area, constructed as a spill containment pad to prevent the run-on of stormwater from adjacent areas. Slope the spill containment area so that washwater is collected in a containment pad drain system with perimeter drains, trench drains or catchment drains. Size the containment pad to extend out a minimum of four feet on all sides of the vehicles and/or equipment being washed.
- Convey the washwater to a sump (like a grit separator) and then to a sanitary sewer (if allowed by the City of Tacoma), or other appropriate wastewater treatment or recycle system. An NPDES permit may be required for any washwater discharge to a storm drain or receiving water after treatment. Contact the Ecology regional office for NPDES Permit requirements.
- The containment sump must have a positive control outlet valve for spill control with live containment volume, and oil/water separation. Size the minimum live storage volume to contain the maximum expected daily washwater flow plus the sludge storage volume below the outlet pipe. The outlet valve will be shut

Note that the purpose of the valve is to convey only washwater and contaminated stormwater to a treatment system.
during the washing cycle to collect the washwater in the sump. The valve should remain shut for at least two hours following the washing operation to allow the oil and solids to separate before discharge to a sanitary sewer. (See Ecology Publication WQ-R-95-56)

- The inlet valve in the discharge pipe should be closed when washing is not occurring, thereby preventing the entry of uncontaminated stormwater into the pretreatment/treatment system. The stormwater can then drain into the conveyance/discharge system outside of the wash pad (essentially bypasses the washwater treatment/conveyance system). Post signs to inform people of the operation and purpose of the valve. Clean the concrete pad thoroughly until there is no foam or visible sheen in the washwater prior to closing the inlet valve and allowing uncontaminated stormwater to overflow and drain off the pad (see Figure 4.1).

- Collect the washwater from building structures and convey it to appropriate treatment such as a sanitary sewer system if it contains oils, soaps, or detergents, where feasible. If the washwater does not contain oils, soaps, or detergents then it could drain to soils that have sufficient natural attenuation capacity for dust and sediment.

Recommended Additional BMPs:

- The wash area should be well marked at gas stations, multi-family residences and any other business where non-employees wash vehicles.

- For uncovered wash pads, the positive control outlet valve may be manually operated, but a pneumatic or electric valve system is preferable. The valve may be on a timer circuit where it is opened upon completion of a wash cycle. The timer would then close the valve after the sump or separator is drained (Figure 4.1).

- Use phosphate-free biodegradable detergents when practicable.

- Consider recycling the washwater.

- Because soluble/emulsifiable detergents can be used in the wash medium, the selection of soaps and detergents and treatment BMPs should be considered carefully. Oil/water separators are ineffective in removing emulsified or water soluble detergents.

Exceptions

- At commercial parking lots, where it is not possible to discharge the washwater to a sanitary sewer, a temporary plug or a temporary sump pump can be used at the storm drain to collect the washwater for off-site disposal such as to a nearby sanitary sewer.

- Charity car washes are not allowed to discharge dirty wash water to the storm drain. Prior to holding a charity car wash, contact the City of Tacoma for information about proper car washing procedures and to find out about utilizing a Clean Bay Car Wash loaner kit.

- New and used car dealerships may wash vehicles in the parking stalls as long as a temporary plug system is used to collect the washwater for disposal as stated above, or an approved treatment system for the washwater is in place.

At industrial sites contact the local Ecology Regional Office for NPDES Permit requirements even if soaps, detergents, and/or other chemical cleaners are not used in washing trucks.
A1.4 COLLECTION AND DISPOSAL OF WASTEWATER IN MOBILE INTERIOR WASHING OPERATIONS

Description of Pollutant Sources: This activity applies to businesses that wash carpets and other interior items on a mobile site-to-site basis. The typical fleet washing process includes use of machines that spray the washwater solution onto the carpet or upholstery and then suck the dirty solution up into a portable tank with limited capacity.

Pollutants of concern consist of nutrients, suspended solids, organic compounds (such as pesticides and chemicals used for flea and odor control), biochemical oxygen demand (BOD), and chemical oxygen demand (COD).

Pollutant Control Approach: Common practice in the past was to discharge the dirty solution onto the ground or to a drain connected to the storm drainage system between site visits. These practices are now illegal. Wastewater must be poured into a sanitary sewer drain at the site of collection, the business office, or at another proper location. If sanitary sewer disposal is not available or not allowed, the collected wastewater must be returned to the business site for process treatment or transfer to a holding tank.

Required BMPs

This BMP is required of all businesses doing mobile interior wash activities:

- Absolutely no wastewater from mobile interior wash activities can be disposed of outdoors, or to a drain connected to the storm drainage system. This point must be made clear to all employees. Wastewater from mobile washing operations may be permitted for sanitary sewer disposal if it does not contain high concentrations of toxic materials. Some of the chemicals used for flea and odor control are listed by EPA as toxics. The Tacoma Sanitary Source Control Unit at 591-5588 will need to know the type of chemicals and amount of water you intend to discharge. If the discharge is approved, they will then issue a permit for your activity. Wastewater must be poured into a sanitary sewer drain at the site of collection, the business office, or at another proper location.

If sanitary sewer disposal is not available or not allowed, the collected wastewater must be returned to the business site for process treatment or transfer to a holding tank. See BMP S.3 in Chapter 5 for details on these drainage/disposal alternatives.

Recommended BMPs

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

- Use the least toxic detergents and cleaners that will get the job done. Select non-phosphate detergents when possible.

- Limit the amount of water used in interior washing operations. This will save you time, money and effort when it comes to proper disposal.

- Recycle washwater for more than one use.
SECTION A2

TRANSFER OF LIQUID OR SOLID MATERIALS
A2.1 LOADING AND UNLOADING AREAS FOR LIQUID OR SOLID MATERIAL

Description of Pollutant Sources: Loading/unloading of liquid and solid materials at industrial and commercial facilities are typically conducted at shipping and receiving, outside storage, fueling areas, etc. Materials transferred can include products, raw materials, intermediate products, waste materials, fuels, scrap metals, etc. Leaks and spills of fuels, oils, powders, organics, heavy metals, salts, acids, alkalis, etc. during transfer are potential causes of stormwater contamination. Spills from hydraulic line breaks are a common problem at loading docks.

Pollutant Control Approach: Cover and contain the loading/ unloading area where necessary to prevent run-on of stormwater and runoff of contaminated stormwater.

Required BMPs

At All Loading/ Unloading Areas:

- A significant amount of debris can accumulate at outside, uncovered loading/unloading areas. Sweep these surfaces frequently to remove material that could otherwise be washed off by stormwater. Sweep outside areas that are covered for a period of time by containers, logs, or other material after the areas are cleared.

- Place drip pans, or other appropriate temporary containment device, at locations where leaks or spills may occur such as hose connections, hose reels and filler nozzles. Drip pans shall always be used when making and breaking connections (see Figure 4.2). Check loading/ unloading equipment such as valves, pumps, flanges, and connections regularly for leaks and repair as needed.

At Tanker Truck and Rail Transfer Areas to Above/Below-ground Storage Tanks:

- To minimize the risk of accidental spillage, prepare an "Operations Plan" that describes procedures for loading/unloading. Train the employees, especially fork lift operators, in its execution and post it or otherwise have it readily available to employees.

- Report spills of reportable quantities to Ecology (refer to Chapter 7 for telephone numbers of Ecology Regional Offices).

- Prepare and implement an Emergency Spill Cleanup Plan for the facility (BMP Spills of Oil and Hazardous Substances) which includes the following BMPs:
  - Ensure the clean up of liquid/solid spills in the loading/ unloading area immediately, if a significant spill occurs, and, upon completion of the loading/unloading activity, or, at the end of the working day.
  - Retain and maintain an appropriate oil spill cleanup kit on-site for rapid cleanup of material spills. (See BMP A7.14 Spills of Oil and Hazardous Substances).
  - Ensure that an employee trained in spill containment and cleanup is present during loading/unloading.
At Rail Transfer Areas to Above/below-ground Storage Tanks:

- Install a drip pan system as illustrated (see Figure 4.3) within the rails to collect spills/leaks from tank cars and hose connections, hose reels, and filler nozzles.

Loading/Unloading from/to Marine Vessels:

- Facilities and procedures for the loading or unloading of petroleum products must comply with Coast Guard requirements.

Transfer of Small Quantities from Tanks and Containers:

- Refer to BMPs A4.8 Storage of Liquids in Permanent Above-Ground Tanks, and A4.7 Storage of Liquid, Food Waste, or Dangerous Waste Containers, for requirements on the transfer of small quantities from tanks and containers, respectively.

At All Loading/Unloading Areas:

- Consistent with Uniform Fire Code requirements and to the extent practicable, conduct unloading or loading of solids and liquids in a manufacturing building, under a roof, or lean-to, or other appropriate cover.

- Berm, dike, and/or slope the loading/unloading area to prevent run-on of stormwater and to prevent the runoff or loss of any spilled material from the area.

- Large loading areas frequently are not curbed along the shoreline. As a result, stormwater passes directly off the paved surface into surface water. Place curbs along the edge, or slope the edge such that the stormwater can flow to an internal storm drain system that leads to an approved treatment BMP.

- Pave and slope loading/unloading areas to prevent the pooling of water. The use of catch basins and drain lines within the interior of the paved area must be minimized as they will frequently be covered by material, or they should be placed in designated “alleyways” that are not covered by material, containers or equipment.

Recommended BMPs:

- For the transfer of pollutant liquids in areas that cannot contain a catastrophic spill, install an automatic shutoff system in case of unanticipated off-loading interruption (e.g. coupling break, hose rupture, overfill, etc.).

At Loading and Unloading Docks:

- Install/maintain overhangs, or door skirts that enclose the trailer end (see Figures 4.4 and 4.5) to prevent contact with rainwater.

- Design the loading/unloading area with berms, sloping, etc. to prevent the run-on of stormwater.
Retain on-site the necessary materials for rapid cleanup of spills.

**At Tanker Truck Transfer Areas to Above/Below-Ground Storage Tanks:**

- Pave the area on which the transfer takes place. If any transferred liquid, such as gasoline, is reactive with asphalt, pave the area with Portland cement concrete.

- Slope, berm, or dike the transfer area to a dead-end sump, spill containment sump, a spill control (SC) oil/water separator, or other spill control device. The minimum spill retention time should be 15 minutes at the greater flow rate of the highest fuel dispenser nozzle through-put rate, or the peak flow rate of the 6-month, 24-hour storm event over the surface of the containment pad, whichever is greater. The volume of the spill containment sump should be a minimum of 50 gallons with an adequate grit sedimentation volume.
A2.2 FUELING AT DEDICATED STATIONS

Description of Pollutant Sources: A fueling station is a facility dedicated to the transfer of fuels from a stationary pumping station to mobile vehicles or equipment. It includes above or underground fuel storage facilities. In addition to general service gas stations, fueling may also occur at 24-hour convenience stores, construction sites, warehouses, car washes, manufacturing establishments, port facilities, and businesses with fleet vehicles. Typically, stormwater contamination at fueling stations is caused by leaks/spills of fuels, lube oils, radiator coolants, and vehicle washwater.

Pollutant Control Approach: Fueling stations must be constructed on an impervious concrete pad under a roof to keep out rainfall and stormwater run-on. A treatment BMP must be used for contaminated stormwater and wastewaters in the fueling containment area.

For new or substantially remodeled Fueling Stations:

Required BMPs:

- Prepare an emergency spill response and cleanup plan (per BMP A7.14 Spills of Oil and Hazardous Substances) and have designated trained person(s) available either on site or on call at all times to promptly and properly implement that plan and immediately cleanup all spills. Keep suitable cleanup materials, such as dry adsorbent materials, on site to allow prompt cleanup of a spill.

- Train employees on the proper use of fuel dispensers. Post signs in accordance with the Uniform Fire Code (UFC). Post “No Topping Off” signs (topping off gas tanks causes spillage and vents gas fumes to the air). Make sure that the automatic shutoff on the fuel nozzle is functioning properly.

- The person conducting the fuel transfer must be present at the fueling pump during fuel transfer, particularly at unattended or self-serve stations.

- Keep drained oil filters in a suitable container or drum.

- Design the fueling island to control spills (dead-end sump or spill control separator in compliance with the UFC), and to treat collected stormwater and/or wastewater to required levels. Slope the concrete containment pad around the fueling island toward drains; either trench drains, catch basins and/or a dead-end sump. The slope of the drains shall not be less than 1 percent (Section 7901.8 of the UFC). Drains to treatment shall have a shutoff valve, which must be closed in the event of a spill. The spill control sump must be sized in compliance with Section 7901.8 of the UFC; or

- Design the fueling island as a spill containment pad with a sill or berm raised to a minimum of four inches (Section 7901.8 of the UFC) to prevent the runoff of spilled liquids and to prevent run-on of stormwater from the surrounding area. Raised sills are not required at the open-grate trenches that connect to an approved drainage-control system.

- The fueling pad must be paved with Portland cement concrete, or equivalent. Asphalt is not considered an equivalent material.
The fueling island must have a roof or canopy to prevent the direct entry of precipitation onto the spill containment pad (see Figure 4.6). The roof or canopy should, at a minimum, cover the spill containment pad (within the grade break or fuel dispensing area) and preferably extend several additional feet to reduce the introduction of windblown rain. Convey all roof drains to storm drains outside the fueling containment area.

Stormwater collected on the fuel island containment pad must be conveyed to a sanitary sewer system, if approved by the City of Tacoma; or to an approved treatment system such as an oil/water separator and a basic treatment BMP. (Basic treatment BMPs are listed in Volume V and include media filters and biofilters) Discharges from treatment systems to storm drains or surface water or to the ground must not display ongoing or recurring visible sheen and must not contain greater than a significant amount of oil and grease.

Alternatively, stormwater collected on the fuel island containment pad may be collected and held for proper off site disposal.

Conveyance of any fuel-contaminated stormwater to a sanitary sewer must be approved by the City of Tacoma and must comply with pretreatment regulations (WAC 173-216-060). These regulations prohibit discharges that could cause fire or explosion. An explosive or flammable mixture is defined under state and federal pretreatment regulations, based on a flash point determination of the mixture. If contaminated stormwater is determined not to be explosive, then it could be conveyed to a sanitary sewer system.

Transfer the fuel from the delivery tank trucks to the fuel storage tank in impervious contained areas and ensure that appropriate overflow protection is used. Alternatively, cover nearby storm drains during the filling process and use drip pans under all hose connections.

Additional BMP for Vehicles 10 feet in height or greater:

A roof or canopy may not be practicable at fueling stations that regularly fuel vehicles that are 10 feet in height or greater, particularly at industrial or WSDOT sites. At those types of fueling facilities, the following BMPs apply, as well as all of the other required BMPs and fire prevention (UFC) requirements.

If a roof or canopy is impractical the concrete fueling pad must be equipped with emergency spill control, which includes a shutoff valve for the drainage from the fueling area. The valve must be closed in the event of a spill. An electronically actuated valve is preferred to minimize the time lapse between spill and containment. Spills must be cleaned up and disposed off-site in accordance with BMP A7.14 Spills of Oil and Hazardous Substances.

The valve may be opened to convey contaminated stormwater to a sanitary sewer, if approved by the City of Tacoma, or to oil removal treatment such as an API or CP oil/water separator, catch basin insert, or equivalent treatment, and then to a basic treatment BMP. Discharges from treatment systems to storm drains or surface water...
or to the ground must not display ongoing or recurring visible sheen and must not contain greater than a significant amount of oil and grease.

An explosive or flammable mixture is defined under state and federal pretreatment regulations, based on a flash point determination of the mixture. If contaminated stormwater is determined not to be explosive or flammable then it could be conveyed to a sanitary sewer system.
A2.3 ENGINE REPAIR AND MAINTENANCE

Description of Pollutant Sources: This activity applies to businesses and public agencies where fuel filters, engine oil and other fluids such as battery acid, coolants and transmission and brake fluids are removed and replaced in vehicles and equipment. It also applies to mobile vehicle maintenance operations, such as at construction sites. Related vehicle maintenance activities are covered under the following activity headings in this manual:

- A1.3 Washing, Pressure Washing and Steam Cleaning of Vehicles/Equipment/Building Structures
- A2.2 Fueling at Dedicated Stations
- A3.4 Painting, Finishing and Coating of Vehicles, Products and Equipment
- A7.3 Vehicle and Equipment Parking and Storage

Pollutants of concern include toxic hydrocarbons, toxic organic compounds, oils and greases, pH and heavy metals.

Pollutant Control Approach: Control of leaks and spills of fluids using good housekeeping and cover and containment BMPs.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and agencies engaged in engine and vehicle repair:

- Employees must be educated about the need for careful handling of automotive fluids. Employees at businesses or agencies who routinely change or handle these fluids must be trained in spill response and cleanup procedures.

- Spill cleanup materials, such as rags and absorbent materials, must always be kept close at hand when changing oil and other fluids. You can comply more easily with sewer and stormwater requirements by running a ’dry shop’, thereby reducing your consumption/discharge of liquids. Soiled rags and other cleanup material must be properly disposed of or cleaned and reused.

- No drains inside maintenance buildings may connect to either the sanitary sewer or the storm drainage system without prior approval.

- Do not hose down the maintenance/repair area. Instead, sweep the area weekly to collect dirt, and wipe up spills with rags and other absorbent materials.

- If the work is done at a mobile location, such as a construction site, a tarp, ground cloth or drip pans must be used beneath the vehicle or equipment to capture all spills and drips. The collected drips and spills must be recycled or disposed of properly. See BMP S.2 in Chapter 5 for disposal options.

- If this activity occurs at a stationary business location, the activity area must be moved indoors. An exception to this requirement would be equipment that is too large to fit under a roofed area. In this case, the outdoor area must be paved, provided with a sump drain and provision made for stormwater run-on prevention. See BMP S.6 and S.7 in Chapter 5 for more on paving, sump drains and holding tanks.
and run-on prevention. Contact the Tacoma Sanitary Source Control unit at 591-5588 for information on requirements for disposal to sewer. If you are on a septic tank, sump contents will need to be pumped and disposed of by an oil recycler or hazardous waste company.

- Recycle oil, antifreeze, batteries, and air conditioning coolant.

- Implement the following treatment BMP in addition to the Required BMPs:
  - An oil/water separator or other appropriate treatment, if soluble components are present, should be used to treat all runoff from the fluid changing area.

**Recommended BMPs**

The following BMPs are not required, but can provide additional pollution prevention.

- Drain all fluids, from wrecked vehicles and 'parts' cars/equipment upon arrival. Recover air conditioning gases.

- Use reusable cloth rags to clean up drips and small spills instead of disposables: these can be professionally laundered and reused. Do not attempt to launder these at home or at a coin-op laundry.

- Use absorbent pillows or booms in or around storm drains and catch basins to absorb oil and fuel.
A2.4 MOBILE FUELING OF VEHICLES AND HEAVY EQUIPMENT

Description of Pollutant Sources: Mobile fueling, also known as fleet fueling, wet fueling, or wet hosing, is the practice of filling fuel tanks of vehicles by tank trucks that are driven to the yards or sites where the vehicles to be fueled are located. Mobile fueling is only conducted using diesel fuel, as mobile fueling of gasoline is prohibited. Diesel fuel is considered as a Class II Combustible Liquid, whereas gasoline is considered as a Flammable Liquid.

Historically mobile fueling has been conducted for off-road vehicles that are operated for extended periods of time in remote areas. This includes construction sites, logging operations, and farms. Mobile fueling of on-road vehicles is also conducted commercially in the State of Washington.

Pollutant Control Approach: Proper training of the fueling operator, and the use of spill/drip control and reliable fuel transfer equipment with backup shutoff valving are typically needed.

Required BMPs

Organizations and individuals conducting mobile fueling operations must implement the following BMPs.

The operating procedures for the driver/operator should be simple, clear, effective and their implementation verified by the organization that will potentially be liable for environmental and third party damage.

- Ensure that all mobile fueling operations are approved by the Tacoma Fire Department and comply with local and Washington State fire codes.
- In fueling locations that are in close proximity to sensitive aquifers, designated wetlands, wetland buffers, or other waters of the State, approval by the City of Tacoma is necessary to ensure compliance with additional local requirements.
- Ensure the compliance with all 49 CFR 178 requirements for DOT 406 cargo tanker. Documentation from a Department of Transportation (DOT) Registered Inspector shall be proof of compliance.
- Ensure the presence and the constant observation/monitoring of the driver/operator at the fuel transfer location at all times during fuel transfer and ensure that the following procedures are implemented at the fuel transfer locations:
  - Locating the point of fueling at least 25 feet from the nearest storm drain or inside an impervious containment with a volumetric holding capacity equal to or greater than 110 percent of the fueling tank volume, or covering the storm drain to ensure no inflow of spilled or leaked fuel. Storm drains that convey the inflow to a spill control separator approved by the City of Tacoma, including the Tacoma Fire Department need not be covered. Potential spill/leak conveyance surfaces must be impervious and in good repair.
- Placement of a drip pan, or an absorbent pad under each fueling location prior to and during all dispensing operations. The pan (must be liquid tight) and the absorbent pad must have a capacity of 5 gallons. Spills retained in the drip pan or the pad need not be reported.

- The handling and operation of fuel transfer hoses and nozzle, drip pan(s), and absorbent pads as needed to prevent spills/leaks of fuel from reaching the ground, storm drains, and receiving waters.

- Not extending the fueling hoses across a traffic lane without fluorescent traffic cones, or equivalent devices, conspicuously placed so that all traffic is blocked from crossing the fuel hose.

- Removing the fill nozzle and cessation of filling when the automatic shut-off valve engages. Do not allow automatic shutoff fueling nozzles to be locked in the open position.

- Not “topping off” the fuel receiving equipment

- Provide the driver/operator of the fueling vehicle with:
  - Adequate flashlights or other mobile lighting to view fill openings with poor accessibility. Consult with the Tacoma Fire Department for additional lighting requirements.
  - Two-way communication with his/her home base.

- Train the driver/operator annually in spill prevention and cleanup measures and emergency procedures. Make all employees aware of the significant liability associated with fuel spills.

- The fueling operating procedures should be properly signed and dated by the responsible manager, distributed to the operators, retained in the organization files, and made available in the event an authorized government agency requests a review.

- Ensure that the Tacoma Fire Department (911) and the appropriate regional office of the Department of Ecology are immediately notified in the event of any spill entering the surface or ground waters. Establish a “call down list” to ensure the rapid and proper notification of management and government officials should any significant amount of product be lost off-site. Keep the list in a protected but readily accessible location in the mobile fueling truck. The “call down list” should also pre-identify spill response contractors available in the area to ensure the rapid removal of significant product spillage into the environment.

- Maintain a minimum of the following spill clean-up materials in all fueling vehicles, that are readily available for use:
  - Non-water absorbents capable of absorbing 15 gallons of diesel fuel;
  - A storm drain plug or cover kit;
- A non-water absorbent containment boom of a minimum 10 feet in length with a 12-gallon absorbent capacity;
- A non-metallic shovel; and,
- Two, five-gallon buckets with lids.

- Use automatic shutoff nozzles for dispensing the fuel. Replace automatic shut-off nozzles as recommended by the manufacturer.

- Maintain and replace equipment on fueling vehicles, particularly hoses and nozzles, at established intervals to prevent failures.

- Automatic fuel transfer shut-off nozzles; and,

- An adequate lighting system at the filling point.
A3.1 CONCRETE AND ASPHALT MIXING AND PRODUCTION AT STATIONARY SITES

Description of Pollutant Sources: This activity applies to businesses and agencies that mix raw materials onsite to produce concrete or asphalt. It also applies to subsequent uses such as pouring concrete structures and making other concrete or asphalt products. Mobile concrete pouring and asphalt application are covered under Activity A3.2 in this section. Requirements for stockpiling of raw materials are covered under Activity A4.1 Storage or Transfer (outside) of solid raw materials, by-products or finished products.

Pollutants of concern include toxic hydrocarbons, toxic organic compounds, oils and greases, heavy metals and pH.

Pollutant Control Approach: Cover and contain processes where possible and prevent stormwater run-on and contamination, where feasible.

Any facility categorized under SIC Code 2951 or SIC Code 3273 may need to comply with Ecology’s Sand and Gravel General Permit. Contact Ecology at (360) 407-6400 for additional information.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and public agencies active in concrete and asphalt mixing and production:

- Eliminate all illicit connections to the storm drainage system. See BMP S.1 in Chapter 5 for a detailed discussion on identifying and eliminating these connections.

- All process water from production, pouring and equipment cleaning must be discharged to a dead-end sump, process water treatment system or sanitary sewer, or recycled. Never wash fresh concrete or concrete mixer washout into streets, storm drainage systems, streams or other water bodies.

- A BMP maintenance schedule must be established, and employees educated about the need to prevent stormwater contamination through the use and proper maintenance of BMPs.

- Production and pouring areas must be protected from stormwater run-on. See BMP S.7 in Chapter 5 for methods of run-on protection.

- Cover the production area for prevention of stormwater run-on. See BMP S.4 and S.7 for information on covers and run-on prevention.

- Use absorbent materials or catch basin filters in and around storm drains and catch basins to filter out contaminants. See Volume V of this Manual, Runoff Treatment BMPs for more information about absorbent materials and catch basin filters.
**Recommended BMPs**

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

- The production and pouring area should be swept at the end of each work day to collect loose chunks of aggregate and raw materials for recycling or proper disposal. See BMP S.2 in Chapter 5 for disposal options.

