SDOT BEST MANAGEMENT PRACTICES (BMP) REFERENCE MANUAL

Capital Projects and Roadway Structures

Prepared for

City of Seattle
Department of Transportation

December 2008

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Capital Projects and Roadway Structures

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Contents

Capital Projects and Roadway Structures

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
Capital Projects and Roadway Structures	702	Electrical Maintenance Routine/Preventative
	703	Electrical Maintenance Construction/Rehab/Upgrade
	704	Electrical Troubleshooting and Repair

Description of Work

RCAT 702 Electrical preventative maintenance of the bascule and swing bridge electrical systems including maintenance or repair of the bridge power and control circuits, lighting, navigational and electronic communications systems. Also includes electrical maintenance and repair to seawalls, subways, transfer stations, etc.

RCAT 703 New electrical construction and modification in the bascule and swing bridges to improve electrical systems including work on electrical controllers, lighting, navigation, and electronic communication systems. Also includes electrical construction in the seawall, subways, transfer stations, etc.

RCAT 704 Electrical troubleshooting and repair to minimize downtime and ensure continuous operation including the repair of power and control circuits; lighting; navigational; electronic communications system; and electrical systems in seawalls, subways, transfer stations, etc.

Objectives

Prevent equipment, tools, and other materials from falling into watercourses or streams.

Site Preparation

Permit Conditions: **When used in watercourses or streams, these Best Management Practices (BMPs) must be used in accordance with permit requirements.** Inspect and maintain BMPs according to guidelines specified in applicable permits.

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. **Diaper/Netting** (if applicable to work being performed):
   - Do not rely on diaper/netting during periods of high winds.
   - Install the diaper/netting (a suspended fine-mesh netting or canvas) under the bridge where the work will be performed to catch debris during maintenance activities.
   - Use multiple nets with different mesh sizes if required for the particular work tasks. Mesh size should become progressively smaller from top to bottom.
   - Attach the diaper/netting securely before starting work.
   - Ensure that the diaper/netting does not enter the water.

3. **Plywood Work Platform** (if applicable to work being performed):

   - Do not use a plywood work platform where spans exceed 16 feet from bent to bent. Framework is usually 4-inch x 6-inch joists 16 inches on center which span the stream (see Figure 1).
   - Place 3/4-inch x 4-foot x 8-foot plywood flat and tight, edge to edge, on joists, and tacked with nails for easy removal.
   - Place tarps over the plywood deck and draped vertically approximately 36 inches high at the abutment wall of the deck and over the hand rails at the other edges.
   - Ensure that plywood platform and tarp do not enter the water.
   - Consider using an under bridge inspection truck (UBIT) depending on location and scope of work.

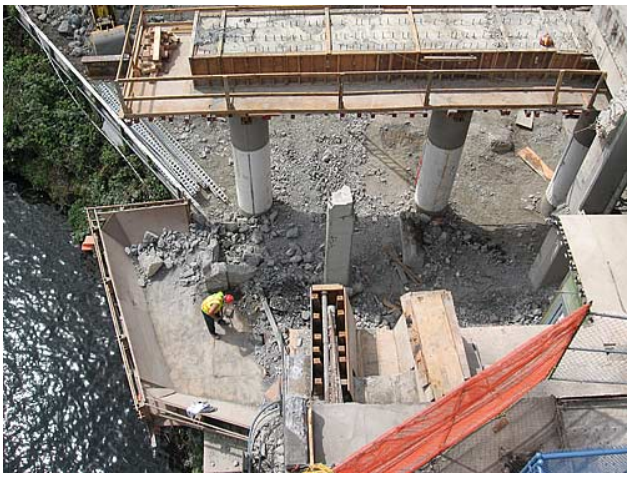

Figure 1. Plywood work platform.

4. **Turbidity Curtain** (if applicable, for seawall work or other work occurring within a watercourse or stream):

   - **Follow "Fish Exclusion Protocol" (Regional Road Maintenance Endangered Species Act Program Guidelines, Appendix E) and permit conditions during maintenance activities.** Exclude fish from the construction area using appropriate methods such as capture with netting, dewatering at a controlled rate, and removal of stranded fish according to HPA permit conditions.
   - Install a turbidity curtain prior to the start of work and according to the manufacturer's recommendations and applicable permit requirements (see Figure 2).
   - Deploy and maintain turbidity curtain at sufficient depth to reach bottom and contain sediment.

- Use turbidity curtains when construction activities adjoin quiescent waters (e.g., lakes, ponds, and slow flowing creeks) where sediment discharge to the water body is unavoidable.
- Ensure that the curtain does not extend deep enough to stir up sediment by hitting the bottom repeatedly in wave and tidal conditions. Use a pervious filter fabric for the bottom 1 foot if it is desirable for the curtain to reach the bottom in an active-water situation.
- Do not place turbidity curtains across the entire width of a channel. Do not deploy a curtain across the entire flow of the watercourse or stream; across more than 2/3 of the main flow of any salmonids bearing water at the time of the year when any life history stage of salmonids are expected to be present; or where flow volume or water velocity will inhibit function.
- Install a turbidity curtain so that it is oriented parallel to the direction of flow and extends the entire depth of the watercourse in calm-water situations.
- Use flexible flotation buoys along the top of the curtain, and a load line incorporated into the curtain fabric to hold down the bottom. Ensure that fabric is a brightly colored impervious mesh.
- Place one anchor at least every 100 feet, or as needed, then tow the fabric out in a furled condition, and connect to the anchors using the flotation devices, not to the bottom of the curtain. Once in place, cut the furling lines and allow the bottom of the curtain to sink.

Figure 2. Turbidity curtain.

BMP Maintenance During Site Work

1. **Diaper/Netting and Plywood Work Platform:**

    - Remove sediment buildup as required; crew must provide progressive clean up of debris during the day.

- Repair rips or tears in diaper/netting or tarps as soon as they are discovered.
- Schedule additional inspections during storm events and make any required repairs.
- Use a vactor truck as needed to collect sediment produced during repair activities.

2. **Turbidity Curtain:**

   - During construction, inspect the turbidity curtain daily for holes or other problems, and make any needed repairs promptly.
   - Schedule additional inspections during storm events and make any required repairs.
   - Ensure that water discharged from the turbidity curtain meets permit requirements at the point of discharge.

Site Cleanup

1. **Diaper/Netting and Plywood Work Platform:**

   - Remove debris on diaper/netting, tarps, or plywood work platforms.
   - Remove diaper/netting and tarps used on plywood work platforms carefully after work, not allowing debris to fall (recycle or reuse if applicable).
   - Inspect diaper/netting and tarps after the job is complete to make sure they are in good repair for the next project.

2. **Turbidity Curtain:**

   - Allow remaining suspended particles to settle for 6 to 12 hours after removing sediment before removing the turbidity curtain.
   - Follow the manufacturer's recommendations for removing turbidity curtains which may include installing furling lines along the curtain, detaching from anchors, and towing out of the water.
   - Recycle or reuse the turbidity curtain, if applicable.

3. **Waste Disposal:** Retrieve any debris generated during construction that has entered the water and dispose of it at an approved upland facility.

4. **Site Rehabilitation:** Revegetate bridge abutment areas disturbed by maintenance activities (if applicable).

References

Regional Road Maintenance Endangered Species Act Program Guidelines (Regional Road Maintenance Technical Working Group 2002)	Construction Stormwater Control Technical Requirements Manual (Seattle 2009)
2.52 - Diaper Netting 2.101 - Plywood Work Platform 2.162 - Turbidity Curtain	E2.95 - Turbidity Curtain C1.45 - Solid Waste Handling and Disposal

SDOT Manual Name	RCAT	RCAT Description
Capital Projects and Roadway Structures	706	Repair Bridge Expansion Joints
	709	Structure Repair (Concrete)
	712	Repair Metal Railings
	713	Repair Concrete Railings
	714	Epoxy Pumping
	716	Wooden Structure Repair
	729	Annual Stairway Rehabilitation Program

Description of Work

RCAT 706 Routine repair or replacement of all bridge expansion joints damaged by traffic.

RCAT 709 Repairing damage to bridge structures resulting from both accidents and deterioration, including structural repair of concrete bridges.

RCAT 712 Straightening, or removing and replacing deteriorated or damaged steel and aluminum railings including repairing all metal bridge, stairway and other pedestrian hand railings, as well as broken concrete around steel posts.

RCAT 713 Patching deteriorated or damaged concrete railings.

RCAT 714 Inject epoxy into cracks of concrete structures to seal the cracks and stops future spalling including cleaning sediment out of cracks prior to injecting epoxy.

RCAT 716 Structural repair of concrete decks and bridge understructure.

RCAT 729 Repair of concrete stairways, including the resetting and/or replacement of concrete slabs, repair of concrete treads and landings.

Objectives

Prevent sediment, debris, uncured concrete, uncured epoxy, and other contaminants from maintenance/repair activities from falling into watercourses or streams, entering drainage systems, or being carried into surface water by precipitation.

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. **Painting and Epoxy:** Use tarpaulins, ground cloths, or drip pans in areas where materials are mixed, carried, and applied to capture any spilled materials. Store and transport liquid materials used in appropriate clearly labeled containers with tight-fitting lids.

3. **Concrete Containment:**

   - Isolate the work area.
   - **Storm Drain Covers and Catch Basin Filter Socks:** Install drain covers (see Figure 1) over any catch basin or storm drain inlets that are connected to the storm drain system and are located downslope or adjacent to the work area. Install catch basin filter socks in any structures that are **greater than 12 inches deep** (see Figure 2).
     - 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. Storm drain cover.

Figure 2. Catch basin filter sock.

4. **Diaper/Netting** (if applicable to work being performed):

   - Do not rely on diaper/netting during periods of high winds.
   - Install the diaper/netting (a suspended fine-mesh netting or canvas) under the bridge where the work will be performed to catch debris during maintenance activities.
   - Use multiple nets with different mesh sizes if required for the particular work tasks. Mesh size should become progressively smaller from top to bottom.
   - Attach the diaper/netting securely before starting work.
   - Ensure that the diaper/netting does not enter the water.

5. **Plywood Work Platform** (if applicable to work being performed):

   - Do not use a plywood work platform where spans exceed 16 feet from bent to bent. Framework is usually 4-inch x 6-inch joists 16 inches on center which span the stream (see Figure 3).
   - Place 3/4-inch x 4-foot x 8-foot plywood flat and tight, edge to edge, on joists, and tacked with nails for easy removal.
   - Place tarps over the plywood deck and draped vertically approximately 36 inches high at the abutment wall of the deck and over the hand rails at the other edges.
   - Ensure that plywood platform and tarp do not enter the water.
   - Consider using an under bridge inspection truck (UBIT) depending on location and scope of work.

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

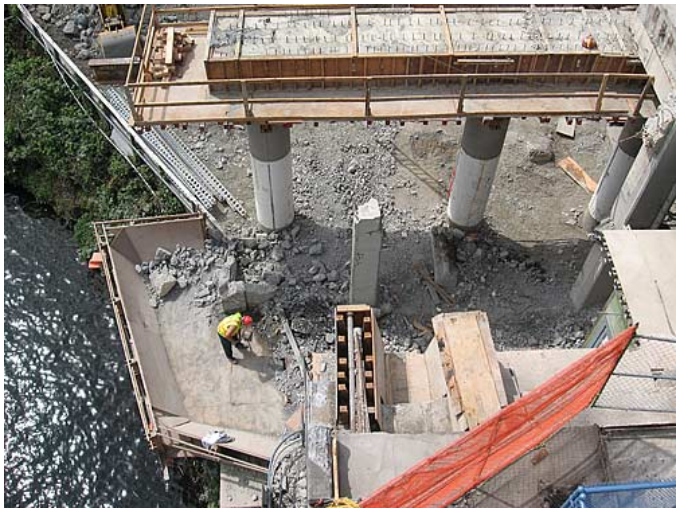

Figure 3. Plywood work platform.

BMP Maintenance During Site Work

1. **Concrete Containment:**

   - **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).

   - Continually monitor operations to determine whether slurry, cuttings, or wastewater could enter the stormwater system or a water body. If observations indicate that a violation of water quality standards could occur,

stop operations and immediately implement preventative measures such as berms, barriers, secondary containment, and vactor trucks.

- Vacuum slurry and cuttings during the activity to prevent migration off site and do not allow the slurry and cuttings to remain on permanent concrete or asphalt paving overnight.

- Wash off hand tools (e.g., screeds, shovels, rakes, floats, and trowels) only into formed areas awaiting installation of concrete or use a temporary sump to collect and contain wash water.

- Contain and collect discarded concrete slurry generated during exposed aggregate washing.

- Contain and remove any excess materials, such as chemicals and concrete.

- Ensure that onsite cleanup sump for concrete is large enough to prevent overflows from occurring.

2. **Diaper/Netting and Plywood Work Platform:**

   - Remove sediment buildup as required; crew must provide progressive clean up of debris during the day.

   - Repair rips or tears in diaper/netting or tarps as soon as they are discovered.

   - Schedule additional inspections during storm events and make any required repairs.

   - Use a vactor truck as needed to collect sediment produced during repair activities.

Site Cleanup

1. **Concrete Containment:**

   - **Storm Drain Covers:** Remove sediment buildup in front of the catch basin or storm drain inlets by hand sweeping. Remove drain covers from any catch basin or storm drain inlets.

   - **Catch Basin Filter Socks:** Remove catch basin filter socks 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).

- Cleaning of concrete application and mixing equipment or concrete-delivery vehicles on the work site must be performed in a designated area where the rinse water is controlled. Neutralize the pH of the rinse water prior to disposal.

- Dispose of collected slurry and cuttings in a manner that does not violate groundwater or surface water quality standards.

- Use a temporary sump to contain water from on site cleanup of tools or equipment and remove material from the sump after cleanup is complete.

2. **Diaper/Netting and Plywood Work Platform:**

   - Remove debris on diaper/netting, tarps, or plywood work platforms.

   - Remove diaper/netting and tarps used on plywood work platforms carefully after work, not allowing debris to fall (recycle or reuse if applicable).

   - Inspect diaper/netting and tarps after the job is complete to make sure they are in good repair for the next project.

3. **Waste Disposal:**

   - Sweep or shovel loose aggregate chunks and dust and collect the material for recycling or proper disposal at the end of each workday.

   - Remove waste material from site and dispose of properly.

   - Remove material from temporary sump after cleanup is complete.

4. **Site Rehabilitation:** Revegetate bridge abutment areas disturbed by maintenance activities (if applicable).

5. *Optional BMP:* Recycle broken concrete.

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)
2.37 - Concrete Containment (2) 2.52 - Diaper Netting 2.79 - Inlet Protection 2.101 - Plywood Work Platform	C1.20 - Use of Chemicals During Construction C1.35 - Sawcutting and Paving Pollution Prevention C1.45 - Solid Waste Handling and Disposal E3.25 - Storm Drain Inlet Protection E3.65 - Cleaning Inlets and Catch Basins	BMP 5 - Spill Prevention and Cleanup BMP16 - Concrete Pouring, Concrete/ Asphalt Cutting, and Asphalt Application BMP21 - Painting Finishing, and Coating of Vehicles, Boats, Buildings, and Equipment	C151 - Concrete Handling C152 - Sawcutting and Surfacing Pollution Prevention	6A-2.33 - Concrete Handling

SDOT Manual Name	RCAT	RCAT Description
Capital Projects and Roadway Structures	707	Refurbish Litter Cans
	721	Structural Painting
	722	Graffiti Patrol
	750	Other Maintenance Construction Bridge
	751	Mechanical Maintenance

Description of Work

RCAT 707 Repair litter cans as needed, repaint and apply decal.

RCAT 721 Exterior painting of bridges, bridge structures, pedestrian overpasses, underpasses and tunnels.

RCAT 722 Inspect, remove or cover graffiti in public areas, including publicly owned buildings, structures, and facilities; includes removing printed materials and posters.

RCAT 750 Construction of temporary walkways and working platforms and other miscellaneous construction and testing stand pipe.

RCAT 751 Miscellaneous mechanical maintenance, repair, or inspection on moveable bridges including inspection of drive systems, centerlocks, tail locks, traffic barriers, and gates; lubrication of equipment; hydraulic systems maintenance; and balancing and shimming bridges.

Objectives

Prevent paint and paint chips, solvents, debris from sandblasting, grease and oil, and other contaminants from falling into watercourses or streams, entering drainage systems, or being carried into surface water by precipitation.

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. **Painting:** Use tarpaulins, ground cloths, or drip pans in areas where materials are mixed, carried, and applied to capture any spilled materials. Store and transport liquid materials used in appropriate clearly labeled containers with tight-fitting lids.

3. **Storm Drain Covers and Catch Basin Filter Socks:** Install drain covers (see Figure 1) over any catch basin or storm drain inlets that are located downslope or adjacent to the work area. Install catch basin filter socks in any structures that are **greater than 12 inches deep** (see Figure 2).

- 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. Storm drain cover.

Figure 2. Catch basin filter sock.

4. **Diaper/Netting** (if applicable to work being performed):

   - Do not rely on diaper/netting during periods of high winds.
   - Install the diaper/netting (a suspended fine-mesh netting or canvas) under the bridge where the work will be performed to catch debris during maintenance activities.
   - Use multiple nets with different mesh sizes if required for the particular work tasks. Mesh size should become progressively smaller from top to bottom.
   - Attach the diaper/netting securely before starting work.
   - Ensure that the diaper/netting does not enter the water.

5. **Plywood Work Platform** (if applicable to work being performed):

   - Do not use a plywood work platform where spans exceed 16 feet from bent to bent. Framework is usually 4-inch x 6-inch joists 16 inches on center which span the stream (see Figure 3).
   - Place 3/4-inch x 4-foot x 8-foot plywood flat and tight, edge to edge, on joists, and tacked with nails for easy removal.
   - Place tarps over the plywood deck and draped vertically approximately 36 inches high at the abutment wall of the deck and over the hand rails at the other edges.
   - Ensure that plywood platform and tarp do not enter the water.

- Consider using an under bridge inspection truck (UBIT) depending on location and scope of work.

6. **Airborne Debris Curtain:**

   - Contain blasting and spraying activities by hanging tarpaulins, or using plywood or plastic sheeting to block the wind and prevent dust and overspray from escaping (see Figure 4).
   - Do not perform uncontained spray painting, blasting, or sanding activities over open water without proper protection (e.g., overspray collection, drop clothes, booms, etc.).
   - Avoid collecting debris in areas subject to foot or vehicular traffic to control tracking.

Figure 3. Plywood work platform.

Figure 4. Airborne debris curtain.

7. **Painting, Finishing, and Coating:**

   - Use ground cloths or drop cloths underneath outdoor painting, scraping, sandblasting work, and properly clean and temporarily store collected debris. Use porous drop cloths for exterior surface preparation work to capture solids and allow rainwater to seep through.
   - Do not conduct spraying, blasting, or sanding activities over open water or where wind may blow paint into water. Use a curtain to contain the activity if windy conditions are present.

8. *Optional BMPs:*

   - Avoid the activity when rain is falling or expected, where feasible.
   - Purchase recycled paints, paint thinner, solvents, and other products if feasible.

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. **Painting, Finishing, and Coating:** Repair rips or tears in ground cloths that occur during work.

3. **Diaper/Netting and Plywood Work Platform:**

   - Remove sediment buildup as required; crew must provide progressive clean up of debris during the day.

   - Repair rips or tears in diaper/netting or tarps as soon as they are discovered.

   - Schedule additional inspections during storm events and make any required repairs.

   - Use a vactor truck as needed to collect sediment produced during repair activities.

4. **Sweeping:** Remove sediment buildup as required using hand brooms, by vacuuming, or with mechanical street sweepers as appropriate (see Figure 5).

5. *Optional BMP:* Use efficient spray equipment such as electrostatic, air-atomized, high-volume/low-pressure, or gravity-feed spray equipment.

Figure 5. Mechanical street sweeping.

Site Cleanup

1. **Storm Drain Covers:** Remove sediment buildup in front of the catch basin or storm drain inlets by hand sweeping. Remove drain covers from any catch basin or storm drain inlets.

2. **Catch Basin Filter Socks:** Remove catch basin filter socks 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).

3. **Diaper/Netting and Plywood Work Platform:**

   - Remove debris on diaper/netting, tarps, or plywood work platforms.

   - Remove diaper/netting and tarps used on plywood work platforms carefully after work, not allowing debris to fall (recycle or reuse if applicable).

   - Inspect diaper/netting and tarps after the job is complete to make sure they are in good repair for the next project.

4. **Sweeping:** Use vacuum sweeper or hand broom to clean road surface. Use a vactor truck to clean drainage system if needed.

5. **Waste Disposal:**

   - Wash-up waters from water-based paints may go into a sanitary sewer, which is regulated by the King County Industrial Waste Program 206-263-3000.

   - Wastes from oil-based paints, cleaning solvents, thinners, and mineral spirits must be disposed of through a licensed waste management firm or treatment, storage, and disposal (TSD) facility.

6. *Optional BMP:* Recycle paint, paint thinner, solvents, washwater from pressure washers, and any other recyclable materials.

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)
2.52 - Diaper Netting 2.79 - Inlet Protection 2.101 - Plywood Work Platform	C1.20 - Use of Chemicals During Construction C1.45 - Solid Waste Handling and Disposal C1.55 - Airborne Debris Curtain E3.25 - Storm Drain Inlet Protection E3.65 - Cleaning Inlets and Catch Basins	BMP 5 - Spill Prevention and Cleanup BMP 21 - Painting, Finishing, and Coating of Vehicles, Boats, Buildings, and Equipment

SDOT Manual Name	RCAT	RCAT Description
Capital Projects and Roadway Structures	708	Structure Flushing

Description of Work

Remove grease, pigeon droppings, and other corrosive agents from steel, open metal bridge decks (bascule), and concrete structures including bearing pads and saddles.

Objectives

Prevent sediment, debris, paint and paint chips, lubricants, and other contaminants from falling into watercourses or streams.

Site Preparation

Permit Conditions: **The General Hydraulic Project Approval (GHPA) and National Pollutant Discharge Elimination System (NPDES) permits allow routine bridge cleaning and washing with low pressure water.** Wash water can be discharged to state waters without a filter if dry cleaning is done before washing.

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. **Storm Drain Covers:** Install drain covers (see Figure 1) on any bridge drains.

Figure 1. Storm Drain Cover.

3. **Dry Cleaning:** Dry clean (scrape, sweep, or vacuum) before washing. This includes flaking paint. Remove residual grease with degreaser on absorbent material. (Exercise discretion when cleaning areas where worker safety may be compromised. Areas of the bridge that cannot be safely dry cleaned should be flushed.)

4. **Pressure Washing:** Use clean wash water with no detergents or other additives, and the minimum pressure that will clean the bridge and prevent paint chips from entering receiving waters. Avoid flaking paint and lower the pressure if needed to prevent the removal of bonded paint.

5. **Plywood Work Platform:**

   - Do not use a plywood work platform where spans exceed 16 feet from bent to bent. Framework is usually 4-inch x 6-inch joists 16 inches on center which span the stream (see Figure 2).
   - Place 3/4-inch x 4-foot x 8-foot plywood flat and tight, edge to edge, on joists, and tacked down with nails for easy removal.
   - Place tarps over the plywood deck and drape them vertically approximately 36 inches high at the abutment wall of the deck and over the hand rails at the other edges.
   - Consider using an under bridge inspection truck (UBIT) depending on location and scope of work.
   - Ensure that the plywood platform and tarp do not enter the water.

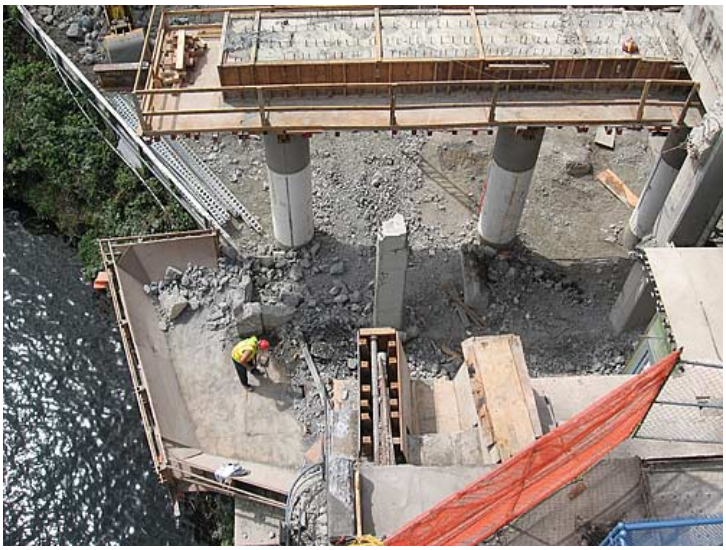

Figure 2. Plywood work platform under the Fremont Bridge.

6. **Airborne Debris Curtain:**

   - Contain blasting and spraying activities by hanging tarpaulins, or using plywood and/or plastic sheeting to block the wind and prevent dust and overspray from escaping (see Figure 3).
   - Do not perform uncontained spray painting, blasting, or sanding activities over open water without proper protection (e.g., overspray collection, drop clothes, booms, etc.).

- Avoid collecting debris in areas subject to foot or vehicular traffic to control tracking.

Figure 3. Airborne debris curtain.

BMP Maintenance During Site Work

1. **Plywood Work Platform:**

   - Remove sediment buildup as required; crew must provide progressive clean up of debris during the day.

   - Repair rips or tears in tarps as soon as they are discovered.

2. **Waste Containment:** Collect waste materials regularly, and contain and store them under cover until they can be disposed of properly.

Site Cleanup

1. **Storm Drain Covers:** Remove sediment buildup in front of the catch basin or storm drain inlets by hand sweeping. Remove drain covers from any catch basin or storm drain inlets.

2. **Plywood Work Platform:**

   - Remove debris on tarps and plywood work platforms.

   - Remove tarps used on plywood work platforms carefully after work, not allowing debris to fall (recycle or reuse if applicable).

   - Inspect tarps after the job is complete to make sure they are in good repair for the next project.

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)	Other References
2.52 - Diaper Netting 2.79 - Inlet Protection 2.101 - Plywood Work Platform	E3.25 - Storm Drain Inlet Protection C1.45 - Solid Waste Handling and Disposal C1.55 - Airborne Debris Curtain	BMP 9 - Washing, Pressure Washing, and Steam Cleaning of Vehicles, Equipment, and Building Structures BMP 21 - Painting, Finishing, and Coating of Vehicles, Boats, Buildings, and Equipment	Bridge Maintenance Washing and Cleaning Programmatic Permit Guidance (WSDOT 2005)

SDOT Manual Name	RCAT	RCAT Description
Capital Projects and Roadway Structures	709	Structure Repair (Steel)
	712	Repair Metal Railings
	729	Annual Stairway Rehabilitation Program

Description of Work

RCAT 709 Repairing damage to steel bridge structures resulting from both accidents and deterioration.

RCAT 712 Straightening, or removing and replacing deteriorated or damaged steel and aluminum railings including repairing all metal bridge, stairway and other pedestrian hand railings.

RCAT 729 Repair/replacement of metal handrails.

Objectives

Prevent debris, slag and metal, and other contaminants from falling into watercourses or streams or being carried into surface water by precipitation.

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. **Diaper/Netting** (if applicable to work being performed):

   - Do not rely on diaper/netting during periods of high winds.
   - Install the diaper/netting (a suspended fine-mesh netting or canvas) under the bridge where the work will be performed to catch debris during maintenance activities.
   - Use multiple nets with different mesh sizes if required for the particular work tasks. Mesh size should become progressively smaller from top to bottom.
   - Attach the diaper/netting securely before starting work.
   - Ensure that the diaper/netting does not enter the water.

3. **Plywood Work Platform** (if applicable to work being performed):

   - Do not use a plywood work platform where spans exceed 16 feet from bent to bent. Framework is usually 4-inch x 6-inch joists 16 inches on center which span the stream (see Figure 1).
   - Place 3/4-inch x 4-foot x 8-foot plywood flat and tight, edge to edge, on joists, and tacked with nails for easy removal.

- Place tarps over the plywood deck and draped vertically approximately 36 inches high at the abutment wall of the deck and over the hand rails at the other edges.
- Ensure that plywood platform and tarp do not enter the water.
- Consider using an under bridge inspection truck (UBIT) depending on location and scope of work.

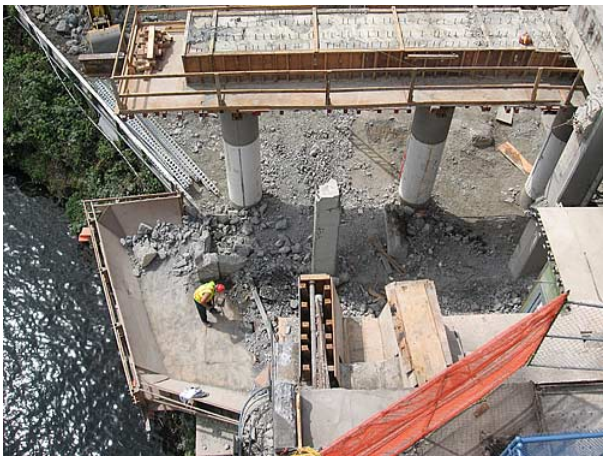

Figure 1. Plywood work platform.

4. **Airborne Debris Curtain:**

- Contain blasting and spraying activities by hanging tarpaulins, or using plywood and/or plastic sheeting to block the wind and prevent dust and overspray from escaping (Figure 2).
- Do not perform uncontained spray painting, blasting, or sanding activities over open water without proper protection (i.e. overspray collection, drop clothes, booms, etc.).
- Avoid collecting debris in areas subject to foot or vehicular traffic to control tracking.

Figure 2. Airborne debris curtain.

BMP Maintenance During Site Work

1. **Diaper/Netting and Plywood Work Platform:**

   - Remove sediment buildup as required; crew must provide progressive clean up of debris during the day.

   - Repair rips or tears in diaper/netting or tarps as soon as they are discovered.

   - Schedule additional inspections during storm events and make any required repairs.

   - Use a vactor truck as needed to collect sediment produced during repair activities.

2. **Airborne Debris Curtain:** Contain and remove any excess materials, such as chemicals or scrap metal.

Site Cleanup

1. **Diaper/Netting and Plywood Work Platform:**

   - Remove debris on diaper/netting, tarps, or plywood work platforms.

   - Remove diaper/netting and tarps used on plywood work platforms carefully after work, not allowing debris to fall (recycle or reuse if applicable).

   - Inspect diaper/netting and tarps after the job is complete to make sure they are in good repair for the next project.

2. **Site Rehabilitation:** Revegetate bridge abutment areas disturbed by maintenance activities (if applicable).

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)
2.52 - Diaper Netting 2.79 - Inlet Protection 2.101 - Plywood Work Platform	C1.20 - Use of Chemicals During Construction C1.45 - Solid Waste Handling and Disposal C1.55 - Airborne Debris Curtain E3.25 - Storm Drain Inlet Protection E3.65 - Cleaning Inlets and Catch Basins	BMP 5 - Spill Prevention and Cleanup

SDOT Manual Name	RCAT	RCAT Description
Capital Projects and Roadway Structures	716 719 729	Wooden Structure Repair Repair Wood Railings Annual Stairway Rehabilitation Program

Description of Work

RCAT 716 Repair damaged wooden structures resulting from both accidents and deterioration including structural repair of wood decks and bridge understructure.

RCAT 719 Repairing, replacing, or inspecting wooden railings on bridges, stairways and footpaths as necessary to eliminate hazards.

RCAT 729 Repair of wood stairways and repair/replacement of timber rail and post and metal handrails.

Objectives

Prevent sediment, debris, uncured concrete, wood chips, sawdust, and other contaminants from falling into 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. **Diaper/Netting** (if applicable to work being performed):

   - Do not rely on diaper/netting during periods of high winds.
   - Install the diaper/netting (a suspended fine-mesh netting or canvas) under the bridge where the work will be performed to catch debris during maintenance activities.
   - Use multiple nets with different mesh sizes if required for the particular work tasks. Mesh size should become progressively smaller from top to bottom.
   - Attach the diaper/netting securely before starting work.
   - Ensure that the diaper/netting does not enter the water.

3. **Plywood Work Platform** (if applicable to work being performed):

   - Do not use a plywood work platform where spans exceed 16 feet from bent to bent. Framework is usually 4-inch x 6-inch joists 16 inches on center which span the stream (see Figure 1).

- Place 3/4-inch x 4-foot x 8-foot plywood flat and tight, edge to edge, on joists, and tacked with nails for easy removal.
- Place tarps over the plywood deck and draped vertically approximately 36 inches high at the abutment wall of the deck and over the hand rails at the other edges. Ensure that plywood platform and tarp do not enter the water.
- Consider using an under bridge inspection truck (UBIT) depending on location and scope of work.

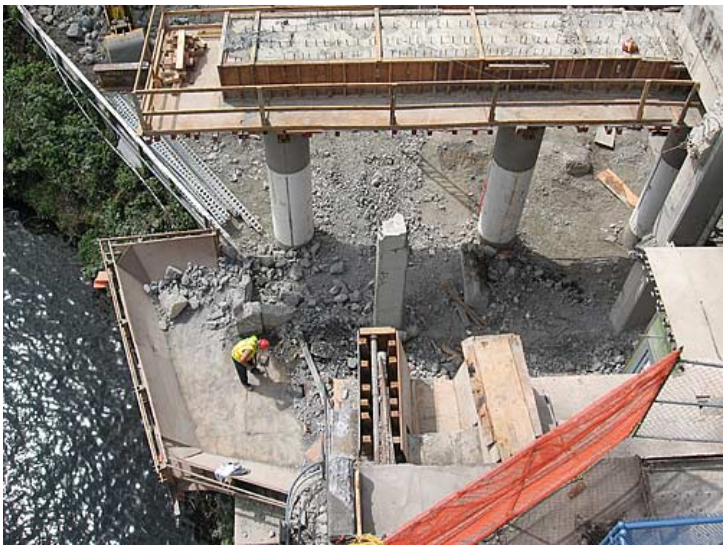

Figure 1. Plywood work platform.

BMP Maintenance During Site Work

1. **Diaper/Netting and Plywood Work Platform:**

   - Remove sediment buildup as required; crew must provide progressive clean up of debris during the day.
   - Repair rips or tears in diaper/netting or tarps as soon as they are discovered.
   - Schedule additional inspections during storm events and make any required repairs.
   - Use a vactor truck as needed to collect sediment produced during repair activities.

2. **Concrete Containment:**

   - Contain and remove any excess materials, such as chemicals and concrete.
   - Ensure that onsite cleanup sump for concrete is large enough to prevent overflows from occurring

Site Cleanup

1. **Diaper/Netting and Plywood Work Platform:**

   - Remove debris on diaper/netting, tarps, or plywood work platforms.
   - Remove diaper/netting and tarps used on plywood work platforms carefully after work, not allowing debris to fall (recycle or reuse if applicable).
   - Inspect diaper/netting and tarps after the job is complete to make sure they are in good repair for the next project.

2. **Concrete Containment:**

   - Use a temporary sump to contain water from tool and equipment cleanup on site and remove material from the sump after cleanup is complete.
   - Sweep or shovel loose aggregate chunks and dust and collect the material for recycling or proper disposal at the end of each workday.
   - Remove waste material from site and dispose of properly.

3. **Site Rehabilitation:** Revegetate bridge abutment areas disturbed by maintenance activities (if applicable).

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)
2.37 - Concrete Containment (2) 2.52 - Diaper Netting 2.79 - Inlet Protection 2.101 - Plywood Work Platform	C1.20 - Use of Chemicals During Construction C1.45 - Solid Waste Handling and Disposal E3.25 - Storm Drain Inlet Protection E3.65 - Cleaning Inlets and Catch Basins	BMP16 - Concrete Pouring, Concrete/ Asphalt Cutting, and Asphalt Application	C151 - Concrete Handling	6A-2.33 - Concrete Handling

SDOT Manual Name	RCAT	RCAT Description
Capital Projects and Roadway Structures	717	Retaining Wall/Seawall Maintenance

Description of Work

Maintenance and repair of retaining walls and seawalls including riprap and gabions.

Objectives

Limit disturbance of vegetation and soils, as well as minimize worksite sediments and debris from entering water courses, streams, or water bodies. Prevent uncured concrete and chemicals from leaving the work site and entering adjacent water bodies.

Retaining Wall Maintenance and Repair on Land

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. **Storm Drain Covers and Catch Basin Filter Socks:** Install drain covers (see Figure 1) over any catch basin or storm drain inlets that are located downslope or adjacent to the work area. Install catch basin filter socks in any structures that are **greater than 12 inches deep** (see Figure 2).

   - 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.

3. **Other Required BMPs:**

   - Isolate the work area and dewater the construction area if possible.
   - Have an adequate fuel supply and backup pumps in the event of emergency or mechanical failure. Provide approved secondary containment as conditions allow.

4. *Optional BMPs:*

   - Avoid the activity when rain is falling or expected, where feasible.
   - Plan and schedule work in dry, low tide, or low flow conditions if possible, except in emergency situations. .

Figure 1. Storm drain cover.

Figure 2. Catch basin filter sock.

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. **Concrete Containment:**

   - Continually monitor operations to determine whether slurry, cuttings, or wastewater could enter the stormwater system or a water body. If observations indicate that a violation of water quality standards could occur, stop operations and immediately implement preventative measures such as berms, barriers, secondary containment, and vactor trucks.

   - Wash off hand tools (e.g., screeds, shovels, rakes, floats, and trowels) only into formed areas awaiting installation of concrete or use a temporary sump to collect and contain wash water.

   - Contain and collect discarded concrete slurry generated during exposed aggregate washing.

   - Contain and remove any excess materials, such as chemicals and concrete.

   - Ensure that onsite cleanup sump for concrete is large enough to prevent overflows from occurring.

Site Cleanup

1. **Storm Drain Covers:** Remove sediment buildup in front of the catch basin or storm drain inlets by hand sweeping. Remove drain covers from any catch basin or storm drain inlets.

2. **Catch Basin Filter Socks:** Remove catch basin filter socks 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).

3. **Concrete Containment:**

   - Cleaning of concrete application and mixing equipment or concrete-delivery vehicles on the work site must be performed in a designated area where the rinse water is controlled. Do not discharge to the sanitary sewer without prior approval from King County.

   - Dispose of collected slurry and cuttings in a manner that does not violate groundwater or surface water quality standards.

   - Use a temporary sump to contain water from on site cleanup of tools or equipment and remove material from the sump after cleanup is complete.

   - *Optional BMPs:*

     - Avoid the activity when rain is falling or expected, where feasible.

     - Use a sandbag barrier or containment berm to direct stormwater run-on around the construction site (see Figure 3).

Figure 3. Containment berm example.

4. **Waste Disposal:**

   - Sweep or shovel loose aggregate chunks and dust and collect the material for recycling or proper disposal at the end of each workday.

   - Remove waste material from site and dispose of properly.

   - Remove material from temporary sump after cleanup is complete.

- Sweep or shovel loose aggregate chunks and dust, and collect the material for recycling or proper disposal at the end of each workday (see Figure 4).

5. *Optional BMP:* Recycle broken concrete.

Figure 4. Manual sweeping.

Seawall/Retaining Wall Maintenance and Repair in Waterways

Site Preparation

1. **Work Windows/Timing:**
   - Conduct all work in compliance with the approved work windows/timing restrictions for the protection of Endangered Species Act (ESA)-listed species or species they forage upon in the City of Seattle action areas.
   - Perform the work in dry weather whenever possible (80-90% of the time).
   - Minimize construction impacts by conducting work during minus tides or low water levels.
   - Use only clean, washed, and commercially-obtained fill materials.
2. **Spill Prevention:**
   - **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.
   - Keep the written Spill Prevention and Control Plan (SPCP) onsite that describes materials to be used and measures to prevent or reduce impacts from potential spills (e.g., fuel, hydraulic fluid, etc.).
   - Keep two oil absorbing floating booms onsite during all phases of work. The booms must be appropriate for the size of the work and must be available whenever heavy equipment is used below the ordinary high water (OHW) or

mean higher high water (MHHW). The booms shall be stored where they can be immediately deployed in response to potential petroleum leakage.

3. **Clearing and Grubbing:**
   - Limit clearing and grubbing to the minimum required.
   - Retain vegetation to the maximum extent possible.
   - Minimize clearing and grubbing effects by cutting vegetative stems, but not removing the root systems.
4. **Sediment Barriers/Containment Booms:**
   - Place sediment barriers (e.g., filter fence, straw wattle, wood straw, or other effective erosion control method) around disturbed sites to prevent erosion.
   - For in-water work at or below OHW or MHHW, install appropriate and effective erosion control devices (e.g., sealed sand or gravel bags, turbidity curtains, filter fences [see Figure 5], or other containment systems) or other water quality control devices before project work begins.
   - Use a containment boom for sawdust and debris work. If in marine water, a containment boom may rest on substrate rather than float at all times due to tidal action.
5. **Turbidity Curtain:**
   - **Follow "Fish Exclusion Protocol" (Regional Road Maintenance Endangered Species Act Program Guidelines, Appendix E) and permit conditions during maintenance activities.** Exclude fish from the construction area using appropriate methods such as capture with netting, dewatering at a controlled rate, and removal of stranded fish according to HPA permit conditions.
   - Install a turbidity curtain prior to the start of work and according to the manufacturer's recommendations and applicable permit requirements (see Figure 6).

Figure 5. Filter Fence.

Figure 6. Turbidity curtain.

- Deploy and maintain turbidity curtain at sufficient depth to reach bottom and contain sediment.
- Use turbidity curtains when construction activities adjoin quiescent waters (e.g., lakes, ponds, and slow flowing creeks) where sediment discharge to the water body is unavoidable.
- Ensure that the curtain does not extend deep enough to stir up sediment by hitting the bottom repeatedly in wave and tidal conditions. Use a pervious filter fabric for the bottom 1 foot if it is desirable for the curtain to reach the bottom in an active-water situation.
- Do not place turbidity curtains across the entire width of a channel. Do not deploy a curtain across the entire flow of the watercourse or stream; across more than 2/3 of the main flow of any salmonids bearing water at the time of the year when any life history stage of salmonids are expected to be present; or where flow volume or water velocity will inhibit function.
- Install a turbidity curtain so that it is oriented parallel to the direction of flow and extends the entire depth of the watercourse in calm-water situations.
- Use flexible flotation buoys along the top of the curtain, and a load line incorporated into the curtain fabric to hold down the bottom. Ensure that fabric is a brightly colored impervious mesh.
- Place one anchor at least every 100 feet, or as needed, then tow the fabric out in a furled condition, and connect to the anchors using the flotation devices, not to the bottom of the curtain. Once in place, cut the furling lines and allow the bottom of the curtain to sink.

6. **Heavy Equipment:**
   - Ensure that equipment used for work below the OHW or MHHW or in riparian zones or shoreline areas is clean and free of accumulated grease, oil, and mud and that leaks are repaired before arriving at the project.
   - Refuel and service all equipment only in an established staging area. