

**SDOT BEST MANAGEMENT PRACTICES
(BMP) REFERENCE MANUAL**

Street Maintenance Surface Repair
Emergency Response

December 2008

SDOT BEST MANAGEMENT PRACTICES (BMP) REFERENCE MANUAL

Street Maintenance Surface Repair Emergency Response

Prepared for

City of Seattle
Department of Transportation
700 Fifth Avenue, Suite 3900
Seattle, Washington 98124
Telephone: 206/684-8750

Prepared by

Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206/441-9080

December 31, 2008

Contents

Street Maintenance Operations

3. Emergency Response

RCAT 301 - Slide Control

RCAT 302 - Slide Cleanup

RCAT 320 - Emergency - Drainage

RCAT 330 - Emergency - Windstorm

RCAT 340 & 341 - Snow and Ice Patrol, Ice Control and Anti-icing

RCAT 342 - Other Winter Maintenance

RCAT 344 – Ready/Prepare Snow and Ice Equipment

RCAT 345 - Snow and Ice Clean-up

RCAT 350 - Other Emergency Control

RCAT 815 - Clean and Repair Equipment and Tools

This best management practice (BMP) reference manual was written to assist you, an SDOT field crew member, in preventing pollution from impacting stormwater. Your actions in the field contribute significantly to preventing stormwater pollution and keeping our streams, lakes, and Puget Sound clean. These manuals also help SDOT comply with the City of Seattle's Stormwater Permit.

We would like to receive your feedback on the information this manual contains. Direct feedback; questions regarding any of the BMPs listed; and information about missing work tasks, pollution sources, or missing BMPs should be directed to Maureen Meehan (SDOT's NPDES Stormwater Advisor) at (206) 684-8750.

To report a spill or any illegal dumping issues you observe while in the field, please call the SPU Water Quality Hotline at (206) 684-7587.

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|------------------|
| Street Maintenance Operations 3. Emergency Response | 301 | Slide Control |

Description of Work

Prevent, contain, or control slides in possible slide areas by building berms; laying visqueen and concrete blocks; and constructing barriers, spill walls, or using other slide prevention techniques.

Objectives

Protect storm drain systems and water bodies from stormwater and sediment. Protect streets and roadways from being damaged due to slides.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.
2. **Catch Basin Filter Sock:** Use the following best management practices (BMPs) if stormwater or sediment could discharge to separate storm drain system during construction:
 - Install catch basin filter socks in any structures that are **greater than 12 inches deep** (see Figure 1) that are located downslope or adjacent to the work area.
 - Place the appropriate size filter sock in the storm drain or catch basin.
 - Place the storm drain or catch basin grate on top of the filter sock to hold it in place.
 - Trim and remove filter sock material that extends beyond the grate.



Figure 1. Catch basin filter sock.

Evaluate the situation and apply one or more of the following best management practices (BMPs) to prevent, contain, or control slides.

1. Earth Dike:

- Install earth dike (see Figure 2) prior to starting land-disturbing activity using design criteria listed in Table 1.
- Ensure that subbasin tributary area is one acre or less.
- Stabilize the dike with temporary or permanent vegetation if it will remain in place for more than 15 days.

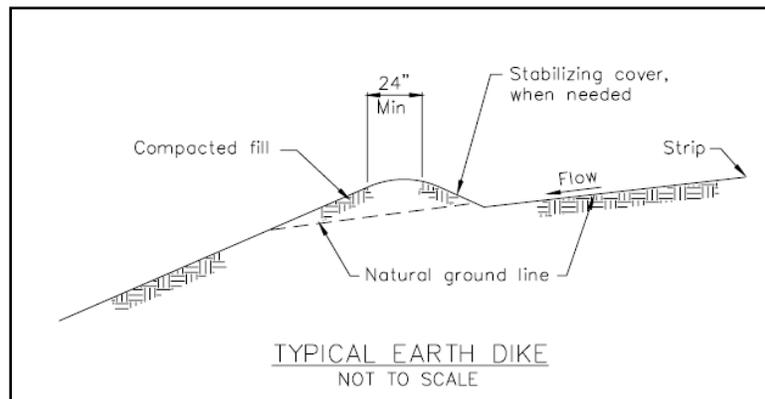


Figure 2. Earth dike diagram.

Table 1. Design Criteria for Earth Dike.

| Feature | Requirement |
|-----------------------------------|--|
| Top Width | 2 foot minimum. |
| Height | 18 inch minimum measured from upslope toe and at a compaction of 90 percent ASTM D698 standard proctor |
| Side Slopes | 25 percent or flatter |
| Grade | Topography dependent, except that dike shall be limited to grades between 0.5 and 1.0 percent |
| Horizontal Spacing of Earth Dikes | <ul style="list-style-type: none"> • Slopes less than 5 percent = 300 feet • Slopes 5-10 percent = 200 feet • Slopes 10-40 percent = 100 feet |
| Stabilization | <ul style="list-style-type: none"> • Slopes = less than 5 percent. Seed and mulched construction (see BMPs E1.10 and E1.15). • Slopes = 5-40 percent. Dependent on runoff velocities and dike materials • Stabilization should be done immediately using either sod or riprap to avoid erosion. |
| Outlet | The upslope side of the dike shall provide positive drainage to the dike outlet. No erosion shall occur at the outlet. Provide energy dissipation measures as necessary. Sediment-laden runoff must be released through a sediment trapping facility. |
| Other | Minimize construction traffic over temporary dikes. |

2. Drainage Swale:

- Install drainage swale (see Figure 3) with compacted soil that is excavated to line, grade and cross-section as required using design criteria listed in Table 2.
- Stabilize the drainage swale with temporary or permanent vegetation if it will remain in place for more than 15 days.

