

PARKING, PARKS, OFFICE, STORAGE, AND MOORAGE FACILITIES



05/05/2023

Stormwater Pollution Prevention Plan

APPENDIX A: BMP DESCRIPTIONS

CHAPTER 2 – BEST MANAGEMENT PRACTICES FOR ALL REAL PROPERTY

2.1. Required Best Management Practices

All real property must implement and maintain the following source control best management practices (BMPs) to prevent or minimize pollutants from leaving a site or property (Seattle Municipal Code [SMC], Section 22.803.030):

- BMP 1: Eliminate Illicit Connections and Illicit Discharges
- BMP 2: Perform Routine Maintenance
- BMP 3: Dispose of Fluids and Wastes Properly
- BMP 4: Proper Storage of Solid Wastes
- BMP 5: Spill Prevention and Cleanup
- BMP 6: Provide Oversight and Training for Staff
- BMP 7: Property Maintenance
- BMP 8: Rooftop Dog Runs

Stormwater Code Language	References
SMC, Section 22.803.030 – <i>For all discharges, responsible parties shall implement and maintain source controls to prevent or minimize pollutants from leaving a site or property.</i>	<ul style="list-style-type: none"> ● None provided
SMC. Section 22.801.090 – <i>“Responsible party” means all of the following persons:</i> <ol style="list-style-type: none"> 1. Owners, operators, and occupants of property; and 2. Any person causing or contributing to a violation of the provisions of this subtitle. 	<ul style="list-style-type: none"> ● None provided

2.1.1. BMP 1: Eliminate Illicit Connections and Illicit Discharges

Illicit connections and discharges include sanitary or process wastewater connections and unpermitted discharges of pollutants that are improperly discharging to a drainage system or receiving water. These improper connections and discharges allow a variety of pollutants to flow directly to receiving waters instead of the sanitary sewer or septic system. Frequently, such connections and discharges are not intentional but can be very harmful to the environment and must be eliminated. Refer to *Volume 1, Section 3.11* for the minimum requirements to comply with the Seattle Side Sewer Code (SMC, Chapter 21.16).

Required elements of this BMP include:

- For all real properties, responsible parties must examine their plumbing systems to identify any potential illicit connections. A good place to start is with an examination of the site plans. Remodeling and tenant improvement projects are particularly susceptible to inadvertent illicit connections. If an illicit connection is suspected, trace the source using closed-circuit television inspection (CCTV), dye test with a nontoxic dye, smoke testing, flow test, or visual reconnaissance. These tests are typically best performed by qualified personnel such as a plumbing contractor. Notify the Washington State Department of Ecology (Ecology) Northwest Regional Office at (425) 649-7000 and Seattle Public Utilities (SPU) at (206) 386-1800 prior to performing a dye test that may result in a discharge to a receiving water.
- If illicit connections are found, permanently plug or disconnect the connections.
- Obtain all necessary permits for altering or repairing side sewers and plumbing fixtures. Restrictions on certain types of discharges, particularly industrial process waters, may require pretreatment of discharges before they enter the sanitary sewer. It is the responsibility of the property owner or business operator to obtain the necessary permits and to replace the connection.
- The Stormwater Code allows the Director to require that a responsible party provide or create site drainage and sewer system maps with verified discharge points to aid in identifying illicit connections and/or to verify that illicit connections are eliminated.
- Eliminate illicit discharges to drainage systems and receiving waters.

2.1.2. *BMP 2: Perform Routine Maintenance*

Sediment and pollutants can accumulate over time in various components of drainage collection, conveyance, and treatment systems, such as catch basins, ditches, storm drains, and oil/water separators. When a storm event occurs, the excessive sediment and pollutants can become mobilized and carried into receiving waters, the public drainage system, or a public combined sewer. Performing routine maintenance is required and helps prevent sediment and pollutants from discharging downstream.

Required elements of this BMP include:

- Inspect all conveyance, detention and treatment systems at least annually and clean or repair structures whenever the condition thresholds described in *Appendix G* are triggered. Systems in industrial areas or areas that receive excessive sediment, foliage or debris may require more frequent inspection and maintenance. If leaves or woody debris accumulate on catch basins and inlets, clean as needed to prevent flooding.
- Clean catch basins when they are greater than 60 percent full of sediment, within 6 inches of the bottom of the lowest pipe, or there are obvious signs of pollution visible. At 60 percent capacity, there is not enough settling space to remove sediment from stormwater and they cease to function as designed.
- All catch basins are required to have outlet traps (downturned elbow). Outlet traps help to keep oil and other floatables from discharging to the public drainage system, public combined sewer, or receiving waters. Replace or repair outlet traps when missing or damaged. When catch basins lack sufficient depth or room to install an outlet trap, evaluate the drainage system to determine if there is an appropriate downstream location and install an outlet trap at that location.
- Properly dispose of all solids, polluted material, and stagnant water collected through system cleaning. Do not decant untreated, treated, or filtered water back into drainage system. Do not jet material downstream into the system. In all systems, known or suspected contaminated material may need to be tested for additional disposal requirements.

Consider posting “Dump No Waste” or other warning signs adjacent to inlets/catch basins where possible.

Several contractors offer cleaning services for drainage systems. A list of contractors can be found on the SPU website, online, or in the Yellow Pages under entries such as “Sewer Contractors.”

2.1.3. *BMP 3: Dispose of Fluids and Wastes Properly*

For all real properties, responsible parties must properly dispose of solid and liquid wastes and contaminated stormwater and street waste solids. There are generally five options for disposal, depending on the type of waste:

1. Recycling facilities
2. Permitted centralized waste treatment facilities
3. Municipal solid waste disposal facilities
4. Hazardous waste treatment, storage, and disposal facilities
5. Sanitary sewer or combined sewer

Some liquid wastes and contaminated stormwater (depending on the pollutants and associated concentrations) may be discharged to the sanitary sewer system, but are subject to approval by the City and King County. Restrictions on certain types of discharges may require pretreatment of discharges before they enter the sanitary sewer.

If wastes cannot be legally discharged to a sanitary sewer, 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 properly.

Contaminated street waste solids must be handled by following either the guidance in Management of Street Waste Solids and Liquids in Appendix IV-B of the *Stormwater Management Manual for Western Washington* (SWMMWW) (Ecology 2019) or the Dangerous Waste Regulations (Washington Administrative Code [WAC], Chapter 173-303), if applicable.

For assistance with finding recycling facilities, refer to the King County Green Tools web page (<https://kingcounty.gov/depts/dnrp/solid-waste/programs/green-building.aspx>).

For assistance in determining where to take motor oil, pesticides, smoke alarms, fluorescent bulbs, and other hazardous materials, refer to the Local Hazardous Waste Management Program website (www.hazwastehelp.com).

Required elements of this BMP include:

- Dispose of wastes in accordance with applicable solid waste, dangerous waste, industrial waste, and other regulations.

2.1.4. *BMP 4: Proper Storage of Solid Wastes*

This BMP applies to properties that store solid wastes, including garbage, recyclables, compostable materials, and cooking grease containers outdoors. If improperly stored, these wastes can contribute a variety of pollutants to stormwater.

Required elements of this BMP include:

- Store all solid wastes in suitable containers (Figure 1). Check storage containers and trash compactors for damage and replace them if they are leaking, corroded, or otherwise deteriorating.



Figure 1. Covered Outdoor Storage of Solid Wastes.

- Ensure that storage containers have leakproof lids or are covered by some other means, and that lids are closed at all times.
- Sweep the waste storage area or clean frequently to collect all loose solids for proper disposal in a storage container.
- Connect trash compactors equipped with a drain hose to the sanitary sewer.
- Connect areas containing dumpsters and trash compactors to the sanitary sewer, unless equipped with a drain hose.
- Contain and properly dispose of washwater pursuant to BMP 17 (Cleaning or Washing) when washing dumpsters and used cooking oil containers.
- Clean up leaks and spills as they occur. Keep the area around used cooking oil storage containers clean and free of spilled grease, oils, food waste, and debris.

- Storage Container Requirements for Used Cooking Oil:
 - Store used cooking oil containers indoors or on private property. When authorized by the Seattle Department of Transportation (SDOT) and SPU Solid Waste, containers can be stored in the right-of-way.
 - Owners of used cooking oil containers must implement the following:
 - Label each used cooking oil container with the following:
 - The name and phone number of container owner
 - Contains used cooking oil
 - Report spills by calling SPU at (206) 386-1800
 - Record all authorized users specific to each container.
 - Place and maintain lids on used cooking oil storage containers to prevent rainwater intrusion.
 - Do not fill storage containers beyond 90 percent of their capacity. If accumulated used cooking oil exceeds 90 percent of the capacity of the storage container, obtain and use another suitable storage container.
 - Ensure that screens are kept clean and clear of debris.
 - Used cooking oil containers must be located to prevent tipping, spillage, vandalism, and vehicle impact. Spills resulting from damage, tipping, vandalism, and leaks are the responsibility of the owner of the container. Recommended approaches include:
 - Store used cooking oil in containers inherently resistant to tipping. Barrels are not tip resistant.
 - Locate used cooking oil containers on a level surface or secure them to prevent tipping.
 - Store used cooking oil in containers with a tight-fitting leak-resistant lid.
 - Store used cooking oil containers within a building or in a locked and secure area to prevent unauthorized use or vandalism.
 - Protect used cooking oil containers from vehicle impact by fenced enclosures, bollards, or other physical barriers.
 - Do not attempt to transfer used cooking oil from the kitchen to the used cooking oil container using overfilled small containers.

2.1.5. BMP 5: Spill Prevention and Cleanup

Leaks and spills can damage public infrastructure, interfere with sewage treatment and cause a threat to human health or the environment. Spills are often preventable if appropriate chemical and waste handling techniques are practiced effectively and the spill response plan is immediately implemented. Additional spill control requirements may be required based on the specific activity occurring on site.

A spill can be a one-time event, a continuous leak, or frequent small spills. All types must be addressed. Spills resulting from vandalism or inadequate waste management are the responsibility of the waste owner.

Businesses and real properties that load, unload, store, and manage liquids or other erodible materials must implement this BMP.

2.1.5.1. Spill Prevention

Implement the following practices and provide spill cleanup kits (*Section 2.1.5.3*) at activity locations where spills may occur:

- Clearly mark or label all containers that contain potential pollutants.
- Store and transport liquid materials in appropriate containers with tight-fitting lids.
- Place drip pans underneath all containers, fittings, valves, and where materials are likely to spill or leak. Check drip pans periodically to prevent overflow during rain events.
- Use tarpaulins, ground cloths, or drip pans in areas where materials are mixed, carried, and applied to capture any spilled materials.
- Train employees on the safe techniques for handling materials used on the site and to check for leaks and spills.

2.1.5.2. Spill Plan

- Develop and implement a spill plan and update it annually or whenever there is a change in activities or staff responsible for spill cleanup. Post a written summary of the plan at areas with a high potential for spills, such as loading docks, product storage areas, waste storage areas, and near a phone (Figure 2). The spill plan may need to be posted at multiple locations. Describe the facility, including the owner's name, address, and telephone number; the nature of the facility activity; and the general types of chemicals used at the facility.
- Designate spill response employees to be on the site during business activities. Provide a current list of the names, and telephone numbers (office and home) of designated spill response employee(s) who are responsible for implementing the spill plan.
- Provide a site plan showing the locations of storage areas for chemicals, inlets/catch basins, spill kits and other relevant infrastructure or materials information.
- Describe the emergency cleanup and disposal procedures. Note the location of the spill kit in the spill plan.
- List the names and telephone numbers of public agencies to contact in the event of a spill. Refer to *Section 2.1.5.4* for more information.



Figure 2. Waste Storage Area with Spill Kit and Posted Spill Plan.

2.1.5.3. Spill Cleanup Kit

Store spill cleanup kits near areas with a high potential for spills so that they are easily accessible in the event of a spill. The contents of the spill kit must be appropriate to the types and quantities of materials stored or otherwise used at the facility, and refilled when the materials are used. A spill kit may include the following items:

- Absorbent pads
- Sorbent booms or socks
- Absorbent granular material (such as kitty litter)
- Protective clothing (such as latex gloves and safety goggles)
- Thick plastic garbage bags
- Drain cover

2.1.5.4. Spill Cleanup and Proper Disposal of Material

In the event of a spill, implement the following procedures:

- Implement the spill plan immediately.
- Contact the designated spill response employee(s).
- Block off and seal nearby inlets/catch basins to prevent materials from entering the drainage system or combined sewer.
- At the earliest possible time, but in any case within 24 hours, report all spills, discharges, or releases that have impacted or could impact a drainage system, a combined sewer, a sanitary sewer, or a receiving water to the SPU Operations Response Center at (206) 386-1800. This reporting requirement is in addition to, and not instead of, any other reporting requirements under federal, state, or local laws. Other agencies may include Seattle Fire Department (206) 386-1400, Ecology (425) 649-7000 and the National Response Center (800) 424-8802. Spill reporting should take priority over the collection of supporting information. In case of emergency, dial 911.
- Use an appropriate material to clean up spills. Do not use emulsifiers or dispersants such as liquid detergents or degreasers unless they are cleaned up afterwards.
- Do not wash absorbent materials into interior floor drains or inlets/catch basins. Pick up all absorbent materials for proper disposal after application. Spill cleanup is incomplete until all absorbent materials have been recovered.
- Dispose of used spill control materials in accordance with the Seattle Solid Waste Collection Code (SMC, Chapter 21.36), Dangerous Waste Regulations (WAC, Chapter 173-303), and applicable laws.

The SPU Green Business Program is a free conservation program funded by SPU. The program offers free technical assistance, free spill kits, and assistance in developing a spill plan. They can be reached by calling (206) 343-8505 or on the City's website (www.seattle.gov/util/ForBusinesses/GreenYourBusiness).

2.1.6. BMP 6: Provide Oversight and Training for Staff

The key to sustaining BMPs is to ensure that staff are properly trained in their purpose and maintenance requirements. Assign source control maintenance as a job responsibility for staff.

For all businesses and public entities, required elements of this BMP include:

- Train all team members annually in the operation, maintenance, and inspection of BMPs. Keep training records on file.
- Train all team members annually in spill cleanup.
- Assign an employee to oversee implementation and management of stormwater source control BMPs.

The SPU Green Business Program is a free conservation program funded by SPU. The program offers free technical assistance and can assist with employee training. They can be reached by calling (206) 343-8505 or on the City's website (www.seattle.gov/util/ForBusinesses/GreenYourBusiness).

2.1.7. *BMP 7: Property Maintenance*

Good property maintenance reduces the potential for stormwater to come into contact with pollutants and can reduce maintenance intervals for the drainage system and combined sewer.

Public and commercial parking lots such as those for retail stores, fleet vehicles (including rent-a-car lots and car dealerships), and equipment sale and rental businesses; equipment storage yards; parking lot driveways; and restaurant drive-throughs can be sources of toxic hydrocarbons and other organic compounds, including oils and greases, metals, and suspended solids. Even sidewalks may need occasional cleaning and could generate pollutants.

For all businesses and public entities, required elements of this BMP include:

- Locate pollution generating activities away from stormwater pathways, such as inlets/catch basins, conveyance pipes, and ditches.
- Sweep or vacuum paved areas used for loading and unloading of materials, outdoor production and manufacturing, driveways, parking lots, sidewalks, and storage areas as needed to prevent pollutant transport off site or to the drainage system. Mechanical or hand sweeping may be necessary for areas that a vacuum sweeper cannot reach.
- Do not hose down or otherwise transport pollutants from any area to the ground, drainage system, combined sewer, or receiving water except where permissible pursuant to SMC, Section 22.802.030.
- Discharges of street and sidewalk washwater may be permitted when surfaces are swept prior to washing, detergents are not used, and water use is minimized.
- Promptly contain and clean up solid and liquid leaks and spills (refer to BMP 5 for specific information on spill prevention and cleanup).
- Inspect areas used for loading and unloading, material/waste storage, and vehicle parking as needed to prevent pollutant transport off site or to the drainage system.
- Place drip pans, absorbent pads, or other containment vessels below leaking vehicles (including inoperable vehicles and equipment) in a manner that catches leaks or spills. Drip pans or other containment measures must be managed to prevent overfilling and the contents disposed of properly. Absorbent pads must be weighted down so they do not blow away and must be inspected and changed out and disposed of properly before becoming fully saturated.
- For properties other than those that drain only to the combined sewer, an oil removal system such as an American Petroleum Institute (API) oil/water separator, coalescing plate oil/water separator, catch basin filter sock, or equivalent BMP that is approved by SPU is required for parking lots that meet the threshold for vehicle traffic intensity of a “high-use site.” Refer to SMC, Section 22.801.090 for the definition of “high-use site.”

2.2. Required Best Management Practices for Specific Activities

For business and public entities with specific pollution-generating activities, the following BMPs must be implemented to prevent or minimize pollutants from leaving a site or property:

- BMP 9: Fueling at Dedicated Stations
- BMP 10: Mobile Fueling of Vehicles and Heavy Equipment
- BMP 11: In-Water and Over-Water Fueling
- BMP 12: Maintenance and Repair of Vehicles and Equipment
- BMP 13: Concrete and Asphalt Mixing and Production
- BMP 14: Concrete Pouring, Concrete/Asphalt Cutting, and Asphalt Application
- BMP 15: Recycling, Wrecking Yard, and Scrap Yard Operations
- BMP 16: Storage of Liquids in Aboveground Tanks

Stormwater Code Language	References
<p>SMC, Section 22.803.040 – <i>For all discharges, source controls shall be implemented, to extent allowed by law, by businesses and public entities for the following specific pollution-generating activities as specified in the joint SPU/DPD Directors’ Rule titled “Seattle Stormwater Manual” at “Volume 4 – Source Control,” to the extent necessary to prevent prohibited discharges as described in subsection 22.802.020.A through subsection 22.802.020.D, and to prevent contaminants from coming in contact with drainage water or being discharged to the drainage system, public combined sewer, or directly into receiving waters:</i></p> <ol style="list-style-type: none"> 1. <i>Fueling at dedicated stations, for new or substantially altered fueling stations.</i> 2. <i>Mobile fueling of vehicles and heavy equipment.</i> 3. <i>In-water and over-water fueling.</i> 4. <i>Maintenance and repair of vehicles and equipment.</i> 5. <i>Concrete and asphalt mixing and production.</i> 6. <i>Concrete pouring, concrete/asphalt cutting, and asphalt application.</i> 7. <i>Recycling, wrecking yard, and scrap yard operations.</i> 8. <i>Storage of liquids in aboveground tanks.</i> 	<ul style="list-style-type: none"> ● None provided

2.2.2. *BMP 10: Mobile Fueling of Vehicles and Heavy Equipment*

This BMP applies to businesses and public agencies that fill fuel tanks of vehicles and equipment by means of tank trucks driven to sites where the vehicles are located (also known as mobile fueling, fleet fueling, wet fueling, or wet hosing).

Description of Pollutants

Typically, stormwater contamination at mobile fueling locations is caused by leaks or spills of fuels and automotive fluids. These materials contain organic compounds, oils and greases, and metals that can be harmful to humans and to the aquatic environment. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Required BMP Elements

The following BMPs or equivalent measures are required of all businesses (organizations or individuals) and public agencies that conduct mobile fueling of vehicles and heavy equipment:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Mobile fueling operations must be permitted by the Seattle Fire Department.
- In fueling locations near sensitive aquifers, designated wetlands, wetland buffers, or other receiving water, compliance with additional local requirements may be required.
- Train the driver/operator annually in spill prevention and cleanup. Make all employees aware of the significant liability associated with fuel spills. New employees must be trained upon hiring. Document and keep all training records.
- Develop and follow a written fuel operation plan that is:
 - Properly signed and dated by the responsible manager
 - Retained at headquarters and distributed to all operators, along with the spill plan
 - Made available in the event that an authorized government agency requests a review
- Ensure that the driver/operator is present and constantly observing and monitoring the fuel transfer location during fuel transfer. Implement the following procedures at fuel transfer locations:
 - To the extent practical, locate the point of fueling at least 25 feet from the nearest inlet/catch basin or inside an impervious containment area with a volumetric holding capacity equal to or greater than 110 percent of the fueling tank volume, or cover the inlet/catch basin to ensure there is no inflow of spilled or leaked fuel. Before removing drain cover, check for sheen. Do not remove if sheen is present and properly dispose of contaminated material.
 - Place a drip pan or an absorbent pad under each fueling location prior to and during all dispensing operations. The pan must be watertight and must have a minimum capacity of 5 gallons.

- Handle and operate fuel transfer hoses and nozzles, drip pan(s), and absorbent pads to prevent fuel spills and leaks from reaching the ground, receiving water, and inlets/catch basins.
- Avoid extending the fueling hoses across a traffic lane without a cone barrier and do not allow vehicles to drive over fuel hoses.
- Do not “top off” fuel tanks.
- Use automatic shutoff nozzles for dispensing the fuel. Replace automatic shutoff nozzles as recommended by the manufacturer.
- Inspect, maintain, and replace equipment on fueling vehicles, particularly hoses and nozzles, at established intervals to prevent failures. Document and keep all inspection records on file.
- Use an adequate lighting system at the filling point.
- At a minimum, maintain the following spill cleanup materials in a readily accessible location in all fueling vehicles:
 - Non-water-absorbent materials capable of absorbing 15 gallons of diesel fuel
 - An inlet/catch basin plug or cover
 - A non-water-absorbent containment boom at least 10 feet long with a 12-gallon absorbent capacity
 - A non-spark-generating shovel
 - Adequate means to hold spent absorbents generated by a 15-gallon spill for disposal.
- Immediately remove and properly dispose of fuel-contaminated soils with visible surface contamination to prevent the spread of chemicals to groundwater or receiving water via stormwater runoff.
- Immediately notify the Seattle Fire Department (911), the Ecology Northwest Regional Office (425) 649-7000, and SPU (206) 386-1800 in the event of a spill. Establish a “call down list” to ensure the rapid and proper notification of management and government officials if any significant amount of product is discharged from the site. Keep the list in a protected but readily accessible location in the mobile fueling truck. The “call down list” should also identify spill response contractors available in the area to ensure the rapid removal of significant product spills into the environment. Include this bullet item in the fuel operation plan.
- Do not use dispersants to clean up spills or sheens unless they will be picked up for proper disposal.

2.2.4. *BMP 12: Maintenance and Repair of Vehicles and Equipment*

This BMP applies to businesses and public agencies on whose premises oil, fuel, 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.

Description of Pollutants

Pollutants of concern are total petroleum hydrocarbons, toxic organic compounds, oils and greases, pH, and metals. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Required BMP Elements

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in vehicle and equipment repair and maintenance activities:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Inspect all incoming vehicles and equipment for leaks and spills. Clean up all leaks and spills as they occur. Drain all fluids that have the potential to leak from wrecked vehicles and from equipment when they arrive. Store and dispose of fluids properly.

A spill can be a one-time event, a continuous leak, or frequent small spills. All types must be addressed as prescribed in BMP 5 (Spill Prevention and Cleanup).

- Maintenance and repair activities must be conducted inside a building or other covered impervious containment area that is sloped to prevent run-on of uncontaminated stormwater and runoff of contaminated water. If an emergency situation requires immediate repair outside, containment devices must be used.
- Make sure all outside materials that have the potential to leach or spill to the drainage system are covered and contained or moved to an indoor location.
- Maintenance and repair areas cannot be hosed down. Instead, they must be swept weekly or more often as needed to collect dirt.
- Wastes, such as washwater, may not be discharged to the stormwater system or receiving waters except as conditionally allowed in SMC, Section 22.802.030. Do not discharge vehicle fluids to the drainage system, sanitary sewer, or receiving waters.
- Maintenance and repair shop floor drains must discharge to the sanitary sewer. Do not allow drains inside maintenance buildings to connect to the sanitary sewer without prior approval by SPU, King County, or both.
- If extensive staining and oily sheen are present, absorbent pillows or booms must be used in or around catch basins and properly maintained to prevent oil from entering the drainage system. If operational BMPs are insufficient to prevent and manage recurrent oily discharges, then structural source control measures may be required.