- Sweep all driveways and gutters that show accumulation of materials to minimize the amount that could be carried offsite by rain and enter the storm drainage system.

- Asphalt plants should use an oil/water separator to treat stormwater runoff. See Volume V of this Manual, Runoff Treatment BMPs for more information.

- Pave the mixing, production and pouring areas. A sump drain in these areas is probably not advisable due to potential clogging problems, but could be used in a curing area. Sweep these areas to remove loose aggregate and recycle or dispose of properly.

- Use storm drain covers or similarly effective containment devices to prevent runoff from entering the storm drainage system. Accumulations of dirty runoff must be disposed of properly.


The use of any treatment BMP must not result in the violation of groundwater, surface water, or drinking water standards.
A3.2 CONCRETE POURING, CONCRETE CUTTING, AND ASPHALT APPLICATION AT TEMPORARY SITES

Description of Pollutant Sources: This activity applies to businesses and public agencies that apply asphalt or pour or cut concrete for building construction and remodeling, road construction, sidewalk, curb and gutter repairs and construction, sealing of driveways and roofs, and other applications. These activities are typically done on a temporary site-to-site basis where permanent BMP measures do not apply. Concrete pouring activities can not only severely alter the pH of receiving waters, but slurry from aggregate washing can harden in storm pipes, thus reducing capacity and creating flooding problems.

Pollutants of concern include toxic hydrocarbons, toxic organic compounds, oils and greases, heavy metals, suspended solids and pH.

Pollutant Control Approach: Train employees on proper procedures, sweep or shovel aggregate chunks, collect accumulated runoff and solids, and wash equipment in designated areas.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and agencies doing concrete pouring and asphalt application at temporary sites:

- Employees must be educated on the pollution hazards of concrete and asphalt application and cutting.

- Loose aggregate chunks and dust must be swept or shoveled and collected (not hosed down a storm drain) for recycling or proper disposal at the end of each work day, especially at work sites such as streets, driveways, parking lots, sidewalks, curbs and gutters where rain can readily pick up the loose material and carry it to the nearest stormwater conveyance. Small amounts of excess concrete, grout and mortar can be disposed of in the trash.

- Storm drain covers or similarly effective containment devices must be placed over all nearby drains at the beginning of each day. Shovel or vacuum slurry and remove from the site. All accumulated runoff and solids must be collected and properly disposed (see BMP S.2 in Chapter 5 for disposal options) at the end of each work day, or more often if necessary.

- Exposed aggregate washing, where the top layer of unhardened concrete is hosed or scraped off to leave a rough finish, must be done with a mechanism for containment and collection of the discarded concrete slurry (such as the storm drain covers mentioned above). The easiest way to contain the washwater will be to direct the washings to a hole in the ground where the water can percolate into the ground and the solids later covered with soil.

- If directed to a drain, a catch basin filter insert must be used to remove the solids. This is especially useful if the activity must proceed on rainy days. See Volume V of this Manual, Runoff Treatment BMPs for more information about catch basin filter inserts.
• Cleaning of concrete application and mixing equipment or concrete vehicles on the work site must be done in a designated area where the rinse water is controlled. The rinse water must either be collected for proper disposal or put into a hole in the ground where the water can percolate away and the solids later covered with soil or recovered and disposed or recycled.

The use of any treatment BMP must not result in the violation of groundwater, surface water, or drinking water quality standards.

Recommended BMPs

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

• Avoid the activity when rain is occurring or expected.

• If possible, portable asphalt mixing equipment should be covered by an awning, a lean-to or other simple structure to avoid contact with rain. See BMP S.4 in Chapter 5 for further details on cover structures.

• Recycle broken concrete and asphalt. Look under Recycling Services in the Yellow pages of the phone book to find the recycler nearest you.
A3.3 MANUFACTURING AND POST-PROCESSING OF METAL PRODUCTS

Description of Pollutant Sources: This activity applies to businesses such as mills, foundries, and fabricators that manufacture or post-process metal products. A variety of activities such as machining, grinding, soldering, cutting, welding, quenching, cooling and rinsing may take place. These businesses may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Department of Ecology. See Chapter 6 for a discussion of NPDES requirements. Note: Painting, finishing and coating of metal products is covered under A3.10 Painting, Finishing and Coating of Vehicles, Boats, Buildings and Equipment.

Pollutants of concern include toxic organic compounds, heavy metals, oils and greases, pH, suspended solids, and chemical oxygen demand (COD).

Pollutant Control Approach: Cover and contain operations and apply good housekeeping and preventive maintenance practices to prevent the contamination of stormwater.

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in metals manufacturing or post-processing:

- Eliminate illicit connections to the storm drainage system. See BMP S.1 in Chapter 5 for detailed information on identifying and eliminating illicit connections.

- Process wastewater (including contact cooling water, filter backwash, cooling tower blowdown, etc.) from this activity, and stormwater runoff from activity areas, must discharge to a sanitary sewer, holding tank, or process treatment system that would need an Ecology NPDES Permit for discharge to surface water or storm drain. Contact the Tacoma Sanitary Source Control Unit at 591-5588 to obtain permits for discharge to the sewer. See BMP S.3 in Chapter 5 for detailed requirements.

- Employees must be educated to control their work with metal products to minimize pollution.

- The activity area must be swept at the end of each work day to collect and dispose of metal fragments and product residues properly. See BMP S.2 in Chapter 5 for disposal alternatives.

Recommended BMPs

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

- Limit the amount of water used in quenching and rinsing. Recycle used water where possible.

- Cover the activity area to prevent rain from contacting the process, and to reduce the amount of runoff that has to be detained or treated.
Use a catch basin filter insert to capture stray metal particles. A catch basin filter may help remove dissolved metals. See Volume V of this Manual, Runoff Treatment BMPs for more information on catch basin filter inserts.

Implement a program to track purchase and consumption of lubricants, solvents, and additives. Check with operating managers for an explanation if consumption increases. Recommend action if significant equipment leaks or spills are identified.

Refer to the BMPs under sections A2 Transfer of Liquid Materials and A4 Storage and Stockpiling Activities, and utilize those BMPs which are applicable for materials storage and maintenance activities in your shop.
A3.4 WOOD TREATMENT AREAS

Description of Pollutant Sources: Wood treatment includes both anti-staining and wood preserving using pressure processes or by dipping or spraying. Wood preservatives include creosote, creosote/coal tar, pentachlorophenol, copper naphthenate, arsenic trioxide, malathion, or inorganic arsenicals such as chromated copper arsenate, acid copper chromate, chromate zinc chloride, and fluor-chrome-arsenate-phenol. Anti-staining chemical additives include iodo-prophenyl-butyl carbamate, dimethyl sulfoxide, didecyl dimethyl ammonium chloride, sodium azide, 8-quinolinol; copper (II) chelate, sodium ortho-phenylphenate, 2-(thiocyanomethylthio)-benzothiazole (TCMTB) and methylene bis- (thiocyanate), and zinc naphthenate.

Pollutant sources include drips of condensate or preservative after pressurized treatment; product washwater (in the treatment or storage areas), spills and leaks from process equipment and preservative tanks, fugitive emissions from vapors in the process, blowouts and emergency pressure releases, and kick-back from lumber (phenomenon where preservative leaks as it returns to normal pressure). Potential pollutants typically include the wood treating chemicals, BOD, suspended solids, oil and grease, benzene, toluene, ethylbenzene, phenol, chlorophenols, nitrophenols, heavy metals, and PAH depending on the chemical additive used.

Pollutant Control Approach: Cover and contain all wood treating areas and prevent all leaching of and stormwater contamination by wood treating chemicals. All wood treating facilities in Washington State are required to be covered under an Individual NPDES Permit.

Required BMPs

The individual NPDES Permit will require at a minimum the following BMPs:

- Dedicate equipment that is used for treatment activities to prevent the tracking of treatment chemicals to other areas on the site.

- Eliminate non-process traffic on the drip pad. Scrub down non-dedicated lift trucks on the drip pad.

- Immediately remove and properly dispose of soils with visible surface contamination (green soil) to prevent the spread of chemicals to ground water and/or surface water via stormwater runoff.

- If any wood is observed to be contributing chemicals to the environment in the treated wood storage area, relocate it on a concrete chemical containment structure until the surface is clean and until it is drip free and surface dry.

- Cover and/or enclose, and contain with impervious surfaces, all wood treatment areas. Slope and drain areas around dip tanks, spray booths, retorts, and any other process equipment in a manner that allows return of treatment chemicals to the wood treatment process.

- Cover storage areas for freshly treated wood to prevent contact of treated wood products with stormwater. Segregate clean stormwater from process water. Ensure that all process water is conveyed to an approved treatment system.
- Seal any holes or cracks in the asphalt areas that are subject to wood treatment chemical contamination.

- Elevate stored, treated wood products to prevent contact with stormwater run-on and runoff.

- Place dipped lumber over the dip tank, or on an inclined ramp for a minimum of 30 minutes to allow excess chemical to drip back to the dip tank.

- Place treated lumber either from dip tanks or retorts in a covered paved storage area for at least 24 hours before placement in outside storage. Use a longer storage period during cold weather unless the temporary storage building is heated. The wood shall be drip free and surface dry before it is moved outside.

**Recommended BMP**

- Consider using preservative chemicals that do not adversely impact receiving surface water and groundwater.
A3.5 COMMERCIAL COMPOSTING

Description of Pollutant Sources: Commercial compost facilities, operating outside without cover, require large areas to decompose wastes and other feedstocks. These facilities should be designed to separate stormwater from leachate (i.e., industrial wastewater) to the greatest extent possible. When stormwater is allowed to contact any active composting areas, including waste receiving and processing areas, it becomes leachate. Pollutants in leachate include nutrients, biochemical oxygen demand (BOD), organics, coliform bacteria, acidic pH, color, and suspended solids. Stormwater at a compost facility consists of runoff from areas at the facility that are not associated with active processing and curing, such as product storage areas, vehicle maintenance areas, and access roads.

NPDES Permit Requirements: Discharge of leachate from a compost facility will require a State or NPDES permit from Ecology, depending on the disposal method chosen for managing leachate at the facility. (See Chapter 2 in “Compost Facility Resource Handbook, Guidance for Washington State”, November 1998, Publication # 97-502.) An additional alternative, zero discharge, is possible by containing all leachate from the facility (in tanks or ponds) or preventing production of leachate (by composting under a roof or in an enclosed building).

Pollutant Control Approach: Consider the leachate control specified in publication #97-502 or zero leachate discharge.

Required BMPs

- Ensure that the compost feedstocks do not contain dangerous wastes, regulated under Chapter 173-303 WAC or hazardous products of a similar nature, or solid wastes that are not beneficial to the composting process. Employees must be trained to screen these materials in incoming wastes.

- Contact other federal and state agencies and the City of Tacoma regarding environmental or zoning authority for applicable permit and regulatory information. The Tacoma-Pierce County Health Department is responsible for issuing solid waste handling permits for commercial compost facilities.

- Apply for coverage under the General Permit to Discharge Stormwater Associated with Industrial Activities, if the facility discharges stormwater to surface water or a municipal stormwater system. If all stormwater from the facility infiltrates into the surrounding area, the General Permit is not required.

- Develop a plan of operations as outlined in the Compost Facility Resource Handbook, Publication #97-502.

- Store finished compost in a manner to prevent contamination of stormwater.

- Compost pads are required for all uncovered facilities in areas of the state with wet climates (per water quality regulations).

- Provide curbing for all compost pads to prevent stormwater run-on and leachate run-off.

- Slope all compost pads sufficiently to direct leachate to the collection device.

- Provide one or more sumps or catch basins capable of collecting all leachate generated by the design storm and conveying it to the leachate holding structure for all compost pads.

- Convey all leachate from composting operations to a sanitary sewer, holding tank, or on-site treatment systems designed to treat the leachate and total suspended solids (TSS).

- Ponds used to collect, store, or treat leachate and other contaminated waters associated with the composting process must be lined to prevent ground water contamination. Apply “AKART” or All Known Available and Reasonable Methods of Prevention and Treatment to all pond liners, regardless of the construction materials.

Recommended BMPs

- Clean up debris from yard areas regularly.

- Locate stored residues in areas designed to collect leachate.

- Limit storage times of residues to prevent degradation and generation of leachate.

- Consider using leachate as make-up water in early stages of the composting process. Since leachate can contain pathogenic bacteria, care should be taken to avoid contaminating finished product or nearly finished product with leachate.
A3.6 LANDSCAPING AND LAWN/VEGETATION MANAGEMENT

Description of Pollutant Sources: Landscaping can include grading, soil transfer, vegetation removal, pesticide and fertilizer applications, and watering. Stormwater contaminants include toxic organic compounds, heavy metals, oils, total suspended solids, coliform bacteria, fertilizers, and pesticides.

Lawn and vegetation management can include control of objectionable weeds, insects, mold, bacteria and other pests with chemical pesticides and is conducted commercially at commercial, industrial, and residential sites. Examples include weed control on golf course lawns, access roads, and utility corridors and during landscaping; sap stain and insect control on lumber and logs; rooftop moss removal; killing nuisance rodents; fungicide application to patio decks, and residential lawn/plant care. Toxic pesticides such as pentachlorophenol, carbamates, and organometallics can be released to the environment by leaching and dripping from treated parts, container leaks, product misuse, and outside storage of pesticide contaminated materials and equipment. Poor management of the vegetation and poor application of pesticides or fertilizers can cause appreciable stormwater contamination.

Pollutant Control Approach: Control of fertilizer and pesticide applications, soil erosion, and site debris to prevent contamination of stormwater.

Develop and implement an Integrated Pest Management Plan (IPM) and use pesticides only as a last resort. Refer to Appendix IV-B Example of an Integrated Best Management Program for more information. If pesticides/herbicides are used they must be carefully applied in accordance with label instructions on U.S. Environmental Protection Agency (EPA) registered materials. Maintain appropriate vegetation, with proper fertilizer application where practicable, to control erosion and the discharge of stormwater pollutants. Where practicable grow plant species appropriate for the site, or adjust the soil properties of the subject site to grow desired plant species.

Required BMPs for Landscaping

- Install engineered soil/landscape systems to improve the infiltration and regulation of stormwater in landscaped areas.

- Do not dispose of collected vegetation into waterways or storm drainage systems.

Recommended BMPs for Landscaping

- Conduct mulch-mowing whenever practicable

- Dispose of grass clippings, leaves, sticks, or other collected vegetation, by composting, if feasible.

- Use mulch or other erosion control measures when soils are exposed for more than one week during the dry season or two days during the rainy season.

- If oil or other chemicals are handled, store and maintain appropriate oil and chemical spill cleanup materials in readily accessible locations. Ensure that employees are familiar with proper spill cleanup procedures.
- Till fertilizers into the soil rather than dumping or broadcasting onto the surface. Determine the proper fertilizer application for the types of soil and vegetation encountered.

- Till a topsoil mix or composted organic material into the soil to create a well-mixed transition layer that encourages deeper root systems and drought-resistant plants.

- Use manual and/or mechanical methods of vegetation removal rather than applying herbicides, where practical.

**Required BMPs for the Use of Pesticides**

- Develop and implement an integrated pest management system (IPM) (See section on IPM at end of BMP) and use pesticides only as a last resort.

- Implement a pesticide-use plan and include at a minimum: a list of selected pesticides and their specific uses; brands, formulations, application methods and quantities to be used; equipment use and maintenance procedures; safety, storage, and disposal methods; and monitoring, record keeping, and public notice procedures. All procedures shall conform to the requirements of Chapter 17.21 RCW and Chapter 16-228 WAC (Appendix IV-D R.7).

- Choose the least toxic pesticide available that is capable of reducing the infestation to acceptable levels. The pesticide should readily degrade in the environment and/or have properties that strongly bind it to the soil. Any pest control used should be conducted at the life stage when the pest is most vulnerable. For example, if it is necessary to use a Bacillus thuringiensis application to control tent caterpillars, it must be applied before the caterpillars cocoon or it will be ineffective. Any method used should be site-specific and not used wholesale over a wide area.

- Apply the pesticide according to label directions. Under no conditions shall pesticides be applied in quantities that exceed manufacturer’s instructions.

- Mix the pesticides and clean the application equipment in an area where accidental spills will not enter surface or ground waters, and will not contaminate the soil.

- Store pesticides in enclosed areas or in covered impervious containment. Ensure that pesticide contaminated stormwater or spills/leaks of pesticides are not discharged to storm drains. Do not hose down the paved areas to a storm drain or conveyance ditch. Store and maintain appropriate spill cleanup materials in a location known to all near the storage area.

- Clean up any spilled pesticides and ensure that the pesticide contaminated waste materials are kept in designated covered and contained areas.

- The pesticide application equipment must be capable of immediate shutoff in the event of an emergency.
Do not spray pesticides within 100 feet of open waters including wetlands, ponds, and streams, sloughs and any drainage ditch or channel that leads to open water except when approved by Ecology or by the City of Tacoma. All sensitive areas including wells, creeks and wetlands must be flagged prior to spraying.

As required by the City of Tacoma or by Ecology, complete public posting of the area to be sprayed prior to the application.

Spray applications should only be conducted during weather conditions as specified in the label direction and applicable local and state regulations. Do not apply during rain or immediately before expected rain.

Recommended BMPs for the use of Pesticides

Consider alternatives to the use of pesticides such as covering or harvesting weeds, substitute vegetative growth, and manual weed control/moss removal.

Consider the use of soil amendments, such as compost, that are known to control some common diseases in plants, such as Pythium root rot, ashy stem blight, and parasitic nematodes. The following are three possible mechanisms for disease control by compost addition (USEPA Publication 530-F-9-044):

1. Successful competition for nutrients by antibiotic production;
2. Successful predation against pathogens by beneficial microorganism; and
3. Activation of disease-resistant genes in plants by composts.

Installing an amended soil/landscape system can preserve both the plant system and the soil system more effectively. This type of approach provides a soil/landscape system with adequate depth, permeability, and organic matter to sustain itself and continue working as an effective stormwater infiltration system and a sustainable nutrient cycle.

Once a pesticide is applied, its effectiveness should be evaluated for possible improvement. Records should be kept showing the applicability and inapplicability of the pesticides considered.

An annual evaluation procedure should be developed including a review of the effectiveness of pesticide applications, impact on buffers and sensitive areas (including potable wells), public concerns, and recent toxicological information on pesticides used/proposed for use. If individual or public potable wells are located in the proximity of commercial pesticide applications contact the regional Ecology hydrogeologist to determine if additional pesticide application control measures are necessary.

Rinsate from equipment cleaning and/or triple-rinsing of pesticide containers should be used as product or recycled into product.

The application equipment used should be capable of immediate shutoff in the event of an emergency.
Required BMPs for Vegetation Management

- Use at least an eight-inch "topsoil" layer with at least 8 percent organic matter to provide a sufficient vegetation-growing medium. Amending existing landscapes and turf systems by increasing the percent organic matter and depth of topsoil can substantially improve the permeability of the soil, the disease and drought resistance of the vegetation, and reduce fertilizer demand. This reduces the demand for fertilizers, herbicides, and pesticides. Organic matter is the least water-soluble form of nutrients that can be added to the soil. Composted organic matter generally releases only between 2 and 10 percent of its total nitrogen annually, and this release corresponds closely to the plant growth cycle. If natural plant debris and mulch are returned to the soil, this system can continue recycling nutrients indefinitely.

- Select the appropriate turfgrass mixture for your climate and soil type. Certain tall fescues and rye grasses resist insect attack because the symbiotic endophytic fungi found naturally in their tissues repel or kill common leaf and stem-eating lawn insects. They do not, however, repel root-feeding lawn pests such as Crane Fly larvae, and are toxic to ruminants such as cattle and sheep. The fungus causes no known adverse effects to the host plant or to humans. Endophytic grasses are commercially available and can be used in areas such as parks or golf courses where grazing does not occur. The local Cooperative Extension office can offer advice on which types of grass are best suited to the area and soil type.

- Use the following seeding and planting BMPs, or equivalent BMPs to obtain information on grass mixtures, temporary and permanent seeding procedures, maintenance of a recently planted area, and fertilizer application rates: Temporary Seeding, Mulching and Matting, Clear Plastic Covering, Permanent Seeding and Planting, and Sodding as described in Volume II, Construction Stormwater Pollution Prevention).

- Selection of desired plant species can be made by adjusting the soil properties of the subject site. For example, a constructed wetland can be designed to resist the invasion of reed canary grass by layering specific strata of organic matters (e.g., compost forest product residuals) and creating a mildly acidic pH and carbon-rich soil medium. Consult a soil restoration specialist for site-specific conditions.

- Aerate lawns regularly in areas of heavy use where the soil tends to become compacted. Aeration should be conducted while the grasses in the lawn are growing most vigorously. Remove layers of thatch greater than ¾-inch deep.
Mowing is a stress-creating activity for turfgrass. When grass is mowed too short its productivity is decreased and there is less growth of roots and rhizomes. The turf becomes less tolerant of environmental stresses, more disease prone and more reliant on outside means such as pesticides, fertilizers and irrigation to remain healthy. Set the mowing height at the highest acceptable level and mow at times and intervals designed to minimize stress on the turf. Generally mowing only 1/3 of the grass blade height will prevent stressing the turf.

**Irrigation:**

- The depth from which a plant normally extracts water depends on the rooting depth of the plant. Appropriately irrigated lawn grasses normally root in the top 6 to 12 inches of soil; lawns irrigated on a daily basis often root only in the top 1 inch of soil. Improper irrigation can encourage pest problems, leach nutrients, and make a lawn completely dependent on artificial watering. The amount of water applied depends on the normal rooting depth of the turfgrass species used, the available water holding capacity of the soil, and the efficiency of the irrigation system. Consult with Tacoma Water, the Pierce Conservation District, or Cooperative Extension office to help determine optimum irrigation practices.

**Fertilizer Management:**

- Turfgrass is most responsive to nitrogen fertilization, followed by potassium and phosphorus. Fertilization needs vary by site depending on plant, soil and climatic conditions. Evaluation of soil nutrient levels through regular testing ensures the best possible efficiency and economy of fertilization. For details on soils testing, contact the Pierce Conservation District or Cooperative Extension Service.

- Fertilizers should be applied in amounts appropriate for the target vegetation and at the time of year that minimizes losses to surface and ground waters. Do not fertilize during a drought or when the soil is dry. Alternatively, do not apply fertilizers within three days prior to predicted rainfall. The longer the period between fertilizer application and either rainfall or irrigation, the less fertilizer runoff occurs.

  *Use slow release fertilizers such as methylene urea, IDBU, or resin coated fertilizers when appropriate, generally in the spring. Use of slow release fertilizers is especially important in areas with sandy or gravelly soils.*

- Time the fertilizer application to periods of maximum plant uptake. Generally fall and spring applications are recommended, although WSU turf specialists recommend four fertilizer applications per year.

- Properly trained persons should apply all fertilizers. At commercial and industrial facilities fertilizers should not be applied to grass swales, filter strips, or buffer areas that drain to sensitive water bodies unless approved by the local jurisdiction.
Integrated Pest Management

An IPM program might consist of the following steps:

Step 1: Correctly identify problem pests and understand their life cycle
Step 2: Establish tolerance thresholds for pests.
Step 3: Monitor to detect and prevent pest problems.
Step 4: Modify the maintenance program to promote healthy plants and discourage pests.
Step 5: Use cultural, physical, mechanical, or biological controls first if pests exceed the tolerance thresholds.
Step 6: Evaluate and record the effectiveness of the control and modify maintenance practices to support lawn or landscape recovery and prevent recurrence.

For an elaboration of these steps refer to Appendix IV-B, Example of an Integrated Best Management Program.
A3.7 PAINTING, FINISHING AND COATING OF VEHICLES, BOATS, BUILDINGS AND EQUIPMENT

Description of Pollutant Sources: Surface preparation and the application of paints, finishes and/or coatings to vehicles, boats, buildings, and/or equipment outdoors can be sources of pollutants. Potential pollutants include organic compounds, oils and greases, heavy metals, and suspended solids.

Pollutant Control Approach: Cover and contain painting and sanding operations and apply good housekeeping and preventive maintenance practices to prevent the contamination of stormwater with painting oversprays and grit from sanding.

Required BMPs

- Train employees in the careful application of paints, finishes, and coatings to reduce misuse and over spray. Use ground or drop cloths underneath outdoor painting, scraping, sandblasting work, and properly clean and temporarily store collected debris daily.

- Do not conduct spraying, blasting, or sanding activities over open water or where wind may blow paint into water.

- Wipe up spills with rags and other absorbent materials immediately. Do not hose down the area to a storm drain or receiving water or conveyance ditch to receiving water.

- On marine dock areas sweep rather than hose down debris. Collect any hose water generated and convey to appropriate treatment and disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control device if dust, grit, washwater, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the workday. Collect contaminated runoff and solids and properly dispose of such wastes before removing the containment device(s) at the end of the workday.

- Use a ground cloth, pail, drum, drip pan, tarpaulin, or other protective device for activities such as paint mixing and tool cleaning outside or where spills can contaminate stormwater.

- Properly dispose of all wastes and prevent all uncontrolled releases to the air, ground or water.

- Clean brushes and tools covered with non-water-based paints, finishes, or other materials in a manner that allows collection of used solvents (e.g., paint thinner, turpentine, xylol, etc.) for recycling or proper disposal.