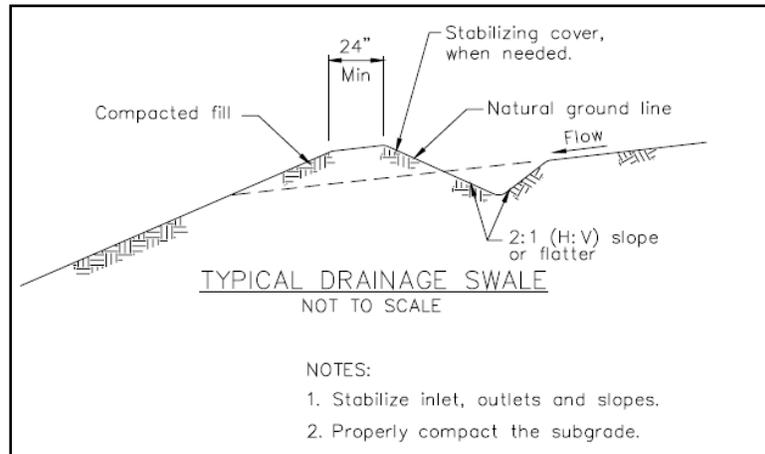


Figure 3. Drainage swale diagram.

Table 2. Design Criteria for Drainage Swale.

| Feature | Requirement |
|---------------|--|
| Bottom Width | 2 foot minimum. Bottom shall be level. |
| Depth | 1 foot min |
| Side Slopes | 25 percent or flatter |
| Grade | 5 percent maximum with positive drainage to suitable outlet such as a sediment trap |
| Stabilization | Seed as per BMP E1.10 temporary seeding or E2.75. Riprap 12 inches thick pressed into bank and extending at least 8 inches vertical from the bottom. |
| Stabilization | Slope of disturbed area: Less 5 percent = 300 feet 5-10 percent = 200 feet 10-40 percent = 100 feet |
| Outlet | Level spreader or riprap to stabilized outlet/sedimentation pond |

3. Plastic Sheeting:

- Install plastic sheeting (see Figure 4) over exposed soils and secure it by staking or using weight (e.g., sandbags or tires) to prevent movement. Do not use rebar as a staking mechanism.
- Key in plastic sheeting at the top of the slope. Use additional BMPs, such as a berm or sediment control, to control surface water runoff from plastic sheeting.



Figure 4. Plastic sheeting used as temporary erosion control.

4. Temporary Seeding and Mulching:

- Install surface runoff control measures such as gradient terraces, earth dike/drainage swales, level spreaders, and sediment basins before seeding.
- Seed during the optimum windows for western Washington (April 1 through June 30 and September 1 through October 1) if possible.
- Irrigate until 75 percent grass cover is established if seeding occurs between July 1 and August 30.
- Mulch or cover seeding with plastic until 75 percent grass cover is established if seeding occurs between October 1 and March 30.
- Immediately install mulch after seeding areas with slopes greater than 25 percent.
- Use erosion blankets (e.g., nets and mats) on level areas, on slopes up to 25 percent, and in channels.
 - Where soil is highly erodable, only use nets in combination with organic mulch such as straw and wood fiber.
 - Use jute nets that are heavy, uniform cloth woven of single jute yarn (if 36 to 48 inches wide; the net shall weigh an average of 1.2 pounds per linear yard).
 - Securely anchor netting to the soil with No. 11 gauge wire staples at least 6 inches long, with an overlap 2 inches across and 6 inches down.
- *Optional BMPs:*
 - Cover soils with mats such as clear plastic, jute, or synthetic fiber
 - Preserve natural vegetation, including grass, trees, shrubs, and vines
 - Implement vegetated swales, dikes, silt fences, check dams, gravel filter berms, sedimentation basins, and proper grading as appropriate.

BMP Maintenance During Site Work

1. **Catch Basin Filter Sock:** Clean or remove and replace filter sock when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).
2. **Earth Dike, Drainage Swale, and Plastic Sheeting:** Inspect BMPs daily during construction. Schedule additional inspections during storm events and make any required repairs.
3. **Temporary Seeding and Mulching:** Reseed areas as necessary if vegetative cover fails to become well established.