2.2.5. *BMP 13: Concrete and Asphalt Mixing and Production*

This BMP applies to businesses and public agencies that mix raw materials onsite to produce concrete or asphalt.

Description of Pollutants

Pollutants of concern include petroleum hydrocarbons, toxic organic compounds, oils and greases, metals, and pH. Not only can concrete pouring activities severely alter the pH of stormwater runoff, but slurry from aggregate washing can harden in drainage infrastructure, thereby reducing capacity, which can result in flooding. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Required BMP Elements

Activities associated with concrete and asphalt mixing and production may require an NPDES permit from Ecology. Refer to Ecology's website (<https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits>) or call Ecology at (360) 407-6000 to determine if the site activities trigger permit coverage.

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in activities related to concrete and asphalt mixing and production at stationary sites:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Cover production areas to protect them from contact with stormwater.
- Recycle all process water from production, pouring, and equipment cleaning or discharge it to a dead-end sump, process water treatment system, or the sanitary sewer. Obtain all necessary permits for discharge to the sanitary sewer.
- Never discharge washout from fresh concrete or concrete mixing into streets, sidewalks, drainage systems, or receiving waters.
- Segregate production areas from stormwater inputs. Any stormwater that mixes with production areas is considered process water and cannot be discharged to the drainage system or receiving waters. Obtain all necessary permits for discharge to the sanitary sewer.
- Establish a BMP maintenance schedule and educate employees annually about the need to prevent stormwater contamination through regular BMP maintenance. Document and keep all maintenance training records on hand.
- Use absorbent materials or catch basin filter socks (Figure 5) in and around inlets/catch basins to help filter out solids. If catch basin filter socks are used, maintain the filters regularly (weekly or as needed) to prevent plugging. Stormwater contaminated with concrete or asphalt must not enter the drainage system.

Catch basin filter socks only remove solids and do not provide treatment for other pollutants associated with concrete and asphalt mixing and production.

- Sweep the production and pouring area, driveways, gutters, and all other outdoor areas daily or more often as necessary to collect fine particles and aggregate for recycling or proper disposal.



Figure 5. Commercially Available Catch Basin Filter Sock.

- Do not wash or hose down areas that flow to the drainage system.
- Make sure all outside materials that have the potential to leach or spill to the drainage system are covered, contained, or moved to an indoor location.
- Collect, treat, and properly dispose of runoff that comes in contact with release agents.
- If operational controls do not prevent stormwater contamination, treatment BMPs may be necessary.

For information about water quality treatment BMPs for activities related to concrete and asphalt mixing and production at stationary sites, refer to *Volume 3 – Project Stormwater Control*. For a current list of proprietary and emerging water quality treatment technologies, refer to Ecology’s website (<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies>).

Recommended BMPs

Although not required, the following BMPs are recommended to further prevent and minimize the contamination of stormwater resulting from concrete and asphalt mixing and production activities:

- Pave the mixing and production areas. A sump drain in these areas is not advisable due to potential clogging problems. Sweep these areas to remove loose aggregate and recycle or properly dispose of the aggregate.
- Use catch basin covers or similarly effective containment devices to prevent runoff from entering the drainage system.

2.2.6. *BMP 14: Concrete Pouring, Concrete/Asphalt Cutting, and Asphalt Application*

This BMP applies to businesses and public agencies that apply asphalt or pour or cut concrete or asphalt for building construction and remodeling; road construction; repair and construction of sidewalks, curbs, and gutters; sealing of driveways and roofs; and other applications.

Description of Pollutants

Pollutants of concern include petroleum hydrocarbons, toxic organic compounds, oils and greases, metals, suspended solids, and pH. Not only can concrete pouring activities severely alter the pH of stormwater runoff, but slurry from aggregate washing can harden in stormwater pipes, thereby, reducing their capacity and resulting in flooding. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Required BMP Elements

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in activities related to concrete pouring and cutting and asphalt application:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Sweep or shovel and collect loose aggregate chunks and dust for recycling or proper disposal at the end of each workday or as needed, 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 system. Never hose down concrete or asphalt waste materials to an inlet/catch basin, ditch or receiving water.
- Place catch basin covers or similarly effective containment devices over all nearby drains at the beginning of each workday.
- Shovel and/or vacuum all slurry and remove from the site. All accumulated runoff and solids must be collected and properly disposed of at the end of each workday, or more often if necessary.
- Make sure all outside materials that have the potential to leach or spill to the drainage system are covered, contained, or moved to an indoor location.
- Use a mechanism for containment and collection of the discarded concrete slurry when performing exposed aggregate washing, where the top layer of unhardened concrete is hosed or scraped off to leave a rough finish. Dispose of the slurry properly.
- Use a catch basin filter sock to remove solid materials from inlets/catch basins. Maintain the filter regularly to prevent plugging. Stormwater contaminated with concrete or asphalt must not enter the drainage system.
- Perform cleaning of concrete application and mixing equipment or concrete delivery vehicles in a designated area where the rinse water can be controlled and properly disposed of.
- Collect, treat, and properly dispose of runoff that comes in contact with diesel or coatings used in asphalt applications, cleanup, or transportation.
- Collect, treat, and properly dispose of runoff from cutting activities.

Recommended BMPs

Although not required, the following BMPs are recommended to further prevent and minimize the contamination of stormwater resulting from concrete pouring and cutting and asphalt application at temporary sites:

- Avoid the activity when rain is falling 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.
- Recycle broken concrete and asphalt. Search for “Recycling Services” online to find a local recycler.

CHAPTER 3 – BUSINESS AND PUBLIC ENTITY BEST MANAGEMENT PRACTICES FOR SPECIFIC ACTIVITIES

In addition to BMP 1 through BMP 8 for all real property (*Section 2.1*) and BMP 9 through BMP 16 for specific activities for all real property (*Section 2.2*), there are many additional source control BMPs that may be required depending on the specific activities that occur or will occur at a business or a public entity, except those that drain only to the combined sewer. Source control requirements are outlined in Seattle Municipal Code (SMC), Section 22.803.040 (Minimum Requirements for Source Controls for All Businesses and Public Entities) and SMC, Section 22.805.020.K (Install Source Control BMPs).

Before reading this chapter, fill out the worksheet in *Section 1.6* to identify which site-specific activities require BMPs.

3.1. Cleaning or Washing

The cleaning or washing of vehicles, aircraft, vessels, engines, tools, cooking equipment, manufacturing equipment, and buildings are pollution generating activities when not conducted properly. When these activities are performed, the resulting washwater usually contains soap or detergents, and can contain a variety of pollutants that contaminate stormwater. The specific BMPs that apply to cleaning and washing are presented in this section.

The discharge from some maintenance activities may be allowed, provided they meet the conditions outlined in the Stormwater Code. Those maintenance activities include street and sidewalk washing and routine external building washdown. Refer to the required provisions and conditions outlined in the Stormwater Code (SMC, Chapters 22.800 through 22.808).

Remember to also implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).

3.1.1. *BMP 17: Cleaning or Washing*

This BMP applies to cleaning, washing, and rinsing activities, including pressure washing and steam cleaning. The purpose of cleaning and washing activities is to remove pollutants from equipment, vehicles, boats and buildings; these pollutants should not be discharged to the public drainage system.

Description of Pollutants

Source pollutants include surfactants; petroleum hydrocarbons; toxic organic compounds; fats, oils, and grease; soaps; detergents; nutrients; metals; polychlorinated biphenyls (PCBs); pH; suspended solids; substances that increase biological oxygen demand (BOD); and substances that increase chemical oxygen demand (COD).

Required BMP Elements

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in cleaning or washing activities:

- Implement all BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Provide training to employees regarding proper disposal of wastewater. This training must be documented.
- Outside drains discharge to the combined sewer, directly to local waters, or to the public drainage system, depending on the location within Seattle. Directing washwater into drains that discharge to the drainage system or local waters is not allowed unless specifically identified as conditionally permitted. Identify the type of system on your property and train employees about required BMPs accordingly.
- The following are conditionally permissible washing practices: (1) Discharges of street and sidewalk washwater when the surfaces have been swept prior to washing, detergents are not used, and water use is minimized; and (2) Discharges of water from routine external building washdown when detergents are not used and water use is minimized. These conditions must be met or the washing activity is prohibited. Sweep surfaces before cleaning/washing to remove excess sediment and other pollutants.
- Discharge wastewater from cleaning or washing activities into the sanitary or combined sewer if properly approved, or into a holding tank. It is illegal to discharge washwater to the drainage system or local waters. Authorization for discharge to the sanitary or combined sewer may be required, and pretreatment may be necessary. If using a holding tank, ensure that it is properly sized and does not overflow.
- Cover and/or contain the washing activity or wash inside a building having a floor drain that discharges to the sanitary sewer.
- If roof equipment or hood vents are cleaned, ensure that no wastewater or prohibited substance (refer to SMC, Chapter 22.802) is discharged to the roof drains or drainage system.
- Label all mobile cleaning equipment as follows: “Properly dispose of all wastewater. Do not discharge to an inlet/catch basin, ditch, stream, or on the ground.”

Ecology Publication WQ-R-95-056, *Vehicle and Equipment Washwater Discharges: Best Management Practices Manual* (Ecology 2012) can be used for guidance on sumps, holding tanks, and the prevention of runoff.

For wash pads discharging directly to the sanitary sewer:

- The uncovered portion of the wash pad must be no larger than 200 square feet or must have an overhanging roof (refer to Figure 6). This is to prevent excess stormwater from entering the sanitary sewer. Covering may be required in many situations.



Figure 6. Car Wash Building with Drain to the Sanitary Sewer.

- If the uncovered wash pad cannot be less than 200 square feet, a shut off valve may be installed which will direct washwater to the sanitary sewer when the wash pad is in use, and stormwater to the drainage system when the wash pad is not in use (refer to Figure 7). The valve on the outlet may be manually operated; however, a pneumatic or electrical 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.
- The wash pad must be clearly signed as to the operation and location of the valve.
- Conduct annual training on operation of the valve system.

- If adjacent to a building or constructed over hazardous material storage areas, other regulations, including the Seattle Fire Code, may apply.
- Obtain all necessary permits for installing, altering or repairing onsite drainage and side sewers. Restrictions on certain types of discharges may require pretreatment before they enter the sanitary sewer.

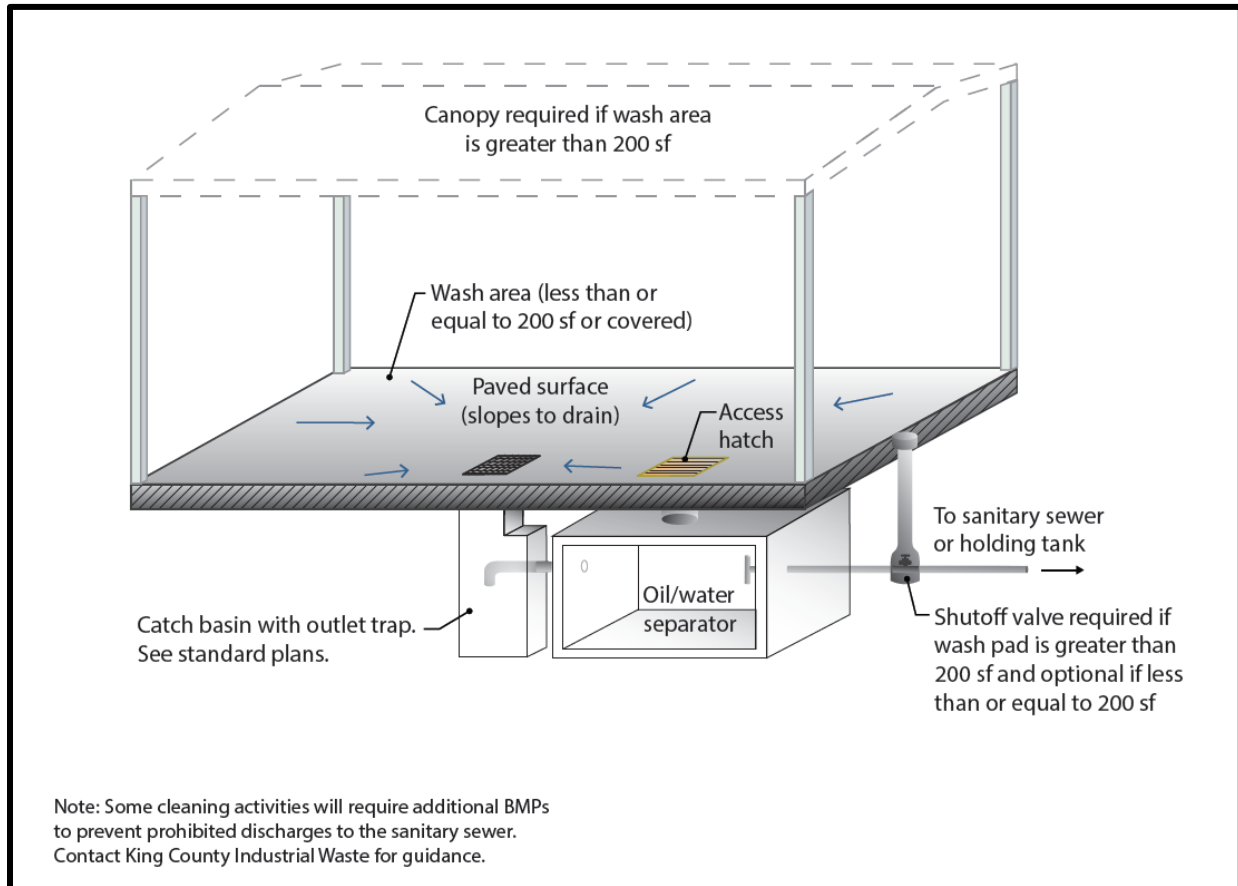


Figure 7. Schematic of Wash Pad with Sump.

Recommended BMPs

Although not required, the following BMPs can provide additional pollution control for washing activities that drain to the sanitary sewer. To reduce the potential overall pollution load to the sanitary sewer from washing operations for tools, vehicles, engines, and manufacturing equipment:

- Minimize water and detergent use in all washing operations.
- Use phosphate-free detergents when practical.
- Consider recycling the washwater by installing a closed-loop water recycling system.
- Use the least hazardous cleaning products available.
- For intermittent washing of vehicles, use a car wash that recycles washwater and discharges to the sanitary sewer.

3.2. Transfer of Liquid or Solid Materials

The transfer of liquid or solid materials, including the loading and unloading of such material, fueling of vehicles or equipment at mobile or designated locations, and vehicle and equipment repair and maintenance are activities that have a high risk for spills or leaks of toxic material. Both required and recommended BMPs can help prevent, minimize, and manage the effects of accidental spills or leaks. The specific BMPs that apply to the transfer of particular types of liquid and solid materials are presented in this section.

Remember to also implement BMP 1 through BMP 8 for all real property from *Section 2.1*.

3.2.1. *BMP 18: Loading and Unloading of Liquid or Solid Material*

This BMP applies to businesses and public agencies engaged in the loading and unloading of liquid or solid materials or the transfer of non-containerized bulk materials. Sources of pollution include loading docks, vehicles, and equipment involved in material handling. These activities are typically conducted at shipping and receiving areas, outside storage areas, and fueling areas.

Description of Pollutants

Leaks and spills of fuels, oils, powders, organic compounds, nutrients, metals, food products, salts, acids, and alkalis during transfer are potential sources of stormwater contamination. Spills from breaks in hydraulic lines and leaking forklifts are common problems at loading docks. Many inlets/catch basins in Seattle discharge directly to local streams and waterways and therefore spilled or leaked products can adversely affect water quality and harm both people and aquatic organisms that come in contact with the contaminated water. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Required BMP Elements

The following BMPs or equivalent measures are required in all loading and unloading areas:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Sweep as often as necessary to prevent material contact with stormwater and to remove accumulated debris and other material that could otherwise be washed off by stormwater. Do not sweep this debris into drainage infrastructure.
- Place drip pans or other appropriate temporary containment devices in locations where leaks or spills may occur, such as hose connections, hose reels, and filler nozzles (Figure 8).
- Always use drip pans when making and breaking connections. Clean drip pans after each use to remove any residual material. Dispose of any residual material in accordance with the Seattle Solid Waste Collection Code (SMC, Chapter 21.36) and the state Dangerous Waste Regulations (WAC, Chapter 173-303).
- Inspect loading and unloading areas after each delivery for leaks and spills and clean up immediately.
- Check material handling equipment such as valves, hoses, pumps, flanges, and connections regularly for leaks, and repair as needed. Document and keep all inspection records. Store contaminated equipment inside or under cover to prevent residual material from coming into contact with stormwater.
- Provide impervious containment with berms, dikes, etc., and/or cover the loading/unloading area to prevent run-on and runoff of contaminated stormwater. Maintain drainage areas in and around storage areas for 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 for collection or to internal “alleyways” where no stockpiled material is kept.



Figure 8. Temporary Containment Device Placed Under a Hose Connection.

The following BMPs or equivalent measures are required in areas of transfer from tanker trucks and railcars to aboveground or underground storage tanks:

- To minimize the risk of accidental spillage, prepare and follow an “Operations Plan” that describes procedures for loading/unloading. Train employees on the plan.
- For rail facilities, install and maintain a drip pan system within the rails to collect spills and leaks from tank cars, hose connections, hose reels, and filler nozzles.

The following BMPs or equivalent measures are required in areas of loading and unloading from or to marine vessels:

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

- For requirements related to the transfer of small quantities from tanks and containers:
- Refer to BMP 28 for storage of portable containers of liquid or dangerous waste containers (*Section 3.4.3*) and BMP 16 for storage of liquids in aboveground tanks (*Section 2.1.16*).

Recommended BMPs

Although not required, the following BMPs can provide additional pollution protection:

- Whenever possible, conduct the activity indoors or under cover to minimize exposure to stormwater.
- For the transfer of liquids in areas that cannot contain a catastrophic spill, install an automatic shutoff system in case of an unanticipated interruption in off-loading (e.g., a coupling break, hose rupture, or overfill).
- Install and maintain overhangs (Figure 9) or door skirts that enclose the trailer end to prevent contact with stormwater.



Figure 9. Loading Docks with an Overhang to Prevent Material Contact with Stormwater.

Mobile Fueling of Vehicles and Heavy Equipment (BMP 10) (*Section 2.1.10*) is recommended in areas of transfer from tanker trucks to aboveground or underground storage tanks; it includes:

- 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 or equivalent.
- Construct a slope, berm, or dike to direct runoff from the transfer area to a dead-end sump, spill containment sump, spill control oil/water separator, or other spill control device. The minimum spill retention time should be 15 minutes for the flow rate of the dispensing mechanism with the highest through-put rate, or at the peak flow rate of the 6-month, 24-hour storm event (or 91 percent of the total runoff volume for the simulation period if using continuous runoff modeling) 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.

3.3. Production and Application

Production and application activities are associated with a high risk for spills or leaks of toxic material. Required and recommended BMPs can help to prevent, minimize, and manage accidental spills or leaks so that there are minimal environmental impacts. The specific BMPs that apply to particular types of production and application activities are presented in this section.

Remember to also implement BMP 1 through BMP 8 for all real property from *Section 2.1*.

3.3.2. *BMP 20: Processing of Treated Wood*

This BMP applies to businesses and public agencies that perform wood treatment including both anti-staining and preserving using pressure processes, dipping, or spraying. It also applies to businesses and public agencies that cut treated wood outside.

Description of Pollutants

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 (leakage of preservative as it returns to normal pressure).

Potential pollutants typically include wood treating chemicals, substances that increase biological oxygen demand (BOD), suspended solids, oils and greases, benzene, toluene, ethylbenzene, phenol, chlorophenols, nitrophenols, metals such as chromium and zinc, and polycyclic aromatic hydrocarbons (PAHs). Potential pollutants depend on the chemical additive used. Wood preservatives and antistaining chemical additives include creosote, creosote/coal tar, pentachlorophenol, copper naphthenate, arsenic trioxide, and inorganic arsenicals. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Required BMP Elements

Activities associated with processing treated wood may require an NPDES permit from Ecology. Refer to Ecology's website (<https://ecology.wa.gov/Water-Shorelines/Water-quality/Runoff-pollution/Stormwater>) or call Ecology at (360) 407-6000 to determine if the site activities trigger permit coverage.

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in activities related to wood treatment:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).

Production Areas:

- Cover and/or enclose the following and contain with impervious surfaces:
 - All wood treatment areas
 - All treated wood
 - All associated wastes
- Segregate clean stormwater from process water. Convey all process water to an approved treatment system and discharge to the sanitary sewer or haul off site. Obtain all necessary permits for discharge to the sanitary sewer.
- Dedicate equipment that is used for treatment activities to prevent the tracking of treatment chemicals to other areas on site.

- For areas around dip tanks, spray booths, and retorts:
 - Eliminate non-process traffic on the drip pad.
 - Scrub down non-dedicated lift trucks on the drip pad.
 - Construct a slope and direct the drainage in a manner that allows treatment chemicals to flow back to the wood treatment process.
 - Seal any holes or cracks in the asphalt areas subject to contamination with wood treatment chemicals.

Storage Areas:

- Cover and/or enclose storage areas for treated wood and contain with impervious surfaces. Alternatively, dry lumber stacks may be thoroughly wrapped in plastic to prevent contact with stormwater, elevated, and stored in uncovered areas.
- Immediately remove and properly dispose of soils with visible surface contamination to prevent the spread of chemicals to groundwater or another receiving water from stormwater runoff.

For Treated Wood Products:

- Elevate treated wood products to prevent contact with stormwater run-on and runoff.
- Place treated wood products over the dip tank or on an inclined ramp for a minimum of 30 minutes to allow excess chemicals to drip back to the dip tank.
- Bulk storage of treated wood is permitted outside only when the units are protected from contact with stormwater by tarpaulins or wraps.
- Ensure that the wood is drip free and dry on the surface before it is moved.
- When cutting treated wood, collect all dust and debris for proper disposal.

3.3.4. *BMP 22: Landscaping and Vegetation Management*

This BMP applies to businesses and public agencies that perform landscaping, including grading, storage of landscape materials, soil transfer, vegetation removal, pesticide and fertilizer applications, and watering. Landscaping and vegetation management can include control of objectionable weeds, insects, mold, bacteria, and other pests by means of chemical pesticides and is conducted commercially at commercial, industrial, and residential sites. Examples of landscaping and lawn and vegetation management include weed control on golf courses, access roads, and utility corridors; treatment or removal of moss from rooftops, sidewalks, or driveways; killing of nuisance rodents; application of fungicides on patio decks; and residential lawn and plant care.

Description of Pollutants

Stormwater contaminants from landscaping and vegetation management activities include toxic organic compounds, metals, oils, suspended solids, pH, coliform bacteria, fertilizers, pesticides, and detergents.

Pesticides such as pentachlorophenol, carbamates, and organometallics can be released to the environment as a result of leaching and dripping from treated plants, container leaks, product misuse, and outside storage of pesticide-contaminated materials and equipment. Inappropriate management of vegetation and improper application of pesticides or fertilizers can result in stormwater contamination. These pollutants must not be discharged to the drainage system or directly into receiving waters, except as permitted by Ecology.

The Washington State Department of Agriculture regulates pesticide use and application.

Required BMP Elements

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in landscaping and vegetation management activities:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).

Landscaping:

- Do not dispose of or store collected vegetation in drainage systems, waterways, receiving waters, or public spaces. Take care to avoid contamination or site disturbance.
- Use mulch or other erosion control measures when soils or erodible materials are exposed for more than 1 week during the dry season (May 1 to September 30) or 2 days during the rainy season (October 1 to April 30).
- Comply with *Appendix I* of this manual and *S435 – BMPs for Pesticides and an Integrated Pest Management Program* in Volume IV of the SWMMWW (Ecology 2019) (referenced in BMP 49 and BMP 50) for more information.
- Implement the landscaping principles in *Volume 1, Section 7.8*, when planning, constructing, and maintaining landscaped areas.
- Comply with all landscape management plans that apply to the site (refer to *Appendix I* of this manual).