- Store toxic materials under cover (tarp, etc.) during precipitation events and when not in use to prevent contact with stormwater.
Enclose and/or contain all work while using a spray gun or conducting sand blasting and in compliance with applicable air pollution control, OSHA, and WISHA requirements. Do not conduct outside spraying, grit blasting, or sanding activities during windy conditions which render containment ineffective.

Recommended BMPs

- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain.
- Recycle paint, paint thinner, solvents, pressure washwater, and any other recyclable materials.
- Use efficient spray equipment such as electrostatic, air-atomized, high volume/low pressure, or gravity feed spray equipment.
- Purchase recycled paints, paint thinner, solvents, and other products if feasible.
A3.8 COMMERCIAL PRINTING OPERATIONS

Description of Pollutant Sources: Materials used in the printing process include inorganic and organic acids, resins, solvents, polyester film, developers, alcohol, vinyl lacquer, dyes, acetates, and polymers. Waste products may include waste inks and ink sludge, resins, photographic chemicals, solvents, acid and alkaline solutions, chlorides, chromium, zinc, lead, spent formaldehyde, silver, plasticizers, and used lubricating oils. As the printing operations are conducted indoors, the only likely points of potential contact with stormwater are the outside temporary storage of waste materials and offloading of chemicals at external unloading bays. Pollutants can include TSS, pH, heavy metals, oil and grease, and COD.

Pollutant Control Approach: Ensure appropriate disposal and NPDES permitting of process wastes. Cover and contain stored raw and waste materials.

Required BMPs

- Discharge process wastewaters to a sanitary sewer, or to an approved process wastewater treatment system, if approved by the City of Tacoma.
- Do not discharge process wastes or wastewaters into storm drains or surface water.
- Determine whether any of these wastes qualify for regulation as dangerous wastes and dispose of them accordingly.
- Store raw materials or waste materials that could contaminate stormwater in covered and contained areas.

Recommended BMPs

- Train all employees in pollution prevention, spill response, and environmentally acceptable materials handling procedures.
- Store materials in proper, appropriately labeled containers. Identify and label all chemical substances.
- All stormwater management devices should be inspected regularly and maintained as necessary.
- Try to use press washes without listed solvents, and with the lowest VOC content possible. Don't evaporate ink cleanup trays to the outside atmosphere.
- Place cleanup sludges into a container with a tight lid and dispose of as hazardous waste. Do not dispose of cleanup sludges in the garbage or in containers of soiled towels.

For additional information on pollution prevention the following Washington Department of Ecology publications are recommended: A Guide for Screen Printers, Publication #94-137R and A Guide for Lithographic Printers, Publication #94-139R.
A3.9 MANUFACTURING OPERATIONS – OUTSIDE

Description of Pollutant Sources: Manufacturing pollutant sources include outside process areas, stack emissions, and areas where manufacturing activity has taken place in the past and significant pollutant materials remain and are exposed to stormwater.

Pollution Control Approach: Cover and contain outside manufacturing and prevent stormwater run-on and contamination, where feasible.

Required BMPs

- Sweep paved areas regularly, as needed, to prevent contamination of stormwater.

- Alter the activity by eliminating or minimizing the contamination of stormwater.

- Enclose the activity (see Figure 4.7). If possible, enclose the manufacturing activity in a building.

- Cover the activity and connect floor drains to a sanitary sewer, if approved by the City of Tacoma. Berm or slope the floor as needed to prevent drainage of pollutants to outside areas (see Figure 4.8).

- Isolate and segregate pollutants as feasible. Convey the segregated pollutants to a sanitary sewer, process treatment or a dead-end sump depending on available methods and applicable permit requirements.
SECTION A4

STORAGE AND STOCKPILING ACTIVITIES
A4.1 BMPs FOR STORAGE OR TRANSFER (OUTSIDE) OF SOLID RAW MATERIALS, BY-PRODUCTS OR FINISHED PRODUCTS

Description of Pollutant Sources: Solid raw materials, by-products, or products such as gravel, sand, salts, topsoil, compost, logs, sawdust, wood chips, lumber and other building materials, concrete, and metal products sometimes are typically stored outside in large piles, stacks, etc. at commercial or industrial establishments. Contact of outside bulk materials with stormwater can cause leachate, and erosion of the stored materials. Contaminants include TSS, BOD, organics, and dissolved salts (sodium, calcium, and magnesium chloride, etc).

Pollutant Control Approach: Provide impervious containment with berms, dikes, etc. and/or cover to prevent run-on and discharge of leachate pollutant(s) and TSS.

Required BMPs

- Do not hose down the contained stockpile area to a storm drain or a conveyance to a storm drain or to receiving water.

- Choose one or more of the source control BMP options listed below for stockpiles greater than 5 cubic yards of erodible or water soluble materials such as soil, road deicing salts, compost, unwashed sand and gravel, sawdust, etc. Also included are outside storage areas for solid materials such as logs, bark, lumber, metal products, etc.

- Store in a building or paved and bermed covered area as shown in Figure 4.9, or;

- Place temporary plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent) over the material as illustrated (see Figure 4.10), or;

- Pave the area and install a stormwater drainage system. Place curbs or berms along the perimeter of the area to prevent the run-on of uncontaminated stormwater and to collect and convey runoff to treatment. Slope the paved area in a manner that minimizes the contact between stormwater (e.g., pooling) and leachable materials in compost, logs, bark, wood chips, etc.

- For large stockpiles that cannot be covered, implement containment practices at the perimeter of the site and at any catch basins as needed to prevent erosion and discharge of the stockpiled material offsite or to a storm drain. Ensure that contaminated stormwater is not discharged directly to catch basins without being conveyed through a treatment BMP.

- Convey contaminated stormwater from the stockpile area to a wet pond, wet vault, settling basin, media filter, or other appropriate treatment system depending on the contamination.
Recommended BMPs:

- Maintain drainage areas in and around storage of solid materials with a minimum slope of 1.5 percent to prevent pooling and minimize leachate formation. Areas should be sloped to drain stormwater to the perimeter where it can be collected, or to internal drainage “alleyways” where material is not stockpiled.

- Sweep paved storage areas regularly for collection and disposal of loose solid materials.

- If and when feasible, collect and recycle water-soluble materials (leachates) to the stockpile.

- Stock cleanup materials, such as brooms, dustpans, and vacuum sweepers near the storage area.
A4.2 STORAGE AND TREATMENT OF CONTAMINATED SOILS

Description of Pollutant Sources: This activity applies to businesses and agencies that store and treat soils contaminated with toxic organic compounds, petroleum products, or heavy metals. Such contamination typically comes to light when an environmental audit is done, or old underground tanks are removed. The soils are usually excavated and taken off-site for treatment via aeration and perhaps chemical stabilization. Stormwater runoff that comes in contact with contaminated soil can carry those contaminants along with loose dirt into receiving waters.

Pollutants of concern include toxic organic compounds, oils and greases and heavy metals.

Pollutant Control Approach: The Tacoma-Pierce County Health Department Waste Management Section at (253) 798-6047 regulates and permits businesses treating contaminated soil. In addition, a permit from the Puget Sound Clean Air Agency is required if the treatment method for removing soil contaminants involves forcing air through, or sucking air from, the soil. Contact these agencies for additional information regarding the appropriate pollutant control approach.

Required BMPs

The BMPs included here are intended as a supplement to other regulations. The following BMPs or equivalent measures are required of all businesses engaged in storage and treatment of contaminated soils:

- The storage area for contaminated soils must be enclosed indoors, covered, or contained by a curb, dike, or berm constructed around the material storage area. If the contaminated soils are covered, stormwater run-on protection must also be provided. BMP S.7 in Chapter 5 provides further details on containment and run-on prevention.

- Employees must be educated on methods to prevent contamination from leaving the site.

- Cleanup materials must be stocked near the storage area.

- Gutters, storm drains, catch basins, and other drainage system features on the site must be cleaned following the completion of site work, or at least once per year, whichever comes first. Sediments from such cleaning must be disposed of properly. See BMP S.9 and S.2 for details on catch basin cleaning and disposal options.

Recommended BMPs

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

- If feasible, the storage area should be swept weekly for collection of stray soil, which can be added back to the piles, or properly disposed. See BMP S.2 in Chapter 5 for information on disposal options.
• Implement one of the following treatment BMPs in conjunction with a runoff containment plan:
  - Vegetated biofilter.
  - Catch basin insert for the targeted pollutants or wet vault.
  - Or equivalent BMP, see Volume V.

The use of any treatment BMP must not result in the violation of groundwater, surface water, or drinking water quality standards.
A4.3 TEMPORARY STORAGE OR PROCESSING OF FRUITS OR VEGETABLES

Description of Pollutant Sources: This activity applies to businesses that temporarily store fruits and vegetables outdoors prior to processing or sale, or that crush, cut, or shred fruits or vegetables for wines, frozen juices, and other food and beverage products. Nutrients and soil washing off of fruit can have a detrimental effect on receiving waters.

Pollutants of concern include nutrients, suspended solids, biochemical oxygen demand (BOD) and color.

Pollutant Control Approach: Store and process fruits and vegetables indoors or under cover whenever possible. Educate employees about proper procedures. Eliminate illicit connections to the storm drainage system. Cover and contain operations and apply good housekeeping and preventive maintenance practices to prevent the contamination of stormwater.

Required BMPs

The following BMPs or equivalent measures are required of all businesses engaged in storage of fruits or vegetables:

- Employees must be educated on benefits of keeping a clean storage area.
- Eliminate illicit connections to the storm drainage system. See BMP S.1 in Chapter 5 for details on detecting and eliminating these connections.
- No untreated water used to clean produce can enter the storm drainage system. Minimize the use of water when cleaning produce to avoid excess runoff.
- Cleanup materials, such as brooms and dustpans, must be kept near the storage area.
- Gutters, storm drains and catch basins on the property must be cleaned as needed. See BMP S.9 in Chapter 5 for details on catch basin cleaning requirements.

The following BMPs or equivalent measures are required of all businesses that process fruits or vegetables:

- Eliminate illicit connections to the storm drainage system. See BMP S.1 in Chapter 5 for details on detecting and eliminating these connections.
- Employees must be educated on benefits of keeping a clean processing area.
- Cleanup materials, such as brooms, dustpans and shovels, must be kept near the storage area.
- The processing area must be swept or shoveled daily to collect dirt, fruit and vegetable fragments for proper disposal.
- The processing area must be enclosed in a building or shed, or covered with provisions for stormwater run-on prevention. See BMP S.4, S.5, and S.7 in Chapter 5 for more on covering and run-on prevention.

OR

The processing area must be paved and sloped to a sanitary sewer drain, holding tank, or process treatment system collection drain, and stormwater run-on prevention must be provided for the processing area. Call the Tacoma Sanitary Source Control Unit at 591-5588 for information on discharging to the sanitary sewer. See BMP S.6 and S.3 in Chapter 5 for details on paving and drainage.

Recommended BMPs

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

- Cover storage areas for fruits and vegetables. See BMP S.4 and S.5 in Chapter 5 for more details on coverings.

- A containment curb, dike, or berm can be used to prevent offsite runoff from storage or processing areas and also to prevent stormwater run-on. See BMP S.7 in Chapter 5 for more information. Note that run-on prevention is required for processing areas, but not for storage areas.

- The storage area should be swept or shoveled daily to collect dirt and fruit and vegetable fragments for proper disposal. Keep hosing to a minimum.

- Use one or a combination of the following treatment BMPs:
  - Wet pond or wet vault to treat storage area runoff.
  - Vegetated biofilter to treat storage area runoff.
  - Catch basin, with appropriate insert for the targeted pollutants, to treat storage area runoff. See S.9 in Chapter 5 for information on catch basin cleaning.
  - Or equivalent BMP, see Volume V.
A4.4 STORAGE OF SOLID WASTES AND FOOD WASTES

Description of Pollutant Sources: This activity applies to businesses and public agencies that store solid wastes and food wastes outdoors. This includes ordinary garbage. If improperly stored in our climate, these wastes can contribute a variety of different pollutants to stormwater. Requirements for handling and storing solid waste may require a permit from the Tacoma-Pierce County Health Department. For more information, call the Waste Management Section at 253-798-6047.

NOTE: Dangerous solid wastes must be stored and handled under special guidelines. Businesses and agencies that store dangerous wastes must follow specific regulations outlined by the Department of Ecology, and in some cases, the Tacoma-Pierce County Health Department (TPCHD). Ecology regulations are outlined in Chapter 6. Please contact the Department of Ecology at 360-407-6300 and the TPCHD at 253-798-6047 for the specific requirements and permitting information.

Pollutants of concern include toxic organic compounds, oils and greases, heavy metals, nutrients, suspended solids, chemical oxygen demand (COD) and biochemical oxygen demand (BOD).

Pollutant Control Approach: Store wastes in suitable containers with leak proof lids. Sweep or shovel loose solids. Educate employees about the need to check for and replace leaking containers.

Required BMPs

The following BMPs are required of all businesses and public agencies engaged in storage of non-dangerous solid wastes or food wastes:

- All solid and food wastes must be stored in suitable containers. Piling of wastes without any cover is not acceptable.

- Storage containers must be checked for leaks and replaced if they are leaking, corroded, or otherwise deteriorating.

- Storage containers must have leak-proof lids, or else be covered by some other means. Lids must be kept closed at all times. This is especially important for dumpsters, as birds can pick out garbage and drop it, promoting rodent, health and stormwater problems.

OR

If lids cannot be provided for the waste containers, or they cannot otherwise be covered, there is another option: a designated waste storage area must be provided with a containment berm, dike or curb, and the designated area must drain to a sanitary sewer or holding tank for further treatment. See BMP S.7 and S.3 in Chapter 5 for more information.

- Employees must be trained to frequently check storage containers for leaks and to ensure that the lids are on tightly.
The waste storage area must be swept or otherwise cleaned frequently to collect all loose solids for proper disposal in a storage container. Do not hose the area to collect or clean solids.

If you clean your containers, all rinse water from cleaning must be disposed of in a sanitary sewer or septic system.

Clean out catch basins on your property that receive drainage from your waste storage area. See BMP S.9 in Chapter 5 for details on catch basin cleaning.

Recommended BMPs

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

- If the amount of waste accumulated appears to frequently exceed the capacity of the storage container, then another storage container should be obtained and utilized.

- Store containers such that wind will not be able to knock them over.

- Designate a storage area, pave the area, and slope the drainage to a holding tank or sanitary sewer drain. If a holding tank is used, the contents must be pumped out before the tank is full, and properly disposed. See BMP S.2 in Chapter 5 for more information on disposal options.

- Compost appropriate wastes. Contact Tacoma Solid Waste Utility Recycling and Composting at 253-565-5955 for more information on composting.

- Recycle your solid wastes. The Industrial Materials Exchange (IMEX) program facilitates the transfer of excess materials and wastes to those who can use them. IMEX can be reached at 206-296-4899, or use the IMEX computer bulletin board modem access number at 1-800-858-6625.
A4.5 RECYCLERS AND SCRAP YARDS

Description of Pollutant Sources: Includes businesses that reclaim various materials for resale or for scrap, such as vehicles and vehicle/equipment parts, construction materials, metals, beverage containers, and papers.

Potential sources of pollutants include paper, plastic, metal scrap debris, engines, transmissions, radiators, batteries, and other materials that contain fluids or are contaminated with fluids. Other pollutant sources include leachate from metal components, contaminated soil, and the erosion of soil. Activities that can generate pollutants include the transfer, dismantling, and crushing of vehicles and scrap metal; the transfer and removal of fluids; maintenance and cleaning of vehicles, parts, and equipment; and storage of fluids, parts for resale, solid wastes, scrap parts, and materials, equipment and vehicles that contain fluids; generally in uncovered areas.

Potential pollutants typically found at vehicle recycle and scrap yards include oil and grease, ethylene and propylene glycol, total suspended solids, BOD, heavy metals, and acidic pH.

Required BMPs

For facilities subject to Ecology’s Industrial Stormwater General Permit refer to BMP Guidance Document #94-146, “Best Management Practices to Prevent Stormwater Pollution at Vehicle Recycler Facilities,” Washington Department of Ecology, September 1994 for selection of BMPs. The BMPs in that guidance document can also be applied to scrap material recycling facilities depending on the pollutant sources existing at those facilities and to non-permitted facilities.
A4.6 TREATMENT, STORAGE, OR DISPOSAL OF DANGEROUS WASTES

This activity applies to businesses and public agencies that are permitted by the Washington State Department of Ecology to treat, store, or dispose of dangerous wastes. DOE regulates these facilities with specific requirements, which include the need for a National Pollutant Discharge Elimination System (NPDES) permit. Detailed BMPs are not included in this manual since site requirements for these facilities are well beyond the level of typical BMP applications. See Chapter 6 for reference information.

The Tacoma-Pierce County Health Department also administers some aspects of dangerous waste treatment, storage and disposal. Call 253-798-6047 for more information.
A4.7 STORAGE OF LIQUID, FOOD WASTE OR DANGEROUS WASTE CONTAINERS

Description of Pollutant Sources: Steel and plastic drums with volumetric capacities of 55 gallons or less are typically used at industrial facilities for container storage of liquids and powders. The BMPs specified below apply to container(s) located outside a building used for temporary storage of accumulated food wastes, vegetable or animal grease, used oil, liquid feedstock or cleaning chemical, or Dangerous Wastes (liquid or solid) unless the business is permitted by Ecology to store the wastes. Leaks and spills of pollutant materials during handling and storage are the primary sources of pollutants. Oil and grease, acid/alkali pH, BOD, and COD are potential pollutant constituents.

Pollutant Control Approach: Store containers in impervious containment under a roof or other appropriate cover, or in a building. For roll-containers (for example, dumpsters) that are picked up directly by the collection truck, a flail can be placed on both sides of the curb to facilitate moving the dumpster. If a storage area is to be used on-site for less than 30 days, a portable temporary secondary system like that shown in Figure 4.11 can be used in lieu of a permanent system as described above.

Required BMPs

- Place tight-fitting lids on all containers.
- Place drip pans beneath all mounted container taps and at all potential drip and spill locations during filling and unloading of containers.
- Inspect container storage areas regularly for corrosion, structural failure, spills, leaks, overfills, and failure of piping systems. Check containers daily for leaks/spills. Replace containers, and replace and tighten bungs in drums as needed.
- Businesses accumulating Dangerous Wastes that do not contain free liquids need only to store these wastes in a sloped designated area with the containers elevated or otherwise protected from stormwater run-on.
- Drums stored in an area where unauthorized persons may gain access must be secured in a manner that prevents accidental spillage, pilferage, or any unauthorized use (see Figure 4.12).
- If the material is a Dangerous Waste, the business owner must comply with any additional Ecology requirements as specified in Chapter 6, Section 6.2, R.2.
- Storage of reactive, ignitable, or flammable liquids must comply with the Uniform Fire Code.
- Cover dumpsters, or keep them under cover such as a lean-to, to prevent the entry of stormwater. Replace or repair leaking garbage dumpsters.
- Drain dumpsters and/or dumpster pads to sanitary sewer. Keep dumpster lids closed. Install waterproof liners.
- Keep containers with Dangerous Waste, food waste, or other potential pollutant liquids inside a building unless this is impracticable due to site constraints or Uniform Fire Code requirements.

- Store containers in a designated area, which is covered, bermed or diked, paved and impervious in order to contain leaks and spills (see Figure 2.10). The secondary containment shall be sloped to drain into a dead-end sump for the collection of leaks and small spills.

- For liquid wastes, surround the containers with a dike as illustrated in Figure 2.10. The dike must be of sufficient height to provide a volume of either 10 percent of the total enclosed container volume or 110 percent of the volume contained in the largest container, whichever is greater, or, if a single container, 110 percent of the volume of that container.

- Where material is temporarily stored in drums, a containment system can be used as illustrated, in lieu of the above system (see Figure 4.13).

- Place containers mounted for direct removal of a liquid chemical for use by employees inside a containment area as described above. Use a drip pan during liquid transfer (see Figure 4.14).

- For contaminated stormwater in the containment area, connect the sump outlet to a sanitary sewer, if approved by the City of Tacoma, or to appropriate treatment such as an API or CP oil/water separator, catch basin filter or other appropriate system (see Volume V). Equip the sump outlet with a normally closed valve to prevent the release of spilled or leaked liquids, especially flammables (compliance with Fire Codes), and dangerous liquids. This valve may be opened only for the conveyance of contaminated stormwater to treatment.

- Another option for discharge of contaminated stormwater is to pump it from a dead-end sump or catchment to a tank truck or other appropriate vehicle for off-site treatment and/or disposal.
A4.8 STORAGE OF LIQUIDS IN PERMANENT ABOVE-GROUND TANKS

**Description of Pollutant Sources:** Above-ground tanks containing liquids (excluding uncontaminated water) may be equipped with a valved drain, vent, pump, and bottom hose connection. They may be heated with steam heat exchangers equipped with steam traps. Leaks and spills can occur at connections and during liquid transfer. Oil and grease, organics, acids, alkalis, and heavy metals in tank water and condensate drainage can also cause stormwater contamination at storage tanks.

**Pollutant Control Approach:** Install secondary containment or a double-walled tank. Slope the containment area to a drain with a sump. Stormwater collected in the containment area may need to be discharged to treatment such as an API or CP oil/water separator, or equivalent BMP. Add safeguards against accidental releases including protective guards around tanks to protect against vehicle or forklift damage, and tagging valves to reduce human error. Tank water and condensate discharges are process wastewater that may need an NPDES Permit.

**Required BMPs**

- Inspect the tank containment areas regularly to identify problem components such as fittings, pipe connections, and valves, for leaks/spills, cracks, corrosion, etc.

- Place adequately sized drip pans beneath all mounted taps and drip/spill locations during filling/unloading of tanks. Valved drain tubing may be needed in mounted drip pans.

- Sweep and clean the tank storage area regularly, if paved.

- Replace or repair tanks that are leaking, corroded, or otherwise deteriorating.

- All installations shall comply with the Uniform Fire Code and the National Electric Code.

- Locate permanent tanks in impervious (Portland cement concrete or equivalent) secondary containment surrounded by dikes as illustrated in Figure 4.15, or UL Approved double-walled. The dike must be of sufficient height to provide a containment volume of either 10 percent of the total enclosed tank volume or 110 percent of the volume contained in the largest tank, whichever is greater, or, if a single tank, 110 percent of the volume of that tank.

- Slope the secondary containment to drain to a dead-end sump (optional), or equivalent, for the collection of small spills.

- Include a tank overfill protection system to minimize the risk of spillage during loading.

- If the tank containment area is uncovered, equip the outlet from the spill-containment sump with a shutoff valve, which is normally closed and may be opened, manually or automatically, only to convey contaminated stormwater to approved treatment or disposal, or to convey uncontaminated stormwater to a storm drain. Evidence of contamination can include the presence of visible sheen, color, or turbidity in the
runoff, or existing or historical operational problems at the facility. Simple pH measurements with litmus or pH paper can be used for areas subject to acid or alkaline contamination.

- At petroleum tank farms, convey stormwater contaminated with floating oil or debris in the contained area through an API or CP-type oil/water separator (Volume V, Treatment BMPs), or other approved treatment prior to discharge to storm drain or surface water.
A4.9 PARKING AND STORAGE FOR VEHICLES AND EQUIPMENT

Description of Pollutant Sources: Public and commercial parking lots such as retail store, fleet vehicle (including rent-a-car lots and car dealerships), equipment sale and rental parking lots, and parking lot driveways, can be sources of toxic hydrocarbons and other organic compounds, oils and greases, metals, and suspended solids caused by the parked vehicles.

Required BMPs

- If washing of a parking lot is conducted, discharge the washwater to a sanitary sewer, or other approved wastewater treatment system, if allowed by the City of Tacoma, or collect it for off-site disposal.

- Do not hose down the area to a storm drain or to a receiving water. Sweep parking lots, storage areas, and driveways, regularly to collect dirt, waste, and debris.

- An oil removal system such as an API or CP oil and water separator, catch basin filter, or equivalent BMP (see Volume V), approved by the City of Tacoma, is applicable for parking lots meeting the threshold vehicle traffic intensity level of a high-use site. For more information on high use sites, refer to Volume I, Section 4.2, Step V, Step 2.
A4.10 LOADING AND UNLOADING AREAS FOR SOLID MATERIAL

(Please refer to A2.1, Loading and Unloading Areas for Liquid and Solid Material.)
SECTION A5

CONSTRUCTION AND DEMOLITION ACTIVITIES
A5.1 CLEARING, GRADING AND PREPARATION OF CONSTRUCTION SITES

This activity applies to businesses and municipal agencies that develop lands for construction. It also applies to residences that undertake large yard clearing and grading projects. Stormwater runoff from bare ground can be loaded with dirt and other pollutants. This material can clog ditches and stream channels, thus reducing carrying capacity and increasing flooding, as well as smothering spawning beds for fish. Simply controlling runoff and not allowing it to leave the site will prevent these harmful effects. Clearing, grading and preparation activities are covered in detail in Volume II of this Manual, Construction Stormwater Pollution Prevention. Grading activities are also regulated in the City of Tacoma by the Grading and Excavation Code, Section 2.02.330 of the official code of the City of Tacoma.

An NPDES permit is needed from the Washington state Department of Ecology (Ecology) where five (5) or more acres of land is disturbed. Beginning in 2003, coverage under Ecology’s General Permit will be required for construction sites that result in the disturbance of one acre or more of land. Compliance with the Construction Stormwater Pollution Prevention requirements in Ecology’s manual is required, as applicable.
A5.2 DEMOLITION OF BUILDINGS

Description of Pollutant Sources: This activity applies to removal of existing buildings by controlled explosions, wrecking balls, or manual methods, and subsequent clearing of the rubble. The loose debris can contaminate stormwater.

Pollutants of concern include toxic organic compounds, heavy metals and suspended solids.

Pollutant Control Approach: Regularly clean up debris that can contaminate stormwater. Protect the storm drainage system from dirty runoff and loose particles. Sweep paved surfaces daily.

Required BMPs

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in building demolition:

- 1. Storm drain covers or a similarly effective containment device must be placed on all nearby drains to prevent dirty runoff and loose particles from entering the storm drainage system. Covers shall be placed at the beginning of the work day and the accumulated materials collected and disposed before removing the covers at the end of the work day. If storm drains are not present, dikes, berms or other methods must be used to protect overland discharge paths from runoff. See BMP S.2 and S.7 in Chapter 5 for more information on runoff control and disposal options.

- 2. Street gutters, sidewalks, driveways, and other paved surfaces in the immediate area of the demolition must be swept at the end of each work day to collect and properly dispose of loose debris and garbage.

Recommended BMPs

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

- Water should be sprayed throughout the site to help control wind blowing of fine materials such as soil, concrete dust, and paint chips. The amount of water must be controlled so that runoff from the site does not occur, yet dust control is achieved. Oils must never be used for dust control.

- If possible, a wall should be constructed to prevent stray building materials and dust from escaping the area during demolition.

- Install catch basin filter inserts to treat site runoff. Additional information about catch basin filter inserts can be found in Volume V of this Manual, Runoff Treatment BMPs.

- Schedule demolition to take place at a dry time of the year.
A5.3 BUILDING REPAIR, REMODELING AND CONSTRUCTION

Description of Pollutant Sources: This activity refers to activities associated with construction of buildings and other structures, remodeling of existing buildings and houses, and general exterior building repair work. Painting of buildings is covered under A3.10 Painting, Finishing and Coating of Vehicles, Boats, Buildings and Equipment. Concrete pouring is covered under A3.2 Concrete Pouring and Asphalt Application at Temporary Sites.

Pollutants of concern include toxic hydrocarbons, toxic organics, suspended solids, heavy metals, pH, oils and greases.

Pollutant Control Approach: Employees must be educated about the need to control site activities. Control leaks, spills and loose material. Utilize good housekeeping practices.

Required BMPs

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

- Employees must be educated about the need to control site activities to prevent stormwater pollution, and also trained in spill cleanup procedures.
- Spill cleanup materials, appropriate to the chemicals being used on site, must be available at the work site at all times.
- The work site must be cleaned up at the end of each work day, with materials such as solvents put away indoors or covered and secured so that vandals will not have access to them.
- The area must be swept daily to collect loose litter, paint chips, grit, and dirt.
- Absolutely no substance can be dumped on pavement, on the ground, in or toward storm drains, regardless of its content, unless it is water only.
- Ground or drop cloths must be used underneath scraping and sandblasting work. Groundcloths, buckets, or tubs must also be used anywhere that work materials are laid down.
- Tools covered with non-water-based finishes, or other materials must be cleaned in a manner that enables collection of used solvents for recycling or proper disposal. See BMP S.2 in Chapter 5 for disposal options.
- Storm drain covers or similarly effective devices must be used if dust, grit, washwater, or other pollutants may escape the work area. This is particularly necessary on rainy days. The cover or containment device shall be placed over the storm drain at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the cover at the end of the day.
Recommended BMPs

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

- Recycle materials whenever possible.

- Light spraying of water on the work site can control some of the dust and grit that can blow away. Oils must never be used for dust control. Never spray to the point of runoff from the site.

- Activities such as tool cleaning should occur over a ground cloth or within a containment device such as a tub.

- Catch basin filter inserts should be considered if work will be ongoing for an extended period of time or if significant amounts of hydrocarbons, oils and greases, heavy metals, or suspended solids are expected in site runoff. Additional information about catch basin filter inserts can be found in Volume V of this Manual, Runoff Treatment BMPs.
SECTION A6

DUST CONTROL AND SOIL AND SEDIMENT CONTROL
A6.1 BMPs FOR DUST CONTROL AT DISTURBED LAND AREAS AND UNPAVED ROADWAYS AND PARKING LOTS

Description of Pollutant Sources: Dust can cause air and water pollution problems particularly at demolition sites, disturbed land areas, and unpaved roadways and parking lots.

Pollutant Control Approach: Minimize dust generation and apply environmentally friendly and government approved dust suppressant chemicals, if necessary.

Required BMPs

- Sprinkle or wet down soil or dust with water as long as it does not result in a wastewater discharge.
- Use only local and/or state government approved dust suppressant chemicals such as those listed in Ecology Publication #96-433, “Techniques for Dust Prevention and Suppression.”
- Avoid excessive and repeated applications of dust suppressant chemicals. Time the application of dust suppressants to avoid or minimize their wash-off by rainfall or human activity such as irrigation.
- Apply stormwater containment to prevent the conveyance of stormwater TSS into storm drains or receiving waters.
- The use of motor oil or other oils for dust control is prohibited. Care should be taken when using lignin derivatives and other high BOD chemicals in excavations or areas easily accessible to surface water or ground water.
- Consult with the Ecology Regional Office in your area on discharge permit requirements if the dust suppression process results in a wastewater discharge to the ground, ground water, storm drain, or surface water.

Recommended BMPs for Roadways and Other Trafficked Areas:

- Consider limiting use of off-road recreational vehicles on dust generating land.
- Consider paving unpaved permanent roads and other trafficked areas at municipal, commercial, and industrial areas.
- Consider paving or stabilizing shoulders of paved roads with gravel, vegetation, or local government approved chemicals.
- Encourage use of alternate paved routes, if available.
- Vacuum or wet sweep fine dirt and skid control materials from paved roads soon after winter weather ends or when needed.
- Consider using traction sand that is pre-washed to reduce dust emissions.
Recommended BMPs for Dust Generating Areas:

- Prepare a dust control plan. Helpful references include: Control of Open Fugitive Dust Sources (EPA-450/3-88-088), and Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures (EPA-450/2-92-004)

- Limit exposure of soil (dust source) as much as feasible.

- Stabilize dust-generating soil by growing and maintaining vegetation, mulching, topsoiling, and/or applying stone, sand, or gravel.

- Apply windbreaks in the soil such as trees, board fences, tarp curtains, bales of hay, etc.

- Cover dust-generating piles with wind-impervious fabric, or equivalent material.
A6.2 DUST CONTROL AT MANUFACTURING SITES

Description of Pollutant Sources: Industrial material handling activities can generate considerable amounts of dust that is typically removed using exhaust systems. This can generate air emissions that can contaminate stormwater. Dusts can be generated at cement and concrete products mixing, and wherever powdered materials are handled. Particulate materials that are of concern to air pollution control agencies include grain dust, sawdust, coal, gravel, crushed rock, cement, and boiler fly ash. The objective of this BMP is to reduce the stormwater pollutants caused by dust generation and control.

Pollutant Control Approach: Prevent dust generation and emissions where feasible, regularly clean-up dust that can contaminate stormwater, and convey dust contaminated stormwater to proper treatment.

Required BMPs

- Clean, as needed, powder material handling equipment and vehicles that can be sources of stormwater pollutants, to remove accumulated dust and residue.

- Regularly sweep dust accumulation areas that can contaminate stormwater. Sweeping should be conducted using vacuum filter equipment to minimize dust generation and to ensure optimal dust removal.

Recommended BMPs

- In manufacturing operations, train employees to carefully handle powders to prevent generation of dust.

- Use dust filtration/collection systems such as bag house filters, cyclone separators, etc. to control vented dust emissions that could contaminate stormwater. Control of zinc dusts in rubber production is one example.

- Use water spray to flush dust accumulations to sanitary sewers where allowed by the City of Tacoma or to other appropriate treatment system.

- Use approved dust suppressants such as those listed in Ecology Publication “Techniques for Dust Prevention and Suppression,” #96-433. (Ecology, 1996). Application of some products may not be appropriate in close proximity to receiving waters or conveyances close to receiving waters. For more information check with the Ecology Regional Office or the local jurisdiction.

- For removal of TSS in stormwater use sedimentation basins, wet ponds, wet vaults, catch basin filters, vegetated filter strips, or equivalent sediment removal BMPs. Refer to Volume V Runoff Treatment BMPs for more information about these BMPs.
A6.3 SOIL EROSION AND SEDIMENT CONTROL AT INDUSTRIAL SITES

Description of Pollutant Sources: Industrial activities on soil areas; exposed and disturbed soils; steep grading; etc. can be sources of sediments that can contaminate stormwater runoff.

Pollutant Control Approach: Limit the exposure of erodible soil, stabilize or cover erodible soil where necessary to prevent erosion, and/or provide treatment for stormwater contaminated with TSS caused by eroded soil.

Required BMPs

- Vegetative cover such as grass, trees, shrubs, on erodible soil areas; or,
- Covering with mats such as clear plastic, jute, synthetic fiber; and/or,
- Preservation of natural vegetation including grass, trees, shrubs, and vines, vegetated swale, dike, silt fence, check dam, gravel filter berm, sedimentation basin, and proper grading. (For design information refer to Volume II, “Standards and Specifications for BMPs”).
SECTION A7
OTHER ACTIVITIES
A7.1 COMMERCIAL ANIMAL HANDLING AREAS

Description of Pollutant Sources: Animals at racetracks, kennels, fenced pens, veterinarians, and businesses that provide boarding services for horses, dogs, cats, etc., can generate pollutants from the following activities: manure deposits, animal washing, grazing and any other animal handling activity that could contaminate stormwater. Pollutants can include coliform bacteria, nutrients, and total suspended solids.

Pollutant Control Approach: To prevent, to the maximum extent practicable, the discharge of contaminated stormwater from animal handling and keeping areas.

Required BMPs

- Regularly sweep and clean animal keeping areas to collect and properly dispose of droppings, uneaten food, and other potential stormwater contaminants.

- Do not hose down to storm drains or to receiving water those areas that contain potential stormwater contaminants.

- Do not allow any washwaters to be discharged to storm drains or to receiving water without proper treatment.

- If animals are kept in unpaved and uncovered areas, the ground must either have vegetative cover or some other type of ground cover such as mulch.

- If animals are not leashed or in cages, the area where animals are kept must be surrounded by a fence or other means that prevents animals from moving away from the controlled area where BMPs are used.
A7.2 LOG SORTING AND HANDLING

Description of Pollutant Sources: Log yards are paved or unpaved areas where logs are transferred, sorted, debarked, cut, and stored to prepare them for shipment or for the production of dimensional lumber, plywood, chips, poles, or other products. Log yards are generally maintained at sawmills, shipping ports, and pulp mills. Typical pollutants include oil and grease, BOD, settleable solids, total suspended solids (including soil), high and low pH, heavy metals, pesticides, wood-based debris, and leachate.

The following are pollutant sources:

1. Log storage, rollout, sorting, scaling, and cutting areas
2. Log and liquid loading areas
3. Log sprinkling
4. Debarking, bark bin and conveyor areas
5. Bark, ash, sawdust and wood debris piles, and other solid wastes
6. Metal salvage areas
7. Truck, rail, ship, stacker, and loader access areas
8. Log trucks, stackers, loaders, forklifts, and other heavy equipment
9. Maintenance shops and parking areas
10. Cleaning areas for vehicles, parts, and equipment
11. Storage and handling areas for hydraulic oils, lubricants, fuels, paints, liquid wastes, and other liquid materials
12. Pesticide usage for log preservation and surface protection
13. Application of herbicides for weed control
14. Contaminated soil resulting from leaks or spills of fluids

Ecology's Baseline General Permit Requirements:

Industries with log yards are required to obtain coverage under the baseline general permit for discharges of stormwater associated with industrial activities to surface water. The permit requires preparation and on-site retention of Stormwater Pollution Prevention Plans (SWPPP). The SWPPP must identify operational, source control, erosion and sediment control and, if necessary, treatment BMPs. Required and recommended operational, source control, and treatment BMPs are presented in detail in Ecology’s Guidance Document: Best Management Practices to Prevent Stormwater Pollution at Log Yards, Publication # 95-53, May 1995. It is recommended that all log yard facilities obtain a copy of this document. Ecology is revising this manual. The revised BMP Manual for Log Yards should be available January 31, 2003.
A7.3 BOAT BUILDING, MOORING, MAINTENANCE AND REPAIR

Description of Pollutant Sources: Sources of pollutants at boat and shipbuilding, repair, and maintenance at boatyards, shipyards, ports, and marinas include pressure washing, surface preparation, paint removal, sanding, painting, engine maintenance and repairs, and material handling and storage, if conducted outdoors. Potential pollutants include spent abrasive grits, solvents, oils, ethylene glycol, washwater, paint over-spray, cleaners/detergents, anti-corrosive compounds, paint chips, scrap metal, welding rods, resins, glass fibers, dust, and miscellaneous trash. Pollutant constituents include TSS, oil and grease, organics, copper, lead, tin, and zinc.

Pollutant Control Approach: Apply good housekeeping, preventive maintenance and cover and contain BMPs in and around work areas.

Required BMPs

The following BMPs or equivalent measures are required of all businesses, public agencies and private boat owners engaged in boat building, mooring, maintenance and repair that are not covered by the NPDES permit for boatyards:

- Maintenance and repair activities that can be moved on-shore must be moved accordingly. This action reduces some of the potential for direct pollution impact on waterbodies.

- Blasting and spray painting activities must be sheltered by hanging tarps to block the wind and prevent dust and overspray from escaping. Move the activity indoors if possible. See Chapter 6 for details on Puget Sound Clean Air Agency limitations.

- Ground cloths must be used for collection of drips and spills in painting and finishing operations, and paint chips and used blasting sand from sand blasting.

- Bilge water must be collected for proper disposal rather than discharged on land or water. See BMP S.2 in Chapter 5 for detail on disposal options. Several companies are available for bilge pumpout services. The problem can be avoided if oil-absorbent pads are used to capture the oil in the bilge water before or during pumping. If pads are used, they must be recycled or properly disposed.

- Ballast water that has an oily sheen on the surface must be collected for proper disposal rather than discharged on land or water. See BMP S.2 in Chapter 5 for details on disposal options.

- Maintenance yard areas must be swept and cleaned, without hosing down the area, at least once per week or as needed. This prevents sand blasting materials, scrapings, paint chips, oils, and other loose debris from being carried away with stormwater. The collected materials must be disposed of properly. See BMP S.2 in Chapter 5 for disposal options.

- Docks and boat ramps must be swept at least once per week or as needed, and the collected materials must be disposed of properly. Dry docks must be swept before flooding.
Paint and solvent mixing, fuel mixing and similar handling of liquids shall be performed on shore, or such that no spillage can occur directly into surface waterbodies.

Routine cleanup materials such as oil-absorbent pads, brooms, dustpans, mops, buckets, and sponges must be stocked near docks.

When washing your boat in the water, use no soaps or detergents. Brush the hull with water only.

Comply with BMP A2.3 and A4.2 if engine repair and maintenance are conducted.

Recommended BMPs

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

- Boat construction and structural repair activities should be covered.
- Materials such as paints, tools, and ground cloths should be stored indoors or in a covered area when not in use.
- Select the least toxic anti-fouling paint available.
- Boat interiors should be routinely cleaned, with proper disposal of collected materials, so that accumulations of water drained from them are not contaminated.
- Use sanders that have dust containment bags and avoid sanding in windy conditions.
- All used oil should be recycled if feasible. Most marinas now offer used oil recycling services. To dispose of filters, let drain 24 hours, then double wrap in plastic and dispose in the regular garbage, or take them to the Tacoma Landfill Household Hazardous Waste facility for recycling. Pending state legislation may make disposal in the garbage illegal, so call the Hazardous Waste Line at 1-800-287-6429 for current information.
- Citizens for a Healthy Bay, a local environmental group, provides “Clean Bay Boating Kits.” Call them at 253-383-2429 to obtain a free kit.
- Check with marinas for other BMPs they have developed.
- Use one of the following treatment BMPs when paint chips or blasting grit are prevalent in the work area
  - Catch basin filter insert.
  - Infiltration basin.
  - Wet pond or vault.
  - Constructed wetland.
  - Vegetated biofilter.
  - Filtration with media designed for the pollutants that are present.
  - Or equivalent BMP, see Volume V.
A7.4 LOGGING

Description of Pollutant Sources: This activity covers logging activities that fall under the Washington State Forest Practices Act category of Class IV general forest practices. These are situations where timber harvesting is done in the process of converting forest lands into other land uses, such as home and business construction. Stormwater runoff from bare ground can be loaded with dirt and other pollutants. This material can clog ditches and stream channels, thus reducing carrying capacity and increasing flooding, as well as smothering spawning beds for fish. Simply controlling runoff and not allowing it to leave the site will prevent these harmful effects. Clearing and grading activities are covered in detail in Volume II of this Manual, Construction Stormwater Pollution Prevention. Grading activities are also regulated in the City of Tacoma by the Grading and Excavation Code, Section 2.02.330 of the official code of the City of Tacoma.

An NPDES permit is needed from the Washington state Department of Ecology (Ecology) where five (5) or more acres of land is disturbed. Beginning in 2003, coverage under Ecology’s General Permit will be required for construction sites that result in the disturbance of one acre or more of land. Compliance with the Construction Stormwater Pollution Prevention requirements in Ecology’s manual is required, as applicable. Virtually all logging operations will require a permit from the Washington State Department of Natural Resources. Sensitive/critical areas and wetlands ordinances for Tacoma also contain requirements for logging activities in the vicinity of waterbodies.

Pollutants of concern include suspended solids, oils and greases, biochemical oxygen demand (BOD), nutrients, toxic organic compounds and heavy metals.

Pollutant Control Approach: Maintain required buffers adjacent to critical areas, including streams and wetlands. Keep sediments out of waterbodies and off paved areas.

Required BMPs

- Vegetation along stream corridors, and adjacent to other waterbodies and wetlands, must be preserved. Maintenance of a vegetated buffer enables filtration of most of the pollutants of concern for this activity. The above-mentioned ordinances contain specific requirements for buffer setbacks.

- Logging access roads must have a crushed rock or spall apron construction entrance where they join the pavement to prevent sediments from being tracked onto the pavement.

- On-site fueling and maintenance operations must follow the required BMPs as outlined in A2.4 Mobile Fueling, A2.3 Engine Repair and Maintenance and A.4.2 Storage of Liquid Chemicals, Waste Oils, Solvents or Petroleum Products in Portable Containers.
Recommended BMPs

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

- Erosion potential can be reduced by avoiding logging on steep slopes.

- If access roads are constructed for logging, they should be provided with drainage ditches that divert runoff into vegetated areas or stormwater treatment systems.

- Plant vegetated buffers in areas where they are already lost downslope of proposed logging areas, with sufficient lead time to allow for effective growth.
A7.5 MINING AND QUARRYING OF SAND, GRAVEL, ROCK, PEAT, CLAY AND OTHER MATERIALS

Description of Pollutant Sources: This activity applies to surface excavation and on-site storage of sand, gravel and other materials that are mined. All mining operations that have stormwater runoff from the site are required to apply for a National Pollutant Discharge Elimination System (NPDES) permit with the Department of Ecology. Ecology has specific BMPs required by the permit. Some additional BMPs to help meet Ecology’s discharge performance standards are listed below.

Pollutants of concern are suspended solids, nutrients, pH and metals.

Pollutant Control Approach: Provide containment and or cover for any on-site storage areas to prevent run-on and discharge of suspended solids and other pollutants.

Recommended BMPs

The following BMPs are not required, but can be used to provide pollution protection in addition to other requirements:

- If the material is appropriate, use excavated spoil material to form compacted berms along downslope sides of the site to contain runoff. Berms should be seeded to promote growth of grass or other vegetation to limit erosion from the berms. Safety considerations must be examined to prevent flooding due to berm failure.

- Semi-permanent stockpiles should be seeded to promote vegetation growth to limit erosion from the stockpiles.

- Use detention ponds to promote settling of suspended solids, or infiltration basins to filter suspended solids, to clean up runoff before it leaves the site. Refer to Volume V for more information.

- Use anchored tarps to cover stockpiles at small-scale mining operations, if there is a potential for contaminated stormwater to leave the site.
A7.6 SWIMMING POOL AND SPA CLEANING AND MAINTENANCE

Description of Pollutant Sources: This activity applies to all municipal and commercial swimming pools and spas, including Tacoma-Pierce County Health Department (TPCHD) regulated facilities. Pools and spas at hotels, motels, apartment and condominium complexes are covered here. Pools at single-family residences are covered in Chapter 3 of this BMP manual. Commercial pool and spa cleaning services must follow these required BMPs for all pools they service.

Pollutants of concern include nutrients, suspended solids, chlorine, pH and chemical oxygen demand (COD).

Pollutant Control Approach: Dispose of pool or spa water to the sanitary sewer.

Required BMPs

- The preferred method of pool or spa water disposal is to the sanitary sewer. If a sanitary sewer is available, all TPCHD regulated facilities are required to connect for draining and backwash. Contact the Tacoma Sanitary Source Control Unit at 253-591-5588 for specific instructions on allowable flow rates and timing before starting to drain the pool. Never discharge pool water to a septic system, as it will cause the system to fail.

- If discharge to the sanitary sewer is not possible, pool and spa water may be discharged to a ditch or storm drainage system provided that the water has been dechlorinated first. You are required to contact Tacoma Stormwater Source Control Unit at 253-591-5588 prior to discharge for instructions on allowable flow rates for the system or ditch that is being discharged to. Neutralizing chemicals are available for dechlorinating water. Letting the pool or spa "sit" may also reduce chlorine levels. Use a test kit to determine if the concentration has reached zero.

- State law allows discharges of pool water to the ground, not to a water body or storm drainage system, with a chlorine level of up to 3 parts per million. However, the water must not cross property lines or impact neighboring properties, and a satisfactory means for distributing the water to the ground must be used so there is no runoff.

- Diatomaceous earth used in pool filters cannot be discharged to surface waters, storm drainage systems, septic systems, or on the ground.

Recommended BMPs

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

- Hire a professional pool-draining service to collect all pool water for offsite disposal.
Description of Pollutant Sources: Deicing and/or anti-icing compounds are used on highways, streets, airport runways, and on aircraft to control ice and snow. Typically ethylene glycol and propylene glycol are deicers used on aircraft. Deicers commonly used on highways and streets include calcium magnesium acetate (CMA), calcium chloride, magnesium chloride, sodium chloride, urea, and potassium acetate. The deicing and anti-icing compounds become pollutants when they are conveyed to storm drains or to surface water after application. Leaks and spills of these chemicals can also occur during their handling and storage.

BMPs for Airport De/anti-icing Operations

Pollutant Control Approach for Aircraft: Spent glycol discharges in aircraft application areas are process wastewaters that are regulated under Ecology's industrial stormwater general permit. (Contact the Ecology Regional Office for details.) BMPs for aircraft de/anti-icers must be consistent with aviation safety and the operational needs of the aircraft operator.

Required BMPs for Aircraft:

- Conduct aircraft deicing or anti-icing applications in impervious containment areas. Collect aircraft deicer or anti-icer spent chemicals, such as glycol, draining from aircraft in deicing or anti-icing application areas and convey to a sanitary sewer, treatment, or other approved disposal or recovery method. Divert deicing runoff from paved gate areas to appropriate collection areas or conveyances for proper treatment or disposal.

- Do not allow spent deicer or anti-icer chemicals or stormwater contaminated with aircraft deicer or anti-icer chemicals to be discharged from application areas including gate areas, to surface water, or ground water, directly or indirectly.

- Transfer deicing and anti-icing chemicals on an impervious containment pad, or equivalent spill/leak containment area, and store in secondary containment areas. (See Storage of Liquids in Above-Ground Tanks)

Recommended BMPs for Aircraft:

- Establish a centralized aircraft de/anti-icing facility, if feasible and practicable, or in designated areas of the tarmac equipped with separate collection drains for the spent deicer liquids.

- Consider installing an aircraft de/anti-icing chemical recovery system, or contract with a chemical recycler, if practicable.
Required BMPs for Airport Runways/Taxiways:

- Avoid excessive application of all de/anti-icing chemicals, which could contaminate stormwater.

- Store and transfer de/anti-icing materials on an impervious containment pad or an equivalent containment area and/or under cover in accordance with BMP Storage or Transfer (Outside) of Solid Raw Materials, By-Products, or Finished Products in this volume. Other material storage and transfer approaches may be considered if it can be demonstrated that stormwater will not be contaminated with or that the de/anti-icer material cannot reach surface or ground waters.

Recommended BMPs for Airport Runways/Taxiways:

- Include limits on toxic materials and phosphorous in the specifications for de/anti-icers, where applicable.

- Consider using anti-icing materials rather than deicers if it will result in less adverse environmental impact.

- Select cost-effective de/anti-icers that cause the least adverse environmental impact.

BMPs for Streets/Highways

Required BMPs for Streets/Highways

- Select de and anti-icers that cause the least adverse environmental impact. Apply only as needed using minimum quantities.

- Where feasible and practicable use roadway deicers, such as calcium magnesium acetate, potassium acetate, or similar materials, that cause less adverse environmental impact than urea, and sodium chloride.

- Store and transfer de/anti-icing materials on an impervious containment pad in accordance with BMP Storage or Transfer (Outside) of Solid Raw Materials, By-Products, or Finished Products in this volume.

- Sweep/clean up accumulated de/anti-icing materials and grit from roads as soon as possible after the road surface clears.

Recommended BMPs for Streets/Highways

- Intensify roadway cleaning in early spring to help remove particulates from road surfaces.

- Include limits on toxic metals in the specifications for de/anti-icers.
A7.8  ROOF AND BUILDING DRAINS AT MANUFACTURING AND COMMERCIAL BUILDINGS

Description of Pollutant Sources: Stormwater runoff from roofs and sides of manufacturing and commercial buildings can be sources of pollutants caused by leaching of roofing materials, building vents, and other air emission sources. Vapors and entrained liquid and solid droplets/particles have been identified as potential pollutants in roof/building runoff. Metals, solvents, acidic/alkaline pH, BOD, and organics, are some of the pollutant constituents identified.

Pollutant Control Approach: Evaluate the potential sources of stormwater pollutants and refer the business to the Puget Sound Clean Air Agency for the application of source control BMPs.

Required BMPs

These required source control BMPs will be addressed by the Puget Sound Clean Air Agency.

- If leachates and/or emissions from buildings are suspected sources of stormwater pollutants, then sample and analyze the stormwater draining from the building.

- If a roof/building stormwater pollutant source is identified, implement appropriate source control measures such as air pollution control equipment, selection of materials, operational changes, material recycle, process changes, etc.
A7.9 URBAN STREETS

Description of Pollutant Sources: Streets can be the sources of vegetative debris, paper, fine dust, vehicle liquids, tire wear residues, heavy metals (lead and zinc), soil particles, ice control salts, domestic wastes, lawn chemicals, and vehicle combustion products. Street surface contaminants have been found to contain significant concentrations of particle sizes less than 250 microns. (Sartor and Boyd, 1972)

Pollutant Control Approach: Conduct efficient street sweeping where and when appropriate to minimize the contamination of stormwater. Do not wash street debris into storm drains.

Recommended BMPs

- For maximum stormwater pollutant reductions on curbed streets and high volume parking lots use efficient vacuum sweepers (refer to Volume V, Ch. 12 of this manual, for information about an emerging high-efficiency vacuum sweeper technology).

  Note: High-efficiency street sweepers utilize strong vacuums and the mechanical action of main and gutter brooms combined with an air filtration system that only returns clean air to the atmosphere (i.e., filters very fine particulates). They sweep dry and use no water since they do not emit any dust.

  It has been reported that high-efficiency vacuum sweepers have the capability of removing, from pavements under good condition, 80 percent or more of the accumulated street dirt particles whose diameters are less than 250 microns. (Sutherland, 1998) This assumes pavements under good condition and reasonably expected accumulation conditions.

- For moderate stormwater pollutant reductions on curbed streets use regenerative air sweepers or tandem sweeping operations.

  Note: A tandem sweeping operation involves a single pass of a mechanical sweeper followed immediately by a single pass of a vacuum sweeper or regenerative air sweeper.

  - A regenerative air sweeper blows air down on the pavement to entrain particles and uses a return vacuum to transport the material to the hopper.
  - These operations usually use water to control dust. This reduces their ability to pick up fine particulates.

  It has been reported that these types of sweepers have the capability of removing approximately 25 to 50 percent of the accumulated street dirt particles whose diameters are less than 250 microns. (Sutherland, 1998) This assumes pavements under good conditions and typical accumulation conditions.

- For minimal stormwater pollutant reductions on curbed streets use mechanical sweepers.

  - Note: Mechanical sweepers are referred to as broom sweepers and use the mechanical action of main and gutter brooms to throw material on a conveyor belt that transports it to the hopper.
  - These sweepers usually use water to control dust. This reduces their ability to pick up fine particulates.
It has been reported that mechanical sweepers have the capability of removing only 10 to 20 percent of the accumulated street dirt particles whose diameters are less than 250 microns. (Sutherland, 1998) This assumes pavements under good condition and the most favorable accumulation conditions.

- Conduct sweeping at optimal frequencies. Optimal frequencies are those scheduled sweeping intervals that produce the most cost-effective annual reduction of pollutants normally found in stormwater and can vary depending on land use, traffic volume and rainfall patterns.

- Train operators in those factors that result in optimal pollutant removal. These factors include sweeper speed, brush adjustment and rotation rate, sweeping pattern, maneuvering around parked vehicles, and interim storage and disposal methods.

- Consider the use of periodic parking restrictions in low to medium density single-family residential areas to ensure the sweeper’s ability to sweep along the curb.

- Establish programs for prompt sweeping, removal, and disposal of debris from special events that will generate higher than normal loadings.

- Disposal of street sweeping solids must comply with “Recommendations for Management of Street Wastes” described in Appendix IV-C of this volume.

- Inform citizens about the importance of NOT putting yard debris, oil and other wastes in street gutters in order to reduce street pollutant sources.
A7.10 RAILROAD YARDS

Description of Pollutant Sources: Pollutant sources can include drips/leaks of vehicle fluids onto the railroad bed, human waste disposal, litter, locomotive/railcar/equipment cleaning areas, fueling areas, outside material storage areas, the erosion and loss of soil particles from the railroad bed, maintenance and repair activities at railroad terminals, switching yards, and maintenance yards, and herbicides used for vegetation management. Waste materials can include waste oil, solvents, degreasers, antifreeze solutions, radiator flush, acids, brake fluids, soiled rags, oil filters, sulfuric acid and battery sludges, and machine chips with residual machining oil and toxic fluids/solids lost during transit. Potential pollutants include oil and grease, TSS, BOD, organics, pesticides, and metals.

Pollutant Control Approach: Apply good housekeeping and preventive maintenance practices to control leaks and spills of liquids in railroad yard areas.

Required BMPs

- Implement the applicable BMPs in this chapter depending on the pollutant generating activities/sources at a railroad yard facility.

- Do not allow discharge to outside areas from toilets while a train is in transit. Pumpout facilities should be used to service these units.

- Use drip pans at hose/pipe connections during liquid transfer and other leak-prone areas.

- During maintenance do not discard debris or waste liquids along the tracks or in railroad yards.

In areas subjected to leaks/spills of oils or other chemicals convey the contaminated stormwater to appropriate treatment such as a sanitary sewer, if approved by the City of Tacoma, or, to a CP or API oil/water separator for floating oils, or other appropriate treatment BMP. See Volume V.
A7.11 MAINTENANCE OF PUBLIC AND UTILITY CORRIDORS AND FACILITIES

Description of Pollutant Sources: Passageways and equipment at petroleum product, natural gas, and water pipelines, and electrical power transmission corridors and rights-of-way can be sources of pollutants such as herbicides used for vegetation management, and eroded soil particles from unpaved access roads. At pump stations waste materials generated during maintenance activities may be temporarily stored outside. Additional potential pollutant sources include the leaching of preservatives from wood utility poles, PCBs in older transformers, water that is removed from underground transformer vaults, and leaks/spills from petroleum pipelines. The following are potential pollutants: oil and grease, TSS, BOD, organics, PCB, pesticides, and heavy metals.

Pollutant Control Approach: Control of fertilizer and pesticide applications, soil erosion, and site debris that can contaminate stormwater.

Required BMPs

- Implement BMPs included in Chapter 4, A.9 Landscaping and Lawn/Vegetation Management and in Chapter 6, Section 6.2, R.6, Pesticide Regulations.

- When water or sediments are removed from electric transformer vaults, determine whether contaminants might be present before disposing of the water and sediments. This includes inspecting for the presence of oil or sheen, and determining from records or testing if the transformers contain PCBs. If records or tests indicate that the sediment or water are contaminated above applicable levels, manage these media in accordance with applicable federal and state regulations, including the federal PCB rules (40 CFR 761) and the state MTCA cleanup regulations (Chapter 173-340 WAC). Water removed from the vaults can be discharged in accordance with the federal 40 CFR 761.79, and state regulations (Chapter 173-201A WAC and Chapter 173-200 WAC), or via the sanitary sewer if the requirements, including applicable permits, for such a discharge are met. (See also Chapter 6, Section 6.2-R2).

- Within utility corridors, consider preparing maintenance procedures and an implementation schedule that provides for vegetative, gravel, or equivalent cover that minimizes bare or thinly vegetated ground surfaces within the corridor, to prevent the erosion of soil.

- Provide maintenance practices to prevent stormwater from accumulating and draining across and/or onto roadways. Stormwater should be conveyed through roadside ditches and culverts. The road should be crowned, outsloped, water barred or otherwise left in a condition not conducive to erosion. Appropriately maintaining grassy roadside ditches discharging to surface waters is an effective way of removing some pollutants associated with sediments carried by stormwater.

- Maintain ditches and culverts at an appropriate frequency to ensure that plugging and flooding across the roadbed, with resulting overflow erosion, does not occur.

- Apply the appropriate BMPs from Section A4 of this Volume, Storage Activities, for the storage of waste materials that can contaminate stormwater.
Recommended BMPs

- When selecting utility poles for a specific location, consideration should be given to the potential environmental effects of the pole or poles during storage, handling, and end-use, as well as its cost, safety, efficacy and expected life. If a wood product treated with chemical preservatives is used, it should be made in accordance with generally accepted industry standards such as the American Wood Preservers Association Standards. If the pole or poles will be placed in or near an environmentally sensitive area, such as a wetland or a drinking water well, alternative materials or technologies should be considered. These include poles constructed with material(s) other than wood such as fiberglass composites, metal, or concrete. Other technologies and materials, such as sleeves or caissons for wood poles, may also be considered when they are determined to be practicable and available.

- As soon as practicable remove all litter from wire cutting/replacing operations, etc.

- Implement temporary erosion and sediment control in areas where clear-cuts are conducted and new roads are constructed.
A7.12 MAINTENANCE OF ROADSIDE DITCHES

Description of Pollutant Sources: Common road debris including eroded soil, oils, vegetative particles, and heavy metals can be sources of stormwater pollutants.

Pollutant Control Approach: Roadside ditches should be maintained to preserve the condition and capacity for which they were originally constructed, and to minimize bare or thinly vegetated ground surfaces. Maintenance practices should provide for erosion and sediment control (Refer to Activity A3.6 Landscaping and Lawn/Vegetation Management).

Required BMPs

- Inspect roadside ditches regularly, as needed, to identify sediment accumulations and localized erosion.

- Clean ditches on a regular basis, as needed. Ditches should be kept free of rubbish and debris.

- Vegetation in ditches often prevents erosion and cleanses runoff waters. Remove vegetation only when flow is blocked or excess sediments have accumulated. Conduct ditch maintenance (seeding, fertilizer application, harvesting) in late spring and/or early fall, where possible. This allows vegetative cover to be re-established by the next wet season thereby minimizing erosion of the ditch as well as making the ditch effective as a biofilter.

- In the area between the edge of the pavement and the bottom of the ditch, commonly known as the “bare earth zone,” use grass vegetation, wherever possible. Vegetation should be established from the edge of the pavement if possible, or at least from the top of the slope of the ditch.

- Diversion ditches on top of cut slopes, that are constructed to prevent slope erosion by intercepting surface drainage, must be maintained to retain their diversion shape and capability.

- Ditch cleanings are not to be left on the roadway surfaces. Sweep dirt and debris remaining on the pavement at the completion of ditch cleaning operations.

- Roadside ditch cleanings, not contaminated by spills or other releases and not associated with a stormwater treatment system such as a bioswale, may be screened to remove litter and separated into soil and vegetative matter (leaves, grass, needles, branches, etc.). The soil fraction may be handled as ‘clean soils’ and the vegetative matter can be composted or disposed of in a municipal waste landfill. For more information, please see “Recommendations for Management of Street Wastes,” in Appendix IV-D of this volume.

- Roadside ditch cleanings contaminated by spills or other releases known or suspected to contain dangerous waste must be handled following the Dangerous Waste Regulations (Chapter 173-303 WAC) unless testing determines it is not dangerous waste.
Inspect culverts on a regular basis for scour or sedimentation at the inlet and outlet, and repair as necessary. Give priority to those culverts conveying perennial and/or salmon-bearing streams and culverts near streams in areas of high sediment load, such as those near subdivisions during construction.

**Recommended BMPs**

- Install biofiltration swales and filter strips to treat roadside runoff wherever practicable and use engineered topsoils wherever necessary to maintain adequate vegetation (CH2M Hill, 2000). These systems can improve infiltration and stormwater pollutant control upstream of roadside ditches. Refer to Volume 5 of this manual, Runoff Treatment BMPs for additional information about biofiltration swales and filter strips.
A7.13 MAINTENANCE OF STORMWATER DRAINAGE AND TREATMENT FACILITIES

Description of Pollutant Sources: Facilities include roadside catch basins on arterials and within residential areas, conveyance systems, detention facilities such as ponds and vaults, oil and water separators, biofilters, settling basins, infiltration systems, and all other types of stormwater treatment systems presented in Volume V. Roadside catch basins can remove from 5 to 15 percent of the pollutants present in stormwater. When catch basins are about 60 percent full of sediment, they cease removing sediments. Oil and grease, hydrocarbons, debris, heavy metals, sediments and contaminated water are found in catch basins, oil and water separators, settling basins, etc.

Pollutant Control Approach: Provide maintenance and cleaning of debris, sediments, and oil from stormwater collection, conveyance, and treatment systems to obtain proper operation.

Required BMPs

Maintain stormwater treatment facilities according to the O & M procedures presented in Section 4.6 of Volume V of this manual, in addition to the following BMPs:

- Inspect and clean treatment BMPs, conveyance systems, and catch basins as needed, and determine whether improvements in O & M are needed.

- Promptly repair any deterioration threatening the structural integrity of the facilities. These include replacement of clean-out gates, catch basin lids, and rock in emergency spillways.

- Ensure that storm sewer capacities are not exceeded and that heavy sediment discharges to the sewer system are prevented.

- Regularly remove debris and sludge from BMPs used for peak-rate control, treatment, etc. and discharge to a sanitary sewer if approved by the City of Tacoma, or truck to a local or state government approved disposal site.

- Clean catch basins in accordance with the information provided in Volume V, Runoff Treatment BMPs, Section 4.6, number 5. Additional information is also included in Chapter 5 of this volume, BMP S.9 Cleaning Catch Basins.

- Clean woody debris in a catch basin as frequently as needed to ensure proper operation of the catchbasin.

- Post warning signs; “Dump No Waste - Drains to Ground Water,” “Streams,” “Lakes,” or emboss on or adjacent to all storm drain inlets where practical.

- Disposal of sediments and liquids from the catch basins must comply with “Recommendations for Management of Street Wastes” described in Appendix IV-D of this volume.
Select additional applicable BMPs from this chapter depending on the pollutant sources and activities conducted at the facility. Those BMPs include:

- A4.7 - BMPs for Storage of Liquid, Food Waste, or Dangerous Waste Containers
- A6.3 - BMPs for Soil Erosion and Sediment Control at Industrial Sites
- A7.9 - BMPs for Urban Streets
- A7.14 - BMPs for Spills of Oil and Hazardous Substances
- S1 - BMPs for Illicit Connections to Storm Drains
A7.14 SPILLS OF OIL AND HAZARDOUS SUBSTANCES

Description of Pollutant Sources: Owners or operators of facilities engaged in drilling, producing, gathering, storing, processing, transferring, distributing, refining or consuming oil and/or oil products are required by Federal Law to have a Spill Prevention and Control Plan if the storage capacity of the facility, which is not buried, is 1,320 gallons or more of oil, or any single container with a capacity in excess of 660 gallons and which, due to their location, could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR Part 110, into or upon the navigable waters of the United States or adjoining shorelines (40 CFR 112.1(b)). Onshore and offshore facilities, which, due to their location, could not reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines are exempt from these regulations (40 CFR 112.1(1)(i)). Owners of businesses that produce Dangerous Wastes are also required by State Law to have a spill control plan. These businesses should refer to Chapter 6, Section 6.2, R-2. The federal definition of oil is oil of any kind or any form, including, but not limited to petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

Pollutant Control Approach: Maintain, update, and implement an oil spill prevention/cleanup plan.

Required BMPs

- Prepare an Emergency Spill Control Plan (SCP), which includes:
  - A description of the facility including the owner’s name and address;
  - The nature of the activity at the facility;
  - The general types of chemicals used or stored at the facility;
  - A site plan showing the location of storage areas for chemicals, the locations of storm drains, the areas draining to them, and the location and description of any devices to stop spills from leaving the site such as positive control valves;
  - Cleanup procedures;
  - Notification procedures to be used in the event of a spill, such as notifying key personnel. Agencies such as Ecology, Tacoma Fire Department, Washington State Patrol, City of Tacoma, U.S. Coast Guard and the U.S. Environmental Protection Agency shall be notified;
  - The name of the designated person with overall spill cleanup and notification responsibility;

- Train key personnel in the implementation of the Emergency SCP. Prepare a summary of the plan and post it at appropriate points in the building, identifying the spill cleanup coordinators, location of cleanup kits, and phone numbers of regulatory agencies to be contacted in the event of a spill;

- Update the SCP regularly;

- Immediately notify Ecology and the City of Tacoma if a spill may reach sanitary or storm sewers, ground water, or surface water, in accordance with federal and Ecology spill reporting requirements;

- Immediately clean up spills. Do not use emulsifiers for cleanup unless an appropriate disposal method for the resulting oily wastewater is implemented. Absorbent material shall not be washed down a floor drain or storm sewer; and,
Locate emergency spill containment and cleanup kit(s) in high potential spill areas. The contents of the kit shall be appropriate for the type and quantities of chemical liquids stored at the facility.

**Recommended BMP**

- Spill kits should include appropriately lined drums, absorbent pads, and granular or powdered materials for neutralizing acids or alkaline liquids where applicable. In fueling areas: absorbent should be packaged in small bags for easy use and small drums should be available for storage of absorbent and/or used absorbent. Spill kits should be deployed in a manner that allows rapid access and use by employees.
Figure 4-1 – Uncovered Wash Area

Figure 4.2 – Drip Pan

Figure 4.3 – Drip Pan Within Rails
Figure 4.4 – Loading Dock with Door Skirt

Figure 4.5 – Loading Dock with Overhang

Figure 4.6 – Covered Fuel Island

Figure 4.7 – Enclose the Activity

Figure 4.8 – Cover the Activity
Figure 4.9 – Covered Storage Area for Bulk Solids (include berm if needed)

Figure 4.10 – Material Covered with Plastic Sheeting

Figure 4.11 – Secondary Containment System
Figure 4.12 – Locking System for Drum Lid

Figure 4.13 – Covered and Bermed Containment Area

Figure 4.14 – Mounted Container
Figure 4.15 – Above-Ground Tank Storage
Chapter 5 – Source Control Best Management Practices

In the previous chapter, different commercial activities were described and BMPs for pollution prevention were listed. This chapter provides the detailed descriptions of those source control BMPs.

Section 4.3, BMPs to Consider for All Activities, provides a list of general BMPs that each business should consider. Most of these are common sense, housekeeping types of activities, such as spill cleanup, moving activities indoors, and using the least toxic materials available. The implementation of these types of BMPs will help improve water quality.

5.1 Index of BMP Descriptions

<table>
<thead>
<tr>
<th>BMP</th>
<th>DESCRIPTION TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.1</td>
<td>Eliminate illicit storm drainage system connections</td>
</tr>
<tr>
<td>S.2</td>
<td>Dispose of collected runoff and waste materials properly</td>
</tr>
<tr>
<td>S.3</td>
<td>Connect process water discharges to a sanitary sewer, holding tank, or water treatment system</td>
</tr>
<tr>
<td>S.4</td>
<td>Cover the activity with a roof or awning</td>
</tr>
<tr>
<td>S.5</td>
<td>Cover the activity with an anchored tarp or plastic sheet</td>
</tr>
<tr>
<td>S.6</td>
<td>Pave the activity area and slope to a sump or holding tank</td>
</tr>
<tr>
<td>S.7</td>
<td>Surround the activity area with a curb, dike or berm, or elevate the activity</td>
</tr>
<tr>
<td>S.8</td>
<td>Implement integrated pest management measures</td>
</tr>
<tr>
<td>S.9</td>
<td>Clean catch basin</td>
</tr>
</tbody>
</table>
5.2 Source Control BMPs

**BMP S.1 ELIMINATE ILLICIT STORM DRAIN CONNECTIONS**

A common problem with the storm drain system for Tacoma is the existence of illegal hook-ups to the system. Many businesses and residences hooked internal building drains, sump overflows, process wastewater discharges and even sanitary sewer and septic system pipes to the storm drain in the past as a matter of course. These connections allow a variety of pollutants to flow directly to receiving waters instead of to 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 potential to pollute that these connections represent, the Environmental Protection Agency, under the mandate of the National Pollutant Discharge Elimination System (NPDES) stormwater permits, has made the elimination of such illicit connections a top priority.

All businesses and residences in Tacoma must examine their plumbing systems to determine if illicit connections exist. A good place to start would be with site plans. This will help the current owner understand what piping systems were installed initially, making piping that does not appear on the plan a priority for investigation. Any time it is found that toilets, sinks, appliances, showers and bathtubs, floor drains, industrial process waters and all other indoor activities are connected to the storm drainage system, these connections must either be immediately rerouted to the sanitary or septic system, holding tanks, or process treatment system. Exceptions to this requirement would be those industries and businesses that have been issued an NPDES Baseline General Permit by Ecology, and are allowed specific discharges under that permit. Please refer to R.4 in Chapter 6 to determine if your type of business is required to have a NPDES permit.

If it is found that sanitary facilities, such as toilets, are hooked to the storm drain system, you must have permits from your local sewer utility (Tacoma 253-591-5588) to reroute them to the sanitary sewer. If sanitary service is not available, contact the City of Tacoma for a septic permit.

Dye testing with a non-toxic dye is one way of helping to determine where a pipe or structure drains to if it is 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 the Tacoma Source Control Unit at 253-591-5588 if you need assistance in locating city structures adjacent to your property.

Smoke testing can also be used to detect illicit connections. It is typically best done by qualified personnel. All indoor discharges should be shut off before this test is conducted. A smoke bomb or other smoke-generating device is placed in a storm drain manhole, and air is forced in after it. Personnel should be stationed at each suspect drain location to observe if smoke is coming out. Smoking drains should be tagged for future rerouting.

Drains which are found to connect to the storm drainage system must either be permanently plugged or disconnected and rerouted as soon as possible. Drains that are no longer needed can be plugged with concrete or similarly effective permanent materials. If a drain pipe is to be rerouted and a sanitary sewer services the property, then the local sewer district must be contacted. Contact the number listed above for specific directions prior to rerouting. Restrictions on certain types of discharges, particularly industrial process waters, may require pretreatment of discharges before entering the sanitary sewer. It is the responsibility of the property owner or
business operator 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 Tacoma-Pierce County Health Department at 253-798-6470. If the discharge is anything other than domestic waste, then a holding tank or on-site treatment will be necessary. Contact the Tacoma Sanitary Source Control unit at 253-591-5588 for specific directions for installation and disposal.
BMP S.2  DISPOSE OF COLLECTED RUNOFF AND WASTE MATERIALS PROPERLY

Every business and residence in Tacoma 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

Many liquid wastes and contaminated stormwater (depending on the pollutants and associated concentrations present) can be put into the sanitary sewer, subject to approval by the local sanitary sewer district. Animal wastes can also be disposed of in a sanitary sewer, subject to loading capacity constraints.

If wastes cannot be legally discharged to a sanitary sewer or septic system, one of the other three disposal options must be used. Sumps or holding tanks may be useful for storing liquid wastes temporarily. The contents must be disposed of in the sanitary sewer or at a dangerous waste facility depending on the nature of the waste.

Recycling facilities are a recommended option for many commercial and household items, including used oils, used batteries, old equipment, glass, some plastics, metal scrap materials, solvents, paints, wood and land clearing wastes, and various other solid wastes. Solid wastes that cannot be recycled and that are not hazardous must be disposed of at a licensed municipal solid waste disposal facility. The list in Chapter 7 of this manual has the phone numbers and addresses of these facilities in Tacoma.

Dangerous and hazardous wastes must be properly transported to an appropriate hazardous waste disposal, treatment and storage facility. Included in Chapter 7 is a list of companies dealing in these activities.

Costs of disposal vary considerably from option to option. Especially in the case of dangerous wastes, the different types of wastes should be kept segregated. Disposal costs are usually determined by the most hazardous or difficult to dispose of waste present, so you can keep your costs down by not mixing wastes. The Tacoma-Pierce County Health Department Hazardous Waste section at 798-6047 can help you determine the best disposal options for your waste.
BMP S.3  CONNECT PROCESS WATER DISCHARGES TO A SANITARY SEWER, HOLDING TANK, OR WASTEWATER TREATMENT SYSTEM

This BMP is a minimum requirement for all industrial and commercial activities that generate contaminated process wastewater, such as washing activities, composting activities, and production and processing activities. The water used in these activities cannot drain to surface waters or groundwater untreated. Process water must drain to a sanitary sewer, holding tank, or wastewater treatment system, or it can be recycled.

The first priority for these businesses is discharge of process water to a sanitary sewer via a new or existing plumbing connection. In order to connect to the sewer, you must contact Tacoma Building and Land Use Services at 591-5030 for information on permits for the connection. Pretreatment of industrial wastewaters will often be necessary before it is allowed to discharge to the sewer. Call Tacoma Sanitary Source Control Unit at 591-5588 for more information.

If a sanitary sewer is not available, or if it is determined that a discharge connection is not allowed, the only remaining options are holding tanks or an on-site wastewater treatment facility. Consideration should be given to using a holding tank for used process water if the volume of process water generated by the activity is not excessive. The contents of the holding tank must be pumped out or drained before the tank is full and disposed of properly (see BMP S.2 in this chapter for information on disposal options). If a sanitary sewer connection cannot be made and a holding tank is not used, a wastewater treatment facility must be constructed on the site. This treatment facility must be designed to receive and effectively treat all discharges of process water from the business. The Washington State Department of Ecology must be contacted for approval of such a facility, since discharges from the treatment facility will enter surface waters or be spread on land. See Chapter 6 for Ecology's requirements for discharges of process waters.

For all types of process water discharges the following measures are required if the activity is to remain uncovered. Define a designated area for the activity and provide a mechanism for prevention of stormwater run-on into the activity area. This can be a curb, dike or berm (see BMP S.7 in this chapter for more information) or similar effective means to prevent run-on. In this manner, only the precipitation that falls within the activity area is discharged and/or treated along with the activity process water. The designated area should be paved and sloped to a central collection drain. The collection drain must connect to the sanitary sewer (with pretreatment if required), the on-site holding tank, or the on-site treatment facility, whichever method is selected.

This process water BMP can be made more effective if the activity is covered, thus reducing the total amount of water to be treated.

January 2003  Volume IV – Source Control BMPs  5-5
BMP S.4  COVER THE ACTIVITY WITH A ROOF OR AWNING

Not every activity can or needs to be located inside a building. In many cases, a simple roof or awning will protect the activity from coming into contact with stormwater, and usually at a lower cost than a complete building. If you do decide to build one of these structures, you will need to obtain permits from the Tacoma Building and Land Use Services Division at 591-5030. They will also be able to help you with fire code requirements and zoning code provisions.

The roof structure can be designed in several ways. One option is a lean-to type of structure, where sheets of corrugated steel, fiberglass, aluminum or similar impermeable material are attached to the wall of a building and are supported by sturdy poles. Similarly, if there is no building to attach to, roofing materials can be sufficiently supported at all four corners as a stand alone cap, or a waterproof tent canopy can be used.

The area of the roof cover should be sufficient to prevent any precipitation from reaching the covered materials. Examples of these types of structures are shown in Figure 5.1.

Another option for covering an activity is to use an overhanging awning of sufficient size to prevent rain from reaching the materials. Many of the building permit, fire code and zoning requirements will also apply to these structures. An example of an awning cover is shown in Figure 5.2.

Activities such as fueling operations may be more conveniently covered by an island-type overhanging roof. This type of roof is supported by columns along the center of the structure rather than at the corners, enabling vehicles easy access underneath while still providing sufficient protection from rain. An example of this type of roof structure is shown in Figure 5.2.

Note that floating fuel stations (such as some used for refueling boats) cannot be covered, according to the fire code.

The particular roof cover option used at a given site is subject to the site layout and available space, affordability, and limitations imposed by other regulations. Structural cover options other than those given above can be used if they perform the same function. This BMP should usually be implemented in conjunction with sump or sanitary sewer drains and provisions for prevention of stormwater run-on into the covered area. BMPs S.6 and S.7 in this chapter present information on sump installation and run-on prevention.
**BMP S.5  COVER THE ACTIVITY WITH AN ANCHORED TARP OR PLASTIC SHEET**

Some activities, such as stockpiling of raw materials, can be effectively covered with a sturdy tarp or heavy plastic sheet made of impermeable material. Weights such as bricks, tires, or sandbags should be used to anchor the cover in place. Care should be taken to ensure that the tarp or sheet covers the activity completely and that stormwater run-on does not penetrate significantly under the cover. If several sheets are used to form a cover, the sheets should be tethered together or laid in an overlapping manner. If necessary, pins or stakes should be used to anchor the tarp to the ground. The tarp must be inspected daily to ensure that no holes or gaps are present in the tarp coverage. An example of this type of cover is shown in Figure 5.3.

The tarp covering will be easier to keep in place and will last longer if some form of wind protection is possible. Attempts should be made to locate stockpiles adjacent to buildings where winds are reduced, but not in between buildings where a wind tunnel effect can occur.

Tarps are an inexpensive and cost effective BMP for many activities. This BMP can be combined with runoff containment/run-on prevention curbs, dikes, and berms for better effectiveness (see BMP S.7 for more information).
BMP S.6  PAVE THE ACTIVITY AREA AND SLOPE TO A SUMP OR HOLDING TANK

This BMP applies to several activities that cannot be covered effectively. It is particularly suited to activities with the potential for leaks and spills, but that otherwise do not generate excessive amounts of polluted runoff. Examples are storage of liquid chemicals, waste oils, and solvents in portable containers such as drums; loading and unloading of liquids from trucks; and painting, finishing and coating activities. A sump or holding tank serves to provide spill containment until the liquids can be pumped out and properly disposed. If the activity produces large amounts of runoff, this BMP will not be very effective because the stray contaminants will overflow the sump or pass through the sump before collection and disposal are possible. To prevent run-on, the area should be enclosed with a berm, curb, or dike as shown in Figure 5.5, Containment Types. The following implementation information is intended for situations where this BMP can be effective.

A designated activity area should be paved and sloped to drain to a central collection point. A sump, vault, or holding tank should be installed underneath this collection drain. Some materials, such as gasoline, can react with asphalt pavement and break it down, releasing additional pollutants. If the area is not yet paved and materials are present which may react with asphalt, the area must be paved with concrete. If the area is already paved with asphalt, an asphalt sealant can be applied which can aid in preventing pavement degradation. Whichever paving material is used, the paved surface must be free of gaps and cracks.

The sump or holding tank should have a capacity large enough to contain the entire volume of a potential spill. An example of a paved activity area with a sump drain is shown in Figure 5.4.

Wash pads may frequently need to use a sump arrangement like this. To keep disposal costs down, a drain cover, plug or shutoff valve upstream of the sump should be used at times when the activity is not occurring.

The cost of constructing a sump and the disposal of accumulated contents can be high, so businesses should consider whether other allowable alternative BMPs can be used.

Commercial services that pump sumps and holding tanks are listed in the Yellow Pages of the phone directory under Environmental and Ecological Services.

BMPs S.4, S.5 and S.7 in this chapter present information on covering activities and run-on prevention.
BMP S.7  SURROUND THE ACTIVITY AREA WITH A CURB, BERM, OR DIKE, OR ELEVATE THE ACTIVITY

This set of BMP options can be an effective means for prevention of stormwater run-on to an activity area. In addition, a curb, berm or dike can be used for containment of spills in the activity area, or for containment of contaminated activity runoff. Generally, a containment BMP is most applicable to spill control situations; that is, sites where runoff is relatively clean, but occasional spills may occur. This BMP may be less expensive to implement than paving the activity area and providing proper drainage collection, but can also be more difficult to maintain if stormwater ponding occurs inside a containment dike.

If a curb, dike or berm is used to prevent stormwater run-on to a covered activity area, and the activity area is paved or otherwise impermeable, the berm should be placed underneath the covering so that rain will not pond inside it. Stormwater run-on can also be prevented by elevating the activity with a platform or other type of pedestal.

Containment may be achieved with concrete curbing, an earthen berm, a tub such as a plastic wading pool, or some other dike material, depending on the activity, its size, and resources available. Activities that require more space and therefore cannot be contained with a tub may need to be surrounded by a curb, dike, or berm. Aboveground storage tanks of liquids, storage of chemicals or wastes in numerous drums, and stockpiling of fertilizer are examples of activities that can be contained effectively in this manner. As the activity area gets larger, containment with an earthen berm can probably be provided less expensively than concrete curbing.

If a curb, berm or dike is used for runoff containment, and other containment sizing regulations (such as fire codes, Department of Ecology or Tacoma-Pierce County Health Department restrictions) do not apply, it should function so that all stormwater runoff from rain events up to the 6 month storm is contained in the immediate activity area until it infiltrates into the ground or is properly disposed of later. This approach is applicable for activities that involve liquid material storage, and that may consequently incur spills. It is also applicable to stockpile areas where runoff is typically polluted with suspended solids. If a stormwater treatment system is presently on-site, a valve should be installed in the containment dike so that excess stormwater can be drained out of the activity area and directed to the treatment system. This valve should always be kept closed unless excess stormwater is being discharged, so that any spills that occur within the activity area can be effectively contained.

Difficulties in maintenance may arise with disposal of the captured water on sites without stormwater treatment capability. The collected rainwater may need to be treated before discharge. If the activity is located on impermeable ground, then potentially contaminated water will accumulate within the containment area. If contaminated, this accumulated water cannot simply be drained from the area; it must be collected and disposed of at a licensed disposal facility. During the wet season, this course of action can lead to frequent draining that may prove costly. In addition, some type of monitoring would be needed to determine if ponded water is contaminated. Depending on the monitoring requirements, this can also be very costly.

For storage of small items, the simplest containment device is a tub or wading pool. A plastic child’s wading pool may be sufficient for some activities that do not require a lot of space, such as storing painting materials, and temporary storage of wastes in drums. Make sure the material you are using does not react with the plastic. An example of this is shown in Figure 5.5.
For larger areas, a containment curb, dike, or berm may be necessary. If an earthen berm is used, it must be seeded with grass or other vegetation so that it does not erode. Sketches of a containment dike and a containment curb are shown in Figure 5.5.

The volume of the containment area should be equal to 110% of the volume of the largest tank.

It should be noted that neglect and poor maintenance can render the containment useless. Other BMPs should be considered before containment is. Commercial products are available that are a combination containment box/elevated pedestal. These effective devices prevent stormwater run-on by elevating containers off the ground, and allow for collection of spills and drips inside the pedestal box. Similar arrangements can be constructed by hand as well.

BMPs S.4, S.5 and S.6 in this chapter provide information on covering activities and sump installation.
BMP S.8 IMPLEMENT INTEGRATED PEST MANAGEMENT MEASURES

Use of herbicides, fungicides, and rodenticides should always be done with extreme caution, not only because of the potential harm to humans and pets, but also because of the potential harm to fish, wildlife, and our water resources. In light of the toxic nature of these compounds, special attention should be given to pesticide usage in all applications. The discussion below applies more to large-scale pesticide users, but should be considered for backyard applications as well.

Commercial, agricultural, municipal, and other large scale pesticide users, such as golf courses and parks, should adhere to the principles of integrated pest management (IPM), a decision-making process for pest management that strives for intelligent, environmentally sound control of pests. It is a systems approach to pest management that combines agronomic, biological, chemical and genetic information for educated decisions on the type of control to use, the timing and extent of chemical application, and whether non-chemical means can attain an acceptable level of pest control.

IPM is a preventive measure aimed at knowing the exact pests being targeted for control, the locations and times when pests will pose problems, the level of pest-induced damage that can be tolerated without taking action, the most vulnerable life stage, and control actions that are least damaging to the environment. The major components of IPM are as follows:

- Monitoring and inventory of pest populations
- Determination of pest-induced injury and action levels
- Identification of priority pest problems
- Selection and timing of least toxic management tools
- Site-specific treatment with minimized chemical use
- Evaluation and adjustment of pesticide applications

Monitoring of pest populations is a key to successful IPM implementation. Pest problems are universally easier to control if the problem can be discovered early. With IPM, pesticides are used only as a last resort. Maximization of natural controls, including biological controls and removal of pests by hand, is always the first choice.

More information on IPM is available from the Washington State Department of Agriculture and from the Washington State University Extension Service, or in Appendix IV-B of this volume.
BMP S.9   CLEANING CATCH BASINS

Cleaning catch basins regularly is one of the most important stormwater source control measures that a business can take.

Catch basins are typically located under low spots in parking lots, along curbs and road edges, and where storm drain pipes combine flows. Catch basins on the surface collect runoff for storm drains that are typically located directly underneath them. Most catch basins have some storage in the bottom that never drains to an outflow pipe. This permanent storage area is intended to trap sediments, debris, and other particles that can settle out of stormwater, thus preventing clogging of downstream pipes and washing of these solids into receiving waters.

For additional information on the maintenance of catch basins, refer to Volume V, Runoff Treatment BMPs, Section 4.6, number 5.

Several companies offer catch basin cleaning services. Pertinent equipment dealers and cleaning services can be found in the telephone Yellow Pages under headings like "Sewer Cleaning Equipment and Supplies" and "Sewer Contractors". All of the solids and stagnant water collected from catch basin sumps must be disposed of properly. None of the sump contents can be flushed into the catch basin outflow pipe. Depending on the nature of the pollutants in the sump, and the associated types of activities taking place on the site, the sump contents may need to be disposed of as hazardous waste. Contractors who perform catch basin cleanout services will be required to follow specified disposal requirements.

It should be apparent that use of other BMPs, such as frequent sweeping of activity areas, covering activity areas, reducing activity occurrence and containing runoff from activity areas will help reduce catch basin cleaning frequency, thus saving time and money. All businesses and agencies should set up maintenance schedules for all of their BMPs so that coordinated BMP maintenance efforts result in reduced catch basin cleaning frequencies.
5.3 Treatment BMPs

The previous section gave you source control BMPs -- in other words, how to prevent stormwater from becoming contaminated in the first place. Information on stormwater treatment BMPs can be found in Volume 1, Section 1.4 and Volume 5, particularly Chapter 2.
FIGURE 5.1
Roofs & Awnings

LEAN–TO STRUCTURE
N.T.S.

STAND–ALONE CANOPY
N.T.S.
FIGURE 5.2
Roofs & Awnings

OVERHANGING AWNING
N.T.S.

ISLAND–TYPE OVERHANGING ROOF
N.T.S.
FIGURE 5.3
Tarp Covering

FIGURE 5.4
Paved Area with Sump Drain
FIGURE 5.5
Containment Types

SIMPLE CONTAINMENT DEVICES

CONTAINMENT DIKE

CONTAINMENT CURB

CONTAINMENT TYPES
N.T.S.
Chapter 6 – Regulations and Requirements

The information in this chapter is provided to help you comply with other Tacoma and Washington State regulations, which may apply to your project, industry or business in terms of protecting water quality. Some of the State regulations are summarized for your convenience. Because of the continuing modification of statutes, regulations, and City ordinances, a listing of relevant regulations is provided but should be verified. It is your responsibility to obtain the current version of any ordinances, statutes, or regulations that apply to your project. Copies of City ordinances are available at the City Clerk’s office at the Municipal Building located at 747 Market Street, 253-591-5171.

6.1 City of Tacoma Codes and Ordinances

2.02.090.........Off-Site Improvements  
2.02.330   ......Grading and Excavation Code  
2.12.............Flood Hazard and Coastal High Hazard Areas  
2.13.............Waterfront Structures and Marinas  
2.17.............Penalties for Non-Compliance with Ordinances  
5.04.............Infectious Waste Management  
5.20.............Garbage, Rubbish and Pollution  
5.47.............Underground Storage Tank Removal  
5.50.............Swimming Pools  
8.30.............Nuisances  
9.16.............Streets and Sidewalks - Keeping Clean  
10.14.080......Drainage of Surface Water  
12.08.............Sewage Disposal - Regulations and Rates (Includes stormwater requirements)  
12.09.............Solid Waste, Recycling, and Hazardous Waste  
13.10.............Shoreline Management  
13.09.............South Tacoma Groundwater Protection District  
13.11.............Critical Areas Preservation  
13.12.............Environmental Code

6.2 State, Federal, and Other Regulations and Requirements

R.1 Washington State Department of Ecology (Ecology) requirements for the discharge of process wastewaters directly to surface waters

R.2 Ecology requirements for generators of dangerous (hazardous) wastes

R.3 Ecology stormwater NPDES permit requirements

R.4 Ecology requirements for underground and above ground storage tanks.

R.5 EPA and Ecology requirements for spill-control and prevention plans
R.6 Washington State Department of Agriculture (WSDA) pesticide regulations

R.7 Puget Sound Air Pollution Control Agency (PSAPCA) air quality regulations

R.8 Requirements of Native American Tribes

R.1 WASHINGTON STATE DEPARTMENT OF ECOLOGY REQUIREMENTS FOR THE DISCHARGE OF PROCESS WASTEWATERS DIRECTLY TO SURFACE WATERS

If a public sanitary sewer is not available, process wastewater may be discharged, after suitable treatment, to a surface waterbody like a lake or stream, or to a drainage field. If the discharge is to a surface water body, Ecology must be contacted to obtain approval of the type and design of the treatment system, as well as the design and location of the outfall and the need for an NPDES Permit. If a septic tank and drainfield are used for treatment, requirements of the Tacoma-Pierce County Health Department will also apply; contact the On-Site Sewage Program directly at 253-798-6470 for more information.

Ecology’s requirements can be found at WAC Chapter 173.240. Some of the specific requirements include:

1. An engineering report must be prepared describing the proposed project. The general contents of the engineering report are specified by Ecology (WAC Chapter 173-240). The report is reviewed and approved by Ecology.

2. The treatment system must be designed in accordance with Criteria for Sewage Works Design, October 1985, by Ecology.

3. The outfall must be designed in accordance with specific dilution zone dimensions (WAC Chapter 173-201A-100).

4. The quality of the discharge into the receiving water must be treated and diluted (according to the dilution criteria noted above) so as to not result in a violation of water quality standards (WAC Chapter 173-201A).

5. The treatment plant must be properly maintained and operated by a certified operator (WAC Chapter 173-230).

R.2 WASHINGTON STATE DEPARTMENT OF ECOLOGY REQUIREMENTS FOR DANGEROUS WASTE GENERATORS
The state dangerous waste regulations (WAC Chapter 173-303) cover accumulation, storage, transportation, treatment and disposal. Of interest to this manual is the temporary accumulation of waste until taken from the site to a permitted disposal site. Only portions of those regulations that apply to temporary storage are summarized here.

**Permitted Generators**

Businesses that generate 220 pounds or more of waste, either per batch or in the aggregate, over one month must comply with the storage specifications outlined below:

*If placed in containers:*

1. If the container is not in good condition (for example, severe rusting or apparent structural defects) or if it begins to leak, the owner must replace the container.
2. The container must be labeled as to its contents.
3. The container must be lined with a material that does not react with the waste.
4. The container must be kept closed except when adding or removing waste.
5. The container must not be opened, handled, or stored in a manner which may cause a rupture or leak.
6. At least weekly examine the containers for leakage.
7. Containers storing reactive or ignitable waste must meet requirements of the Uniform Fire Code.
8. Incompatible wastes must be stored separately.
9. Ecology may require secondary containment of the storage area. Specifically, the storage area must:

   a. Be capable of collecting and holding spills and leaks.
   b. If uncovered, be capable of handling a 25-year storm.
   c. Have a base that is free of cracks or gaps and is sufficiently impervious to leaks, spills, and rainfall.
   d. Be sloped or designed so that liquids can drain to a point for removal.
   e. Have positive drainage control (e.g., a valve) to ensure containment until any liquid is removed, which must occur in a timely manner.
f. Have a holding capacity equal to 10 percent of the volume of all containers or the volume of the largest container, whichever is greater.

g. Not allow run-on of rainfall from areas adjacent to the storage area.

If the waste does not contain free liquids, the above requirements need not be met, provided that the area is sloped or the containers are elevated.

*If placed in tanks:*

1. The tank must be lined with a material that does not react with the waste.

2. The tank, tank area, and its ancillary equipment must be inspected according to a written schedule.

3. If retired, the tank is to be cleaned of all contents, and those contents properly disposed of.

4. Tanks storing reactive or ignitable waste must meet the Uniform Fire Code.

5. Incompatible wastes must be stored separately.

The generators must have a designated employee on site or on call with the responsibility for coordinating all emergency response measures. Spills are to be contained and cleaned up as soon as practicable.

**Small-Quantity Waste Generators**

These are businesses that generate less than 220 pounds of dangerous waste per month or per batch (or 2.2 pounds of extremely hazardous waste). Small-quantity generators still fall under Ecology regulations to the extent that the materials must be properly stored on site until shipment. The wastes must be moved from the property whenever the accumulated quantity equals or exceeds 220 pounds or whenever the material has resided on site for 180 days. The waste must be disposed of at an approved facility. If the business is in compliance with these requirements, they are also considered solid waste generators, and are regulated by the Tacoma-Pierce County Health Department. For technical assistance and site visits, contact the Tacoma-Pierce County Health Department at 253-798-6047 or the City of Tacoma at 253-591-5588. Regulations governing small-quantity generators are currently being reviewed to possibly raise the accumulation limit. Call the Hazardous Waste Line at 800-287-6429 for the most up-to-date information.
Dangerous Waste Pollution Prevention Plans

A recent state law established the requirement that generators of dangerous wastes in excess of 220 lbs/month (2,640 lbs/year) prepare a waste reduction plan, called a pollution prevention plan, not to be confused with the stormwater pollution prevention plan (see R.4). The required content of the plan is set forth in *Pollution Prevention Planning - Guidance Manual*, January 1992, Publication #91-2, for WAC Chapter 173-307.

Many of the actions described in these plans may benefit stormwater quality and thus should be integrated into any decisions about the selection of the BMPs described in Chapters 4 and 5 of this manual.

See WAC Chapters 173-303 and 307 for further details, as well as the above-named publication.

R.3  WASHINGTON STATE DEPARTMENT OF ECOLOGY STORMWATER NPDES PERMIT REQUIREMENTS

The Federal National Pollutant Discharge Elimination System (NPDES) program requires industries or industrial-type activities to obtain permits for stormwater discharge.

Coverage under Ecology’s general permit for Stormwater Discharges Associated with Industrial Activities for each regulated facility. A business must obtain permit coverage if its primary activity falls under one of the categories listed in the permit or its fact sheet. The permit and fact sheet may be viewed on Ecology’s website at [www.ecy.wa.gov/programs/wq/permits/index.html](http://www.ecy.wa.gov/programs/wq/permits/index.html).

The program requires the preparation of a stormwater pollution prevention plan (SWPPP or SWP3). A NPDES permit is required for certain categories of industries and municipalities for discharge to surface water, or a storm drain that discharges to surface water or to surface water and groundwater.

R.4  ECOLOGY REQUIREMENTS FOR UNDERGROUND AND ABOVE GROUND STORAGE TANKS

Underground Storage Tanks

Underground storage tanks (UST) that contain fuel and other petroleum products are regulated by the Department of Ecology under [WAC Chapter 173-360 Underground Storage Tank Regulations](http://wac.wa.gov/septant/pdfs/WAC173-360.pdf). This law applies to USTs that have a capacity of greater than 110 gallons. USTs which store federally listed or otherwise regulated hazardous waste, heating fuel on the premises where used, farm or residential USTs less than 1,100
gallons in size and other types are exempt from these regulations (WAC Chapter 173-360-110).

The state UST regulations require permits for USTs in use after July 1991. Specific performance criteria such as design, integrity testing, inventory control, UST performance monitoring, spill control and reporting for new USTs are outlined in this regulation. USTs in existence prior to adoption of this regulation in 1990 must meet the upgrade criteria or new UST requirements by 1998 or complete closure of the system.

USTs that have been closed or taken out of service after December 1988 must complete closure (removal or in-place closure) in accordance with WAC Chapter 173-360. Requirements for UST closure with Ecology include submittal of a 30-day notice of closure, site assessment, and completion of any applicable cleanup actions. A report of the closure actions must be submitted to Ecology.

**Above Ground Storage Tanks**

Above ground storage tanks (AST) which store dangerous wastes are regulated under [WAC Chapter 173-303 Dangerous Waste Regulations](#), which is administered by Ecology. Underground storage tanks which store dangerous wastes must also meet the criteria for tanks in this regulation. Businesses which store, handle or generate dangerous wastes are regulated under this regulation based on the volume of dangerous waste generated. The Dangerous Waste Regulations have specific requirements for AST integrity, corrosion protection, secondary containment, leak detection, and use and management criteria, in addition to general requirements for businesses that have dangerous wastes.

For ASTs which contain other types of materials such as petroleum products or raw materials, the Department of Ecology guidance document *Guidelines to Prevent, Control, and Contain Spills from the Bulk Storage of Petroleum Products* is available for technical guidance.

Inquiries about business-specific requirements and permitting for USTs and ASTs should be directed to the Department of Ecology, Southwest Regional Office at 360-407-6300.
R.5 U.S. EPA AND WASHINGTON STATE DEPARTMENT OF ECOLOGY EMERGENCY SPILL CLEANUP REQUIREMENTS

USEPA - Spill Prevention Control and Cleanup (SPCC) Plans (40 CFR 112)

This federal regulation requires that owners or operators of facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, or consuming oil and oil products are required to have a spill prevention and control plan (SPCC), provided that the facility is not transportation related; and, that the aboveground storage of a single container is in excess of 660 gallons, or an aggregate capacity greater than 1,320 gallons, or a total below ground capacity in excess of 42,000 gallons.

The plan must:

1. Be well thought out in accordance with good engineering.

2. Achieve three objectives - prevent spills, contain spills that occur, cleanup spills.

3. Identify name, location, owner, and type of facility.

4. Have date of initial operation and oil spill history.

5. Designate the person responsible.

6. Be approved and certified by the person in authority.

7. Contain a facility analysis.

8. Tanks must have secondary containment and leak detection.

Department of Ecology Dangerous Wastes (WAC 173-303-350)

The regulations state that generators must have a contingency plan that must include:

1. Actions taken in the event of a spill.

2. Descriptions of arrangements with local agencies.

3. Identification of the owner's emergency coordinator.

4. List of emergency equipment.

5. Evaluation plan for business personnel.

R.6 WASHINGTON STATE DEPARTMENT OF AGRICULTURE PESTICIDE REGULATIONS

Washington State pesticide laws are administered by the State's Department of Agriculture, under the Washington Pesticide Control Act (RCW Chapter 15.58), Washington Pesticide Application Action (RCW Chapter 17.21), and regulations in WAC Chapter 16.228. In Tacoma, all pest control operators and fumigators are required to obtain certification from the Tacoma-Pierce County Health Department. Contact the Health Department's Compliance Program at 798-6440 for more information. The requirements relevant to water quality protection are:

1. Persons who apply pesticides are required to be licensed except:
   a. People who use general-use pesticides on their own or their employer's property.
   b. Grounds maintenance people using only general use pesticides on an occasional basis not amounting to a regular occupation.
   c. Governmental employees who apply general use pesticides without utilizing any kind of motorized or pressurized apparatus.
   d. Employees of a commercial applicator or a government agency who are under direct on-site supervision by a licensed applicator.

2. Licensed applicators must undergo 40 hours of continuing education to keep the license.

3. No person shall pollute streams, lakes, and other water supplies in pesticide loading, mixing and application.

4. No person shall transport, handle, store, load, apply, or dispose of any pesticide, pesticide container, or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, including human beings, desirable plants, and animals.

See WAC Chapter 16.228 for further details.
R.7 PUGET SOUND CLEAN AIR AGENCY AIR QUALITY REGULATIONS

The Puget Sound region is under the jurisdiction of regional air quality authorities who in turn must function under Washington State and federal air quality regulations. The Puget Sound Clear Air Agency (PSCAA) is the regulatory agency for air quality in Tacoma.

The air authority has policies on fugitive dust and outside painting. PSCAA requires that reasonable precautions be taken to prevent fugitive particulate material from becoming airborne when handling, loading, transporting or storing particulate material. PSCAA defines what are reasonable precautions such as: the paving of parking lots and storage areas, housekeeping measures to minimize the accumulation of mud and dust, and to prevent its tracking onto public roads, and stabilization of storage piles with water spray, chemical stabilizers, tarps, or enclosure.

PSCAA requires that abrasive blasting and spray painting operations be performed inside a booth designed to capture the blast grit or overspray. Outdoor blasting or painting of structures or items too large to be handled indoors are to be enclosed with tarps. Containers of solvents and coatings are to be kept closed. The Compliance Guidelines specify how spraying equipment is to be cleaned. It also requires an operation and maintenance plan for spray operations.

See Compliance Guidance for Spray Coating Operations, PSCAA.

PSCAA regulations may be viewed on the agency’s website at www.pscleanair.org.

R.8 REQUIREMENTS OF NATIVE AMERICAN TRIBES

Tribal staff review federal, state, and local permits for projects on tribal lands or projects on non-tribal lands that may affect treaty-reserved resources or areas. The Puyallup Indian Tribe has lands and continuing treaty interests in natural resources. Check with their Natural Resource or Environmental Divisions for more information on the treaty rights and the permit review role of the tribe.
Chapter 7 – Quick Reference Phone Numbers

Environmental Protection Agency (EPA) - Region X 800-424-4372

IMEX (Industrial Materials Exchange) 206-296-4899

City of Tacoma
Stormwater Source Control Unit 253-591-5588
Sanitary Source Control Unit 253-591-5588
Pretreatment Program 253-591-5588
Building and Land Use Services (Permits) 253-591-5030
Fire Prevention Bureau 253-591-5740
Solid Waste Management Utility 253-591-5543
Household Hazardous Waste 253-591-5418
Recycling Services 253-565-5955

Tacoma-Pierce County Health Department
On-Site Sewage and Underground Storage Tanks 253-798-6470
Hazardous Waste Section 253-798-6047
Solid Waste 253-798-6047
Hazardous Waste Line 800-287-6429
Pest Control Operators and Fumigators 253-798-6470

University of Washington Center for Urban Water Resources 206-543-6272

Washington State Department of Agriculture 360-902-2010
877-301-4555

Washington State Department of Ecology 360-407-6000

Southwest Regional Office 360-407-6300
Dangerous/Hazardous Waste 360-407-6300
NPDES Stormwater or Wastewater permits 360-407-6400
Spill Reporting 800-424-8802
Recycling 800-732-9253
Groundwater Quality and Protection 360-407-6400
Underground and Above Ground Storage Tanks 360-407-7170

Washington State University/Pierce County Cooperative Extension 253-798-7180

Puyallup Tribe 253-597-6200

Puget Sound Clean Air Agency 800-552-3565
## Appendix IV-A
### Recycling/Disposal of Vehicle Fluids/Other Wastes*

<table>
<thead>
<tr>
<th><strong>RECOMMENDED MANAGEMENT</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antifreeze</strong></td>
<td>Store separately for resale. Separate ethylene glycol from propylene glycol for off-site recycling. If not recyclable, send to Treatment, Storage, and Disposal Facility (TSDF) for disposal.</td>
</tr>
<tr>
<td><strong>Batteries</strong></td>
<td>INTACT: Accumulate under cover prior to sale, deliver to recycler or, return to manufacturer. BROKEN: Accumulate acid from broken batteries in resistant containers with secondary containment. Send to TSDF for disposal.</td>
</tr>
<tr>
<td><strong>Brake fluid</strong></td>
<td>Accumulate in separate, marked, closed container. Do not mix with waste oil. Recycle.</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>Store gasoline, and diesel separately for use or resale. Mixtures of diesel, gasoline, oil, and other fluids may not be recyclable and may require expensive disposal.</td>
</tr>
<tr>
<td><strong>Fuel filters</strong></td>
<td>Drain fluids for use as product. With approval of local landfill operator, dispose to dumpster, if needed.</td>
</tr>
<tr>
<td><strong>Oil filters</strong></td>
<td>Puncture the filter dome and drain it for 24 hours. Put oil drained from filters into your &quot;USED OIL ONLY&quot; container. Keep drained filters in a separate container marked &quot;USED OIL FILTERS ONLY.&quot; Locate a scrap metal dealer who will pick up and recycle your filters. With approval of local landfill operator, dispose of drained filters to dumpster.</td>
</tr>
<tr>
<td><strong>Paint</strong></td>
<td>Accumulate oil-based and water-based paints separately for use or resale. If not recyclable, send accumulations to TSDF for disposal.</td>
</tr>
<tr>
<td><strong>Power steering fluid</strong></td>
<td>Same as for used oils</td>
</tr>
<tr>
<td><strong>Shop towels/oily rags</strong></td>
<td>Use cloth towels that can be laundered and reused. Accumulate used shop towels in a closed container. Sign up with an industrial laundry service that can recycle your towels.</td>
</tr>
<tr>
<td><strong>Solvents</strong></td>
<td>Consider using less hazardous solvents or switching to a spray cabinet that doesn't use solvent. Accumulate solvents separately. Consider purchasing your own solvent still and recycling solvent on site. Do not mix with used oil. Do not evaporate as a means of disposal.</td>
</tr>
<tr>
<td><strong>Transmission oil, differential and rear end fluids</strong></td>
<td>Accumulate in your &quot;USED OIL ONLY&quot; container. Arrange for pickup for off-site recycling.</td>
</tr>
<tr>
<td><strong>Used oils; including, crankcase oil, transmission oil, power steering fluid and differential/rear end oil</strong></td>
<td>Keep used oil in a separate container marked &quot;USED OIL ONLY.&quot; Do not mix with brake fluid, or used antifreeze. Do not mix with any other waste if you plan to burn it in your shop for heating. Arrange for pickup for off-site recycling.</td>
</tr>
<tr>
<td><strong>Windshield washer fluid</strong></td>
<td>Accumulate separately for use or resale. Discharge to on-site sewage disposal, or, if acceptable by the local sewer authority, discharge to sanitary sewer.</td>
</tr>
</tbody>
</table>

* This information was obtained from Ecology’s Hazardous Waste Program. For a copy of “Hazardous Waste Services Directory,” Publication #91-12s, Revised December 1994, listing facilities which recycle/dispose of wastes, solvents, paints, photographic wastes, refrigerants, oils, oil filters, and silver; provide spill assistance and oil/water separator cleanout service, and drum disposal/recycling; TSD facilities; and waste brokers; call Ecology’s Hazardous Waste and Toxic Reduction Program at (360) 407-6721.
Appendix IV-B
Example of an Integrated Pest Management Program

Integrated Pest Management (IPM) is a natural, long-term, ecologically based systems approach to controlling pest populations. This system uses techniques either to reduce pest populations or maintain them at levels below those causing economic injury, or to so manipulate the populations that they are prevented from causing injury. The goals of IPM are to encourage optimal selective pesticide use (away from prophylactic, broad spectrum use), and to maximize natural controls to minimize the environmental side effects.

A step-by-step comprehensive Integrated Pest Management (IPM) Program is provided below as a guide:

Introduction

This section provides a sound cultural approach to managing lawns and landscapes and minimizing runoff. Many homeowners or property managers will be able to implement most or all of this approach, others will wish to hire these services out. For the do-it yourselfer, an array of resources are available to assist in the effort. Landscaping businesses, agricultural extensions, local agencies, master gardener programs, local nurseries and even the library can all provide assistance. Landscaping professionals (businesses) are particularly encouraged to practice IPM.

Definition

“Integrated pest management, or IPM, is an approach to pest control that uses regular monitoring to determine if and when treatments are needed, and employs physical, mechanical, cultural, and biological tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Least-toxic chemical controls are used as a last resort.”

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

The Integrated Pest Management Process

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

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

Step Two: Establish tolerance thresholds for pests.

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

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

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

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

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

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

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

1. **Red thread disease** is most likely under low nitrogen fertility conditions and most severe during slow growth conditions. Mow and bag the clippings to remove diseased blades. Fertilize lightly to help the grass recover, then begin grasscycling and change to fall fertilization with a slow-release or natural-organic fertilizer to provide an even supply of nutrients. Chemical fungicides are not recommended because red thread cannot kill the lawn.

2. **Crane fly damage** is most prevalent on lawns that stay wet in the winter and are irrigated in the summer. Correct the winter drainage and/or allow the soil to dry between irrigation cycles; larvae are susceptible to drying out so these changes can reduce their numbers. It may also be possible to reduce crane fly larvae numbers by using a power de-thatcher on a cool, cloudy day when feeding is occurring close to the surface. Studies are being conducted using beneficial nematodes that parasitize the crane fly larvae; this type of treatment may eventually be a reasonable alternative.

Only after trying suitable non-chemical control methods, or determining that the pest outbreak is causing too much serious damage, should chemical controls be considered. Study to determine
what products are available and choose a product that is the least toxic and has the least non-target impact. Refer to the Operational BMPs for the use of Pesticides below for guidelines on choosing, storing and using lawn and garden chemicals.

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

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

A comprehensive IPM Program should also include the proper use of pesticides as a last resort, and vegetation/fertilizer management to eliminate or minimize the contamination of stormwater.
Appendix IV-C
Recommendations for Management of Street Wastes

Introduction
This appendix is a summary, taken from the June 1999 draft Ecology publication titled Recommendations for Management of Street Waste (Publication WQ 99-09). The guidance document addresses waste generated from stormwater maintenance activities such as street sweeping and the cleaning of catch basins, and to a limited extent, other stormwater conveyance and treatment facilities. Limited information is available on the characteristics of wastes from detention/retention ponds, bioswales, and similar stormwater treatment facilities. The recommendations provided here may be generally applicable to these facilities, with extra diligence given to waste characterization.

These recommendations do not constitute rules or regulations, but are suggestions for street waste handling, reuse, and disposal using current regulations and the present state of knowledge of street waste constituents. The recommendations are intended to address the liquid and solid wastes collected during routine maintenance of stormwater catch basins, detention/retention ponds and ditches and similar storm water treatment and conveyance structures, and street and parking lot sweeping. In addition to these recommendations, end users and other authorities may have their own requirements for street waste reuse and handling.

"Street Wastes" include liquid and solid wastes collected during maintenance of stormwater catch basins, detention/retention ponds and ditches and similar storm water treatment and conveyance structures, and solid wastes collected during street and parking lot sweeping.

"Street Wastes," as defined here, does not include solids and liquids from street washing using detergents, cleaning of electrical vaults, vehicle wash sediment traps, restaurant grease traps, industrial process waste, sanitary sewage, mixed process, or combined sewage/stormwater wastes. Wastes from oil/water separators at sites that load fuel are not included as street waste. Street waste also does not include flood debris, land slide debris, and chip seal gravel.

Street waste does not ordinarily classify as dangerous waste. The owner of the storm water facility and/or collector of street waste is considered the waste generator and is responsible for determining whether or not the waste designates as dangerous waste. Sampling to date has shown that material from routine maintenance of streets and stormwater facilities does not classify as dangerous waste (See Table D.6 below). However, it is possible that street waste from spill sites could classify as dangerous waste. Street waste from areas with exceptionally high average daily traffic counts may contain contaminants - such as heavy metals, total petroleum hydrocarbons (TPH), and carcinogenic polycyclic aromatic hydrocarbons (c-PAH) - at levels that limit reuse options.

Street Waste Solids
Street waste is solid waste. While street waste from normal street and highway maintenance is not dangerous waste, it is solid waste, as defined under The Solid Waste Management Act (Chapter 70.95 RCW) and under Minimum Functional Standards for Solid Waste Handling (Chapter 173-304 WAC). Under the Solid Waste Management Act, local health departments have primary jurisdiction over solid waste management. Street waste solids may contain...
contaminants at levels too high to allow unrestricted reuse. At the time this document is being prepared, the Minimum Functional Standards are being revised. Chapter 173-304 WAC will be replaced with Chapter 173-350 WAC. There are currently no specific references in the Minimum Functional Standards to facilities managing street waste solids. These facilities will typically fit under the section dealing with Piles Used for Storage and Treatment (Section 320 of the proposed revisions). There are no specific references for reuse and disposal options for street wastes in the Minimum Functional Standards, although the Minimum Functional Standards do not apply to clean soils. In the proposed rule, clean soils are defined as 'soils that do not contain contaminants at concentrations which could degrade the quality of air, waters of the state, soils, or sediments; or pose a threat to the health of humans or other living organisms' (WAC 173-350-100). Whether or not a soil is a clean soil depends primarily upon the level of contaminants and, to a lesser degree, on the background level of contaminants at a particular location and the exposure potential to humans or other living organisms. Therefore, both the soil and potential land application sites must be evaluated to determine if a soil is a clean soil. Local health departments should be contacted to determine if a street waste meets the definition of “clean soil” when it will be reused as a soil.

There is no simple regulatory mechanism available to classify street waste solids as "clean" for uncontrolled reuse or disposal. Local health districts have historically used the Model Toxics Control Act Cleanup Regulation (MTCA) Method A residential soil cleanup levels to approximate "clean" and to make decisions on land application proposals. These regulations were amended in February 2001. The MTCA regulation is not intended to be directly applied to setting contaminant concentration levels for land application proposals. However, they may provide human health and environmental threat information and a useful framework for such decisions, when used in conjunction with other health and environmental considerations. The local health department should be contacted to determine local requirements for making this determination.

Using the old MTCA regulations, many local health departments have set a criteria of 200 mg/Kg Total Petroleum Hydrocarbons (TPH) for diesel and heavy fuel oils as a threshold level for clean soil. Using the new MTCA terrestrial ecological evaluation procedures, allowable TPH levels for land application could range from 200 – 460, depending on site characteristics and intended land use. Street waste sampling has historically yielded TPH values higher than 200 mg/kg for hydrocarbons in the diesel and heavy oil range. These values typically reflect interference from natural organic material and, to a lesser extent, relatively immobile petroleum hydrocarbons. The mobile hydrocarbons that are of concern for ground water protection are generally not retained with street waste solids. Ecology's Manchester Lab has developed an analytical method to reduce the problem of natural organic material being included in the TPH analysis for diesel and heavier range hydrocarbons. This new method, called NWTPH-Dx, reduces the background interference associated with vegetative matter by as much as 85% to 95%. However, even with the new methodology, TPH test results for street waste may still be biased by the presence of natural vegetative material and may still exceed 200 mg/kg. Where the laboratory results report no 'fingerprint' or chromatographic match to known petroleum hydrocarbons, the soils should not be considered to be petroleum contaminated soils.

Street waste solids frequently contain levels of carcinogenic PAHs (c-PAH) that make unrestricted use inappropriate. This is complicated further by analytical interference caused by organic matter that raises practical quantitation or reporting limits. To greatly reduce the level of interference, the use of US EPA Test Method 8270, incorporating the silica gel cleanup step, is recommended. The calculated c-PAH value can vary greatly depending upon how non-detect values are handled. The new MTCA Method A criterion for c-PAH is 0.1 mg/kg (the sum of all
seven c-PAH parameters multiplied by the appropriate toxicity equivalency factor)) for unrestricted land uses. The MTCA criteria for soil cleanup levels for industrial properties is 2.0 mg/kg. Following this guidance, most sites where street wastes could be reused as soil will be commercial or industrial sites, or sites where public exposure will be limited or prevented.

**Permitting of street waste treatment and storage facilities as solid waste handling facilities by the local health department is required.** Under the Solid Waste Management Act, local health departments have primary jurisdiction over solid waste management.

Street waste handling facilities are subject to the requirements of the Minimal Functional Standards for Solid Waste Handling. The specific requirements will depend upon the manner in which the waste is managed. Most facilities will probably be permitted under the section dealing with Piles Used for Storage and Treatment (Section 320 of the proposed revisions).

For most facilities, permit requirements include a plan of operation, sampling, record keeping and reporting, inspections, and compliance with other state and local requirements. The plan of operation should include a procedure for characterization of the waste and appropriate reuse and disposal options, consistent with the recommendations in this document and applicable federal, state and local requirements.

**A street waste site evaluation (see sample at end of this appendix) is suggested for all street waste as a method to identify spill sites or locations that are more polluted than normal.** The disposal and reuse options listed below are based on characteristics of routine street waste and are not appropriate for more polluted wastes. The collector of street waste should evaluate it both for its potential to be classified as dangerous waste and to not meet end users requirements.

**Street waste that is suspected to be dangerous waste should not be collected with other street waste.** Material in catch basins with obvious contamination (unusual color, staining, corrosion, unusual odors, fumes, and oily sheen) should be left in place or segregated until tested. Testing should be based on probable contaminants. Street waste that is suspected to be dangerous waste should be collected and handled by someone experienced in handling dangerous waste. If potential dangerous waste must be collected because of emergency conditions, or if the waste becomes suspect after it is collected, it should be handled and stored separately until a determination as to proper disposal is made. Street waste treatment and storage facilities should have separate "hot load" storage areas for such waste. **Dangerous Waste** includes street waste known and suspected to be dangerous waste. This waste must be handled following the Dangerous Waste Regulations (Chapter 173-303 WAC) unless testing determines it is not dangerous waste.

**Spills should be handled by trained specialists.** Public works maintenance crews and private operators conducting street sweeping or cleaning catch basins should have written policies and procedures for dealing with spills or suspected spill materials. Emergency Spill Response telephone numbers should be immediately available as part of these operating policies and procedures.

**The end recipient of street waste must be informed of its source and may have additional requirements for its use or testing that are not listed here.** This document is based primarily on average street waste’s chemical constituents and their potential affect on human health and the environment. There are physical constituents (for example, broken glass or hypodermic needles) or characteristics (for example, fine grain size) that could also limit reuse options.
Additional treatment such as drying, sorting, or screening may also be required, depending on the needs and requirements of the end user.

**Street waste treatment and storage facilities owned or operated by governmental agencies should be made available to private waste collectors and other governmental agencies on a cost recovery basis.** Proper street waste collection and disposal reduces the amount of waste released to the environment. The operators of street waste facilities should restrict the use of their facilities to certified and/or licensed waste collectors who meet their training and liability requirements.

The use of street waste solids under this guidance should not lead to designation as a hazardous waste site, requiring cleanup under MTCA. Exceeding MTCA Method A unrestricted land use cleanup levels in street waste and products made from street waste, does not automatically make the site where street waste is reused a cleanup site. A site is reportable only if "-a release poses a threat to human health or the environment-" (Model Toxic Control Act). The reuse options proposed below are designed to meet the condition of not posing a threat to human health or the environment.

**Testing of street waste solids will generally be required as part of a plan of operation that includes procedures for characterization of the waste.** Testing frequency, numbers of samples, parameters to be analyzed, and contaminant limit criteria should all be provided as part of an approved plan of operation. Tables D.4 and D.5 below provide some recommended parameters and sampling frequencies for piles of street waste solids from routine street maintenance. These are provided as guidance only, and are intended to assist the utility and the local health department in determining appropriate requirements. Sampling requirements may be modified, over time, based on accumulated data. When the material is from a street waste facility or an area that has never been characterized by testing, the test should be conducted on a representative sample before co-mingling with other material. Testing in these instances would be to demonstrate that the waste does not designate as dangerous waste and to characterize the waste for reuse. At a minimum, the parameters in Table D.4 are recommended for these cases. Note that it will generally not be necessary to conduct TCLP analyses when the observed values do not exceed the recommended values in Table D.4. Table D.6 illustrates some observed relationships between total metals and TCLP metals values.

For further information on testing methods and sampling plans, refer to:

- **SW 846** (US EPA, Office of Solid Waste, Test Methods for Evaluating Solid Wastes, 3rd Ed.) and

For street waste not exceeding the suggested maximum values in Table D.4, the following street waste solids reuse and disposal options are recommended:

- Street sweepings that consist primarily of leaves, pine needles and branches, and grass cuttings from mowing grassy swales can be composted. Litter and other foreign material must be removed prior to composting or the composting facility must provide for such removal as part of the process. The screened trash is solid waste and must be disposed of at an appropriate solid waste handling facility.
Coarse sand screened from street sweeping after recent road sanding, may be reused for street sanding, providing there is no obvious contamination from spills. The screened trash is solid waste and must be disposed of at an appropriate solid waste handling facility.

Roadside ditch cleanings, not contaminated by a spill or other release and not associated with a stormwater treatment system such as a bioswale, may be screened to remove litter and separated into soil and vegetative matter (leaves, grass, needles, branches, etc.). The soils from these activities are not generally regulated as solid waste. Ditching material that may be contaminated must be stored, tested and handled in the same manner as other street waste solids. It is the generator’s responsibility to visually inspect and otherwise determine whether the materials may be contaminated.

Construction street wastes - solids collected from sweeping or in storm water treatment systems at active construction sites - may be placed back onto the site that generated it, or managed by one on the methods listed below, provided that it has not been contaminated as a result of a spill. For concrete handling at construction site, refer to BMP C151 in Volume II, Construction Stormwater Pollution Prevention.

Screened street waste soils may be used as feedstock materials for topsoil operations. This option should be reserved for street waste soils with very low levels of contaminants. Diluting street waste soils with clean soils or composted material must not be used as a substitute for treatment or disposal. There may be physical contaminants (for example, glass, metal, nails, etc.) in street waste that cannot be entirely screened from the waste. Where present, these contaminants in street waste could preclude its use as feedstock material for topsoil operations.

Fill in parks, play fields, golf courses and other recreational settings, where direct exposure by the public is limited or prevented. One way to accomplish is to cover the fill with sod, grass or other capping material to reduce the risk of soil being ingested. The level of contaminants in the street waste must be evaluated to ensure that the soils meet the definition of clean soils when used in this manner.

Fill in commercial and industrial areas, including soil or top dressing for use at industrial sites, roadway medians, airport infields and similar sites, where there is limited direct human contact with the soil, and the soils will be stabilized with vegetation or other means. The level of contaminants in the street waste must be evaluated to ensure that the soils meet the definition of clean soils when used in this manner.

Top dressing on roadway slopes, road or parking lot construction material and road subgrade, parking lot subgrade, or other road fill. The level of contaminants in the street waste must be evaluated to ensure that the soils meet the definition of clean soils when used in this manner.

Daily cover or fill in a permitted municipal solid waste landfill, provided the street waste solids have been dewatered. Street waste solids may be acceptable as final cover during a landfill closure. The local health department and landfill operator should be consulted to determine conditions of acceptance.

Treatment at a permitted contaminated soil treatment facility.

Recycling through incorporation into a manufactured product, such as Portland cement, prefab concrete, or asphalt. The facility operator should be consulted to determine conditions of acceptance.

Other end-use as approved by the local health department.
• Disposal at an appropriate solid waste handling facility.

For street waste that exceed the suggested maximum values in Table D.4, the following street waste solids reuse and disposal options are recommended:

• Treatment at a permitted contaminated soil treatment facility.
• Recycling through incorporation into a manufactured product, such as Portland cement, prefab concrete, or asphalt. The facility operator should be consulted to determine conditions of acceptance.
• Other end-use as approved by the local health department
• Disposal at an appropriate solid waste handling facility.

Street Waste Liquids

Street waste collection should emphasize solids in preference to liquids. Street waste solids are the principal objective in street waste collection and are substantially easier to store and treat than liquids.

Street waste liquids require treatment and/or must follow location limitations before their discharge. Street waste liquids usually contain high amounts of suspended and total solids and adsorbed metals. Treatment requirements depend on the discharge location.

Discharges to sanitary sewer and storm sewer systems must be approved by the entity responsible for operation and maintenance of the system. Ecology will not generally require waste discharge permits for discharge of stormwater decant to sanitary sewers or to stormwater treatment BMPs constructed and maintained in accordance with Ecology’s Stormwater Management Manual for Western Washington. (See Volume 5 for further detail).

The following disposal options are recommended, in order of preference, for catch basin decant liquid and for water removed from stormwater treatment facilities.

Under the Municipal General Permit, municipalities are required to use this guidance in determining appropriate means of dealing with street wastes from stormwater maintenance activities. Your regional Department of Ecology water quality staff can help you with treatment standards and permit requirements for your particular situation.

Discharge of catch basin decant liquids to a municipal sanitary sewer connected to a Public Owned Treatment Works (POTW) is the preferred disposal option. Discharge to a municipal sanitary sewer requires the approval of the sewer authority. Street waste liquids discharged to a POTW may be treated at a combined street waste liquid and solid facility (decant facility) or at separate liquids only facilities. These liquid only facilities may consist of modified type 2 catch basins (with a flow restrictor or oil/water separator) or water quality vaults, strategically located through the sanitary collection system. These should provide 24-hour detention for the expected volumes and should be constructed and operated to ensure that the decant discharge does not resuspend sediments. Sewer authorities should require periodic sampling and decant facility operators should test their waste effluent on a regular basis, but street waste decant liquid should meet the most restrictive local limits with 24 hours of undisturbed gravity settling. Overnight settling is more practical and will likely meet most local
pretreatment requirements. (See Table D.9 Catch Basin Decant Values Following Settling for typical catch basin decant values from King County’s decant facility at Renton).

State and local regulations generally prohibit discharge of stormwater runoff into sanitary sewers, to avoid hydraulic overloads and treatment performance problems. The volume of storm water discharged from catch basins and small stormwater treatment facilities is generally not sufficient to be a problem, provided the discharge point is properly selected and designed.

**Stormwater removed from catch basins and stormwater treatment wetvaults may be discharged into a Basic or Enhanced Stormwater Treatment BMP.**

Decant liquid collected from cleaning catch basins and stormwater treatment wetvaults may be discharged back into the storm sewer system under the following conditions:

- The preferred disposal option of discharge to sanitary sewer is not reasonably available, and
- The discharge is to a Basic or Enhanced Stormwater Treatment Facility (See Volume V, Chapters 3 and 4), and
- The storm sewer system owner/operator has granted approval and has determined that the treatment facility will accommodate the increased loading.

Pretreatment may be required to protect the treatment BMP.

Reasonably available will be determined by the stormwater utility and by the circumstances, including such factors as distance, time of travel, load restrictions, and capacity of the stormwater treatment facility. Some jurisdictions may choose not to allow discharge back to the storm sewer system. Currently King County does not allow such discharges, under King County Code 9.12 – Water Quality.

**Discharge back into the storm sewer is an acceptable option, under certain conditions:**

- Other practical means are not reasonably available, and
- Pretreatment is provided by discharging to a modified type 2 catch basin (with a flow restrictor or oil/water separator) or water quality vault, and
- The discharge is upstream of a basic or enhanced stormwater treatment BMP, and
- The storm sewer system owner/operator has granted approval.

Other practical means includes the use of decanting facilities and field decant sites that discharge to sanitary sewers or discharge to an approved stormwater treatment BMP.

Limited field testing of flocculent aids has been conducted. While the use of flocculent aids is promising, sufficient testing has not been conducted to allow approval of any specific product or process. In general, the following conditions must be met for flocculent use to be approved:

- The flocculent must be non-toxic under circumstances of use and approved for use by the Department of Ecology
- The decant must be discharged to an approved basic or enhanced stormwater treatment BMP, with sufficient capacity and appropriate design to handle the anticipated volume and pollutant loading
• The discharge must be approved by the storm sewer system owner/operator.

**Water removed from stormwater ponds, vaults and oversized catch basins may be returned to storm sewer system.** Stormwater ponds, vaults and oversized catch basins contain substantial amounts of liquid, which hampers the collection of solids and pose problems if the removed waste must be hauled away from the site. Water removed from these facilities may be discharged back into the pond, vault or catch basin provided:

• Clear water removed from a stormwater treatment structure may be discharged directly to a downgradient cell of a treatment pond or into the storm sewer system.
• Turbid water may be discharged back into the structure it was removed from if:
  – The removed water has been stored in a clean container (eductor truck, Baker tank or other appropriate container used specifically for handling stormwater or clean water) and
  – There will be no discharge from the treatment structure for at least 24 hours.
• The discharge must be approved by the storm sewer system owner/operator.

Vegetation management and structural integrity concerns sometimes require that the ponds be refilled as soon after solids removal as possible. For ponds and other systems relying on biological processes for waste treatment, it is often preferable to reuse at least some portion of the removed water.

**Site Evaluation**

A site evaluation is suggested as method to identify spill sites or locations that are more polluted than normal.

The site evaluation will aid in determining if waste should be handled as dangerous waste and in determining what to test for if dangerous waste is suspected. The site evaluation will also help to determine if the waste does not meet the requirements of the end users.

There are three steps to a site evaluation:

1. An **historical review** of the site for spills, previous contamination and nearby toxic cleanup sites and dangerous waste and materials.

   The historical review will be easier if done on an area wide basis prior to scheduling any waste collection. The historical review should be more thorough for operators who never collected waste at a site before. At a minimum, the historical review should include operator knowledge of the area's collection history or records kept from previous waste collections.

   Private operators should ask the owner of the site for records of previous contamination and the timing of the most recent cleaning. Ecology’s Hazardous Substance Information Office maintains a Toxic Release Inventory and a “Facility Site” web page, tracking more than 15,000 sites. This information is available through the Internet at [http://www.wa.gov/ecology/iss/fsweb/fshome.html](http://www.wa.gov/ecology/iss/fsweb/fshome.html) or by calling a toll-free telephone number (800-633-7585). The web page allows anyone with web-access to search for facility information by address, facility name, town, zip code, and SIC code, etc. It lists why the Department of Ecology is tracking each one (NPDES, TSCA, RCRA, Clean Air Act, etc.), as well as who to call within Ecology to find out more about the given facility.
2. An area visual inspection for potential contaminant sources such as a past fire, leaking tanks and electrical transformers, and surface stains.

The area around the site should be evaluated for contaminant sources prior to collection of the waste. The area visual inspection may be done either as part of multiple or as single site inspections. If a potential contaminant source is found, the waste collection should be delayed until the potential contaminant is assessed.

A second portion of the area visual inspection is a subjective good housekeeping evaluation of the area. Locations with poor housekeeping commonly cut corners in less obvious places and should be inspected in greater detail for illegal dumping and other contamination spreading practices.

3. A waste and container inspection before and during collection.

The inspection of the waste and catch basin or vault is the last and perhaps most critical step in the site evaluation.

For example, if the stormwater facility has an unusual color in or around it, then there is a strong possibility that something could have been dumped into it. Some colors to be particularly wary of are yellow-green from antifreeze dumping and black and/rainbow sheen from oil and/or grease dumping. In addition, if any staining or corrosion is observed, then a solvent may have been dumped.

Fumes are also good indicators of potential dangerous or dangerous waste. Deliberate smelling of catch basins should be avoided for worker safety, but suspicious odors may be encountered from catch basins thought to be safe. Some suspicious odors are rotten eggs (hydrogen sulfide is present), gasoline or diesel fumes, or solvent odors. If unusual odors are noted, contact a dangerous waste inspector before cleaning the basin.

Finally, operator experience is the best guide to avoid collection of contaminated waste.
### Table C.1 - Typical TPH Levels in Street Sweeping and Catch Basin Solids

<table>
<thead>
<tr>
<th>Reference</th>
<th>Street Sweeping (mg/kg)</th>
<th>Catch Basin Solid (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snohomish County (1) (Landau 1995)</td>
<td>390 – 4300</td>
<td></td>
</tr>
<tr>
<td>King County (1) (Herrera 1995)</td>
<td></td>
<td>123 – 11049 (Median 1036)</td>
</tr>
<tr>
<td>Snohomish County &amp; Selected Cities (1) (W &amp; H Pacific, 1993)</td>
<td>163 - 1500 (Median 760)</td>
<td>163 – 1562 (Median 760)</td>
</tr>
<tr>
<td>City of Portland (2) (Bresch)</td>
<td></td>
<td>MDL – 1830 (Median – 208)</td>
</tr>
<tr>
<td>Oregon (1) (Collins; ODOT 1998)</td>
<td>1600 – 2380</td>
<td></td>
</tr>
<tr>
<td>Oregon (3) (Collins; ODOT 1998)</td>
<td>98 - 125</td>
<td></td>
</tr>
</tbody>
</table>

(1) Method WTPH 418.1; does not incorporate new methods to reduce background interference due to vegetative material  
(2) Method NWTPH-Dx  
(3) Method WTPH – HCID

### Table C.2 - Typical c-PAH Values in Street Waste Solids and Related Materials

<table>
<thead>
<tr>
<th>Sample Source</th>
<th>Street Sweeping</th>
<th>City of Everett</th>
<th>WSDOT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Street Sweplings</td>
<td>Soil</td>
<td>3-Way Topsill</td>
</tr>
<tr>
<td>Benzo(a)anthracene</td>
<td>0.1U</td>
<td>0.076U</td>
<td>0.074U</td>
</tr>
<tr>
<td>Chrysene</td>
<td>0.14</td>
<td>0.09</td>
<td>0.074U</td>
</tr>
<tr>
<td>Benzo(b)fluoranthene</td>
<td>0.11</td>
<td>0.076U</td>
<td>0.074U</td>
</tr>
<tr>
<td>Benzo(k)fluoranthene</td>
<td>0.13</td>
<td>0.076U</td>
<td>0.074U</td>
</tr>
<tr>
<td>Benzo(a)pyrene</td>
<td>0.13</td>
<td>0.076U</td>
<td>0.074U</td>
</tr>
<tr>
<td>Indeno(1,2,3-cd)pyrene</td>
<td>0.1U</td>
<td>0.076U</td>
<td>0.074U</td>
</tr>
<tr>
<td>Dibenzo(a,h)anthracene</td>
<td>0.1U</td>
<td>0.076U</td>
<td>0.074U</td>
</tr>
<tr>
<td>Revised MTCA Benzo(a)pyrene [ND=PQL]</td>
<td>0.215</td>
<td>0.134</td>
<td>0.134</td>
</tr>
<tr>
<td>Benzo(a)pyrene [ND=1/2 PQL]</td>
<td>0.185</td>
<td>0.069</td>
<td>0.067</td>
</tr>
<tr>
<td>Benzo(a)pyrene [See below]</td>
<td>0.185</td>
<td>0.069</td>
<td>0.0</td>
</tr>
<tr>
<td>Benzo(a)pyrene [ND=0]</td>
<td>0.155</td>
<td>0.001</td>
<td>0</td>
</tr>
</tbody>
</table>

*If the analyte was not detected for any PAH, then ND=0. If analyte was detected in at least 1 PAH, then ND=1/2 PQL. If the average concentration (using ND=1/2 PQL) is greater than the maximum detected value, then ND=Maximum value.

The new Method A soil cleanup level for unrestricted land use is 0.1 mg/Kg for BAP. (WAC 173-340-900, Table 740-1)

The new Method A soil cleanup level for industrial properties is 2 mg/Kg for BAP. (WAC 173-340-900, Table 745-1)
### Table C.3 - Typical Metals Concentrations in Catch Basin Sediments

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>Ecology 1993</th>
<th>Thurston 1993</th>
<th>King County 1995</th>
<th>King County 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>METALS; TOTAL (mg/kg)</td>
<td>(Min – Max)</td>
<td>(Min – Max)</td>
<td>(Min - Max)</td>
<td>Mean</td>
</tr>
<tr>
<td>As</td>
<td>&lt;3 -- 24</td>
<td>.39 -- 5.4</td>
<td>4 – 56</td>
<td>0.250</td>
</tr>
<tr>
<td>Cd</td>
<td>0.5 -- 2.0</td>
<td>&lt; 0.22 -- 4.9</td>
<td>0.2 – 5.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Cr</td>
<td>19 -- 241</td>
<td>5.9 -- 71</td>
<td>13 - 100</td>
<td>25.8</td>
</tr>
<tr>
<td>Cu</td>
<td>18 -- 560</td>
<td>25 -- 110</td>
<td>12 - 730</td>
<td>29</td>
</tr>
<tr>
<td>Pb</td>
<td>24 -- 194</td>
<td>42 -- 640</td>
<td>4 – 850</td>
<td>80</td>
</tr>
<tr>
<td>Ni</td>
<td>33 -- 86</td>
<td>23 -- 51</td>
<td>14 – 41</td>
<td>23</td>
</tr>
<tr>
<td>Zn</td>
<td>90 -- 558</td>
<td>97 -- 580</td>
<td>50 – 2000</td>
<td>130</td>
</tr>
<tr>
<td>Hg</td>
<td>.04 -- .16</td>
<td>.024 -- .193</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table C.4 - Recommended Parameters and Suggested Values for Determining Reuse & Disposal Options

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Suggested Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic, Total</td>
<td>20.0 mg/kg (a)</td>
</tr>
<tr>
<td>Cadmium, Total</td>
<td>2.0 mg/kg (b)</td>
</tr>
<tr>
<td>Chromium, Total</td>
<td>42 mg/kg (c)</td>
</tr>
<tr>
<td>Lead, total</td>
<td>250 mg/kg (d)</td>
</tr>
<tr>
<td>Nickel</td>
<td>100 mg/kg (e)</td>
</tr>
<tr>
<td>Zinc</td>
<td>270 mg/kg (e)</td>
</tr>
<tr>
<td>Mercury (Inorganic)</td>
<td>2.0 mg/kg (f)</td>
</tr>
<tr>
<td>PAHs (Carcinogenic)</td>
<td>0.1 – 2.0 mg/kg (see Note at (g) below)</td>
</tr>
<tr>
<td>TPH (Heavy Fuel Oil)</td>
<td>200 - 460 mg/kg (see Note at (h) below)</td>
</tr>
<tr>
<td>TPH (Diesel)</td>
<td>200 – 460 mg/kg (see Note at (h) below)</td>
</tr>
<tr>
<td>TPH (Gasoline)</td>
<td>100 mg/kg (i)</td>
</tr>
<tr>
<td>Benzene</td>
<td>0.03 mg/kg (i)</td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td>6 mg/kg (i)</td>
</tr>
<tr>
<td>Toluene</td>
<td>7 mg/kg (i)</td>
</tr>
<tr>
<td>Xylenes (Total)</td>
<td>9 mg/kg (i)</td>
</tr>
</tbody>
</table>

(a) Arsenic: from MTCA Method A - Table 740-1: Soil cleanup levels for unrestricted land uses
(b) Cadmium: from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses
(c) Chromium; from MTCA Method A - Table 740-1: Soil cleanup levels for unrestricted land uses
(d) Lead; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses
(e) Nickel and Zinc; from MTCA Table 749-2: Protection of Terrestrial Plants and Animals
(f) Mercury; from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses
(g) PAH-Carcinogenic: from MTCA Method A – Table 740-1: Soil cleanup levels for unrestricted land uses and Table 745-1, industrial properties, based on cancer risk via direct contact with contaminated soil (ingestion of soil) in residential land use situations and commercial/industrial land uses. Note: The local health department may permit higher levels as part of a Plan of Operation, where they determine that the proposed end use poses little risk of direct human contact or ingestion of soil.
(h) TPH: from MTCA Tables 749-2 & 749-3: Protection of Terrestrial Plants and Animals. Values up to 460 mg/kg may be acceptable where the soils are capped or covered to reduce or prevent exposure to terrestrial plants and animals. Where the laboratory results report no “fingerprint” or chromatographic match to known petroleum hydrocarbons, the soils will not be considered to be petroleum contaminated soils.
(i) BETX; from MTCA Method A - Table 740-1: Soil cleanup levels for unrestricted land uses.
### Table C.5 - Recommended Sampling Frequency for Street Waste Solids

<table>
<thead>
<tr>
<th>Cubic Yards of Solids</th>
<th>Minimum Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 100</td>
<td>3</td>
</tr>
<tr>
<td>101 – 500</td>
<td>5</td>
</tr>
<tr>
<td>501 – 1000</td>
<td>7</td>
</tr>
<tr>
<td>1001 – 2000</td>
<td>10</td>
</tr>
<tr>
<td>&gt;2000</td>
<td>10 + 1 for each additional 500 cubic yards</td>
</tr>
</tbody>
</table>

Modified from Ecology’s Interim Compost Guidelines

### Table C.6 - Pollutants in Catch Basin Solids – Comparison to Dangerous Waste Criteria

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>METALS</td>
<td>Total Metals (mg/kg)</td>
<td>TCLP Metals (mg/kg)</td>
<td>TCLP values (mg/l)</td>
</tr>
<tr>
<td>As</td>
<td>&lt;3 – 56</td>
<td>&lt;.02 - .5</td>
<td>5.0</td>
</tr>
<tr>
<td>Cd</td>
<td>&lt;.22 – 5</td>
<td>.0002 - .03</td>
<td>1.0</td>
</tr>
<tr>
<td>Cr</td>
<td>5.9 - 241</td>
<td>.0025 - .1</td>
<td>5.0</td>
</tr>
<tr>
<td>Cu</td>
<td>12 - 730</td>
<td>.002 -- .88</td>
<td>none</td>
</tr>
<tr>
<td>Pb</td>
<td>4 - 850</td>
<td>.015 -- 3.8</td>
<td>none</td>
</tr>
<tr>
<td>Ni</td>
<td>23 - 86</td>
<td>&lt; .01 -- .36</td>
<td>none</td>
</tr>
<tr>
<td>Zn</td>
<td>50 - 2000</td>
<td>.04 -- 6.7</td>
<td>none</td>
</tr>
<tr>
<td>Hg</td>
<td>.02 - .19</td>
<td>.0001 -- .0002</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Data from Thurston County (Thurston County 1993), King County (Herrera 1995) and Ecology (Serdar; Ecology 1993).

### Table C.7 - Typical Catch Basin Decant Values Compared to Surface Water Quality Criteria

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>State Surface Water Quality Criteria</th>
<th>Range of Values Reported</th>
<th>Range of Values Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>METALS</td>
<td>Freshwater Acute (ug/l – dissolved metals)</td>
<td>Freshwater Chronic (ug/l – dissolved metals)</td>
<td>Total Metals (ug/l)</td>
</tr>
<tr>
<td>Arsenic</td>
<td>360</td>
<td>190</td>
<td>100 – 43000</td>
</tr>
<tr>
<td>Cd</td>
<td>2.73</td>
<td>0.84</td>
<td>64 - 2400</td>
</tr>
<tr>
<td>Cr (total)</td>
<td></td>
<td></td>
<td>13 -- 90000</td>
</tr>
<tr>
<td>Cr (III)*</td>
<td>435</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>Cr (VI)</td>
<td>0.5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Copper*</td>
<td>13.04</td>
<td>8.92</td>
<td>81 -- 200000</td>
</tr>
<tr>
<td>Lead*</td>
<td>47.3</td>
<td>1.85</td>
<td>255 -- 230000</td>
</tr>
<tr>
<td>Ni</td>
<td>1114</td>
<td>124</td>
<td>40 -- 330</td>
</tr>
<tr>
<td>Zn</td>
<td>90.1</td>
<td>82.3</td>
<td>401 -- 440000</td>
</tr>
<tr>
<td>Mercury</td>
<td>2.10</td>
<td>0.02</td>
<td>0.5 -- 21.9</td>
</tr>
</tbody>
</table>

*Hardness dependent; hardness assumed to be 75 mg/l
Table C.8 - Typical Values for Conventional Pollutants in Catch Basin Decant

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>Ecology 1993</th>
<th>(Min - Max)</th>
<th>King County 1995</th>
<th>(Min - Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Values as mg/l; except where stated</td>
<td>Mean</td>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td>PH</td>
<td>6.94</td>
<td>6.18 - 7.98</td>
<td>8</td>
<td>6.18 - 11.25</td>
</tr>
<tr>
<td>Conductivity (umhos/cm)</td>
<td>364</td>
<td>184 - 1110</td>
<td>480</td>
<td>129 - 10,100</td>
</tr>
<tr>
<td>Hardness (mg/l CaCO3)</td>
<td>234</td>
<td>73 - 762</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fecal Coliform (MPN/100 ml)</td>
<td>3000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOD</td>
<td>151</td>
<td>28 - 1250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COD</td>
<td>900</td>
<td>120 - 26,900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil &amp; Grease</td>
<td>11</td>
<td>7.0 - 40</td>
<td>471</td>
<td>15 - 6242</td>
</tr>
<tr>
<td>TOC</td>
<td>136</td>
<td>49 - 7880</td>
<td>3670</td>
<td>203 - 30,185</td>
</tr>
<tr>
<td>Total Solids</td>
<td>1930</td>
<td>586 - 70,400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>212</td>
<td>95 - 550</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>2960</td>
<td>265 - 111,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settleable Solids (ml/l/hr)</td>
<td>27</td>
<td>2 - 234</td>
<td>57</td>
<td>1 - 740</td>
</tr>
<tr>
<td>Turbidity (ntu)</td>
<td>1000</td>
<td>55 - 52,000</td>
<td>4673</td>
<td>43 - 78,000</td>
</tr>
</tbody>
</table>

Table C.9 - Catch Basin Decant Values Following Settling

<table>
<thead>
<tr>
<th>Parameter; Total Metals in mg/l</th>
<th>Portland – Inverness Site Min - Max</th>
<th>King County - Renton Min - Max</th>
<th>METRO Pretreatment Discharge Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>.0027 - .015</td>
<td>&lt; MDL – 0.12</td>
<td>4</td>
</tr>
<tr>
<td>Cadmium</td>
<td>.0009 - .015</td>
<td>&lt; MDL – 0.11</td>
<td>0.6</td>
</tr>
<tr>
<td>Chromium</td>
<td>.0046 - .0980</td>
<td>.017 – .189</td>
<td>5</td>
</tr>
<tr>
<td>Copper</td>
<td>.015 - .8600</td>
<td>.0501 – .408</td>
<td>8</td>
</tr>
<tr>
<td>Lead</td>
<td>.050 – 6.60</td>
<td>.152 – 2.83</td>
<td>4</td>
</tr>
<tr>
<td>Nickel</td>
<td>.0052 - .10</td>
<td>.056 - .187</td>
<td>5</td>
</tr>
<tr>
<td>Silver</td>
<td>.0003 - .010</td>
<td>&lt; MDL</td>
<td>3</td>
</tr>
<tr>
<td>Zinc</td>
<td>.130 – 1.90</td>
<td>.152 – 3.10</td>
<td>10</td>
</tr>
<tr>
<td>Settleable Solids; ml/L</td>
<td>No Data</td>
<td>.02 - 2</td>
<td>7</td>
</tr>
<tr>
<td>Nonpolar FOG</td>
<td>5.7 - 25</td>
<td>5 - 22</td>
<td>100</td>
</tr>
<tr>
<td>Ph (std)</td>
<td>6.1 – 7.2</td>
<td>6.74 – 8.26</td>
<td>5.0 - 12.0</td>
</tr>
<tr>
<td>TSS</td>
<td>2.8 - 1310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recorded Total Monthly Flow; Gallons</td>
<td>Data not available</td>
<td>31,850 - 111,050</td>
<td></td>
</tr>
<tr>
<td>Recorded Max. Daily Flow; Gallons</td>
<td>Data not available</td>
<td>4,500 - 18,600</td>
<td>25,000 GPD</td>
</tr>
<tr>
<td>Calculated Average Daily Flow; GPD</td>
<td>Data not available</td>
<td>1517 - 5428</td>
<td></td>
</tr>
</tbody>
</table>

1) Data from King County’s Renton Facility (data from 1998 – 1999) and the City of Portland’s Inverness Site (data from 1999 – 2001); detention times not provided
Resource Materials – Management of Street Wastes

Austin, City of, Removal Efficiencies of Stormwater Control Structures. Environmental and Conservation Services Department, 1990.

City of Portland Vactor Waste Decant Data, Personal Communication with Katie Bretsch, April 2000.


Ecology, Dangerous Waste Regulations, Chapter 173-303 WAC.


Ecology, Minimum Functional Standards for Solid Waste Handling, Chapter 173-304 WAC.

Ecology, Model Toxics Control Act (MTCA) Cleanup Regulations, Chapter 173-340 WAC.

Ecology, Water Quality Standards For Surface Waters of the State of Washington, Chapter 173-201A.

Hazardous Waste Management Act of 1976, Chapter 70.105 RCW

Herrera Environmental Consultants, Inc., King County Maintenance Waste Disposal Characterization Study, prepared for King County Surface Water Management Division, January Draft, 1995.


King County, *Vactor Waste Disposal Plan*, King County Surface Water Management Division, Water Quality Unit, 1994.

King County’s Renton Facility Decant Data, Personal Correspondence with Jerry Creek, and Susan Turner, June 1999


Pitt, R., 1985, *Characterizing and Controlling Urban Runoff through Street and Sewer Cleaning*, EPA/600/2-85/038


Thurston County Environmental Health Division, (Environmental Health Division-Unpublished data), 1993

Thurston County Environmental Health Division, *Report on Street Facility Monitoring* Grant Tax No. 91-129, April 1993