Site Cleanup

1. **Catch Basin Filter Sock:**
 - Remove sediment buildup in front of the catch basin or storm drain inlets by hand sweeping.
 - Remove the filter sock and dispose of the collected sediment in a suitable container to be hauled off site.
 - Reuse the filter sock at another site if it remains in good condition (e.g., no rips, tears, or visible staining). Use a vactor truck to clean any water or sediment out of the catch basin or storm drain inlet after flushing has been completed.
2. **Earth Dike, Drainage Swale, and Plastic Sheeting:**
 - Evaluate the site to determine if BMPs are no longer needed (the area has stabilized; potential of sediment laden water exiting the area has passed).
 - Remove sediment buildup.
 - Remove the BMP (recycle or reuse if applicable).
 - Revegetate the area disturbed by BMP removal (if applicable).
 - *Optional BMP:* Use a vactor truck to clean any water and/or sediment out of catch basin or storm drain inlets.
3. **Temporary Seeding and Mulching:** Check mulched areas periodically, especially following severe storms, when damaged areas of mulch or tie-down material should be repaired.

References

| | | | |
|--|--|---|--|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) | Stormwater Management Manual for Western Washington (Ecology 2005) |
| 2.56 - Diversion Berm 2.58 - Diversion Channel 2.79 - Inlet Protection 2.99 - Plastic Covering | E1.10 - Temporary Seeding E1.15 - Mulching and Matting E1.20 - Clear Plastic Covering E2.80 - Earth Dike and Drainage Swale E3.25 - Storm Drain Inlet Protection | BMP 33 - Soil erosion and sediment control | C220 - Inlet Protection |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|------------------|
| Street Maintenance Operations 3. Emergency Response | 302 | Slide Cleanup |

Description of Work

Cleanup of slides by removing material and debris, flushing and sweeping the street as necessary, and repairing damaged roadway structures and drainage systems. Because of the large variation in project size, numerous BMPs may be drawn upon, on an as-needed basis.

Objectives

Protect storm drain systems and water bodies from stormwater and sediment. Open streets to traffic and remove all hazards.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.
2. **Catch Basin Filter Sock:** Use the following best management practices (BMPs) if flush water will discharge to the separate storm drain system:
 - **Structures less than 12-inches deep:** Remove debris using a mechanical street sweeper or by hand sweeping before flushing.
 - **Structures greater than 12-inches deep:** Install a storm drain or catch basin filter sock (see Figure 1).
 - Place the appropriate size filter sock in the storm drain or catch basin.
 - Place the storm drain or catch basin grate on top of the filter sock to hold it in place.
 - Trim and remove filter sock material that extends beyond the grate.



Figure 1. Catch basin filter sock.

Evaluate the situation and apply one or more of the following best management practices (BMPs) to prevent further erosion from occurring.

1. Earth Dike:

- Install earth dike (see Figure 2) prior to starting land-disturbing activity using design criteria listed in Table 1.
- Ensure that subbasin tributary area is one acre or less.
- Stabilize the dike with temporary or permanent vegetation if it will remain in place for more than 15 days.

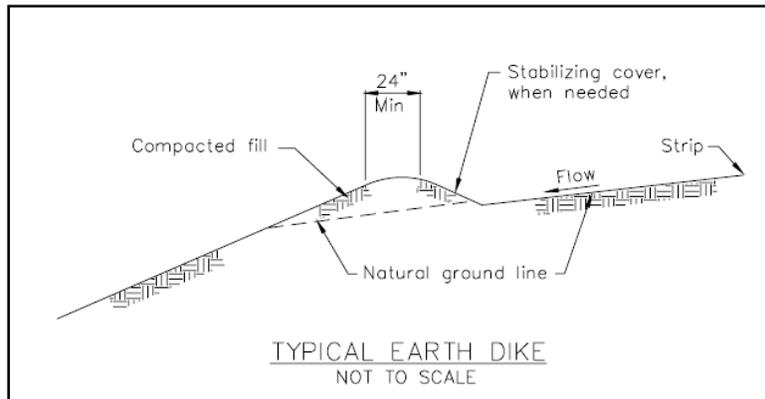


Figure 2. Earth dike diagram.

Table 1. Design Criteria for Earth Dike.

| Feature | Requirement |
|-----------------------------------|--|
| Top Width | 2 foot minimum |
| Height | 18 inch minimum measured from upslope toe and at a compaction of 90 percent ASTM D698 standard proctor |
| Side Slopes | 25 percent or flatter |
| Grade | Topography dependent, except that dike shall be limited to grades between 0.5 and 1.0 percent |
| Horizontal Spacing of Earth Dikes | <ul style="list-style-type: none"> • Slopes less than 5 percent = 300 feet • Slopes 5-10 percent = 200 feet • Slopes 10-40 percent = 100 feet |
| Stabilization | <ul style="list-style-type: none"> • Slopes = less than 5 percent. Seed and mulched construction (see BMPs E1.10 and E1.15). • Slopes = 5-40 percent. Dependent on runoff velocities and dike materials. • Stabilization should be done immediately using either sod or riprap to avoid erosion |
| Outlet | The upslope side of the dike shall provide positive drainage to the dike outlet. No erosion shall occur at the outlet. Provide energy dissipation measures as necessary. Sediment-laden runoff must be released through a sediment trapping facility. |
| Other | Minimize construction traffic over temporary dikes |

2. Drainage Swale:

- Install drainage swale (see Figure 3) with compacted soil that is excavated to line, grade and cross-section as required using design criteria listed in Table 2.
- Stabilize the drainage swale with temporary or permanent vegetation if it will remain in place for more than 15 days.

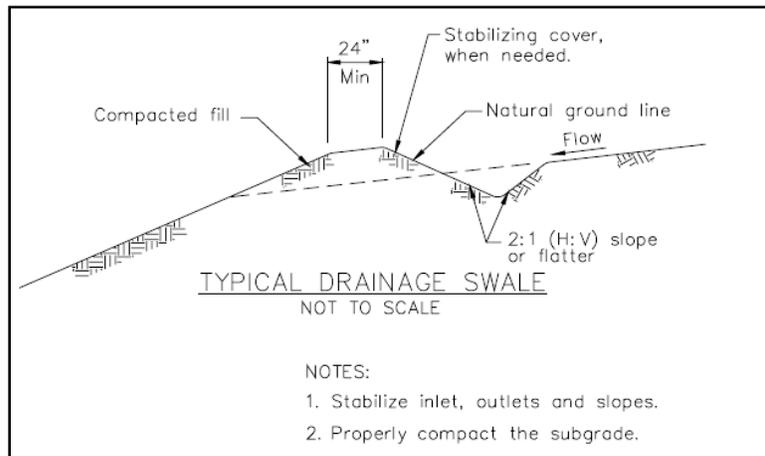


Figure 3. Drainage swale diagram.

Table 2. Design Criteria for Drainage Swale.

| Feature | Requirement |
|---------------|--|
| Bottom Width | 2 foot minimum. Bottom shall be level |
| Depth | 1 foot min |
| Side Slopes | 25 percent or flatter |
| Grade | 5 percent maximum with positive drainage to suitable outlet such as a sediment trap. |
| Stabilization | Seed as per BMP E1.10 temporary seeding or E2.75. Riprap 12 inches thick pressed into bank and extending at least 8 inches vertical from the bottom. |
| Stabilization | Slope of disturbed area: Less 5 percent = 300 feet 5-10 percent = 200 feet 10-40 percent = 100 feet |
| Outlet | Level spreader or riprap to stabilized outlet/sedimentation pond |

3. Plastic Sheeting:

- Install plastic sheeting (see Figure 4) over exposed soils and secure it by staking or using weight (e.g., sandbags or tires) to prevent movement. Do not use rebar as a staking mechanism.
- Key in plastic sheeting at the top of the slope. Use additional BMPs, such as a berm or sediment control, to control surface water runoff from the plastic sheeting.



Figure 4. Plastic sheeting used as temporary erosion control.

4. Sweeping:

- Sweep street and other paved surfaces to remove soil following cleanup of major slide debris
- Use pickup brooms in sensitive areas
- Avoid sweeping up any unknown substance or any object that may be potentially hazardous.

5. Temporary Seeding and Mulching:

- Install surface runoff control measures such as gradient terraces, earth dike/drainage swales, level spreaders, and sediment basins before seeding.
- Seed during the optimum windows for western Washington (April 1 through June 30 and September 1 through October 1) if possible.
- Irrigate until 75 percent grass cover is established if seeding occurs between July 1 and August 30.
- Mulch or cover seeding with plastic until 75 percent grass cover is established if seeding occurs between October 1 and March 30.
- Immediately install mulch after seeding areas with slopes greater than 25 percent.
- Use erosion blankets (e.g., nets and mats) on level areas, on slopes up to 25 percent, and in channels.
 - Where soil is highly erodible, only use nets in combination with organic mulch such as straw and wood fiber.
 - Use jute nets that are heavy, uniform cloth woven of single jute yarn (if 36 to 48 inches wide; the net shall weigh an average of 1.2 pounds per linear yard).
 - Securely anchor netting to the soil with No. 11 gauge wire staples at least 6 inches long, with an overlap 2 inches across and 6 inches down.

- *Optional BMPs:*
 - Cover soils with mats such as clear plastic, jute, or synthetic fiber
 - Preserve natural vegetation, including grass, trees, shrubs, and vines
 - Implement vegetated swales, dikes, silt fences, check dams, gravel filter berms, sedimentation basins, and proper grading as appropriate.

BMP Maintenance During Site Work

1. **Catch Basin Filter Sock:** Clean or remove and replace filter sock when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).
2. **Earth Dike, Drainage Swale, and Plastic Sheeting:** Inspect BMPs daily during construction. Schedule additional inspections during storm events and make any required repairs.
3. **Temporary Seeding and Mulching:** Reseed areas as necessary if vegetative cover fails to become well established.

Site Cleanup

1. **Structures less than 12-inches deep:** Use a vactor truck to clean any water or sediment out of the catch basin or storm drain inlets after flushing has been completed.
2. **Structures greater than 12-inches deep:**
 - Remove sediment buildup in front of the catch basin or storm drain inlets by hand sweeping after flushing has been completed.
 - Remove the filter sock and dispose of the collected sediment in a suitable container to be hauled off site.
 - Reuse the filter sock at another site if it remains in good condition (e.g., no rips, tears, or visible staining).
 - *Optional BMP:* Use a vactor truck to clean any water or sediment out of the catch basin or storm drain inlets.
3. **Earth Dike, Drainage Swale, and Plastic Sheeting:**
 - Evaluate the site to determine if BMPs are no longer needed (the area has stabilized; potential of sediment laden water exiting the area has passed).
 - Remove sediment buildup.
 - Remove the BMP (recycle or reuse if applicable).
 - Revegetate the area disturbed by BMP removal (if applicable).

- *Optional BMP:* Use a vactor truck to clean any water and/or sediment out of catch basin or storm drain inlets.

4. Temporary Seeding and Mulching:

- Check mulched areas periodically, especially following severe storms, when damaged areas of mulch or tie-down material should be repaired.
- Reseed areas that fail to establish at least 80 percent vegetative cover as soon as such areas are identified. Use an alternate method such as sodding, mulching, or nets/blankets if reseeding is ineffective.

References

| | | | |
|--|---|---|--|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) | Stormwater Management Manual for Western Washington (Ecology 2005) |
| 2.56 - Diversion Berm 2.58 - Diversion Channel 2.79 - Inlet Protection 2.99 - Plastic Covering 2.152 - Sweeping | E1.10 - Temporary Seeding E1.15 - Mulching and Matting E1.20 - Clear Plastic Covering E2.80 - Earth Dike and Drainage Swale E3.25 - Storm Drain Inlet Protection E3.70 - Street Sweeping and Vacuuming | BMP 33 - Soil erosion and sediment control | C220 - Inlet Protection |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|----------------------|
| Street Maintenance Operations 3. Emergency Response | 320 | Emergency - Drainage |

Description of Work

- **Enclosed Drainage Systems:** Removing debris, sediments, and liquids from enclosed drainage systems using a vactor truck, by hand, or other mechanical means.
- **Open Drainage Systems:** Repair, replacement, installation, and maintenance tasks performed on open drainage systems including retention/detention facilities, swales, pollution control devices, manholes, catch basins, vaults, pipes, culverts, ditches, and inlets/outlets. Reduce potential for sediment and debris from re-entering water.

Objectives

Clean and remove large quantities of sediments and/or other debris from drainage systems before entering watercourses, streams and/or water bodies.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.
2. **Enclosed Drainage Systems:**
 - Use BMPs such as blocking the facility outlet, using less water, and blocking the downgradient end of the pipe.
 - Use appropriate permit procedures including air testing and entry procedures if entering a confined space.
 - Clean catch basins when they are more than half full or when the sediment is within 18 inches of the bottom of the outlet pipe.
 - Clean organic and woody debris that has accumulated in a catch basin as frequently as needed to ensure proper operation of the catch basin.
 - Use a vactor truck (see Figure 1) or shovels to properly clean and dispose of material from catch basins.
 - Vacuum out solids to reduce sediment and turbidity from moving downgrade throughout the drainage system when using high-pressure flushing equipment.
 - Prepare work sequence to address backup equipment or project phasing when the vactor truck tank is full.



Figure 1. Catch basin cleaning with a vector truck.

3. Open Drainage Systems:

- **WAC 220-110-020 (83):** “Watercourse” and “river or stream” means any portion of a channel, bed, bank, or bottom waterward of the ordinary high water line of waters of the state including areas in which fish may spawn, reside, or through which they may pass, and tributary waters with defined bed or banks, which influence the quality of fish habitat downstream.
- Conduct vactoring according to applicable permit requirements when used in a watercourse or stream.

BMP Maintenance During Site Work

Inspect and clean open or enclosed conveyance systems, and catch basins as needed, and determine whether improvements in operation and maintenance procedures are needed.

Site Cleanup

None.

References

| | | |
|--|--|---|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) |
| 2.166 - Vactoring | E3.65 - Cleaning Inlets and Catch Basins | BMP2 - Routine Maintenance of Stormwater Drainage System |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|-----------------------|
| Street Maintenance Operations 3. Emergency Response | 330 | Emergency - Windstorm |

Description of Work

All activities directly related to a severe windstorm which require immediate response.

Objectives

Protect storm drain systems and water bodies from stormwater and sediment during emergency cleanup activities following storms.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.
2. **Restore Vegetative Buffers:**
 - Clear downed branches and other debris from the roadway and adjacent vegetative buffer.
 - Preserve existing vegetation as a buffer to the greatest extent possible.
 - Restore the vegetative buffer (i.e., the strip of vegetation adjacent to shoulders, ditches, pavement, and/or gravel roads) using a ditch master or hand tools, as necessary.
 - Maintain habitat and shade where vegetative buffer is located along stream and/or watercourse banks.
 - Allow plants to grow above ditches or channels to provide shade as long as this does not create a public safety hazard.
 - Use other BMPs such as hand seeding, hydroseeding, or live staking as appropriate.

BMP Maintenance During Site Work

1. **Restore Vegetative Buffers:**
 - Mow or trim the vegetative buffer in accordance with applicable standards.
 - Revegetate as necessary

Site Cleanup

1. **Sweeping:** Inspect and sweep or vacuum visible sediment tracking on a daily basis.

2. **Restore Vegetative Buffers:** Do not dispose of collected vegetation in stormwater drainage systems, waterways, water bodies or greenbelt areas (see Figure 1).
3. *Optional BMP:* Dispose of grass clippings, leaves, sticks, and other collected vegetation by composting, if feasible.



Figure 1. Hand sweeping of vegetation waste.

References

| | | | | |
|--|--|---|--|------------------------------------|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) | Stormwater Management Manual for Western Washington (Ecology 2005) | Highway Runoff Manual (WSDOT 2008) |
| 2.168 - Vegetative Buffer | E1.30 - Preserving Natural Vegetation E1.35 - Buffer Zones E1.40 - Permanent Seeding and Planting E3.30 - Vegetated Strip | BMP44 - Maintenance of Roadside Ditches | C101 - Preserving Natural Vegetation C234 - Vegetated Strip | 6A-2.24 Vegetated Strip |

| SDOT Manual Name | RCAT | RCAT Description |
|-------------------------------|-------------|---------------------------------|
| Street Maintenance Operations | 340 | Snow and Ice Patrol |
| 3. Emergency Response | 341 | Snow and Ice Control/Anti-Icing |

Description of Work

RCAT 340 Patrol and inspect streets, bridges and known trouble spots during potential icy conditions.

RCAT 341 Apply sand/salt or chemical mixture, plow arterial streets, bus routes and trouble spots to remove snow and ice during a snowstorm, remove accumulated snow immediately after the storm.

Objectives

Reduce vehicle accidents that may adversely impact sensitive areas. Minimize pollutants resulting from vehicle accidents such as petroleum hydrocarbons, heavy metals, and road wash-off from entering storm drainage/stream system.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

2. **Sand/Deicer and Plowing:**
 - Use sand or grit rather than deicers where feasible and practical. Minimize the use of salt by reducing salt-to-sand ratios.
 - Apply sand or deicers only as needed using minimum quantities.
 - Perform before storm hits when streets are generally in good condition and only patches of ice/snow may exist (temperature must be below 35 degrees or continuing to drop).
 - Select deicers and anti-icers that result in the least adverse environmental impact. If needed for safety, use 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 in a covered area on an impervious containment pad.
 - Plow snow in areas that allow vegetation to act as a filter and contain sand.

BMP Maintenance During Site Work

Sand/Deicer and Plowing: Inspect roadway conditions daily during potential icy conditions and apply de-icer/sand mixture or de-icer when needed.

Site Cleanup

1. Sand/Deicer and Plowing:

- Sweep (see Figure 1) or clean up accumulated deicing and anti-icing materials and grit from roads as soon as possible after the road surface clears.
- Prioritize cleanup efforts to minimize impacts to aquatic habitat areas.
- Prioritize cleanup in areas without sediment collection systems.
- Increase maintenance of stormwater structures as necessary.



Figure 1. Mechanical street sweeping.

References

| | | |
|--|--|--|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) |
| 2.152 - Sweeping | E3.70 - Street Sweeping and Vacuuming C1.45 – Solid Waste Handling and Disposal | BMP40 – Deicing and Anti-icing Operations for Airports and Streets |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|--------------------------|
| Street Maintenance Operations 3. Emergency Response | 342 | Other Winter Maintenance |

Description of Work

All activities resulting from a snowstorm other than immediate removal (or sanding) of snow and ice from arterial streets, bus routes, and trouble spots including cleaning frozen drainage inlets, sanding stairways, removing sand and ice from sidewalk and landings, and calibrating equipment.

Objectives

Reduce the amount of sediment and contaminants from snow and ice control activities from reaching stormwater, watercourses, streams, and other water bodies. Reduce occurrence of flooding and debris clogging drain inlets, as well as provide safe sidewalk and stairway surfaces for the public.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.
2. **Sweeping** (see Figure 1):
 - Collect sediment using hand brooms or mechanical brooms if needed.
 - Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose). Washing is not an alternative to sweeping and vacuuming because of the risk of pollutant transport.



Figure 1. Mechanical street sweeping.

BMP Maintenance During Site Work

1. Sweeping:

- Control the number of points where vehicles can leave the site to allow focused sweeping and vacuuming efforts.
- Control speed of sweeper to minimize airborne particulates and remove maximum amount of debris.
- Use water spray system on sweeper to reduce dust.
- Use pickup brooms in sensitive areas.
- Avoid sweeping up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- Do not use kick brooms or sweeper attachments.
- Prevent sediment from entering storm drain system.

2. *Optional BMP:* Where feasible, avoid the activity when rain is falling or expected.

Site Cleanup

1. **Sweeping:** Inspect and sweep or vacuum visible sediment tracking on a daily basis.
2. **Equipment and Vehicle Maintenance:**
 - Clean equipment and tools off site in an area where pollutants can be contained.
 - Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system.
3. **Waste Disposal:** Properly dispose of sweeper wastes at an approved dump site after sweeping is finished.

References

| | | |
|--|--|---|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) |
| 2.152 - Sweeping | E3.70 - Street Sweeping and Vacuuming C1.45 - Solid Waste Handling and Disposal | BMP32 - Dust Control at Manufacturing Sites |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|--------------------------------------|
| Street Maintenance Operations 3. Emergency Response | 344 | Ready/Prepare Snow and Ice Equipment |

Description of Work

All activities associated with readying/preparing equipment for snow and ice response such as removing tailgate of dump truck, loading drop-in sander, tying down sander, loading materials, calibrating equipment, and installing chains on vehicles.

Objective

Prevent sediment or contaminants from being released to stormwater, watercourses, streams, and other water bodies while readying/preparation snow and ice equipment.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

2. **Sweeping** (see Figure 1):
 - Collect any spilled sand or deicing materials using hand brooms or mechanical sweepers as needed.
 - Washing is not an alternative to sweeping and vacuuming because of the risk of pollutant transport.
 - Frequently sweep surfaces including those that have been covered with containers, logs, or other material, to remove accumulated debris and other material that could otherwise be washed off by stormwater. Do not sweep this debris into storm drains.

3. **Equipment Maintenance:**
 - Place drip pans (see Figure 2) or other appropriate temporary containment devices in locations where leaks or spills may occur such as hose connections, hose reels, and filler nozzles.
 - Always use drip pans when making and breaking connections.
 - Check loading and unloading equipment such as valves, hoses, pumps, flanges, and connections regularly for leaks, and repair as needed. Document and keep all inspection records.

- Prevent clean stormwater from entering the loading/unloading area and conduct the activity under cover or indoors if possible.



Figure 1. Mechanical street sweeping.



Figure 2. Drip pan.

BMP Maintenance During Site Work

1. Sweeping:

- Control the number of points where vehicles can leave the site to allow focused sweeping and vacuuming efforts.
- Control speed of sweeper to minimize airborne particulates and remove maximum amount of debris.
- Use water spray system on sweeper to reduce dust.
- Use pickup brooms in sensitive areas.
- Avoid sweeping up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- Do not use kick brooms or sweeper attachments.
- Prevent sediment from entering storm drain system.

2. *Optional BMP:* Where feasible, avoid the activity when rain is falling or expected.

Site Cleanup

1. **Sweeping:** Inspect and sweep or vacuum visible sediment tracking on a daily basis.

2. **Equipment and Vehicle Maintenance:**
 - Clean equipment and tools off site in an area where pollutants can be contained.

 - Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system.

3. **Waste Disposal:** Properly dispose of sweeper wastes at an approved dump site after sweeping is finished.

References

| | | |
|--|--|--|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) |
| 2.152 - Sweeping | E3.70 - Street Sweeping and Vacuuming C1.45 - Solid Waste Handling and Disposal | BMP11 - Loading and Unloading of Liquid or Solid Material |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|----------------------|
| Street Maintenance Operations 3. Emergency Response | 345 | Snow and Ice Cleanup |

Description of Work

Mechanical sweeping of streets and alleys with mechanical brooms to remove sand after a snow and ice event.

Objectives

Reduce the amount of sediment and contaminants from snow and ice control activities from reaching stormwater, watercourses, streams, and other water bodies. Reduce occurrence of flooding and debris clogging drain inlets, as well as provide a safe roadway surface for the traveling public.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

2. **Sweeping:**
 - Sweep snow routes (see Figure 1) to remove sand from streets as soon as possible after a snow/ice event; schedule the removal as part of the snow and ice emergency response.
 - Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose). Washing is not an alternative to sweeping and vacuuming because of the risk of pollutant transport.
 - Sweeping includes both the curblines and centerline.
 - Use attenuator truck for back-up on high speed arterial streets.
 - Work in tandem with another sweeper as required.
 - Dump mechanical sweeper into a dump truck to minimize the number of trips into the headquarters to dump.



Figure 1. Mechanical street sweeping.

BMP Maintenance During Site Work

1. Sweeping:

- Control the number of points where vehicles can leave the site to allow focused sweeping and vacuuming efforts.
- Control speed of sweeper to minimize airborne particulates and remove maximum amount of debris.
- Use water spray system on sweeper to reduce dust.
- Use pickup brooms in sensitive areas.
- Avoid sweeping up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- Do not use kick brooms or sweeper attachments.
- Prevent sediment from entering storm drain system.

2. *Optional BMP:* Where feasible, avoid the activity when rain is falling or expected.

Site Cleanup

1. **Sweeping:** Inspect and sweep or vacuum visible sediment tracking on a daily basis.

2. **Equipment and Vehicle Maintenance:**

- Clean equipment and tools off site in an area where pollutants can be contained.
- Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system.

3. **Waste Disposal:** Properly dispose of sweeper wastes at an approved dump site after sweeping is finished.

References

| | | |
|--|--|---|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) |
| 2.152 - Sweeping | E3.70 - Street Sweeping and Vacuuming C1.45 - Solid Waste Handling and Disposal | BMP32 - Dust Control at Manufacturing Sites |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|-------------------------|
| Street Maintenance Operations 3. Emergency Response | 350 | Other Emergency Control |

Description of Work

All emergency type activities not covered by a specific RCAT including: 1) evaluating a slide on private property, 2) responding to a Fire Department emergency, and 3) setting out barricades for Fire and Police in an emergency.

Objectives

Prevent sediment and contaminants from reaching stormwater, watercourses, streams, and other water bodies.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

2. **Catch Basin Filter Socks:**
 - Install storm drain or catch basin filter socks (see Figure 1) in any catch basin or storm drain inlets that are connected to the storm drain system, are located downslope or adjacent to the work area, and are **greater than 12 inches deep**.
 - Place the appropriate size filter sock in the storm drain or catch basin.
 - Place the storm drain or catch basin grate on top of the filter sock to hold it in place.
 - Trim and remove filter sock material that extends beyond the grate.



Figure 1. Catch basin filter sock.

3. Sweeping:

- Mechanically sweep (see Figure 2) or hand sweep areas where work is occurring, as necessary.
- Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose). Washing is not an alternative to sweeping and vacuuming because of the risk of pollutant transport.



Figure 2. Mechanical street sweeping.

BMP Maintenance During Site Work

1. **Catch Basin Filter Socks:** Clean or remove and replace filter sock when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).
2. **Sweeping:**
 - Use an attenuator truck for back-up on high speed arterial streets.
 - Work in tandem with another sweeper as required.
 - Dump mechanical sweeper waste into a dump truck to minimize the number or trips into the headquarters to dump.
 - Control the number of points where vehicles can leave the site to allow focused sweeping and vacuuming efforts.
 - Control speed of sweeper to minimize airborne particulates and remove maximum amount of debris.
 - Use water spray system on sweeper to reduce dust.
 - Use pickup brooms in sensitive areas.
 - Avoid sweeping up any unknown substance or any object that may be potentially hazardous.

- Adjust brooms frequently; maximize efficiency of sweeping operations.
 - Do not use kick brooms or sweeper attachments.
 - Prevent sediment from entering storm drain system.
3. *Optional BMP:* Avoid the activity when rain is falling or expected, where feasible.

Site Cleanup

1. Catch Basin Filter Socks:

- Remove sediment buildup in front of the catch basin or storm drain inlets by hand sweeping.
- Remove the filter sock and dispose of the collected sediment in a suitable container to be hauled off site.
- Reuse the filter sock at another site if it remains in good condition (e.g., no rips, tears, or visible staining).

2. Equipment Maintenance:

- Clean equipment and tools off site in an area where pollutants can be contained.
- Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system.

3. **Sweeping:** Properly dispose of sweeper wastes at an approved dump site after sweeping is finished.

References

| | | |
|--|--|---|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Construction Stormwater Control Technical Requirements Manual (Seattle 2009) | Source Control Technical Requirements Manual (Seattle 2009) |
| 2.79 - Inlet Protection 2.152 - Sweeping | E3.25 - Storm Drain Inlet Protection E3.70 - Street Sweeping and Vacuuming C1.45 - Solid Waste Handling and Disposal | BMP32 - Dust Control at Manufacturing Sites |

| SDOT Manual Name | RCAT | RCAT Description |
|--|------|--------------------------------------|
| Street Maintenance Operations 3. Emergency Response | 815 | Clean and Repair Equipment and Tools |

Description of Work

Cleaning and minor maintenance of equipment performed by field personnel including moving maintenance equipment and the repair of small tools.

Objectives

Use proper techniques for equipment maintenance, service, and repair operations to reduce the potential for discharge of pollutants to watercourses or streams.

Site Preparation

1. **Spill Kit:** Keep a spill cleanup kit in a nearby vehicle or next to the work site so that it is easily accessible. Make sure the contents of the spill kit are appropriate for the types and quantities of materials used for this work task. Refill spill kit materials before beginning work.

2. **Equipment and Tool Repairs:**
 - Perform vehicle and equipment maintenance, repair, and service at designated repair facilities whenever possible.
 - Routinely inspect equipment, tools, and vehicles for leaks or damage.
 - Promptly repair or replace leaking connections, pipes, hoses, and valves.

BMP Maintenance During Site Work

1. **Washwater:**
 - Discharge all washwater to a sanitary sewer, process treatment system, or holding tank and not to the stormwater drainage system. If a holding tank is used for the storage of washwater, the contents must be pumped out before the tank is full and then discharged into the sanitary sewer or wastewater treatment system.
 - Conduct pressure washing in a designated area (such as a wash pad) that is provided with a sump drain connected to a sanitary sewer or treatment system, or a blind sump or holding tank. Prevent stormwater run-on using a berm or sump.
 - Prohibit discharge of any wastewaters to storm drains.

2. Equipment and Tool Repairs:

- Do not pour material down drains or hose down work areas.
- Use either dry sweeping or damp mopping.
- Remove buildup of oils and grease on equipment.
- Perform equipment maintenance in areas that prevent discharges to the storm drain system.
- Use drip pans (see Figure 1) under equipment when maintaining, repairing, or servicing in the field.
- Clean surfaces following any discharge or spill incident.

3. Optional BMPs:

- Use non-toxic solvents whenever possible.
- 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.



Figure 1. Example of drip pan used for equipment maintenance.

Site Cleanup

Waste Disposal:

- Collect and properly manage (recycle or dispose of) used materials such as grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires.

- Dispose of these wastes at recycling facilities; municipal solid waste disposal facilities; hazardous waste treatment, storage, and disposal (TSD) facilities; or the sanitary sewer.

References

| | |
|--|---|
| Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002) | Source Control Technical Requirements Manual (Seattle 2009) |
| 1.111 – Vegetation (Equipment/Tools Cleanup and Maintenance) | BMP 3 - Dispose of Fluids and Wastes Properly BMP 7 - Cleaning or Washing of Tools, Engines, and Manufacturing Equipment |