Vegetation Management:

- **Fertilizer:**
 - Apply all fertilizers using properly trained personnel. Document and keep all training records.
 - For commercial and industrial facilities, do not apply fertilizers to grass swales, filter strips, or buffer areas that drain to receiving waters.
 - Refer to *S443 – BMPs for Fertilizer Application* in Volume IV of the SWMMWW (Ecology 2019) for additional information (referenced in BMP 55).

Recommended BMPs

Although not required, the following BMPs are recommended to further prevent and minimize the contamination of stormwater resulting from landscaping and lawn and vegetation management activities:

- If adjacent to a building or constructed over hazardous material storage areas, other regulations, including the Seattle Fire Code, may apply.
- Install engineered soil and landscape systems to improve the infiltration and regulation of stormwater in landscaped areas.
- Mulch and mow whenever practical.
- Dispose of grass clippings, leaves, sticks, and other collected vegetation by composting, where feasible.
- Till fertilizers into the soil where practical rather than dumping or broadcasting them 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 greater drought-tolerance.
- Use manual and/or mechanical methods of vegetation removal rather than applying herbicides, where practical.

An amended soil and landscape system can preserve both the plant system and the soil system more effectively. This type of approach can provide a soil and landscape system with adequate depth, permeability, and organic matter to sustain itself and continue working to effectively infiltrate stormwater and provide a sustainable nutrient cycle.

Vegetation Management:

- **Material:**
 - Use topsoil layer that is at least 8 inches thick and consists of at least 8 percent organic matter to provide a sufficient growing medium for the vegetation.
 - Select the appropriate turfgrass mixture for the applicable climate and soil type.

- Fertilizer:
 - Use slow-release fertilizer and organic materials for the best availability for turf grass.
 - Time the fertilizer application to periods of maximum plant uptake. Fertilizers should be applied in amounts appropriate for the target vegetation and at the time of year that minimizes loss to surface water and groundwater.
 - Do not fertilize during a drought or when the soil is dry.
 - Refer to the *S443 – BMPs for Fertilizer Application* in the SWMMWW (Ecology 2019) for additional information (referenced in BMP 55).

3.3.5. *BMP 23: Painting, Finishing, and Coating Activities*

This BMP applies to businesses and public agencies that perform outdoor surface preparation and application of paints, finishes, and coatings to vehicles, boats, buildings, and equipment.

Description of Pollutants

Potential pollutants include organic compounds, oils and greases, metals, and suspended solids. These pollutants must not be discharged to the drainage system or directly into receiving waters.

Required BMP Elements

Activities associated with boatyard and shipyard operations may require an NPDES permit from Ecology. Refer to Ecology's website (<https://ecology.wa.gov/Water-Shorelines/Water-quality/Runoff-pollution/Stormwater>) or call Ecology at (360) 407-6000 to determine if the site activities trigger permit coverage.

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in activities related to the painting, finishing, and coating of vehicles, boats, buildings, and equipment outside.

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).

Preparation and Application:

- Train employees in the application and cleanup of paints, finishes, and coatings to reduce misuse and overspray. Document and keep all training records.
- Use ground cloths or drop cloths underneath outdoor painting, scraping, sandblasting work, and properly clean and temporarily store collected debris after each use.
- Use a catch basin cover, filter sock, or similarly effective runoff control device if dust, sediment or other pollutants may escape the work area. If catch basin filter socks are used onsite, maintain the filter regularly to prevent plugging. Stormwater contaminated with pollutants must not enter the drainage system.

Catch basin filter socks only remove solids and do not provide treatment for other pollutants associated with painting, finishing, and coating activities.

- Do not conduct spraying, blasting, or sanding activities over open water or where wind may blow paint into water. If windy conditions are present, use a curtain to contain the activity.
- While using a spray gun or conducting sand blasting, enclose and/or contain all work in compliance with applicable air pollution control requirements and those of the Occupational Safety and Health Administration (OSHA), the Washington Industrial Safety and Health Act, and the Puget Sound Clean Air Agency.

Cleanup:

- Wipe up spills with rags and other absorbent materials immediately. Do not hose down the area.
- On marine dock areas, sweep to collect debris. Do not hose down debris.
- 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. Whenever possible, conduct these activities inside or in an enclosed area.
- Clean paintbrushes and tools covered with water-based paints into drains connected to the sanitary sewer. Verify the discharge point before discharging.
- Collect solvents used to clean brushes and tools covered with non-water-based paints, finishes, or other materials. Safely and properly recycle or dispose of used solvents (e.g., paint thinner, turpentine, and xylol).

Material Storage and Disposal:

- Dispose of all waste properly and prevent all uncontrolled releases to the air, ground, or water.
- Store all paints, finishes, or solvents inside a building or in covered secondary containment.
- All containers must have tight-fitting lids able to retain the contents in the event of tipping.

Recommended BMPs

Although not required, the following BMPs are recommended to further prevent and minimize the contamination of stormwater resulting from activities related to the painting, finishing, and coating of vehicles, boats, buildings, and equipment:

- Recycle paints, paint thinner, solvents, washwater from pressure washers, 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 where feasible.
- Dispose of unused paint promptly.

3.4. Storage and Stockpiling

Activities related to the storage and stockpiling of liquid or solid materials are potentially associated with a high risk for spillage, leakage, erosion, or leaching of pollutants. Both required and recommended BMPs can help to prevent, minimize, and manage the effects of accidental spills and leaks. The specific BMPs that apply to various types of storage and stockpiling activities are presented below.

Remember to also implement BMP 1 through BMP 8 for all real property from *Section 2.1*.

3.4.1. *BMP 26: Storage of Leachable or Erodible Materials*

This BMP applies to businesses and public agencies on whose premises there will be storage of leachable and erodible materials, including, but not limited to: gravel, sand, salts, topsoil, compost, logs, sawdust, wood chips, lumber and other building materials, concrete, and non-coated galvanized metal or other leachable metal.

Description of Pollutants

If stormwater comes in contact with stockpiled materials, pollutants may be leached or erosion of the stored materials may occur. Though these materials are typically destined to be used outside, storage of large quantities of these materials awaiting sale or use can contribute high levels of localized pollutant loading. Potential pollutants include suspended solids, substances that increase biological oxygen demand (BOD), organic compounds, dissolved salts (e.g., sodium chloride, calcium chloride, and magnesium chloride), metals, and oils that may be attached to metal parts. These pollutants must not be discharged to the drainage system or directly into receiving waters. Even low levels of metals such as copper and zinc can have detrimental effects on aquatic life.

Required BMP Elements

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in the storage of leachable or erodible materials:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Store the material inside or cover and contain the material. The cover must fully prevent wind and weather contact with the polluting material. The cover must not contribute pollutants to the drainage system.
- Do not hose down the contained stockpile area to an inlet/catch basin, ditch, or to receiving waters.
- Sweep paved storage areas daily or more often as necessary to collect and dispose of loose solid materials.
- For stockpiles, implement the following:
 - Store in a covered, paved area, preferably surrounded by a berm, as shown in Figure 11. The cover must fully prevent wind and weather contact with the polluting material. The cover must not contribute pollutants to the drainage system.
 - Place temporary plastic sheeting (polyethylene, polypropylene, Hypalon, or equivalent material) over the material as illustrated in Figure 12. Anchor sheeting to prevent contact with rainfall.
 - For new or modified areas, pave and install a 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 a treatment system.
 - Slope the paved area in a manner that minimizes the contact between stormwater (e.g., pooling) and leachable materials.



Figure 11. Covered and Secured Storage Area for Bulk Solids.



Figure 12. Covered Storage Area for Erodible Material (gravel).

- For large stockpiles that cannot be covered:
 - Install containment devices such as a berm or a low wall around the perimeter of the site and at any catch basins as needed to prevent erosion of the stockpiled material, and to prevent discharge of leachate from the stockpiled material off site or to an inlet/catch basin.
 - Ensure that contaminated stormwater is not discharged directly to the drainage system without being conveyed through a treatment BMP. *Volume 3 – Project Stormwater Control* presents approved methods, requirements, criteria, details, and general guidance for analysis and design of on-site stormwater management, flow control, and water quality treatment pursuant to SMC, Chapter 22.800 through 22.808 (Stormwater Code).
 - Inspect and maintain catch basins on a regular basis (weekly or more often as needed). Stormwater contaminated with pollutants must not enter the drainage system.
- Maintain drainage areas in and around storage areas for solid materials with a minimum slope of 1.5 percent to prevent pooling and minimize leachate formation. Slope storage areas to drain stormwater to a collection area at the perimeter of the storage area or to internal drainage “alleyways” between storage areas, where material is not stockpiled.
- Make cleanup materials, such as brooms, dustpans, and vacuum sweepers, accessible for use near the storage area.

Recommended BMPs

The following BMPs are recommended to further prevent and minimize the contamination of stormwater resulting from activities related to the storage or transfer of leachable and erodible materials:

- If and when feasible, collect and recycle materials and leachate to the stockpile.
- Keep the minimum amount of stockpiled materials on site. Smaller piles minimize the loss of materials due to wind and rain and will make the piles more manageable to cover.

3.4.3. *BMP 28: Portable Container Storage*

The BMPs specified below apply to businesses and public agencies that keep containers outside on their premises that may include, but are not limited to, used automotive fluids, liquid feedstock, cleaning compounds, chemicals, dangerous wastes (liquid or solid), and contaminated stormwater. For outside storage of used cooking oil containers, refer to BMP 4.

Description of Pollutants

Leaks and spills during handling and storage of portable containers are the primary sources of pollutants. Potential pollutant constituents are oils and greases, low (acid) or high (alkaline) pH, surfactants, substances that increase biological oxygen demand (BOD), substances that increase chemical oxygen demand (COD), and toxic organic compounds.

Required BMP Elements

The following required BMPs apply to all portable containers:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Store materials in a leakproof container with a tight-fitting lid able to contain the material in the event of tipping.
- Label all containers to identify their contents. Position containers so that labels/markings are clearly visible.
- Place drip pans beneath all taps on mounted containers and at all potential drip and spill locations during the filling and draining of containers.
- Inspect container storage areas regularly for corrosion, structural failure, spills, leaks, and overfills. Check containers daily for leaks and spills. Replace containers and replace and tighten bungs in drums as needed.
- Secure containers in a manner that prevents accidental spillage, pilferage, or any unauthorized use (Figure 13 and Figure 14).



Figure 13. Covered and Secured Storage Area for Containers.



Figure 14. Containers Surrounded by a Berm in an Enclosed Area.

Recommended BMP Elements

- Wherever possible, store containers on a paved surface under a roof or other appropriate cover or in a building.

The following BMPs or equivalent measures are required for activities related to outside storage of containers of hazardous or dangerous material or wastes and liquids except potable water:

- Store containers in a designated area. Provide covered secondary containment that is capable of holding a volume of either 10 percent of the total volume of the enclosed containers or 110 percent of the volume of the largest container, whichever is greater. Provide a portable secondary containment unit or cover and pave the storage area with an impervious surface and install a berm or dike to surround the area. Slope the area to drain into a dead-end sump for the collection of leaks and small spills.
- Store containers that do not contain free liquids in a designated sloped area with the containers elevated or otherwise protected from stormwater run-on.
- Elevate metal drums to prevent corrosion and leakage.
- Ensure that the storage of reactive, ignitable, or flammable liquids complies with the Seattle Fire Code and Washington State Fire Code.

3.5. Dust, Soil Erosion, and Sediment Control

Construction, manufacturing, and industrial activities have the potential to generate significant amounts of dust, soil, and sediment, which can pollute both air and stormwater. Control measures for dust, soil, and sediment are necessary to prevent pollution, but BMPs that are not properly implemented can be harmful to stormwater and the environment.

The required and recommended BMPs for these activities are presented below. First, prevent the production of dust, soil, and sediment. Then, implement BMPs to minimize their production. Finally, manage dust, soil, and sediment so that contaminated stormwater is not conveyed to the drainage system or receiving waters.

Remember to also implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).

3.5.1. BMP 29: Dust Control in Disturbed Land Areas and on Unpaved Roadways and Parking Lots

This BMP applies to businesses and public agencies that pursue dust control measures in disturbed land areas or on unpaved roadways and parking lots. All land-disturbing activity must comply with the erosion and sediment controls described in the Stormwater Code (SMC, Chapters 22.800 through 22.808).

Description of Pollutants

Dust can result in air and water pollution, particularly at demolition sites, in disturbed land areas, and on unpaved roadways and parking lots. Chemicals applied to dust-prone areas to minimize dust production also have the potential to pollute stormwater and receiving waters if they are not properly selected or applied.

Required BMP Elements

The following BMPs or equivalent measures are required of all businesses and public agencies engaged in activities that generate dust:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Protect inlets/catch basins during application of dust suppressants. Prevent liquid dust suppressants from flowing into the drainage system during application.
- Sprinkle or wet down soil or dust with water as long as it does not result in a discharge to inlets/catch basins or receiving waters.
- Only use local and/or state government approved dust suppressant chemicals, such as those listed in Publication No. 96-433, *Methods for Dust Control* (Ecology 2016a).
- Avoid excessive and repeated application of dust suppression chemicals. Time the application of dust suppressants to avoid or minimize their wash off by rainfall or human activity (such as irrigation).
- Street gutters, sidewalks, driveways, and other paved surfaces in the immediate area of the activity must be swept regularly to collect and properly dispose of dust, dirt, loose debris, and garbage.
- Install catch basin filter socks on site and in surrounding catch basins to collect sediment and debris. Maintain the filters regularly to prevent plugging.

BMPs required for construction dust control, such as dust suppression by water spray, are provided in *Volume 2 – Construction Stormwater Control*.

3.6. Other Activities

Several activities that do not fall into the previously described categories have a high risk for generating pollutants and contaminating stormwater and receiving waters. The required and recommended BMPs for these activities are presented as follows, according to the type of activity and the potential pollutants. Regardless of the activity, an overall approach to pollutant control should first emphasize pollution prevention, then the minimization of pollution, followed by pollution management.

Remember to also implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).

3.6.3. *BMP 34: Boat Building, Maintenance, and Repair*

This BMP applies to businesses and public agencies that perform activities related to boat and shipbuilding and their repair and maintenance at boatyards, shipyards, ports, and marinas. Activities that can generate pollutants include pressure washing, surface preparation, paint removal, sanding, painting, engine maintenance and repairs, and material handling and storage. If conducted outdoors, all of these activities are associated with a high risk for contaminating receiving water.

Description of Pollutants

Potential pollutants include spent abrasive grits, solvents, oils, ethylene glycol, washwater, paint overspray, cleaners and detergents, anticorrosion compounds, paint chips, scrap metal, welding rods, resins, glass fibers, dust, and miscellaneous trash. Pollutant constituents include suspended solids, oils and greases, organic compounds, copper, lead, tin, and zinc.

Required BMP Elements

Activities associated with boatyard and shipyard operations may require an NPDES permit from Ecology. Refer to Ecology's website (<https://ecology.wa.gov/Water-Shorelines/Water-quality/Runoff-pollution/Stormwater>) or call Ecology at (360) 407-6000 to determine if the site activities trigger permit coverage.

The following BMPs or equivalent measures are required for boat and ship building, maintenance, and repair activities:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- In addition to the BMP 5 spill control requirements, include a marine containment boom in spill kits for shipyards, boatyards, and marinas.
- Locate spill kits on all piers or docks.
- Immediately clean up any spills on dock, boat, or ship deck areas and dispose of the wastes properly.
- Immediately repair or replace leaking connections, valves, pipes, hoses, and equipment that can result in the contamination of stormwater.
- Relocate maintenance and repair activities onshore if feasible to reduce the potential for direct pollution of receiving waters.
- Perform paint and solvent mixing, fuel mixing, and similar handling of liquids onshore or in a location with proper containment so that nothing can spill directly into receiving waters.
- All liquids stored over water or on docks must have covered secondary containment.
- Store all batteries and oily parts in a covered container with a tight-fitting lid.
- Store materials such as paints, tools, and ground cloths indoors or in a covered area when not in use.
- Collect spent abrasives regularly and contain or store them under cover until they can be disposed of properly.

- Sweep and clean yard areas, docks, and boat ramps at least once each week or more often as needed. Do not hose them down. Properly dispose of the collected materials. Sweep dry docks before flooding.
- When washing, do not allow any pollutants, including soap, to enter the drainage system or receiving water.
- Use fixed platforms with appropriate plastic or tarpaulin barriers as work surfaces and for containment when work is performed on a vessel in the water to prevent material or overspray from contacting stormwater or receiving water. Use of the platform approach should be kept to a minimum. Only work that is done in compliance with NPDES requirements should be done over water.

The following BMPs or equivalent measures are required for boat and ship blasting and spray painting activities:

- Move the activity indoors or enclose, cover, and contain the activity. Prohibit outside spray painting, blasting, or sanding activities during windy conditions that render containment ineffective.
- Store materials such as paints, tools, and ground cloths indoors or in a covered area when not in use.
- Contain blasting and spray painting activities by hanging tarpaulins to block the wind and prevent dust and overspray from escaping. Do not perform uncontained spray painting, blasting, or sanding activities over open water without proper protection (e.g., overspray collection, drop clothes, booms).
- Use plywood and/or plastic sheeting to cover open areas between decks when sandblasting.
- Use ground cloths to collect drips and spills during painting and finishing operations, paint chips, and used blasting sand during sand blasting.
- Do not paint or use spray guns on or above the deck.

In the event of an accidental discharge of oil or hazardous material into receiving water or onto land if there is a potential for entry into receiving water, the responsible party must meet all notification requirements including, but not limited to, notifying the yard, port, or marina owner or manager; Ecology's Northwest Regional Office at (425) 649-7000; and the National Response Center at (800) 424-8802 (24-hour). If the spill can reach or has reached marine water, call the U.S. Coast Guard at (206) 217-6232.

Recommended BMPs

Although not required, the following BMPs are encouraged to further reduce the potential for stormwater contamination:

- Select the least toxic antifouling paint available.
- Routinely clean boat interiors and properly dispose of collected materials so that accumulated water, which must be drained from the boat, does not become contaminated.

3.6.5. *BMP 36: Deicing and Anti-icing Operations for Airports and Streets*

This BMP applies to businesses and public agencies that perform deicing and anti-icing operations used on highways, streets, airport runways, and aircraft to control ice and snow.

Description of Pollutants

Typically, ethylene glycol and propylene glycol are used on aircraft as deicers. The deicers commonly used on highways and streets include calcium magnesium acetate, calcium chloride, magnesium chloride, sodium chloride, urea, and potassium acetate.

Deicing and anti-icing chemicals become pollutants when they are conveyed to inlets/catch basins or to receiving water after application. Leaks and spills of these chemicals can also occur during their handling and storage.

Discharges of spent glycol in aircraft application areas are process wastewaters regulated under the Ecology NPDES permit. (Contact Ecology at (360) 407-6000 for details.) BMPs for aircraft deicers and anti-icers must be consistent with aviation safety requirements and the operational needs of the aircraft operator.

Required BMP Elements

The following BMPs or equivalent measures are required for deicing and anti-icing activities related to aircraft:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Conduct aircraft deicing and anti-icing applications in impervious containment areas. Collect spent deicing liquids (e.g., ethylene glycol) and anti-icing chemicals (e.g., urea) that drain from aircraft in deicing or anti-icing application areas and convey them to a sanitary sewer, treatment facility, or other approved disposal or recovery method. Divert runoff of deicing chemicals from paved gate areas to appropriate collection areas or conveyances for proper treatment or disposal.
- Do not allow spent deicing and anti-icing chemicals or contaminated stormwater to be discharged directly or indirectly from application areas, including gate areas, to a receiving water or groundwater.
- Transfer deicing and anti-icing chemicals on an impervious containment pad, or an equivalent spill/leak containment area, and store them in secondary containment areas.

The following BMPs or equivalent measures are required for deicing and anti-icing activities related to runways and taxiways:

- Avoid excessive application of 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.

The following BMPs or equivalent measures are required for deicing and anti-icing activities related to streets and highways:

- Select deicers and anti-icers that result in the least adverse environmental impact. Apply only as needed using minimum quantities.
- Where feasible and practical, 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 deicing and anti-icing materials on an impervious containment pad.
- Sweep or clean up accumulated deicing and anti-icing materials and grit from roads as soon as possible after the road surface clears.
- Increase maintenance of stormwater structures as necessary.

Recommended BMPs

Although not required, the following BMPs are recommended to further reduce the potential for the contamination of stormwater and receiving waters:

Aircraft:

- Establish a centralized aircraft deicing and anti-icing facility, if feasible and practical, or conduct deicing and anti-icing in designated areas of the tarmac equipped with separate collection drains for the spent deicing liquids.
- Consider installing a recovery system for aircraft deicing and anti-icing chemicals, or contract with a chemical recycler, if practical.

Airport Runways and Taxiways:

- Include limits on toxic materials and phosphorus in the specifications for deicers and anti-icers, where applicable.
- Consider using anti-icing materials rather than deicers if they will result in less adverse environmental impact.
- Select cost-effective deicers and anti-icers that cause the least adverse environmental impact.

Streets and Highways:

- Intensify roadway cleaning in early spring to help remove particulates from road surfaces.
- Include limits on toxic metals in the specifications for deicers and anti-icers.

3.6.6. BMP 37: Maintenance and Management of Roof and Building Drains at Industrial and Commercial Buildings

This BMP applies to businesses and public agencies where the roofs and sides of industrial or commercial buildings can be sources of pollutants when stormwater runoff results in the leaching of roofing materials, materials from building vents, air emissions, flashing, cleaning agents, and applied moss killers. Flaking paint and caulking can also be sources of pollutants.

Description of Pollutants

Vapors and entrained liquid and solid droplets and particles have been identified as potential pollutants in roof and building runoff. The pollutants identified include metals, solvents, low (acidic) and high (alkaline) pH, substances that increase biological oxygen demand (BOD), and organic compounds. Flaking paint or caulking may be a source of metals and organic compounds. PCBs may leach out of old paint coatings and caulking materials from buildings, such as those built or renovated between 1950 and 1980.

Entities that conduct specific industrial activities are required to obtain an Industrial NPDES Permit for their stormwater discharges. For more information about whether an entity needs an NPDES permit, refer to Ecology's website (<https://ecology.wa.gov/Water-Shorelines/Water-quality/Runoff-pollution/Stormwater>) or call Ecology at (360) 407-6000.

Required BMP Elements

The following BMPs or equivalent measures are required for all commercial and industrial buildings to prevent and reduce stormwater pollution:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- If leachates or emissions from buildings are suspected sources of stormwater pollutants, sample and analyze the stormwater draining from the building and sediment from nearby catch basins.
- If a roof or building is identified as a source of stormwater pollutants, implement appropriate operational source control measures, such as air pollution control equipment, selection of alternative materials, operational changes, material recycling, process changes, remediation, or treatment.
- Sweep areas routinely to remove pollutant residues.
- If operational methods do not prevent or reduce zinc pollution from galvanized roofing or siding, paint/coat the galvanized surfaces as described in Publication 08-10-025, *Suggested Practices to Reduce Zinc Concentrations in Industrial Stormwater Discharges* (Ecology 2008) or treat the stormwater runoff.
- If operational BMPs are not sufficient to prevent stormwater contamination, structural controls must be implemented, including treatment or containment.

3.6.9. *BMP 40: Maintenance of Roadside Ditches*

This BMP applies to businesses and public agencies that perform activities related to the maintenance of roadside ditches, which can present a high risk of polluting stormwater because the ditches in which work is performed flow into the drainage system.

Description of Pollutants

Common road debris including particles from tire wear, dripped oil and other fluids; chemicals used in deicing; pesticides; herbicides; eroded or contaminated soil; and metals can be sources of stormwater pollutants.

Required BMP Elements

The following BMPs or equivalent measures are required for activities related to the maintenance of roadside ditches:

- Implement BMP 1 through BMP 8 for all real property (refer to *Section 2.1*).
- Implement BMPs for Landscaping and Vegetation Management (BMP 22) and integrated pest management (IPM). Implement *S435 – BMPs for Pesticides and an Integrated Pest Management Program* in Volume IV of the SWMMWW (Ecology 2019) (referenced in BMP 49).
- Inspect roadside ditches regularly, as needed to identify sediment accumulations and areas of localized erosion.
- Clean ditches on a regular basis, as needed:
 - Keep ditches free of rubbish and debris.
 - Conduct ditch maintenance (seeding, fertilizer application, and harvesting) when most effective, usually in late spring and/or early fall and avoid maintenance during heavy rainfall.
 - Do not apply fertilizer unless needed to maintain vegetative growth.
 - Do not leave material from the ditch cleaning on roadway surfaces.
 - Sweep and remove dirt and debris that remains on the pavement at the completion of ditch cleaning operations.
 - Segregate clean materials from suspect or contaminated materials. Non-contaminated soils may be handled as “clean soils” and non-contaminated vegetative matter can be composted or disposed of in a municipal waste landfill, if permitted. Suspected contaminated or contaminated material removed from ditches must be tested and handled according to the Dangerous Waste Regulations (WAC, Chapter 173-303) unless testing indicates that it is not dangerous waste.
- Vegetation in ditches often prevents erosion and cleanses runoff:
 - Remove vegetation only when flow is blocked or excess sediments have accumulated.
 - Use grass vegetation, unless specified otherwise by SPU.
 - Establish vegetation from the edge of the pavement if possible or at least from the top of the slope of the ditch.
 - Use temporary erosion and sediment control measures or re-vegetate as necessary to prevent erosion during ditch reshaping.

- 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.
- Inspect culverts on a regular basis for scour or sedimentation at the inlet and outlet, and repair as necessary. Give priority to culverts that are conveying perennial or salmon-bearing streams and to culverts near streams in areas of high sediment load, such as those near subdivisions during construction. Maintain trash racks to avoid damage, blockage or erosion of culverts.
- Waste generated from ditch maintenance, i.e., spoils and debris, may be contaminated and require specialized disposal. Refer to BMP 3 for waste disposal guidelines.
- Note: Work in wet areas may be regulated by local, state, or federal laws that impose obligations on the responsible party.

3.6.10. BMP 41: Potable Water Line Flushing, Water Tank Maintenance, and Hydrant Testing

This BMP applies to businesses and public agencies that perform activities related to potable water line flushing, water tank maintenance, and hydrant testing.

Description of Pollutants

Improper water line flushing, water tank maintenance, and hydrant testing may result in the discharge of sediments and materials to water bodies. Chemicals associated with water line flushing and water tank maintenance may be harmful to aquatic organisms and have an adverse effect on receiving water bodies.

Required BMP Elements

Required BMP elements are contained in *S441 – BMPs for Potable Water Line Flushing, Water Tank Maintenance and Hydrant Testing* in Volume IV of the SWMMWW (Ecology 2019).

would accumulate on the sea bed.

- Do not discharge emulsifiers, dispersants, solvents, or other toxic deleterious materials to waters of the state.

S441 BMPs for Potable Water Line Flushing, Water Tank Maintenance, and Hydrant Testing

Description of Pollutant Sources: Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in systems. Flushing done improperly can result in the discharge of solids to receiving waters. Hydrant testing may result in the discharge of rust particles.

Chemicals used in line flushing and tank maintenance are highly toxic to aquatic organisms and can degrade receiving waters.

Pollutant Control Approach: Dechlorinate and pH adjust water used for flushing, tank maintenance, or hydrant testing. Dispose of the water to the sanitary sewer if possible.

Applicable Operational BMPs:

- Remove solids from associated curbs and gutters before flushing water. Use erosion and sediment control BMPs such as [BMP C235: Wattles](#), [BMP C220: Inlet Protection](#), etc. to collect any solids resulting from flushing activities.
- If using super chlorination or chemical treatment as part of flushing, discharge water to the sanitary sewer. If sanitary sewer is not available, the water may be infiltrated to the ground as long as all of the following are met:
 - The water is dechlorinated to a total residual chlorine of 0.1 ppm or less.
 - Water quality standards are met.
 - A diffuser is used to prevent erosion.
 - The water does not cross property lines.
- Discharging water to a drainage system requires approval from the local jurisdiction. Check with the local jurisdiction to determine their requirements for approval. Most jurisdictions will require the water to be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less and pH adjusted if necessary. Water must be volumetrically and velocity controlled to prevent resuspension of sediments or pollutants in the Municipal Separate Storm Sewer System (MS4).
- Do not over apply dechlorination agents. This can deplete the dissolved oxygen concentration and reduce the pH in discharge / receiving waters.

Optional Operational BMPs:

- If possible, design flushing to convey accumulated material to strategic locations, such as to the sanitary sewer or to a treatment facility; thus, preventing re-suspension and overflow of a

portion of the solids during storm events.

- If possible, conduct flushing and tank maintenance activities on non-rainy days and during the time of year that poses the least risk to aquatic biota.

Optional Treatment BMPs:

- Treatment for dechlorinating can include an application of a stoichiometric quantity of:
 - Ascorbic Acid, Sodium Ascorbate (Vitamin C)
 - Calcium Thiosulfate
 - Sodium Sulfite tablets
 - Sodium Thiosulfate
 - Sodium Bisulfite
 - Alternate Dechlorination Solutions

- Consider installing an aircraft de/anti-icing chemical recovery system, or contract with a chemical recycler.

Applicable 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 [S429 BMPs for Storage or Transfer \(Outside\) of Solid Raw Materials, Byproducts, or Finished Products](#). Consider other material storage and transfer approaches only if the de/anti-icer material will not contaminate stormwater.

Recommended Additional 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.

S406 BMPs for Streets and Highways

Description of Pollutant Sources: These BMPs apply to the maintenance and deicing/anti-icing of streets and highways. Deicing products can be conveyed during storm events to inlets/catch basins or to receiving waters after application. Leaks and spills of these products can also occur during their handling and storage. Equipment and processes used during maintenance can contribute pollutants such as oil and grease, suspended solids, turbidity, high pH, and metals.

Pollutant Control Approach: Apply good housekeeping practices, preventative maintenance, properly train employees, and use materials that cause less adverse effects on the environment.

Applicable BMPs:

Deicing and Anti-Icing Operations

- Adhere to manufacturer's guidelines and industry standards of use and application.
- Store and transfer de and anti-icing materials on impervious containment pads, or an equivalent spill/leak containment area in accordance with [S429 BMPs for Storage or Transfer \(Outside\) of Solid Raw Materials, Byproducts, or Finished Products](#).
- Sweep/clean up accumulated de and anti-icing materials and grit from roads as soon as possible after the road surface clears.
- Minimize use in areas where runoff or spray from the roadway immediately enters sensitive areas such as fish-bearing streams.

3.6.13. BMP 44: Color Events

This BMP applies to the general public, businesses, and religious and commercial entities that participate in, host, or sponsor color events.

Description of Pollutants

The dye materials used in color events can degrade water quality and impact aquatic life. Even if the dye is labeled “biodegradable” or “nontoxic,” it is not allowed to be discharged into storm drains or water bodies.

The term “biodegradable” on a product label does not mean that the product is safe or environmentally friendly. The product may degrade faster than alternative products but can still be harmful to the environment.

Required BMP Elements

Required BMP elements are contained in *S436 – BMPs for Color Events* in Volume IV of the SWMMWW (Ecology 2019).

3.6.14. BMP 45: Pet Waste

This BMP applies to the general public, businesses, and public agencies.

Description of Pollutants

Pet waste can carry viruses and bacteria that could cause disease and lead to beach closures or bans on shellfish harvesting.

Required BMP Elements

Required BMP elements are contained in *S440 – BMPs for Pet Waste* in Volume IV of the SWMMWW (Ecology 2019).

S440 BMPs for Pet Waste

Description of Pollutant Sources: Pets and pet-care can generate pollutants from waste, animal washing, and cage or kennel cleaning. Pet waste that washes into lakes, streams or Puget Sound begins to decay, using up oxygen and releasing ammonia. Low oxygen levels and ammonia combined with warm water can kill fish. Pet waste also contains nutrients that encourage weed and algae growth, and contribute to low oxygen and high pH in waters we use for swimming, boating and fishing. Most importantly, pet waste can carry viruses and bacteria that could cause disease and lead to beach or shellfish harvesting closures.

Pollutant Control Approach: Use a plastic bag or pooper scooper to clean up after pets. Properly dispose of pet waste.

Recommended Operational BMPs for Pet Owners

- Regularly pick up and dispose of pet waste deposited on walks and at home.
- Put pet waste in a securely closed bag and deposit it in the trash. Do not place pet waste in yard waste containers because pet waste may carry diseases, and composting may not kill disease-causing organisms.
- Do not compost or use pet waste as fertilizer. Harmful bacteria, worms, and parasites that can transmit disease can live in the soil for years even after the solid portion of the pet waste has dissolved.
- Do not dispose of unused pet pharmaceuticals in a storm drain, in a toilet, or down a sink. Check with your local refuse collector for proper disposal locations of pet medications.
- When cleaning out cages and kennels, dispose of wash water down the toilet or a mop sink. Otherwise, wash directly over lawn areas or make sure the wash water drains to a vegetated area.
- Bathe pets indoors or in a manner that wash water won't be discharged to storm drains, ditches, or surface waters of the state.

Recommended Operational BMPs for Recreation Areas and Multi-Family Properties

- Post signs at recreation areas and multi-family properties (that allow pets) reminding residents and visitors to pick up after their pets.
- Carefully consider the placement of pet waste stations at recreation sites and near multi-family properties that allow pets. Choose locations convenient for dog walkers to pick up a bag at the start of their walk and locations for them to dispose of it at mid-walk or at the end of their walk.
- Check pet waste stations on a regular basis to keep pet waste bags stocked and disposal stations empty. Consider signage to keep regular trash out of pet waste disposal stations to avoid filling them too quickly. Make sure pet waste disposal stations have a cover to keep out water.
- At multi-family properties with roof-top dog runs, ensure that stormwater from the dog run is

not discharged to the stormwater system. Check with the local jurisdiction regarding roof-top dog run connections to sanitary sewer.

Figure IV-7.5: Example of a Pet Waste Station



Example of a Pet Waste Station

Revised May 2019

3.6.15. BMP 46: Labeling Storm Drain Inlets on Your Property

This BMP applies to businesses and public agencies.

Description of Pollutants

Storm drain inlets themselves are not a source of pollutants; however, they can be used to discharge pollutants. Labels on storm drains can educate the public about prohibitions against dumping materials in storm drains.

Required BMP Elements

Required BMP elements are contained in *S442 – BMPs for Labeling Storm Drain Inlets on Your Property* in Volume IV of the SWMMWW (Ecology 2019).

S442 BMPs for Labeling Storm Drain Inlets On Your Property

Description of Pollutant Sources: Waste materials dumped into storm drain inlets can have severe impacts on receiving waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Pollutant Control Approach: The stencil, affixed sign, or metal grate contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Applicable Operational BMPs:

- Label storm drain inlets in residential, commercial, industrial areas, and any other areas where contributions or dumping to storm drains is likely.
- Stencil or apply storm drain markers adjacent to storm drain inlets to help prevent the improper disposal of pollutants. Or, use a storm drain grate stamped with warnings against polluting.
- Place the marker in clear sight facing toward anyone approaching the inlet from either side.
- Use a brief statement and / or graphical icons to discourage illegal dumping. Examples include:
 - “No Dumping – Drains to Stream”
 - “No Pollutants – Drains to Puget Sound”
 - “Dump No Waste – Drains to Lake”
 - “No Dumping – Puget Sound Starts Here”
- Check with your local government agency to find out if they have approved specific signage and / or storm drain message placards for use. Consult the local agency stormwater staff to determine specific requirements for placard types and methods of application.
- Maintain the legibility of markers and signs. Signage on top of curbs tends to weather and fade. Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.
- When painting stencils or installing markers, temporarily block the storm drain inlet so that no pollutants are discharged from the labeling activities.

Optional Operational BMPs:

Use a stencil in addition to a storm drain marker or grate to increase visibility of the message.

Reference for this BMP: [\(CASQA, 2003\)](#)

Figure IV-7.6: Storm Drain Inlet Labels



Storm Drain Inlet Labels

Revised October 2017

Please see <http://www.ecy.wa.gov/copyright.html> for copyright notice including permissions, limitation of liability, and disclaimer.

3.6.16. BMP 47: Well, Utility, Directional, and Geotechnical Drilling

This BMP applies to businesses and public agencies that are involved with drilling activities.

Description of Pollutants

Drilling activities can allow exposed soil and contaminated soil to wash into the drainage system.

Required BMP Elements

Required BMP elements are contained in *S446 – BMPs for Well, Utility, Directional and Geotechnical Drilling* in Volume IV of the SWMMWW (Ecology 2019).

the past 36 months indicates the soil of the established lawn is deficient in phosphorus. For more information about restrictions on turf fertilizers containing phosphorus, see the following website:

<https://agr.wa.gov/departments/pesticides-and-fertilizers/fertilizers/fertilizers-containing-phosphorus>

Recommended Operational BMPs:

Test soils to determine the correct fertilizer application rates.

- Evaluation of soil nutrient levels through regular testing ensures the best possible efficiency and economy of fertilization.
- Fertilization needs vary by site depending on plant, soil, and climatic conditions.
- Choose organic fertilizers when possible.
- For details on soils testing, contact the local Conservation District, a soils testing professional, or a Washington State University Extension office.

S446 BMPs for Well, Utility, Directional and Geotechnical Drilling

Description of Pollutant Sources: This activity applies to drilling water wells and utilities, environmental protection and monitoring wells, and geotechnical borings that use machinery in the drilling. It does not apply to the use of devices such as hand augers, or for large structural drilling such as drilled shafts.

Drilling activities can expose soil and contaminated soil. These activities may cause the discharge of stormwater contaminated with sediments and other contaminants. This risk increases when drilling in areas with contaminated soils.

Pollutant Control Approach: Reduce sediment runoff from drilling operations.

Applicable Operational BMPs:

- When drilling in areas of known or suspected soil contamination, test and characterize soil cuttings and accumulated sediment to determine proper management and disposal methods. If applicable, generator knowledge may be used to characterize the soil cuttings and accumulated sediment.
- Obtain permits for drilling activities, and for clearing and grading the access routes and the work site.
- Protect environmentally sensitive areas (streams, wetlands, floodplains, floodways, erosion hazards, and landslide hazards) within the area of influence of the work site.
- Mitigate potential impacts to surrounding areas and/or the drainage system.
- For horizontal directional drilling, take measures to capture and contain drilling fluids and

slurry.

- Equip the driller to quickly respond to unusual conditions that may arise.
- Locate and prepare access roadways to minimize the amount of excavation and the potential for erosion.
- Contain accumulated uncontaminated water and sediment on site and pump into a storage tank or direct through a geotextile filtration system (or equivalent system) before discharging to the surrounding ground surface. Contaminants may include, but are not limited to, hydraulic fluids, contaminants in the soil and/or groundwater, polymers, and other drilling fluid additives.
- Keep all sediment-laden water out of storm drains and surface waters. If sediment-laden water does escape from the immediate drilling location, block flow to any nearby waterways or catch basins using fabric, inlet protections, sand bags, erosion fences, or other similar methods. Immediately notify Ecology and the local jurisdiction if sediment-laden water impacts the storm sewer system or surface waters.
- Divert any concentrated flows of water into the site using sandbags or check dams up-slope from the site.
- Dispose of soil cuttings and accumulated sediment appropriately. If cuttings or other soils disturbed in the drilling process are to be temporarily stockpiled on site, they must be covered and surrounded by a berm or filter device. See [S429 BMPs for Storage or Transfer \(Outside\) of Solid Raw Materials, Byproducts, or Finished Products](#).
- Stabilize exposed soils at the end of the job, using mulch or other erosion control measures. See [S425 BMPs for Soil Erosion and Sediment Control at Industrial Sites](#).
- Contain spent drilling slurry on site and allow it to dewater, or haul to an appropriate, approved disposal site.
- Restore disturbed areas with mulch (see [BMP C121: Mulching](#)) and seeding or hydroseeding (see [BMP C120: Temporary and Permanent Seeding](#)).

S447 BMPs for Roof Vents

Description of Pollutant Sources: This activity applies to processes that vent emissions to the roof and/or the accumulation of pollutants on roofs. Processes of special concern are stone cutting, metal grinding, spray painting, paint stripping, galvanizing and electroplating. Pollutants from these processes may build up on roofs and may pollute stormwater roof runoff.

Pollutant Control Approach: Evaluate the potential sources of stormwater pollutants and apply source control BMPs where feasible.

Applicable BMPs:

- Identify processes that are vented and may contribute pollutants to the roof. Pollutants of concern include and are not limited to:

3.6.17. BMP 48: Goose Waste

This BMP applies to the general public, businesses, and public agencies.

Description of Pollutants

Goose waste can contribute to algae growth in water due to its high nutrient content. Goose feces may contain pathogens that can affect people who use the water bodies.

Required BMP Elements

Required BMP elements are contained in *S452 – BMPs for Goose Waste* in Volume IV of the SWMMWW (Ecology 2019).

Suggested Operational BMPs:

- Lightly spray water on the work site to control dust and grit that could blow away. Do not use oils for dust control. Never spray to the point of water runoff from the site.
- Clean tools over a ground cloth or within a containment device such as a tub.
- Consider using filtered vacuuming to collect waste that may be hard to sweep, such as dust on a drop cloth.
- If conducting work in wet weather conditions, consider setting up temporary cover when scraping or pressure-washing lead-based paint.

S452 BMPs for Goose Waste

Description of Pollutant Sources: Goose waste deposited near water or in water can contribute nutrients and algae growth. Goose feces may contain pathogens and contribute to the spread of diseases. Swimmers itch (schistosome or cercarial dermatitis) is caused by a parasite that can be spread by goose droppings, but does not mature or reproduce in humans.

Pollutant Control Approach: To help decrease geese pollution to water sources, remove waste periodically and use deterrent management practices.

Applicable Operational BMPs:

This BMP is for areas of chronic accumulation of goose waste that impact stormwater systems.

- If possible, pick up goose waste using shovels, brooms, rakes, power sweepers, and trash cans. Properly dispose of goose waste in the garbage.
- Do not blow, sweep, or wash goose waste into waterways or storm sewer systems.
- Regularly clean goose waste from areas of chronic deposition where deterrence measures are impractical.
- Do not feed wild geese or any other wild animals.
- In recreational areas post signs discouraging the feeding of geese and other wild animals.

Optional Operational BMPs:

- Change the habitat from goose friendly to goose resistant. Reduce lawn areas and increase the height of shoreline vegetation (tall grass, shrubs); as geese are reluctant to walk through tall vegetation.
- Create a natural geese barrier. 20 to 100 feet of herbaceous vegetation at least 3 feet in height to discourage geese. A narrow, winding path through the plantings will allow for beach access, while preventing geese from having a direct line of sight through the planted area.
- Make bank slopes steeper than 4:1 to discourage geese by preventing a clear view of the bank top and potential predators. Or, separate the beach from the grass with a few steep steps, which makes the ascent too difficult for most geese.

- Narrow ponds to limit takeoff and landing opportunities .
- Where space is limited use one or two rows of shrub plantings combined with a fence. Fences can be made from woven wire, poultry netting, plastic netting, plastic snow fencing, monofilament line, or electrified wire. Fences should be at least 24 inches tall (3 feet may be better), firmly constructed, and installed to prevent the geese from walking around the ends. Lower openings should be no larger than 4 inches from the ground to prevent goslings from walking under or through the fence.
- Construct a grid of wire or line above the water's surface to prevent geese from flying into a pond that they have been accustomed to using. The grid should be one to two feet above the water surface, but may be taller if humans need access to the area under the grid. There should be no more than five feet of space between grid lines. To prevent geese from walking under the grid install a perimeter fence. Regularly monitor the grid for holes, trapped wildlife, and sagging.
- Canada geese are protected under federal and state law and a hunting license and open season are required to hunt them. Where lethal control of Canada geese is necessary outside of hunting seasons, it should be carried out only after the above nonlethal control techniques have proven unsuccessful and only under permits issued by the U.S. Fish and Wildlife Service. Currently, the only agency permitted for lethal removal is the U.S. Department of Agriculture's Wildlife Services. Lethal control techniques include legal hunting, shooting out of season by permit, egg destruction by permit, and euthanasia of adults by government officials.
- Scare geese away when they are around. Geese often learn quickly to ignore scare devices that are not a real physical danger. Vary the use, timing, and location of tactics. Take advantage of geese being fearful of new objects. Examples of harassment and scare tactics:
 - **Dog patrols:** When directed by a handler, dogs are the method of choice for large open areas. Results are often immediate. After an aggressive initial use (several times a day for one or two weeks), geese get tired of being harassed and will use adjacent areas instead. A dog can be tethered to a long lead (which may require relocating the dog and tether frequently to cover more area), be allowed to chase and retrieve a decoy thrown over a large flock of geese, or be periodically released to chase the birds (if this is not against leash laws).
 - **Eyespot Balloons:** Large, helium-filled balloons with large eye-like images. Tether balloons on a 20 to 40 foot monofilament line attached to a stake or heavy object. Locate balloons where they will not tangle with trees or utility lines.
 - **Flags and Streamers:** Simple flags from plastic mounted on tall poles or mylar tape to make 6-foot streamers attached to the top of 8 foot long poles. Flags and streamers work best in areas where there is steady wind.
 - **Scarecrows:** Effective in areas where geese view humans as dangerous predators. For maximum effect, the arms and legs should move in the wind, use bright colors, and large eyes. Large, blow-up toy snakes are reported to work as a type of scarecrow.
 - **Noisemakers:** Devices that make a loud bang such as propane cannons, blanks, and whistle bombs can scare geese. Making the noise as soon as geese arrive and persistence are the keys to success when using these devices. Consult noise ordinances

and other permitting authorities (such as the local police department) before using.

- **Lasers:** Relatively low-power, long-wavelength lasers provide an effective means of dispersing geese under low light conditions. The birds view the light as a physical object or predator coming toward them and generally fly away to escape. Never aim lasers in the direction of people, roads, or aircraft.
- Geese's favorite food is new shoots of grass. Low lying grass also allows easy access to the water for protection from predators. Let grass grow to six inches or taller. Stop fertilizing and watering the lawn to reduce the palatability of the lawn.
- Minimize open sight lines for geese to less than 30 feet.
- Plant shrubs or trees along ponds to limit takeoff and landing opportunities.

Refer to: http://www.humanesociety.org/assets/pdfs/wild_neighbors/canada_goose_guide.pdf and <https://wdfw.wa.gov/species-habitats/species/branta-canadensis> for additional information.

3.6.18. BMP 49: Pesticides and an Integrated Pest Management Program

This BMP applies to businesses and public agencies that use pesticides.

Description of Pollutants

Inadequate management of pesticides can allow them to enter stormwater and receiving water bodies, resulting in impacts on non-targeted organisms.

Required BMP Elements

Required BMP elements are contained in *Appendix I* of this manual and *S435 – BMPs for Pesticides and an Integrated Pest Management Program* in Volume IV of the SWMMWW (Ecology 2019).

- Preserve natural vegetation including grass, trees, shrubs, and vines when possible. See [BMP C101: Preserving Natural Vegetation](#).
- If stabilizing or covering the erodible soil is not possible, then structural controls must be implemented. Structural practice options include:
 - Vegetated swales
 - [BMP C200: Interceptor Dike and Swale](#)
 - [BMP C233: Silt Fence](#)
 - [BMP C207: Check Dams](#)
 - [BMP C232: Gravel Filter Berm](#)
 - Sedimentation basin
 - Proper grading
 - Paving

For design information refer to [II-3 Construction Stormwater BMPs](#).

S435 BMPs for Pesticides and an Integrated Pest Management Program

Description of Pollutant Sources: Pesticides include herbicides, rodenticides, insecticides, fungicides, etc. Examples of pesticide uses include:

- Weed control on golf course lawns, access roads, utility corridors and landscaping.
- Sap stain and insect control on lumber and logs.
- Rooftop moss removal.
- Killing nuisance rodents.
- Fungicide application to patio decks.

It is possible to release toxic pesticides such as pentachlorophenol, carbamates, and organo-metallics 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 pesticides can cause appreciable stormwater contamination and unintended impacts to non-targeted organisms.

Pollutant Control Approach: Control of pesticide applications to prevent contamination of stormwater. Develop and implement an Integrated Pest Management (IPM) Plan. Carefully apply pesticides, in accordance with label requirements.

Applicable Operational BMPs:

- Train employees on proper application of pesticides and disposal practices.
- Follow manufacturers' application guidelines and label requirements.
- Do not apply pesticides in quantities that exceed the limits on the product the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) label. Avoid excessive application of chemical.
- Conduct spray applications during weather conditions as specified in the label requirements and applicable local and state regulations. Do not apply during rain or immediately before expected rain (unless the label directs such timing).
- Clean up any spilled pesticides immediately. Do not hose down to a storm drain, conveyance ditch, or water body.
- Remove weeds/vegetation in stormwater ditches, stormwater facilities, and drainage systems by hand or other mechanical means and only use pesticides as a last resort.
- Flag all sensitive areas including wells, creeks, and wetlands prior to spraying.
- Post notices and delineate the spray area prior to the application, as required by the local jurisdiction, or by Ecology.
- Refer to [S411 BMPs for Landscaping and Lawn / Vegetation Management](#) and use pesticides only as a last resort.
- Conduct any pest control activity 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, apply it to the material before the caterpillars cocoon or it will be ineffective. Any method used should be site-specific and not used wholesale over a wide area.
- Mix pesticides and clean the application equipment under cover in an area where accidental spills will not enter surface or ground waters, and will not contaminate the soil.
- The pesticide application equipment must be capable of immediate shutoff in the event of an emergency.
- Implement a pesticide-use plan and include at a minimum:
 - A list of selected pesticides and their specific uses.
 - Brands and formulations of the pesticides.
 - Application methods and quantities to be used.
 - Equipment use and maintenance procedures.
 - Safety, storage, and disposal methods.
 - Monitoring, record keeping, and public notice procedures. All procedures shall conform to the requirements of [Chapter 17.21 RCW](#) and [Chapter 16-228 WAC](#).
- Develop and implement an Integrated Pest Management (IPM) program if pests are present.

The following steps are adapted from ([Daar, 1992](#)).

- **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.
 - 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.
- **Step Three:** Monitor to detect and prevent pest problems.
 - Monitor regularly to anticipate and prevent major pest outbreaks.
 - Conduct 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.
 - Review your landscape maintenance practices to see if they can be modified to prevent or reduce the problem.
 - 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:
 - Consider the most effective management options concurrent with reducing impacts to the environment. This may mean chemical pesticides are the best option in some circumstances.
 - Consider the use of physical, mechanical, or biological controls.
 - Study to determine what products are available and choose a product that is the least toxic and has the least non-target impact.

- **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.

Recommended Additional Operational BMPs:

- 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.
- Choose pesticides categorized by EPA as reduced risk. For example, the herbicide imazamox.
- When possible, apply pesticides during the dry season so that the pesticide residue is degraded prior to the next rain event.
- If possible, do not spray pesticides within 100 feet of water bodies. Spraying pesticides within 100 feet of water bodies including any drainage ditch or channel that leads to open water may have additional regulatory requirements beyond just following the pesticide product label. Additional requirements may include:
 - Obtaining a discharge permit from Ecology.
 - Obtaining a permit from the local jurisdiction.
 - Using an aquatic labeled pesticide and adjuvant.
- Use manual pest control strategies such as physically scraping moss from rooftops, high-pressure sprayers to remove moss, and rodent traps.
- 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, ash stem blight, and parasitic nematodes.
- Once a pesticide is applied, evaluate its effectiveness for possible improvement. Records should be kept showing the effectiveness of the pesticides applied.
- Follow the FIFRA label requirements for disposal. If the FIFRA label does not have disposal requirements the rinseate from equipment cleaning and/or triple-rinsing of pesticide containers should be used as product or recycled into product.
- Develop an and adaptive management plan and annual evaluation procedure including: (adapted from [Daar, 1992](#))

- A review of the effectiveness of pesticide applications.
- Impact on buffers and sensitive areas, including potable wells. 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.
- Public concerns.
- Recent toxicological information on pesticides used/proposed for use.

Additional Information

For more information, refer to the Pesticide Information Center Online (PICOL) Databases at <http://cru66.cahe.wsu.edu/LabelTolerance.html>.

Washington pesticide law requires most businesses that commercially apply pesticides to the property of another to be licensed as a Commercial Applicator from the Washington State Department of Agriculture.

S444 BMPs for the Storage of Dry Pesticides and Fertilizers

Description of Pollutant Sources: Pesticides such as pentachlorophenol, carbamates, and organometallics can be released to the environment as a result of container leaks and outside storage of pesticide-contaminated materials and equipment. Inappropriate management of pesticides or fertilizers can result in stormwater contamination. Runoff contaminated by pesticides and fertilizers can severely degrade streams and lakes and adversely affect fish and other aquatic life.

Pollutant Control Approach: Store fertilizer and pesticide properly to prevent stormwater contamination.

Applicable Structural BMPs:

Store pesticides and fertilizers in enclosed impervious containment areas that prevent precipitation or unauthorized personnel from coming into contact with the materials..

Applicable Operational BMPs:

- Containers and bags must be covered, intact, and off the ground.
- Store all material so that it cannot come into contact with water.
- Immediately clean up any spilled fertilizer or pesticides.
- Keep pesticide and fertilizer contaminated waste materials in designated covered and contained areas, and dispose of properly.
- Store and maintain spill cleanup materials near the storage area.
- Sweep paved storage areas as needed. Collect and dispose of spilled materials. Do not hose

3.6.19. BMP 50: Storage of Dry Pesticides and Fertilizers

This BMP applies to businesses and public agencies that store dry pesticides and fertilizers.

Description of Pollutants

Inappropriate management of pesticides and fertilizers results in contamination of stormwater and receiving water bodies, which can degrade water quality and adversely affect fish and other aquatic life.

Required BMP Elements

Required BMP elements are contained in *S435 – BMPs for Pesticides and an Integrated Pest Management Program* in Volume IV of the SWMMWW (Ecology 2019).

- A review of the effectiveness of pesticide applications.
- Impact on buffers and sensitive areas, including potable wells. 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.
- Public concerns.
- Recent toxicological information on pesticides used/proposed for use.

Additional Information

For more information, refer to the Pesticide Information Center Online (PICOL) Databases at <http://cru66.cahe.wsu.edu/LabelTolerance.html>.

Washington pesticide law requires most businesses that commercially apply pesticides to the property of another to be licensed as a Commercial Applicator from the Washington State Department of Agriculture.

S444 BMPs for the Storage of Dry Pesticides and Fertilizers

Description of Pollutant Sources: Pesticides such as pentachlorophenol, carbamates, and organometallics can be released to the environment as a result of container leaks and outside storage of pesticide-contaminated materials and equipment. Inappropriate management of pesticides or fertilizers can result in stormwater contamination. Runoff contaminated by pesticides and fertilizers can severely degrade streams and lakes and adversely affect fish and other aquatic life.

Pollutant Control Approach: Store fertilizer and pesticide properly to prevent stormwater contamination.

Applicable Structural BMPs:

Store pesticides and fertilizers in enclosed impervious containment areas that prevent precipitation or unauthorized personnel from coming into contact with the materials..

Applicable Operational BMPs:

- Containers and bags must be covered, intact, and off the ground.
- Store all material so that it cannot come into contact with water.
- Immediately clean up any spilled fertilizer or pesticides.
- Keep pesticide and fertilizer contaminated waste materials in designated covered and contained areas, and dispose of properly.
- Store and maintain spill cleanup materials near the storage area.
- Sweep paved storage areas as needed. Collect and dispose of spilled materials. Do not hose

down the area.

- Do not discharge pesticide contaminated stormwater or spills/leaks of pesticides to storm sewers or to the sanitary sewer. Contaminated stormwater must be collected and disposed of properly. Unused or spilled/leaked pesticides must be disposed of according to the label.
- Comply with [WAC 16-228-1220](#) and [Chapter 16-229 WAC](#).

S449 BMPs for Nurseries and Greenhouses

Description of Pollutant Sources: These BMPs are for use by commercial container plant, greenhouse grown, and cut foliage production operations. Common practices at nurseries and greenhouses can cause elevated levels of phosphorus, nitrogen, sediment, bacteria, and organic material which can contribute to the degradation of water quality.

Pollutant Control Approach: Minimize the pollutants that leave the site by controlling the placement of materials, stabilizing the site, and managing irrigation water.

Applicable Operational BMPs:

- Establish nursery composting areas, soil storage, and mixing areas at least 100 feet away from any stream or other surface water body and as far away as possible from drainage systems.
- Do not dispose of collected vegetation into waterways or storm sewer systems.
- Do not blow, sweep, or otherwise allow vegetation or other debris into the drainage system.
- Regularly clean up spilled potting soil to prevent its movement, especially if fertilizers and pesticides are incorporated. ([Haver, 2014](#))
- Use soil mixing and layering techniques with composted organic material to reduce herbicide use and watering.
- Utilize soil incorporated with fertilizers and / or pesticides immediately; do not store for extended periods. ([Haver, 2014](#))
- Cover soil storage and compost storage piles. Refer to [S429 BMPs for Storage or Transfer \(Outside\) of Solid Raw Materials, Byproducts, or Finished Products](#).
- Dispose of pathogen-laced potting substrate and diseased plants appropriately.
- Place plants on gravel, geotextile, or weed cloth to allow infiltration and minimize erosion, including inside greenhouse structures. ([Haver, 2014](#))
- Properly reuse, recycle, or dispose of used polyfilm, containers, and other plastic-based products so that they do not collect stormwater. ([FDACS, 2014](#))
- Evaluate and manage irrigation to reduce runoff, sediment transport, and erosion.
 - Place irrigation inputs to keep moisture primarily in the plant's root zone. This will significantly reduce nutrient related impacts from fertilizers. ([FDACS, 2014](#))

3.6.20. BMP 51: Irrigation

This BMP applies to businesses and public agencies that have irrigation systems.

Description of Pollutants

Improper irrigation can encourage pest problems, leach nutrients, and make a lawn completely dependent on artificial watering.

Required BMP Elements

Required BMP elements are contained in *S450 – BMPs for Irrigation* in Volume IV of the SWMMWW (Ecology 2019).

the storage area is not under a roof to protect it from rainfall, manage runoff by directing it to a stormwater treatment area. ([FDACS, 2014](#))

S450 BMPs for Irrigation

Description of Pollutant Sources: Irrigation consists of discharges from irrigation water lines, landscape irrigation, and lawn or garden watering. Excessive watering can lead to discharges of chlorinated potable water runoff into drainage systems; it can also cause erosion; and negatively affect plant health. Improper irrigation can encourage pest problems, leach nutrients, and make a lawn completely dependent on artificial watering. Mosquito breeding habitats may form through excessive watering.

Pollutant Control Approach: Limit the amount and location of watering to prevent runoff and discharges to drainage systems.

Applicable Operational BMPs:

- Irrigate with the minimum amount of water needed. Never water at rates that exceed the infiltration rate of the soil.
- Maintain all irrigation systems so that irrigation water is applied evenly and where it is needed.
- Ensure sprinkler systems do not overspray vegetated areas resulting in excess water discharging into the drainage system.
- Inspect irrigated areas for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.
- Inspect irrigated areas regularly for signs of erosion and / or discharge.
- Place sprinkler systems appropriately so that water is not being sprayed on impervious surfaces instead of vegetation.
- Repair broken or leaking sprinkler nozzles as soon as possible.
- Appropriately irrigate lawns based on the species planted, the available water holding capacity of the soil, and the efficiency of the irrigation system.
 - 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.
- Do not irrigate plants during or immediately after fertilizer application. The longer the period between fertilizer application and irrigation, the less fertilizer runoff occurs.
- Do not irrigate plants during or immediately after pesticide application (unless the pesticide label directs such timing).
- Reduce frequency and / or intensity of watering as appropriate for the wet season (October 1 to April 30).

- Place irrigation systems to ensure that plants receive water where they need it. For example, do not place irrigation systems downgradient of plant's root zones on hillsides.

Recommended Operational BMPs:

- Add a tree bag or slow-release watering device (e.g., bucket with a perforated bottom) for watering newly installed trees when irrigation system is not present.
- Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist.
- Use soaker hoses or spot water with a shower type wand when an irrigation system is not present.
 - Pulse water to enhance soil absorption, when feasible.
 - Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method, each pass increases soil absorption and allows more water to infiltrate prior to runoff.
- Identify trigger mechanisms for drought-stress (e.g., leaf wilt, leaf senescence, etc.) of different species and water immediately after initial signs of stress appear.
- Water during drought conditions or more often if necessary to maintain plant cover.
- Adjust irrigation frequency / intensity as appropriate after plant establishment.
- Annually inspect irrigation systems to ensure:
 - That there are no blockages of sprayer nozzles.
 - Sprayer nozzles are rotating as appropriate.
 - Sprayer systems are still aligned with the plant locations and root zones.
- Consult with the local water utility, Conservation District, or Cooperative Extension office to help determine optimum irrigation practices.
- Do not use chemigation and fertigation in irrigation systems. This will help avoid over application of pesticides and fertilizers.

3.6.21. BMP 52: Dock Washing

This BMP applies to the general public, businesses, and public agencies that are involved in dock washing.

Description of Pollutants

Washing docks can result in the discharge of dirt and other pollutants that may be toxic to aquatic life.

Required BMP Elements

Required BMP elements are contained in *S434 – BMPs for Dock Washing* in Volume IV of the SWMMWW (Ecology 2019).

- Operators may use a manually operated positive control valve for uncovered wash pads, but a pneumatic or electric valve system is preferable. The valve may be on a timer circuit and opened upon completion of a wash cycle. After draining the sump or separator, the timer would then close the valve.
- Minimize the use of water and detergents in washing operations when practicable.
- Use phosphate-free biodegradable detergents when practicable.
- Use the least hazardous cleaning products available.
- Consider recycling the washwater.

Operators may use soluble/emulsifiable detergents in the wash medium and should use it with care and the appropriate treatment. Carefully consider the selection of soaps and detergents and treatment BMPs. Oil/water separators are ineffective in removing emulsified or water soluble detergents. Another treatment appropriate for emulsified and water soluble detergents may be required.

Exceptions:

- At gas stations (for charity car washes) or 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.
- New and used car dealerships may wash vehicles in the parking stalls as long as employees use a temporary plug system to collect the washwater for disposal as stated above, or an approved treatment system for the washwater is in place.

At industrial sites, contact Ecology for NPDES Permit requirements even when not using soaps, detergents, and/or other chemical cleaners in washing trucks.

S434 BMPs for Dock Washing

Description of Pollutant Sources: Washing docks (or wharves, piers, floats, and boat ramps) can result in the discharge dirt, bird feces, soaps, and detergents that can be toxic to aquatic life, especially after they take on contaminants while cleaning. The BMPs in this section do not address dry docks, graving docks, or marine railway cleaning operations.

Pollutant Control Approach: Use dry methods and equipment (scraping, sweeping, vacuuming) to remove debris and contaminants prior to cleaning with water to prevent these substances from entering surface water.

Applicable Operational BMPs:

Surface Preparation and Spot Cleaning

- Scoop and collect debris and bird feces.
- Sweep, capture, and dispose of debris from the dock as solid waste. Sweep or vacuum docks to minimize the need for chemical cleaners.

- During cleaning activities, if debris, substances, or wash water could enter surface waters through drains, temporarily block the drains and collect the water for proper disposal.
- Hose down the area if necessary and collect water as feasible.
- Try spot cleaning with water and a coarse cloth before using soaps or detergents.
- If a cleaner is needed for spot cleaning:
 - Mix it in a bucket and use it to scrub down only the areas that need extra attention.
 - Start with vinegar and baking soda and move to other options as needed. Spot clean using a rag if harsher cleaning products are needed.
 - Avoid or minimize the use of petroleum distillates, chlorinated solvents, and ammoniated cleaning agents.
 - Use degreasers or absorbent material to remove residual grease by hand and do not allow this material to enter surface water.
 - Keep cleaners in sealed containers. Keep cleaner containers closed securely when transporting between the shore and docks.
 - Properly dispose of the dirty bucket water.
- Minimize the scour impact of wash water to any exposed soil at the landward end(s) of the dock or below the dock. Place a tarp over exposed soil, plant vegetation, or put berms to contain eroded soil.

Dock Washing and Disposal

- To the extent practicable, collect any wash water generated from hosing down, pressure washing, or cleaning dock areas, and dispose of it properly.
- The following video, provided courtesy of the Port of Seattle, highlights the methods they have developed to collect wash water generated during dock washing.

Video: Dock Scrubbing at Port of Seattle (YouTube Link): <https://www.youtube.com/watch?v=7RBFdjC3K1Q>
- Try pressure washing using light pressure. This uses less water and decreases the need for soap and scrubbing when washing the dock. Avoid using excessive pressure, which may damage the dock or send flakes of paint and other material into the water.
- Do not place any debris and substances resulting from cleaning activities in shoreline areas, riparian areas, or on adjacent land where these substances may erode into waters of the state.
- Where treated wood associated with the structure being washed are present, use non-abrasive methods and tools that, to the maximum extent practicable, minimize removal of the creosote or treated wood fibers when it removes marine growth from creosote or any other treated wood.
- Do not discharge removed marine growth to waters of the state where such marine growth

would accumulate on the sea bed.

- Do not discharge emulsifiers, dispersants, solvents, or other toxic deleterious materials to waters of the state.

S441 BMPs for Potable Water Line Flushing, Water Tank Maintenance, and Hydrant Testing

Description of Pollutant Sources: Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in systems. Flushing done improperly can result in the discharge of solids to receiving waters. Hydrant testing may result in the discharge of rust particles.

Chemicals used in line flushing and tank maintenance are highly toxic to aquatic organisms and can degrade receiving waters.

Pollutant Control Approach: Dechlorinate and pH adjust water used for flushing, tank maintenance, or hydrant testing. Dispose of the water to the sanitary sewer if possible.

Applicable Operational BMPs:

- Remove solids from associated curbs and gutters before flushing water. Use erosion and sediment control BMPs such as [BMP C235: Wattles](#), [BMP C220: Inlet Protection](#), etc. to collect any solids resulting from flushing activities.
- If using super chlorination or chemical treatment as part of flushing, discharge water to the sanitary sewer. If sanitary sewer is not available, the water may be infiltrated to the ground as long as all of the following are met:
 - The water is dechlorinated to a total residual chlorine of 0.1 ppm or less.
 - Water quality standards are met.
 - A diffuser is used to prevent erosion.
 - The water does not cross property lines.
- Discharging water to a drainage system requires approval from the local jurisdiction. Check with the local jurisdiction to determine their requirements for approval. Most jurisdictions will require the water to be dechlorinated to a total residual chlorine concentration of 0.1 ppm or less and pH adjusted if necessary. Water must be volumetrically and velocity controlled to prevent resuspension of sediments or pollutants in the Municipal Separate Storm Sewer System (MS4).
- Do not over apply dechlorination agents. This can deplete the dissolved oxygen concentration and reduce the pH in discharge / receiving waters.

Optional Operational BMPs:

- If possible, design flushing to convey accumulated material to strategic locations, such as to the sanitary sewer or to a treatment facility; thus, preventing re-suspension and overflow of a

3.6.22. BMP 53: Roof Vents

This BMP applies to businesses and public agencies that have roof vents.

Description of Pollutants

This BMP applies to processes that vent emissions to the roof, result in the accumulation of pollutants on roofs, or both. Pollutants from these processes may build up on roofs and may pollute stormwater runoff.

Required BMP Elements

Required BMP elements are contained in *S447 – BMPs for Roof Vents* in Volume IV of the SWMMWW (Ecology 2019).

slurry.

- Equip the driller to quickly respond to unusual conditions that may arise.
- Locate and prepare access roadways to minimize the amount of excavation and the potential for erosion.
- Contain accumulated uncontaminated water and sediment on site and pump into a storage tank or direct through a geotextile filtration system (or equivalent system) before discharging to the surrounding ground surface. Contaminants may include, but are not limited to, hydraulic fluids, contaminants in the soil and/or groundwater, polymers, and other drilling fluid additives.
- Keep all sediment-laden water out of storm drains and surface waters. If sediment-laden water does escape from the immediate drilling location, block flow to any nearby waterways or catch basins using fabric, inlet protections, sand bags, erosion fences, or other similar methods. Immediately notify Ecology and the local jurisdiction if sediment-laden water impacts the storm sewer system or surface waters.
- Divert any concentrated flows of water into the site using sandbags or check dams up-slope from the site.
- Dispose of soil cuttings and accumulated sediment appropriately. If cuttings or other soils disturbed in the drilling process are to be temporarily stockpiled on site, they must be covered and surrounded by a berm or filter device. See [S429 BMPs for Storage or Transfer \(Outside\) of Solid Raw Materials, Byproducts, or Finished Products](#).
- Stabilize exposed soils at the end of the job, using mulch or other erosion control measures. See [S425 BMPs for Soil Erosion and Sediment Control at Industrial Sites](#).
- Contain spent drilling slurry on site and allow it to dewater, or haul to an appropriate, approved disposal site.
- Restore disturbed areas with mulch (see [BMP C121: Mulching](#)) and seeding or hydroseeding (see [BMP C120: Temporary and Permanent Seeding](#)).

S447 BMPs for Roof Vents

Description of Pollutant Sources: This activity applies to processes that vent emissions to the roof and/or the accumulation of pollutants on roofs. Processes of special concern are stone cutting, metal grinding, spray painting, paint stripping, galvanizing and electroplating. Pollutants from these processes may build up on roofs and may pollute stormwater roof runoff.

Pollutant Control Approach: Evaluate the potential sources of stormwater pollutants and apply source control BMPs where feasible.

Applicable BMPs:

- Identify processes that are vented and may contribute pollutants to the roof. Pollutants of concern include and are not limited to:

- Metal dust
 - Grease from food preparation
 - Solvents
 - Hydrocarbons
 - Fines
 - Stone dust
- Look for chemical deposition around vents, pipes, and other surfaces.
 - Install and maintain appropriate source control measures such as air pollution control equipment (filters, scrubbers, and other treatment). ([City of San José Environmental Services, 2004](#))
 - Check that your scrubber solution is appropriate for the chemistry of the fumes.
 - Install vent covers and drip pans where there are none.
 - Prevent leaks in pipefittings and containment vessels with routine maintenance.
 - Consider instituting operational or process changes to reduce pollution.
 - If proper installation and maintenance of air pollution control equipment does not prevent pollutant fallout on your roof, additional treatment of the roof runoff may be necessary.
 - Install/provide appropriate devices for roof runoff before it is discharged off site. This may include approved water quality treatment BMPs or structural stormwater treatment systems.
 - Maintain air filters and pollution control equipment on a regular basis to ensure they are working properly. (The smell of odors from outside the building indicates that the pollution control equipment may need maintenance or evaluation.)
 - When cleaning accumulated emissions from roof tops, collect the washwater and loose materials using a sump pump, wet vacuum or similar device. Discharge the collected runoff to the sanitary sewer after approval by the local sewer authority, or have a waste disposal company remove it.

S451 BMPs for Building, Repair, Remodeling, Painting, and Construction

Description of Pollutant Sources: This activity refers to:

- The construction of buildings and other structures.
- Remodeling of existing buildings and houses.
- General exterior building repair work.

3.6.23. BMP 54: Streets and Highways

This BMP applies to businesses and public agencies that maintain and apply deicers/anti-icers to streets and highways.

Description of Pollutants

This BMP applies to maintenance and deicing/anti-icing of streets and highways. Chemicals used for deicing/anti-icing may be harmful to aquatic organisms.

Required BMP Elements

Required BMP elements are contained in *S406 – BMPs for Streets and Highways* in Volume IV of the SWMMWW (Ecology 2019).

- Consider installing an aircraft de/anti-icing chemical recovery system, or contract with a chemical recycler.

Applicable 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 [S429 BMPs for Storage or Transfer \(Outside\) of Solid Raw Materials, Byproducts, or Finished Products](#). Consider other material storage and transfer approaches only if the de/anti-icer material will not contaminate stormwater.

Recommended Additional 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.

S406 BMPs for Streets and Highways

Description of Pollutant Sources: These BMPs apply to the maintenance and deicing/anti-icing of streets and highways. Deicing products can be conveyed during storm events to inlets/catch basins or to receiving waters after application. Leaks and spills of these products can also occur during their handling and storage. Equipment and processes used during maintenance can contribute pollutants such as oil and grease, suspended solids, turbidity, high pH, and metals.

Pollutant Control Approach: Apply good housekeeping practices, preventative maintenance, properly train employees, and use materials that cause less adverse effects on the environment.

Applicable BMPs:

Deicing and Anti-Icing Operations

- Adhere to manufacturer's guidelines and industry standards of use and application.
- Store and transfer de and anti-icing materials on impervious containment pads, or an equivalent spill/leak containment area in accordance with [S429 BMPs for Storage or Transfer \(Outside\) of Solid Raw Materials, Byproducts, or Finished Products](#).
- Sweep/clean up accumulated de and anti-icing materials and grit from roads as soon as possible after the road surface clears.
- Minimize use in areas where runoff or spray from the roadway immediately enters sensitive areas such as fish-bearing streams.

Maintenance Operations

- Use drip pans or absorbents wherever concrete, asphalt, asphalt emulsion, paint product, and drips are likely to spill, such as beneath discharge points from equipment.
- Cover and contain nearby storm drains to keep runoff from entering the drainage system.
- Collect and contain all solids, slurry, and rinse water. Do not allow these to enter gutters, storm drains, or drainage ditches or onto the paved surface of a roadway or driveway.
- Designate an area onsite for washing hand tools and collect that water for disposal.
- Conduct all fueling of equipment in accordance with [S419 BMPs for Mobile Fueling of Vehicles and Heavy Equipment](#).
- Do not use diesel fuel for cleaning or prepping asphalt tools and equipment.
- Sweep areas as frequently as needed. Collect all loose aggregate and dust for disposal. Do not hose down areas into storm drains.
- Store all fuel, paint, and other products on secondary containment.
- Conduct paint striping operations during dry weather.

Recommended Additional BMPs:

- Where feasible and practicable, use roadway deicing chemicals that cause the least adverse environmental impact. Apply only as needed using minimum quantities. Consider the Pacific Northwest Snowfighters Qualified Products List when selecting roadway de-icers and anti-icers.
- Intensify roadway and drainage structure cleaning in early spring to help remove particulates from road surfaces.
- Include limits on toxic metals in the specifications for de/anti-icers.
- Install catch basin inserts to collect excess sediment and debris as necessary. Inspect and maintain catch basin inserts to ensure they are working correctly.
- Research admixtures (e.g. corrosion inhibitors, surfactants) to determine what additional pollutants may be an issue. Verify with the local jurisdiction if there are any restrictions on admixtures.

S415 BMPs for Maintenance of Public and Private Utility Corridors and Facilities

Description of Pollutant Sources: Corridors and facilities at petroleum product pipelines, natural gas pipelines, water pipelines, 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

3.6.24. BMP 55: Fertilizer Application

This BMP applies to businesses and public agencies that use fertilizers.

Description of Pollutants

Improper application of fertilizer can be a source of nutrients (phosphorus, nitrogen, etc.) that can degrade water quality.

Required BMP Elements

Required BMP elements are contained in *S443 – BMPs for Fertilizer Application* in Volume IV of the SWMMWW (Ecology 2019).

S443 BMPs for Fertilizer Application

Description of Pollutant Sources: Poor application of fertilizers can cause appreciable storm-water contamination. Fertilizers can leach phosphorous, nitrogen, and coliform bacteria. Fertilizers can contribute to algae blooms, increase nutrient concentrations, and deplete oxygen in receiving waters.

Pollutant Control Approach: Minimize the amount of fertilizer necessary to maintain vegetation. Control the application of fertilizer to prevent the discharge of stormwater pollution.

Applicable Operational BMPs:

- Apply the minimum amount of slow-release fertilizer necessary to achieve successful plant establishment.
- Do not fertilize when the soil is dry or during a drought.
- Never apply fertilizers if it is raining or about to rain.
- 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.
- Determine the proper fertilizer application for the types of soil and vegetation involved.
- Follow manufacturers' recommendations and label directions.
- Train employees on the proper use and application of fertilizers.
- Keep fertilizer granules off impervious surfaces. Clean up any spills immediately. Do not hose down to a storm drain, conveyance ditch, or water body.
- If possible, do not fertilize areas within 100 feet of water bodies including wetlands, ponds, and streams.
- Avoid fertilizer applications in stormwater ditches, stormwater facilities, and drainage systems.
- In areas that drain to sensitive water bodies, apply no fertilizer at commercial and industrial facilities, to grass swales, filter strips, or buffer areas unless approved by the local jurisdiction.
- Use slow release fertilizers such as methylene urea, isobutylidene, 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.
- Apply fertilizers in amounts appropriate for the target vegetation and at the time of year that minimizes losses to surface and ground waters.
- Time the fertilizer application to periods of maximum plant uptake. Ecology generally recommends application in the fall and spring, although Washington State University turf specialists recommend four fertilizer applications per year.
- Do not use turf fertilizers containing phosphorous unless a soil sample analysis taken within

the past 36 months indicates the soil of the established lawn is deficient in phosphorus. For more information about restrictions on turf fertilizers containing phosphorus, see the following website:

<https://agr.wa.gov/departments/pesticides-and-fertilizers/fertilizers/fertilizers-containing-phosphorus>

Recommended Operational BMPs:

Test soils to determine the correct fertilizer application rates.

- Evaluation of soil nutrient levels through regular testing ensures the best possible efficiency and economy of fertilization.
- Fertilization needs vary by site depending on plant, soil, and climatic conditions.
- Choose organic fertilizers when possible.
- For details on soils testing, contact the local Conservation District, a soils testing professional, or a Washington State University Extension office.

S446 BMPs for Well, Utility, Directional and Geotechnical Drilling

Description of Pollutant Sources: This activity applies to drilling water wells and utilities, environmental protection and monitoring wells, and geotechnical borings that use machinery in the drilling. It does not apply to the use of devices such as hand augers, or for large structural drilling such as drilled shafts.

Drilling activities can expose soil and contaminated soil. These activities may cause the discharge of stormwater contaminated with sediments and other contaminants. This risk increases when drilling in areas with contaminated soils.

Pollutant Control Approach: Reduce sediment runoff from drilling operations.

Applicable Operational BMPs:

- When drilling in areas of known or suspected soil contamination, test and characterize soil cuttings and accumulated sediment to determine proper management and disposal methods. If applicable, generator knowledge may be used to characterize the soil cuttings and accumulated sediment.
- Obtain permits for drilling activities, and for clearing and grading the access routes and the work site.
- Protect environmentally sensitive areas (streams, wetlands, floodplains, floodways, erosion hazards, and landslide hazards) within the area of influence of the work site.
- Mitigate potential impacts to surrounding areas and/or the drainage system.
- For horizontal directional drilling, take measures to capture and contain drilling fluids and

APPENDIX B: SPILL PLAN SUMMARY

Standard Operating Procedures (SOP) – Spills & Illicit Discharges

Marine Stormwater Utility

March 2023





Table of Contents

Purpose	3
Acronyms & Abbreviations.....	3
Contacts Directory	4
SOP – Landside	5
SOP – Waterside.....	8
APPENDIX	11
Roles & Responsibilities.....	11
References.....	12



Purpose

This document contains standard operating procedures and resources to support spill and illicit discharge identification, response, reporting, and cleanup for the Port of Seattle (Port) Marine Stormwater Utility. The Port holds a Phase I Municipal Stormwater Permit for its Maritime properties, which extend from Shilshole Bay Marina in the north to Terminal 117 in the south. The Port is responsible for addressing illicit discharge and spills in accordance with federal, state, and local laws.

Incidents may occur in areas that involve tenants, Port operations, construction, and other activities. The purpose of this document is to provide direction and resources to support a consistent approach to spills and illicit discharge reporting and response.

Acronyms & Abbreviations

DOH – Washington Department of Health

Ecology – Washington Department of Ecology

ERTS – Environmental Report Tracking System (WA Department of Ecology)

IDDE – Illicit Discharge Detection and Elimination

ICT – Information and Communication Technology (Port of Seattle)

MM – Marine Maintenance (Port of Seattle)

NRC – National Response Center (*not to be confused with NRC Environmental Services, a private company*)

Port – Port of Seattle

SEIN – Seaport Environmental Incident Notification

SOP – standard operating procedures

SPU – Seattle Public Utilities

Utility – Port Marine Stormwater Utility

WA – Washington

WaEMD – Washington Emergency Management Division



Contacts Directory

Org	Title	Phone	Notes
Port	MM Dispatch	(206) 787-3350	7am-3:30pm, with after-hours calls going to ICT
Port	SEIN Hotline	(206) 295-7912	24-hour on-call line primarily for Dispatch or water-side spills
Port	SEIN on-line form	NA	SharePoint LINK
City	Seattle Public Utilities	(206) 386-1800	
State	ERTS	(425) 649-7000	email: nwroerts@ecy.wa.gov , online form: LINK
State	DOH Shellfish Program	(360) 236-3330 (800) 562-5632	Only notify if spill or discharge might cause bacterial contamination of marine waters
State	WaEMD	(800) 258-5990	
Federal	NRC	(800) 424-8802	Notification center staffed by U.S. Coast Guard
Port	Port Police	(206) 433-5400	If at a Port office: 911
City	Seattle Fire Department & Police	911	9-911 from Port office phone

Emergency Response Contractors	On-Call Compliance Contracts
Global Diving and Salvage: (206) 623-0621	DH Environmental: (206) 293-3126
NRC Environmental Services: (206) 607-3000	EA Engineering: (206) 452-5350, (206) 452-5361

Port Staff

Fishermen's Terminal (including Salmon Bay Marina and Maritime Industrial Center): Property Manager (Jessica Carlson), Operations Supervisor (Stephen Aaron), Senior Manager (Rut Perez-Studer)

Shilshole Bay Marina: Property Managers (Trevor Panger), Operations Supervisor (Sebastian Hicks), Senior Manager (Darrell Dare)

T91 Maritime Operations: Property Manager (Lily Ninburg), Cruise Operations Manager (Marie Ellingson), Maritime Operations Managers (Kathy Goodman, Eric Soderlund), Senior Manager (Kelli Goodwin)

Marine Maintenance: MM Regulatory Compliance Program Manager (Scott Silcox), Senior Manager MM Business Operations (Jessica Joyce)

Utility: Senior Manager, Stormwater Utility (Jane Dewell), Utility Program Manager (Ondrej Sklenar), Environmental Management Specialist (Nathan Taylor)

SEIN: Senior Environmental Program Manager (Mike DeSota), Environmental Management Specialist (Nathan Taylor)



SOP – Landside

These SOPs address spills and illicit discharges in upland (landside) areas of Port Maritime properties.

① MM Dispatch receives notice of a spill and gathers information from caller (Incident Contact) to complete, as much as possible, the online SEIN. Dispatch then calls the SEIN hotline.

SEIN staff gather information from Dispatch, Incident Contact, or other Port staff with knowledge of incident to identify:

- On-scene Incident Contact and/or Responsible Party
- Spill details:
 - Specific location
 - Time/date
 - Incident cause
 - Material involved
 - Amount released (e.g., gallons, cups)
 - Sheen length & width
 - Mitigation steps taken so far
 - Current weather
- Access or security limitations (e.g., Transportation Worker Identification Credential, Container Terminal)

② Investigate site if necessary. The following questions help determine necessity:

- Is additional information needed that cannot be obtained from Incident Contact
- Is spill large enough to require additional support (e.g., MM, contractors)
- Is hazardous waste involved that requires additional support (e.g., MM, contractors)
- Has source been found
- Does weather pose an additional risk
- Is SEIN staff presence required to interface with responding agencies such as U.S. Coast Guard, Ecology, SPU, or Fire Department

③ Determine if spill is reportable to SPU/NRC/WaEMD/Ecology

Landside spills have different reporting requirements based on whether the spill reaches stormwater system or waterways. Use the following If/Then questions to determine reporting requirements:



If/Then Questions and Answers (SELECT MOST APPROPRIATE) then go to step ④

If a land-based spill **HAS NOT** entered a stormwater system or waterway, then request that Dispatch submit the online **SEIN form without** reporting to outside agencies.

If a land-based spill **HAS** entered a stormwater system, then request Dispatch report spill to **SPU and WaEMD** and submit online **SEIN form**. SEIN staff will create an Illicit Discharge Detection and Elimination (IDDE) report using the Source Tracing Investigation Form.

If a land-based spill **HAS** entered a waterway, then request Dispatch report spill to **SPU, NRC, and WaEMD**, and submit online **SEIN form**. SEIN staff will complete IDDE Report.

If a land-based spill **HAS** entered a stormwater system or waterway and might cause bacterial contamination of marine waters, such as discharges resulting from a broken sewer line, then request Dispatch report spill to **SPU, WaEMD, and DOH Shellfish Program** and submit online **SEIN form**.

If a spill is found to have occurred off Port property, SEIN staff will notify Ecology via ERTS online form

④ SEIN staff determine if immediate or emergency response is required (described in ‘if/then’ questions below). Factors that influence decision:

- Type of spilled materials
- Source and mitigation actions taken
- Weather forecast
- Ability of tenant/responsible party to respond
- Availability of MM staff to respond
- In the event of hazardous material or waste release, fire, or an emergency that is a danger to human safety, immediately call **Seattle Fire Department & Police at 911**

If/Then Questions and Answers (SELECT MOST APPROPRIATE)

If **IMMEDIATE** clean-up **IS** required but does not rise to the level of an emergency, then go to step ⑤

If **EMERGENCY** response **IS** required and rapid response resources are to be mobilized, then go to step ⑥

If immediate or emergency clean-up is **NOT** required but the spill may become a threat to stormwater system and needs to be addressed the same day, then go to step ⑦



5 Immediate cleanup necessary

Contact property management, Maritime Operations, and/or Environmental managers to communicate spill mitigation requirements. For spill response funding information, refer to SWU Spill Funding Memo found in the Reference section of this document.

- If a clean-up plan by the tenant/customer is deemed sufficient upon by SEIN staff, monitor the situation if necessary and be prepared to follow up with managers if tenant/customer fails to perform within the time frame.
- If a tenant/customer fails to act and there is imminent threat to the environment, call Dispatch to mobilize clean-up action. Notify Port property management and Utility management of these actions.
- Note: At any time, any regulator may call and ask status of spill response process. Slow response can increase damage and related liability.

Next step 8: *Standby for follow-up calls*

6 Emergency Response necessary

In the event of hazardous material release, fire, or an emergency that is a danger to human safety, immediately call Seattle Fire Department & Police

- Call 911 for emergencies first
- Call Port property managers and Port environmental managers to notify of situation
- Call Dispatch to mobilize crew as needed

Next step 8: *Standby for follow-up calls*

7 Not immediate or emergency response

Incident contact and/or SEIN staff delineate and secure area. Discuss situation as needed with property managers, Operations staff, and/or Environmental managers to create a clean-up plan and timeline that can either be communicated to the tenant or initiated by MM, depending on details and the location of the spill.

Next step 8: *Standby for follow-up calls*

8 Standby for follow-up calls

- Ensure required reporting completed
- Document completion of cleanup effort
- Complete and file documents of cleanup as necessary
- If necessary, amend SEIN report form with additional details or corrections, stating the correction, edit date, and name



SOP – Waterside

These SOPs address spills and illicit discharges in waterways (e.g., streams, bays, rivers) associated with Port Maritime properties.

① Port Operations staff discover spill or turbidity. The staff (Incident Contact) follows spill reporting procedure detailed in the online SEIN report form, including:

- Notify NRC
- Notify WaEMD
- Submit SEIN form online

② Incident Contact calls SEIN hotline

SEIN staff gathers information to identify:

- On-scene contact and/or Responsible Party
- Spill details:
 - Specific location
 - Time/date
 - Incident cause
 - Material involved
 - Amount released (e.g., gallons, cups)
 - Sheen length & width
 - Mitigation steps taken so far
 - Current weather
- Access or security limitations (e.g., Transportation Worker Identification Credential, Container Terminal)


Reporting note:

- If spill appears to be land-based and has entered a catch basin or waterway, or appears to be from outside Port property, refer to SOP – Landside spill procedures Step ②

③ SEIN staff investigate site if necessary, addressing the following questions:

- Is additional information needed that cannot be obtained from Incident Contact
- Is spill large enough to require contracted clean-up (if yes, see step ⑤)
- Has source been found
- Does weather pose an additional risk
- Is SEIN presence required to interface with responding agencies such as U.S. Coast Guard, Ecology, or Fire Department

④ Determine from Incident Contact or SEIN field observation if spill is recoverable:

- 
- Does spilled material absorb readily into a tester absorbent pad or roll off
 - Is spilled material silver colored, ropy, and weathered

If yes to either of these questions, it suggests spill is older and may be unrecoverable

Answers (SELECT MOST APPROPRIATE):

Yes, clean-up is needed: Go to step ⑤

No, spill is not recoverable: Remind Incident Contact to submit internal SEIN form online and go to step ⑧

⑤ Is an external **clean-up contractor** required for spill recovery?

Determining factors:

- Material of spill
- Size of spill
- Location of spill
- Source of spill
- Weather
- Time of day
- Availability of local staff for clean-up
- If responsibly party is known, are they willing and able to recover spill?
- If responsible part is unknown, are Port staff (e.g., Marina Specialists) able to perform recovery?

If/Then Questions and Answers (SELECT MOST APPROPRIATE):

If spill can be recovered by Port staff, then go to step ⑥

If spill is too large or for other reasons cannot be recovered by Port staff, then go to step ⑦


⑥ SEIN discuss situation with facility/operations management or staff and direct Port staff to perform recovery as appropriate (e.g., deploy absorbents, collect used absorbents)

Next step ⑧

⑦ Call environmental contractor (i.e., Global Diving, NRC Environmental Services)

- Request clean-up response and explain situation. Follow up with notification to Port staff or Incident Contact
- Use standing emergency purchase order numbers for response costs

Next step ⑧



⑧ Standby for calls from contractor, NRC, Port staff, or outside organizations

- Ensure required reporting is complete
- Initiate purchase requisition from Maritime Environmental Contract Admin to replace emergency purchase order, if utilized
- Complete and file documents for cleanup as necessary
- If necessary, amend SEIN report form with additional details or corrections, stating the correction, edit date, and name



APPENDIX

Roles & Responsibilities

SEIN staff (Mike DeSota and Nathan Taylor)

The primary role of the SEIN staff during an incident response is to:

- Confirm necessary notifications occur in the event a spill incident actually or potentially rises to the jurisdiction of federal, state and local authorities
- Identify an on-scene Incident Contact or Responsible Party
- Provide guidance to spill responders and identify and secure resources
- Evaluate source and cause of spills and assess procedures and prevention measures for future avoidance
- Assure incident response is documented and file documents

Incident Contact (generally Port staff)

- Assess the spill and follow directions of the online SEIN form (see Contacts Directory)

Responsible Party (Customer, tenant, or other entity)

- Self-report spill to appropriate agencies, and alert Maritime Operations or MM Dispatch
- Deploy containment measures (e.g., absorbents or booms)

MM Dispatch (receives spill calls during working hours)

- Receive spill notification calls from Incident Contact or Responsible Party
- Completes online SEIN form as much as possible (see Contacts Directory)
- Calls SEIN staff to convey spill information and receive direction for reporting and MM clean-up requests

ICT after-hours staff (call via MM Dispatch phone; receives spill calls from 3:30 pm to 7 am Mon-Fri, 24/7 Sat-Sun)

- Receive spill notification calls from Incident Contact or Responsible Party
- Calls SEIN staff to convey spill information and receive direction MM clean-up requests
- Calls after-hours on-call MM managers as needed

After hours on-call MM Managers

- Receive spill response calls from ICT after-hours
- Deploy on-call MM staff to respond to spills as needed



References

Ecology Reporting Guidance

<https://ecology.wa.gov/Regulations-Permits/Reporting-requirements/Spills-If-you-spill>

ERTS reporting form

<https://ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue/NWRO-issue-reporting-form>

IDDE Incident Reporting (completed forms filed here)

https://portseattle.sharepoint.com/sites/SEP_Stormwater/Lists/IDDE%20Reports/AllItems.aspx

IDDE Investigation folder (document and picture collection)

https://portseattle.sharepoint.com/sites/SEP_Stormwater/IDDE%20Investigations/Forms/AllItems.aspx

IDDE Source Tracing Investigation Form (template form)

https://portseattle.sharepoint.com/sites/SEP_Stormwater/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2Fsites%2FSEP%5FStormwater%2FShared%20Documents%2FPhase%5F1%5FNPDES%5FPermit%2FS3%5FIDDE%2FSource%5FTracing

Phase I Municipal Stormwater Permit

<https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Municipal-stormwater-general-permits/Municipal-Stormwater-Phase-I-Permit>

SEIN online spill reporting form

https://portseattle.sharepoint.com/sites/SEP_ECAP/Lists/Incident%20Notifications/Reported%20Incident/newifs.aspx

SEIN report folder (completed forms filed here)


https://portseattle.sharepoint.com/sites/sep_ecap/Lists/Incident%20Notifications/AllItems.aspx

Spill Response SOP document set on SharePoint

https://portseattle.sharepoint.com/sites/SEP_Stormwater/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2Fsites%2FSEP%5FStormwater%2FShared%20Documents%2FOther%2FSpill%20Response%20SOP%5FDrafts

SWU Spill Funding Memo and Response

https://portseattle.sharepoint.com/:f/r/sites/SEP_Stormwater/Shared%20Documents/Utility/Operation/Administration?csf=1&web=1&e=bwRb7U



Washington Emergency Management Division

<https://mil.wa.gov/emd-contact-us>

Washington DOH Shellfish Program

<https://www.doh.wa.gov/AboutUs/ProgramsandServices/EnvironmentalPublicHealth/EnvironmentalHealthandSafety/ShellfishProgram/ShellfishProgramContacts>

APPENDIX C: EXAMPLE SITE INSPECTION FORM

Appendix C Port Municipal SWPPP Inspection Form

General Information	
Facility Name:	
Inspection Date/Time:	Weather:
Inspector Name:	Inspector Title:
Inspector Signature:	

General Inspection Observations	
Are outdoor work areas and storage areas organized, clean, and free of debris?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Is there any evidence of contaminants (e.g., trash, debris, sheen/staining) on the ground, in stormwater catch basins/ditches, or in surface waters adjacent to the site?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Do any catch basins, manholes or stormwater structures require cleaning? See City of Seattle Volume 4 BMP 2 Perform Routine Maintenance.	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Are all catch basins, manholes, stormwater structures, and BMPs accessible at all times?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Are materials/products/waste stored indoors or under cover?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Are outdoor waste receptacles in good condition (e.g., no holes or leaks) with lids closed?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
Are vehicles/equipment in good condition (e.g., not leaking)?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
The bolded responses should be described in <u>Detailed Inspection Observations</u> and <u>Issues Resolution</u> below.	

Detailed Inspection Observations		
Area	Observations	Follow-up Needed? ¹
		<input type="checkbox"/> YES <input type="checkbox"/> NO
		<input type="checkbox"/> YES <input type="checkbox"/> NO
		<input type="checkbox"/> YES <input type="checkbox"/> NO
		<input type="checkbox"/> YES <input type="checkbox"/> NO

¹ If yes, enter items into Issues Resolution and follow-up with appropriate parties.

Issues Resolution				
Item No:	Description / Location:	Action Needed	Assigned To	Complete? (Date)
1				
2				
3				
4				
5				

Additional Notes

APPENDIX D: MARINE MAINTENANCE LANDSCAPE MANAGEMENT GUIDELINES

Attachment A



Integrated Pest Management (IPM) Program

Port of Seattle
Marine Stormwater Utility

Issued: November 2022

1.0 What is IPM?

Integrated Pest Management (IPM) is an approach that uses regular monitoring to determine if and when treatments are needed to control insects or pests. IPM includes physical, mechanical, and biological monitoring, and educational tactics to maintain low pest numbers and avoid damage or annoyance. As a last resort, chemical controls are used and least toxic chemicals are encouraged.

2.0 Why use IPM?

IPM protects the natural system that keeps pests in check while minimizing dangerous chemicals, such as pesticides, that are designed to kill or otherwise inhibit specific pests and can harm human health and the environment. IPM is being mandated by many governments and gaining acceptance worldwide, and it is the best long-term solution to deal with pests in an effective way while maintaining low impact on plants, ecosystems, and human health. If pesticides contaminate stormwater, they can harm humans and aquatic life.

An IPM plan is used to determine when pesticide use is necessary. This IPM program supports the Port of Seattle's compliance with the Phase I municipal stormwater permit and City of Seattle regulatory codes.

3.0 What is a Pesticide and Pollutant Sources?¹

A pesticide is a substance intended to prevent, destroy, repel, or mitigate pests. Pesticide categories include herbicides, rodenticides, insecticides, and fungicides. Examples of uses include but are not limited to:

- Weed control on access roads, utility corridors and landscaping
- Insect control on buildings or docks
- Killing nuisance rodents

Pesticides may be released into the environment from leaching and/or dripping from sources. These sources include but are not limited to:

- Treated parts
- Container leaks
- Product misuse, spillage or overspray
- Outside storage of pesticide-contaminated equipment and materials

In cases of poor management, pesticides may cause stormwater contamination and harm non-target organisms.

¹ The material in this section has been adapted from the Department of Ecology 2019 Stormwater Management Manual for Western Washington, which references Daar (1992) (refer to Section 7).



4.0 IPM Procedure²

The following outlines development and implementation of an IPM program for Port of Seattle locations. It is adapted from City of Seattle Stormwater Manual & Ecology Manual (Section 6, Appendix A):

Step 1: Identify and understand the problem pests and their life cycles.

- 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 times of day.
 - For example, Wasps and Hornets are most active in the warmer months, July through September. They are most active during the day and less active at night.
 - This makes treatment most effective at night when they are all consolidated in the hive.

Step 2: Establish tolerance thresholds for pests.

- 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.

Step 3: Monitor to detect and prevent pest problems.

- Monitor regularly to anticipate and prevent major pest outbreaks.
- Conduct 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 record when and where a problem occurs, then monitor for it at about the same time in future years. Use the designated Port of Seattle Stormwater SharePoint to store records.
- Specific monitoring techniques can be used in the appropriate season for some potential problem pests, such as European crane fly.

Step 4: Modify the maintenance program to promote healthy plants and discourage pests.

- Review your landscape maintenance practices determining if they can be modified to prevent or reduce the problem.
- 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.

² The steps in this section have been adapted from the Department of Ecology 2019 Stormwater Management Manual for Western Washington, which references Daar (1992) (refer to Section 7).



Step 5: If pests exceed the tolerance thresholds:

- Consider the most effective management options concurrent with reducing impacts to the environment. This may mean chemical pesticides are the best option in some circumstances.
- Consider the use of physical, mechanical, or biological controls.
- Study to determine what products are available and choose a product that is the least toxic and has the least non-target impact.
- Review provided Safety Data Sheet (SDS) for Hornet and Wasp Spray.

Step 6: Evaluate and record the effectiveness of the control and modify maintenance practices to support lawn and landscape recovery and prevent recurrence.

- Keep records! Use the designated Port of Seattle Stormwater SharePoint to store relevant records or documents.
- 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 each year for the same problems.

5.0 Applicable BMPs

The following outlines applicable **Best Management Practices (BMPs)** for IPM while performing the steps in Section 4. Not all BMPs are applicable in every situation. The main goals are to limit harm to human and plant health and reduce pest populations.

Proper Pesticide Use & Handling:

Use:

- Employees review relevant pesticide SDS for proper application of pesticides and disposal practices (Section 6, Appendices B & C).
- Follow manufacturers' application guidelines and label requirements.
- Do not apply pesticides in quantities that exceed the limits on the product the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) label. Avoid excessive application of chemical.
- Conduct spray applications during weather conditions as specified on the label and consistent with applicable local and state regulations. Do not apply during rain or immediately before expected rain (unless the label directs such timing).
- Conduct pest control activity at the time of the day when the pest is most vulnerable. For example, for wasp and hornets the most effective time to spray the nest is when wasps/hornets are all inside, which is late at night or early in the morning. Spraying at these times also reduces the chance of being stung.

Handling:

- Clean up spilled pesticides immediately. Do not hose down to a storm drain, conveyance ditch, or water body.
- Mix pesticides and clean the application equipment under cover in an area where accidental spills will be contained and not enter surface or ground waters and



contaminate soil.

- The pesticide application equipment must be capable of immediate shutoff in the event of an emergency.

Pesticide-Use Plan:

Consistent with the Port of Seattle’s Marine Maintenance Landscape Guidelines, the Port does not apply pesticides for landscaping on any properties (Section 6, Appendix D).

Landscaping:

- Remove weeds/vegetation in stormwater ditches, stormwater facilities, and drainage systems by hand or other mechanical means.
- Refer to S411 BMPs for Landscaping and Lawn / Vegetation Management when needed.

6.0 Appendices

Integrated Pest Management Program – Appendices:

- Appendix A: 2019 Department of Ecology Stormwater Management Manual for Western Washington – S435 BMPs for Pesticides and an Integrated Pest Management Program
- Appendix B: RAID WASP & HORNET KILLER 271 – Material, Safety Data Sheet
- Appendix C: RAID WASP & HORNET KILLER 33 – Safety Data Sheet
- Appendix D: 2020 Marine Maintenance Landscape Management Guidelines - Update
- Appendix E: City of Seattle Stormwater Manual – 3.6.18. BMP 49: Pesticides and an Integrated Pest Management Program
- Appendix F: Integrated Pest Management Checklist

7.0 References

Sheila Daar, 1992. *Least Toxic Pest Management for Lawns*, Bio Integral Resource Center, Berkeley, CA.

State of Washington, Water Quality Program, 2019. *Stormwater Management Manual for Western Washington*, Department of Ecology State of Washington, pp. 528–532.





Integrated Pest Management (IPM) Program – Appendices

Port of Seattle
Marine Stormwater Utility

Issued: November 2022



**Appendix A: Department
of Ecology Stormwater
Management Manual of
Western Washington -
S435**

Port of Seattle
Marine Stormwater Utility

Issued: November 2022

- Preserve natural vegetation including grass, trees, shrubs, and vines when possible. See [BMP C101: Preserving Natural Vegetation](#).
- If stabilizing or covering the erodible soil is not possible, then structural controls must be implemented. Structural practice options include:
 - Vegetated swales
 - [BMP C200: Interceptor Dike and Swale](#)
 - [BMP C233: Silt Fence](#)
 - [BMP C207: Check Dams](#)
 - [BMP C232: Gravel Filter Berm](#)
 - Sedimentation basin
 - Proper grading
 - Paving

For design information refer to [II-3 Construction Stormwater BMPs](#).

S435 BMPs for Pesticides and an Integrated Pest Management Program

Description of Pollutant Sources: Pesticides include herbicides, rodenticides, insecticides, fungicides, etc. Examples of pesticide uses include:

- Weed control on golf course lawns, access roads, utility corridors and landscaping.
- Sap stain and insect control on lumber and logs.
- Rooftop moss removal.
- Killing nuisance rodents.
- Fungicide application to patio decks.

It is possible to release toxic pesticides such as pentachlorophenol, carbamates, and organo-metallics 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 pesticides can cause appreciable stormwater contamination and unintended impacts to non-targeted organisms.

Pollutant Control Approach: Control of pesticide applications to prevent contamination of stormwater. Develop and implement an Integrated Pest Management (IPM) Plan. Carefully apply pesticides, in accordance with label requirements.

Applicable Operational BMPs:

- Train employees on proper application of pesticides and disposal practices.
- Follow manufacturers' application guidelines and label requirements.
- Do not apply pesticides in quantities that exceed the limits on the product the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) label. Avoid excessive application of chemical.
- Conduct spray applications during weather conditions as specified in the label requirements and applicable local and state regulations. Do not apply during rain or immediately before expected rain (unless the label directs such timing).
- Clean up any spilled pesticides immediately. Do not hose down to a storm drain, conveyance ditch, or water body.
- Remove weeds/vegetation in stormwater ditches, stormwater facilities, and drainage systems by hand or other mechanical means and only use pesticides as a last resort.
- Flag all sensitive areas including wells, creeks, and wetlands prior to spraying.
- Post notices and delineate the spray area prior to the application, as required by the local jurisdiction, or by Ecology.
- Refer to [S411 BMPs for Landscaping and Lawn / Vegetation Management](#) and use pesticides only as a last resort.
- Conduct any pest control activity 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, apply it to the material before the caterpillars cocoon or it will be ineffective. Any method used should be site-specific and not used wholesale over a wide area.
- Mix pesticides and clean the application equipment under cover in an area where accidental spills will not enter surface or ground waters, and will not contaminate the soil.
- The pesticide application equipment must be capable of immediate shutoff in the event of an emergency.
- Implement a pesticide-use plan and include at a minimum:
 - A list of selected pesticides and their specific uses.
 - Brands and formulations of the pesticides.
 - Application methods and quantities to be used.
 - Equipment use and maintenance procedures.
 - Safety, storage, and disposal methods.
 - Monitoring, record keeping, and public notice procedures. All procedures shall conform to the requirements of [Chapter 17.21 RCW](#) and [Chapter 16-228 WAC](#).
- Develop and implement an Integrated Pest Management (IPM) program if pests are present.

The following steps are adapted from ([Daar, 1992](#)).

- **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.
 - 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.
- **Step Three:** Monitor to detect and prevent pest problems.
 - Monitor regularly to anticipate and prevent major pest outbreaks.
 - Conduct 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.
 - Review your landscape maintenance practices to see if they can be modified to prevent or reduce the problem.
 - 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:
 - Consider the most effective management options concurrent with reducing impacts to the environment. This may mean chemical pesticides are the best option in some circumstances.
 - Consider the use of physical, mechanical, or biological controls.
 - Study to determine what products are available and choose a product that is the least toxic and has the least non-target impact.

- **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.

Recommended Additional Operational BMPs:

- 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.
- Choose pesticides categorized by EPA as reduced risk. For example, the herbicide imazamox.
- When possible, apply pesticides during the dry season so that the pesticide residue is degraded prior to the next rain event.
- If possible, do not spray pesticides within 100 feet of water bodies. Spraying pesticides within 100 feet of water bodies including any drainage ditch or channel that leads to open water may have additional regulatory requirements beyond just following the pesticide product label. Additional requirements may include:
 - Obtaining a discharge permit from Ecology.
 - Obtaining a permit from the local jurisdiction.
 - Using an aquatic labeled pesticide and adjuvant.
- Use manual pest control strategies such as physically scraping moss from rooftops, high-pressure sprayers to remove moss, and rodent traps.
- 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, ash stem blight, and parasitic nematodes.
- Once a pesticide is applied, evaluate its effectiveness for possible improvement. Records should be kept showing the effectiveness of the pesticides applied.
- Follow the FIFRA label requirements for disposal. If the FIFRA label does not have disposal requirements the rinseate from equipment cleaning and/or triple-rinsing of pesticide containers should be used as product or recycled into product.
- Develop an and adaptive management plan and annual evaluation procedure including: (adapted from [Daar, 1992](#))

- A review of the effectiveness of pesticide applications.
- Impact on buffers and sensitive areas, including potable wells. 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.
- Public concerns.
- Recent toxicological information on pesticides used/proposed for use.

Additional Information

For more information, refer to the Pesticide Information Center Online (PICOL) Databases at <http://cru66.cahe.wsu.edu/LabelTolerance.html>.

Washington pesticide law requires most businesses that commercially apply pesticides to the property of another to be licensed as a Commercial Applicator from the Washington State Department of Agriculture.

S444 BMPs for the Storage of Dry Pesticides and Fertilizers

Description of Pollutant Sources: Pesticides such as pentachlorophenol, carbamates, and organometallics can be released to the environment as a result of container leaks and outside storage of pesticide-contaminated materials and equipment. Inappropriate management of pesticides or fertilizers can result in stormwater contamination. Runoff contaminated by pesticides and fertilizers can severely degrade streams and lakes and adversely affect fish and other aquatic life.

Pollutant Control Approach: Store fertilizer and pesticide properly to prevent stormwater contamination.

Applicable Structural BMPs:

Store pesticides and fertilizers in enclosed impervious containment areas that prevent precipitation or unauthorized personnel from coming into contact with the materials..

Applicable Operational BMPs:

- Containers and bags must be covered, intact, and off the ground.
- Store all material so that it cannot come into contact with water.
- Immediately clean up any spilled fertilizer or pesticides.
- Keep pesticide and fertilizer contaminated waste materials in designated covered and contained areas, and dispose of properly.
- Store and maintain spill cleanup materials near the storage area.
- Sweep paved storage areas as needed. Collect and dispose of spilled materials. Do not hose



**Appendix B:
RAID® WASP &
HORNET KILLER
271 - Material,
Safety Data Sheet**

Port of Seattle
Marine Stormwater Utility

Issued: November 2022

MATERIAL SAFETY DATA SHEET

Page 1 of 5

MSDS # 111352004

RAID® WASP & HORNET KILLER 271

Date Issued: 05Apr2007

Supersedes: 06Apr2005

US MANUFACTURER:

S.C. Johnson & Son, Inc.
 Phone: (800) 725-6737
 Racine, Wisconsin 53403-2236
 Emergency Phone: (866) 231-5406
 International Emergency Phone:
 (952) 852-4647

CANADIAN MANUFACTURER:

S.C. Johnson and Son, Limited
 Phone: (800) 725-6737
 1 Webster Street
 Brantford, Ontario N3T 5R1
 Transportation Emergency:
 CANUTEC (collect) (613) 996-6666
 Poison Control: (866) 231-5406

HAZARD RATING	HMIS	HAZARD	NFPA	DISTRIBUTED IN CANADA BY:
4-Very High	2	Health	1	S.C. Johnson and Son, Limited
3-High	2	Flammability	2	Phone: (800) 725-6737
2-Moderate	0	Reactivity	0	1 Webster Street
1-Slight		Special		Brantford, Ontario N3T 5R1
0-Insignificant				

SECTION 1 - PRODUCT IDENTIFICATION

PRODUCT NAME..... RAID® WASP & HORNET KILLER 271
 REASON FOR CHANGE..... Section 2. Section 3. Section 4. Section 5. Section 6. Section 7. Section 9. Section 10. Section 11. Hazard Rating. MSDS Serial
 PRODUCT USE..... Household: Insecticide

SECTION 2 - INGREDIENT INFORMATION

INGREDIENT	WEIGHT%	EXPOSURE LIMIT/TOXICITY
Tetramethrin (CAS# 7696-12-0).....	0.20	NOT ESTABLISHED
Permethrin (CAS# 52645-53-1).....	0.20	NOT ESTABLISHED
Carbon dioxide (CAS# 124-38-9).....	1-5	5000 ppm ACGIH TWA , 30000 ppm ACGIH STEL 10000 ppm OSHA TWA 30000 ppm OSHA STEL
Petroleum distillates (CAS# 64742-47-8).....	90-98	100 ppm TWA (STODDARD SOLVENT)

SECTION 3 - HEALTH HAZARDS IDENTIFICATION (Also See Section 11)

ROUTE(S) OF ENTRY..... Eye contact. Skin contact. Ingestion. Inhalation.
 EFFECTS OF ACUTE EXPOSURE:
 EYE..... May cause: Mild eye irritation.
 SKIN..... Harmful if absorbed through skin. May cause: Drying/defatting of skin. Moderate skin irritation.
 INHALATION..... May cause: Irritation to nose, throat and respiratory tract.
 INGESTION..... Aspiration into the lungs may cause severe health effects.
 MEDICAL CONDITIONS..... None known.
 GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE

SECTION 4 - FIRST AID MEASURES

EYE CONTACT..... Flush immediately with plenty of water for at least 15 to 20 minutes. If irritation persists, get medical attention.
 SKIN CONTACT..... Wash contaminated area with water and soap. If irritation persists, get medical attention.

MATERIAL SAFETY DATA SHEET

Page 2 of 5

MSDS # 111352004

RAID® WASP & HORNET KILLER 271

Date Issued: 05Apr2007

Supersedes: 06Apr2005

SECTION 4 - FIRST AID MEASURES (continued)

INHALATION..... Remove to fresh air. If breathing is affected, get medical attention.
INGESTION..... Do not induce vomiting! Immediately drink 1-2 glasses of water. Get medical attention immediately. Do not administer anything by mouth to an unconscious person.

SECTION 5 - FIRE AND EXPLOSION INFORMATION

FLASH POINT..... 180°F (82°C) (TOC)
FLAMMABLE LIMITS..... Not available.
AUTOIGNITION..... Not available.
TEMPERATURE
EXTINGUISHING MEDIA... Foam. CO2. Dry chemical. Water fog.
SPECIAL FIREFIGHTING... Fight fire from maximum distance or protected area. Fire PROCEDURES firefighters should wear self-contained breathing apparatus and protective clothing. Cool and use caution when approaching or handling fire-exposed containers.
UNUSUAL FIRE AND..... Aerosol product - Containers may rocket or explode in heat of EXPLOSION HAZARDS fire.

SECTION 6 - PREVENTIVE RELEASE MEASURES

STEPS TO BE TAKEN IN... Eliminate all ignition sources. Dike large spills. Do not let CASE MATERIAL IS spilled or leaking material enter watercourse. Absorb with RELEASED OR SPILLED oil-dri or similar inert material. Sweep or scrape up and containerize.

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONARY..... CAUTION: MAY CAUSE SKIN IRRITATION. Harmful if absorbed through INFORMATION skin. Avoid contact with skin, eyes and clothing. Avoid breathing spray mist or vapors. CONTENTS UNDER PRESSURE. Do not puncture or incinerate. Exposure to temperatures above 130 F may cause bursting. Environmental Hazard: This pesticide is toxic to fish. Keep out of lakes, ponds or streams. Do not contaminate water by cleaning or disposal of wastes. Keep away from food, foodstuffs and domestic water supplies. KEEP OUT OF REACH OF CHILDREN.
OTHER HANDLING AND..... Store in a cool, dry place with adequate ventilation. Wash STORAGE CONDITIONS thoroughly after handling. Observe good personal hygiene practices. Product residue may remain on/in empty containers. All precautions for handling the product must be used in handling the empty container and residue.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION. No special requirements under label recommended use directions. If major exposure is possible (e.g. spills): Use appropriate respiratory protection to prevent overexposure.
VENTILATION..... For outdoor use only. Do not use indoors or in poorly ventilated areas.
PROTECTIVE GLOVES..... If prolonged or repeated contact is possible: Any impervious material.
EYE PROTECTION..... Safety glasses with side shields.

MATERIAL SAFETY DATA SHEET

Page 3 of 5

MSDS # 111352004

RAID® WASP & HORNET KILLER 271

Date Issued: 05Apr2007

Supersedes: 06Apr2005

SECTION 8 - SPECIAL PROTECTION INFORMATION (continued)

OTHER PROTECTIVE MEASURES..... If major exposure is possible to eyes/skin, wear/use appropriate protective equipment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

COLOR..... Clear
PRODUCT STATE..... Dispensed as a spray mist.
ODOR..... Hydrocarbon Solvent
PH..... Not applicable.
ODOR THRESHOLD..... Not available.
SOLUBILITY IN WATER.... Negligible
SPECIFIC GRAVITY..... 0.81 (H2O=1)
VAPOR DENSITY (AIR=1).. Not available.
EVAPORATION RATE (BUTYL ACETATE=1) Not available.
VAPOR PRESSURE (mm HG). Not available.
BOILING POINT..... Not available.
FREEZING POINT..... Not available.
COEFFICIENT OF..... Not available. WATER/OIL
PERCENT VOLATILE BY.... Not available. VOLUME (%)
VOLATILE ORGANIC..... < 35. COMPOUND (VOC)
THEORETICAL VOC..... Not available. (LB/GAL)

SECTION 10 - STABILITY AND REACTIVITY

STABILITY..... Stable
STABILITY - CONDITIONS. Excessive heat. TO AVOID
INCOMPATIBILITY..... Avoid contact with: Strong oxidizing materials (e.g. liquid chlorine).
HAZARDOUS DECOMPOSITION PRODUCTS When exposed to fire: Produces normal products of combustion.
HAZARDOUS..... Will not occur. POLYMERIZATION
HAZARDOUS..... None known. POLYMERIZATION - CONDITIONS TO AVOID

SECTION 11 - TOXICOLOGY INFORMATION (Also See Section 3)

LD50 (ACUTE ORAL TOX).. Greater than 5000 mg/kg (rats)
LD50 (ACUTE DERMAL TOX) Estimated to be greater than 2000 mg/kg. (rabbit)
LC50 (ACUTE INHALATION TOX) > 7.2 mg/L (rat)
EFFECTS OF CHRONIC..... None known. EXPOSURE
SENSITIZATION..... None known.
CARCINOGENICITY..... None known.
REPRODUCTIVE TOXICITY.. None known.
TERATOGENICITY..... None known.

RAID® WASP & HORNET KILLER 271

Date Issued: 05Apr2007

Supersedes: 06Apr2005

----- SECTION 11 - TOXICOLOGY INFORMATION (Also See Section 3) (continued) -----

MUTAGENICITY..... None known.

----- SECTION 12 - ECOLOGICAL INFORMATION -----

ENVIRONMENTAL DATA..... This product is toxic to fish. Do not discharge into lakes, streams, ponds or public water unless in accordance with an NPDES Permit.

----- SECTION 13 - DISPOSAL CONSIDERATIONS -----

WASTE DISPOSAL..... PESTICIDAL WASTE - Observe all applicable Federal/ Provincial/
INFORMATION State regulations and Local/ Municipal ordinances regarding disposal of pesticide wastes. If possible, recycle empty aerosol can to nearest steel recycling center. Use up package or give to someone who can.

----- SECTION 14 - TRANSPORTATION INFORMATION -----

US DOT INFORMATION..... Please refer to the Bill of Lading/receiving documents for up-to-date shipping information.
CANADIAN SHIPPING NAME. RAID® WASP & HORNET KILLER 271
TDG CLASSIFICATION..... Not applicable.
PIN/NIP..... Not applicable.
PACKING GROUP..... Not applicable.
EXEMPTION NAME..... Consumer commodity

----- SECTION 15 - REGULATORY INFORMATION -----

WHMIS CLASSIFICATION... Not applicable.

All ingredients of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

All ingredients in this product comply with the New Substances Notification requirements under the Canadian Environmental Protection Act (CEPA).

This product is not subject to the reporting requirements under California's Proposition 65.

----- SECTION 16 - OTHER INFORMATION -----

ADDITIONAL INFORMATION. NFPA 30B Level 3 Aerosol. Use as directed.
EPA REGISTRATION #..... 4822-271

----- PREPARATION INFORMATION -----

PREPARED BY..... Manufacturer's Technical Support Department. Refer to page 1 (Manufacturer) for contact information.

MATERIAL SAFETY DATA SHEET

Page 5 of 5

MSDS # 111352004

RAID® WASP & HORNET KILLER 271

Date Issued: 05Apr2007

Supersedes: 06Apr2005

This document has been prepared using data from sources considered technically reliable. It does not constitute a warranty, express or implied, as to the accuracy of the information contained herein. Actual conditions of use and handling are beyond seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State, Provincial and Local laws and regulations.

PRINT DATE: 05Apr2007



**Appendix C:
RAID® WASP &
HORNET KILLER
33 - Safety Data
Sheet**

Port of Seattle
Marine Stormwater Utility

Issued: November 2022

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

1. PRODUCT AND COMPANY IDENTIFICATION

Product information

- Product name** : RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)
- Recommended use** : Insecticide
- Manufacturer, importer, supplier** : S.C. Johnson & Son, Inc.
1525 Howe Street
Racine WI 53403-2236
- Telephone** : +18005585252
- Emergency telephone number** : 24 Hour Medical Emergency Phone: (866)231-5406
24 Hour International Emergency Phone: (703)527-3887
24 Hour Transport Emergency Phone: (800)424-9300

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Globally Harmonized System (GHS) Classification

Hazard classification	Hazard category	Hazards identification
Aerosol	Category 1	Extremely flammable aerosol.
Aspiration hazard	Category 1	May be fatal if swallowed and enters airways.
Gases under pressure	Compressed gas	Contains gas under pressure; may explode if heated.

Labelling

Hazard symbols

- Flame
- Gas cylinder
- Health hazard

Signal word

Danger

Hazard statements

- Extremely flammable aerosol.
- Contains gas under pressure; may explode if heated.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

May be fatal if swallowed and enters airways.

Precautionary statements

If medical advice is needed, have product container or label at hand.

Keep out of reach of children.

Read label before use.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.

Do NOT induce vomiting.

Store locked up.

Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Protect from sunlight. Store in a well-ventilated place.

Dispose of contents/ container to an approved incineration plant.

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Do not spray on an open flame or other ignition source.

Do not pierce or burn, even after use.

Other hazards : None identified

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Weight percent
Distillates (petroleum), hydrotreated light	64742-47-8	60.00 - 100.00
Carbon dioxide	124-38-9	1.00 - 5.00
Isopropanol	67-63-0	1.00 - 5.00
Cypermethrin	52315-07-8	0.0001 - 0.10
Prallethrin	23031-36-9	0.0001 - 0.10

The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

For additional information on product ingredients, see www.whatsinsidescjohnson.com.

4. FIRST AID MEASURES

Eye contact : No special requirements

Skin contact : No special requirements

Inhalation : No special requirements.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

Ingestion : IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Do NOT induce vomiting.

5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Specific hazards during firefighting : Do not use a solid water stream as it may scatter and spread fire. Aerosol Product - Containers may rocket or explode in heat of fire. Do not allow run-off from fire fighting to enter drains or water courses.

Further information : Fight fire from maximum distance or protected area. Cool and use caution when approaching or handling fire-exposed containers. Wear full protective clothing and positive pressure self-contained breathing apparatus. In case of fire and/or explosion do not breathe fumes.

NFPA Classification : NFPA Level 3 Aerosol

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Remove all sources of ignition.
Wear personal protective equipment.
Wash thoroughly after handling.

Environmental precautions : Do not flush into surface water or sanitary sewer system.
Use appropriate containment to avoid environmental contamination.
Outside of normal use, avoid release to the environment.

Methods and materials for containment and cleaning up : If damage occurs to aerosol can:
Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).
Use only non-sparking equipment.
Dike large spills.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

Clean residue from spill site.

7. HANDLING AND STORAGE

Handling

Precautions for safe handling

: Avoid contact with skin, eyes and clothing.
Do not enter places where used or stored until adequately ventilated.
For personal protection see section 8.
Use only as directed.
KEEP OUT OF REACH OF CHILDREN AND PETS.
Pressurized container.
Do not pierce or burn, even after use.

Advice on protection against fire and explosion

: Keep away from sources of ignition - No smoking.
Do not spray on an open flame or other ignition source.

Storage

Requirements for storage areas and containers

: Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.
Keep away from food, drink and animal feedingstuffs.
Keep in a dry, cool and well-ventilated place.
Store locked up.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Components	CAS-No.	mg/m3	ppm	Non-standard units	Basis
Distillates (petroleum), hydrotreated light	64742-47-8	1,200 mg/m3	152 ppm	-	SUPPLIER
Carbon dioxide	124-38-9	9,000 mg/m3	5,000 ppm	-	OSHA TWA
Carbon dioxide	124-38-9	-	30,000 ppm	-	ACGIH STEL
Carbon dioxide	124-38-9	-	5,000 ppm	-	ACGIH TWA
Isopropanol	67-63-0	980 mg/m3	400 ppm	-	OSHA TWA
Isopropanol	67-63-0	-	400 ppm	-	ACGIH STEL
Isopropanol	67-63-0	-	200 ppm	-	ACGIH TWA

Personal protective equipment

Respiratory protection : Do not spray in enclosed areas.

Hand protection : No special requirements.

Eye protection : No special requirements.

Skin and body protection : No special requirements.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

Form : aerosol

Color : clear

Odor : characteristic

Odour Threshold : No data available

pH : Not applicable

Melting point/freezing point : No data available

Initial boiling point and boiling range : No data available

Flash point : 22 °C
71.6 °F

Evaporation rate : No data available

Flammability (solid, gas) : Sustains combustion

Upper/lower flammability or explosive limits : No data available

Vapour pressure : Not applicable

Vapour density : No data available

Relative density : 0.81 g/cm³ at 21 °CGLP: yes

Solubility(ies) : negligible

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

Partition coefficient: n-octanol/water	:	No data available	
Auto-ignition temperature	:	No data available	
Decomposition temperature	:	No data available	
Viscosity, dynamic	:	No data available	
Viscosity, kinematic	:	No data available	
Oxidizing properties	:	No data available	
Volatile Organic Compounds Total VOC (wt. %)*	:	3 % - additional exemptions may apply *as defined by US Federal and State Consumer Product Regulations	
Other information	:	None identified	:

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Stable under recommended storage conditions.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Strong oxidizing agents
Hazardous decomposition products	:	Thermal decomposition can lead to release of irritating gases and vapours.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

11. TOXICOLOGICAL INFORMATION

Emergency Overview : Danger

Acute oral toxicity :

Acute inhalation toxicity :

Acute dermal toxicity :

GHS Properties	Classification	Routes of entry
Acute toxicity	No classification proposed	-
Acute toxicity	No classification proposed	-
Acute toxicity	No classification proposed	-
Skin corrosion/irritation	No classification proposed	-
Serious eye damage/eye irritation	No classification proposed	-
Skin sensitisation	No classification proposed	-
Respiratory sensitisation	No classification proposed	-
Germ cell mutagenicity	No classification proposed	-
Carcinogenicity	No classification proposed	-
Reproductive toxicity	No classification proposed	-
Specific target organ toxicity - single exposure	No classification proposed	-
Specific target organ toxicity - repeated exposure	No classification proposed	-
Aspiration hazard	Category 1	-

Aggravated Medical Condition : None known.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

12. ECOLOGICAL INFORMATION

Product : The product itself has not been tested.

Toxicity

The ingredients in this formula have been reviewed and no adverse impact to the environment is expected when used according to label directions.

Toxicity to fish

Components	End point	Species	Value	Exposure time
Distillates (petroleum), hydrotreated light	static test LC50 OECD Test Guideline 203	Oncorhynchus mykiss (rainbow trout)	> 1,000 mg/l	96 h
Carbon dioxide	No data available			
Isopropanol	flow- through test LC50	Pimephales promelas (fathead minnow)	9,640 mg/l	96 h
Cypermethrin	LC50	Oncorhynchus mykiss (rainbow trout)	0.00283 mg/l	96 h
	NOEC	Pimephales promelas (fathead minnow)	0.00001 mg/l	28 d
Prallethrin	LC50	Oncorhynchus mykiss (rainbow trout)	0.012 mg/l	96 h
	flow- through test	Oncorhynchus mykiss (rainbow trout)	0.003 mg/l	90 d

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200

**RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)**

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

	NOEC			
--	------	--	--	--

Toxicity to aquatic invertebrates

Components	End point	Species	Value	Exposure time
Distillates (petroleum), hydrotreated light	EC50 OECD Test Guideline 202	Daphnia (water flea)	> 1,000 mg/l	48 h
Carbon dioxide	No data available			
Isopropanol	semi- static test NOEC	Daphnia magna	30 mg/l	21 d
Cypermethrin	EC50	Daphnia magna (Water flea)	0.00471 mg/l	48 h
	NOEC	Daphnia magna (Water flea)	0.00004 mg/l	21 d
Prallethrin	EC50	Daphnia magna (Water flea)	0.0062 mg/l	48 h
	NOEC	Daphnia magna	0.00065 mg/l	21 d

Toxicity to aquatic plants

Components	End point	Species	Value	Exposure
------------	-----------	---------	-------	----------

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200

**RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)**

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

				time
Distillates (petroleum), hydrotreated light	ErC50 OECD Test Guideline 201	Pseudokirchneriella subcapitata (green algae)	> 1,000 mg/l	72 h
Carbon dioxide	No data available			
Isopropanol	EC50	Desmodesmus subspicatus (green algae)	> 1,000 mg/l	72 h
Cypermethrin	ErC50	Selenastrum capricornutum, Skeletonema costatum	> 0.0033 mg/l	72 h
Prallethrin	EC50	Pseudokirchneriella subcapitata (green algae)	2 mg/l	96 h

Persistence and degradability

Component	Biodegradation	Exposure time	Summary
Distillates (petroleum), hydrotreated light	69 %	28 d	Readily biodegradable
Carbon dioxide	No data available		
Isopropanol	78 %	20 d	Readily biodegradable
Cypermethrin	0.6 - 1.4 %	33 d	Not readily biodegradable.
Prallethrin	No data available		Not readily biodegradable.

Bioaccumulative potential

Component	Bioconcentration factor (BCF)	Partition Coefficient n-Octanol/water (log)
Distillates (petroleum), hydrotreated light	61 - 159	No data available
Carbon dioxide	No data available	No data available

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

Isopropanol	< 100	0.05
Cypermethrin	373.4 Measured	5.3 - 5.6
Prallethrin	No data available	4.49

Mobility

Component	End point	Value
Distillates (petroleum), hydrotreated light	No data available	
Carbon dioxide	No data available	
Isopropanol	Koc	1.1 estimated
Cypermethrin	Koc	80653 - 574360
Prallethrin	No data available	

PBT and vPvB assessment

Component	Results
Distillates (petroleum), hydrotreated light	Not fulfilling PBT and vPvB criteria
Isopropanol	Not fulfilling PBT and vPvB criteria
Cypermethrin	Not fulfilling PBT and vPvB criteria
Prallethrin	Not fulfilling PBT and vPvB criteria

Other adverse effects : None known.

13. DISPOSAL CONSIDERATIONS

PESTICIDAL WASTE:

For disposal information, please read and follow Disposal instructions on the pesticide label.
Consumer may discard empty container in trash, or recycle where facilities exist.

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

14. TRANSPORT INFORMATION

Please refer to the Bill of Lading/receiving documents for up-to-date shipping information.

	Land transport	Sea transport	Air transport
UN number	1950	1950	1950
UN proper shipping name	AEROSOLS, Flammable	AEROSOLS, Flammable	AEROSOLS, Flammable
Transport hazard class(es)	2.1	2	2.1
Packing group	-	-	-
Environmental hazards	-	-	-
Special precautions for user	Limited quantities derogation may be applicable to this product, please check transport documents.	Limited quantities derogation may be applicable to this product, please check transport documents.	Limited quantities derogation may be applicable to this product, please check transport documents.

15. REGULATORY INFORMATION

FIFRA Labeling

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals.

Following is the hazard information as required on the pesticide label:

CAUTION:

CONTENTS UNDER PRESSURE.

Exposure to temperatures above 130° F may cause bursting.

Extremely flammable.

This product is extremely toxic to fish and aquatic invertebrates.

Drift and runoff may be hazardous to fish in water adjacent to treated areas.

Notification status : All ingredients of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA)

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

Chemical Substance Inventory.

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Registration # / Agency
4822-553/US/EPA

16. OTHER INFORMATION

HMIS Ratings

Health	2
Flammability	3
Reactivity	0

NFPA Ratings

Health	2
Fire	3
Reactivity	0
Special	-

This information is being provided in accordance with the Occupational Safety and Health Administration (OSHA) regulation (29 CFR 1910.1200). The information supplied is designed for workplaces where product use and frequency of exposure exceeds that established for the labeled consumer use.

Further information

Safety Data Sheet

according to Hazard Communication Standard; 29 CFR 1910.1200



RAID® WASP & HORNET KILLER 33 (EPA Reg. No. 4822-553)

Version 1.2

Print Date 03/12/2018

Revision Date 07/12/2016

SDS Number 350000010777

This document has been prepared using data from sources considered to be technically reliable. It does not constitute a warranty, expressed or implied, as to the accuracy of the information contained herein. Actual conditions of use are beyond the seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State, Provincial and Local laws and regulations.

Prepared by	SC Johnson Global Safety Assessment & Regulatory Affairs (GSARA)
-------------	------------------------------------------------------------------



Appendix D: Marine Maintenance Landscape Guidelines

Port of Seattle
Marine Stormwater Utility

Issued: November 2022

Marine Maintenance Landscape Management Guidelines - Update

The Port of Seattle's Marine Maintenance Landscape Department (MMLD) has taken an organic, non-toxic approach to landscaping at its parks and public access properties to protect the environment and the general public. This updated Marine Maintenance Landscape Management Guidelines (guidelines) adheres to guidance provided in the Salmon-Safe Certification Standards for Parks and Natural Areas (Volume 6.0, May 2019).

1. Landscape Design

MMLD conducts a complete site and soil assessment, checking the site conditions (shade vs. sun, marshy vs. dry, inland vs. shoreline) then selects the most suitable trees and plants for the site, using a mix of low maintenance, drought tolerant, disease resistant, and native plant materials. Designs include an emphasis on native and drought tolerant/disease resistant plant material, and no more than 20% of total project consists of turf areas.¹ Various planting resources are used, including the organization Great Plant Picks (<http://www.greatplantpicks.org/>).

2. Shoreline and Upland Habitat Enhancement and Restoration

Current and past site usage will be considered throughout the design phases. Priority shall be given to the preservation of wildlife habitat and wetland areas. As site development occurs, opportunities for the incorporation of bio retention cells (i.e., rain gardens) and other storm water retention devices will be pursued. Designs are intended to be aesthetically pleasing, enhance public use areas and tenant facilities, and reduce storm drain discharges.

3. Tree and Plant Preservation

A site assessment, considering variables such as tree species, soil type and condition and construction needs, is conducted on projects by MMLD. Structurally sound, healthy native trees over 6 inches in diameter are inventoried to be preserved. If preservation is not possible, mitigation for the removal will include incorporating the same species of tree into the new landscape design, as agreed upon by the MM Landscape Supervisor. Material to be preserved is protected from damage by installing fencing around the entire drip line circumference of the tree. Preservation techniques must be approved by the MM Landscape Supervisor.

¹ Turf areas are planted with a seed mix conducive to the Pacific Northwest, supplied by Wibur-Ellis Co. Mix.3 consists of 32.34% Blazer 4 Perennial Ryegrass, 31.94% Fiesta 4 Perennial Ryegrass, and 31.14% Wicked Perennial Ryegrass. Seed originates from Oregon.

4. Site Preservation

Existing trees and plant materials are protected from soil compaction. The latest practices to reduce compaction include use of chips, gravel and geo-textile fabrics to minimize compaction. Fencing (i.e., orange safety fencing) installed to preserve vegetation and trees.

5. Paths and Lots

Walkways, paths, lots and special attractions conform to current Americans with Disabilities Act (ADA) standards. Alternatives to impervious surfaces (e.g., concrete, asphalt or other non-porous materials) will be considered for new construction to improve infiltration by rain.

6. Soil Preparation

Existing soils are amended with compost/topsoil. Compost amended topsoil (i.e., yard waste, bio solids, manure) is typically a commercially manufactured mixture of 50% topsoil and 50% compost and supplied from a reputable vendor.² The final depth of amended soil is 6-12 inches.

7. Plant Material Installation

Trees, shrubs and groundcover are planted with burlap, wire cages, plastic wrapping, twine, wire and other growing containers. These containers are removed entirely from the rootball and planting pit. Plant material is set in the planting pit with the root crown 2 inches above the finished grade. This allows for adequate mulching to be placed in tree rings. Plants are then watered and soil added to fill any remaining voids.

Hydro-seeding is applied to previously amended soil that has been graded and cleared of foreign matter (e.g., rocks, sticks, construction debris). The MMLD approves seed mixes, including wildflower, meadow, reclamation, and turf type mixes. The preferred planting window is between April 1st and October 1st, with consideration given to available irrigation during dry summer months.

8. Lawn Care

MMLD core aerates to improve water and air penetration and promote root growth and soil structure that is better able to withstand long periods between watering. MMLD mows lawns with blades set at 3-4 inches in height, which encourages thicker turf and helps with weed control, and leaves the grass clippings to decompose and serve as mulch and natural fertilizer.

9. Tree and Shrub Care

MMLD plants mixed, not monoculture, groves to help prevent pests and diseases from spreading, and plant dense ground cover to crowd out and suppress weeds.

² Fertilizer is Organic NO PHOS - 7-0-4 (Manufactured by PACIFIC CALCIUM, INC. for: WILBUR-ELLIS COMPANY LLC, 7 E. Washington Ave., Yakima, WA 98903)

Tree pruning is performed according to guidelines in the *American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning)* ANSI A300 Pruning Standard, 2017, developed by the International Society of Arboriculture.

10. General Weed Control

Weed control on land is continuous in shrub beds and tree islands, and is accomplished by mechanical methods (e.g., hand pulling, cultivating, mulch layering, torch burning).

11. Noxious Weed Control

Noxious aquatic plant control is employed at Port marinas where needed when there is a risk to tenants' boat engines due to fouling or other problems associated with heavy aquatic plant growth. The Port has obtained coverage under the Aquatic Plant and Algae Management (APAM) National Pollutant Discharge Elimination System (NPDES) and State Water Discharge General Permit for treatment at Fishermen's Terminal and Salmon Bay Marina.³ This permit allows use of particular chemicals and concentrations for aquatic plant management. Currently the Port uses diquat dibromide and endothall at both locations in April and October, outside the fish window. At Fishermen's Terminal, the use of Flouridone is allowed during the fish window. Notice of treatment is posted 24 hours in advance. The Port submits chemical treatment reports to Ecology at the end of each year.

Pesticides are not used for any other purposes on Port Maritime Properties.

12. Integrated Pest Management

MMLD implements a non-toxic integrated pest management (IPM) control approach to maintain its park system. For specific pest problems, an IPM checklist is completed that documents:

- pest reporting and monitoring
- practices implemented, including non-chemical products and manual practices
- effectiveness of IPM practices
- general observations

The records are kept by MM Landscape Supervisor.

13. Fertilizer and Supplements

No synthetic fertilizers, lime, or herbicides and pesticides are used on landscaped areas. Instead, fertilizers and supplements are used.⁴

³ Current permit number: WAG994177, issued 9/18/2020, WA Department of Ecology.

⁴ Organic NO PHOS - 7-0-4 (Manufactured by PACIFIC CALCIUM, INC. for: WILBUR-ELLIS COMPANY LLC, 7 E. Washington Ave., Yakima, WA 98903)

In general, soluble fertilizer rates of application for turf and shrub bed areas are limited to no more than 0.5 lb nitrogen (N)/1,000 square feet to minimize fertilizer in stormwater runoff. Consistency with this application rate will be periodically checked and confirmed by MM Landscape Supervisor.

Plants with low fertilizer requirements are used for landscaping where feasible.

Fertilizer is used on high and moderate intensity use areas, such as flowerbeds, turf areas and planting beds, and plantings potentially within construction and restoration projects. Fertilizer use is highly restricted within a waterway buffer zone of 25-feet wide.

Soil testing is conducted every 3-5 years to monitor nitrogen and potassium levels . After soil testing results have been provided to MMLD, it will then be determined if fertilizer applications are necessary.⁵

To improve soil fertility, practices such as on-site mulching of leaf and grass clippings are used to reduce need for fertilizer. MMLD collects and recycles plant material and soil to reuse as compost and mulch in our landscape beds. The compost, mulch, and green waste are located on Terminal 105.

To be consistent with the Port's 'Operations and Maintenance Manual for the Port's Maritime Division,'⁶ fertilizers will not be applied to grass swales, filter strips, or buffer areas (i.e., within 25 feet) that drain stormwater directly to receiving waters.

14. Water Conservation

The City of Seattle and The Port of Seattle have formed a cooperative agreement included in *Water Shortage Use Reduction Plan*.⁷ The Port's water conservation plan identifies steps for general and drought related water use reduction.

Water conservation is a top priority. MMLD follows a plan to conserve water by focusing watering in limited areas based on plant needs and use objectives. MMLD develops landscapes that utilize native vegetation which require less irrigation. MMLD is in the process of replacing outdated irrigation equipment with an efficient, modern irrigation system to adjust supply to vegetation requirements, infiltration, evapo-transpiration, and other factors. MMLD uses soil management practices such as composting, mulching, thatching and aerating to reduce irrigation requirements.⁸ The MM Landscape Supervisor will focus attention on Best Management Practices for water conservation. MMLD will review proposed landscape additions and projects, giving consideration to water requirements. In water shortage events, MMLD will consider postponing projects.

⁵ A summary of annual fertilizer use shows a stable or declining trend in synthetic fertilizer use Port-wide. No artificial or chemical fertilizer is used.

⁶ August 2019, Port of Seattle, Maritime Division Operation and Maintenance Guidance Manual (link: https://www.portseattle.org/sites/default/files/2020-05/2019-0816_PortOfSeattle_O%2BM_Manual_0.pdf)

⁷ Port of Seattle, July 2015, *Water Shortage Use Reduction Plan*

⁸ Port of Seattle Water use monitoring is conducted and annual summary reporting is available at MMLD SharePoint site

A drought management plan, coordinated by the MM Landscape Supervisor, will take effect during water shortages.⁹

15. Recycling

We collect and recycle plant material and soil to reuse as compost and mulch in our landscape beds. The compost, mulch, and clean green waste are stored on Terminal 5.

16. Contractors

The Port of Seattle typically does not use landscape contractors. If we do, these contractors would be required to understand and abide by the MMLD IPM plan, water conservation plan, and fertilizer plan consistent with MMLD's standards, prior to any activities performed. Upon job completion, documentation of pest monitoring, IPM practices, the effectiveness of these practices, water usage, and fertilizer usage would be provided to MMLD.

Questions and concerns regarding these guidelines can be addressed to the MM Landscape Supervisor.

Crew Chief/Supervisor: Scott Veysey

Phone 206-787-3231

E-mail veysey.s@portseattle.org

⁹ Port of Seattle, July 2015, *Water Shortage Use Reduction Plan*



Appendix E: City of Seattle Stormwater Manual - BMP 49

Port of Seattle
Marine Stormwater Utility

Issued: November 2022

3.6.18. BMP 49: Pesticides and an Integrated Pest Management Program

This BMP applies to businesses and public agencies that use pesticides.

Description of Pollutants

Inadequate management of pesticides can allow them to enter stormwater and receiving water bodies, resulting in impacts on non-targeted organisms.

Required BMP Elements

Required BMP elements are contained in *Appendix I* of this manual and *S435 – BMPs for Pesticides and an Integrated Pest Management Program* in Volume IV of the SWMMWW (Ecology 2019).



Appendix F: Integrated Pest Management Checklist

Port of Seattle
Marine Stormwater Utility

Issued: November 2022

Integrated Pest Management Checklist	Date:
Name, email, extension:	Facility:
Plants affected:	% dead, diseased, healthy:
Description of infection/disease/pest:	Plant parts affected:
Reference used for identification: <input type="checkbox"/> <i>Pacific Northwest Insect Management Handbook</i> <input type="checkbox"/> Other: _____ _____ _____	Control or Observe (<i>add information on reverse side</i>): <input type="checkbox"/> Control <input type="checkbox"/> Observe
Suggested Methods of Control: <input type="checkbox"/> Weeding <input type="checkbox"/> Pruning <input type="checkbox"/> Removal <input type="checkbox"/> Sheet mulch <input type="checkbox"/> Other mechanical: <input type="checkbox"/> Biocontrol: <input type="checkbox"/> Chemical control: (usage, toxicity, etc.)	

Observations: <i>include date, time, weather, pests, other relevant conditions</i>	Controls: <i>include method of control, assessment of results or progress</i>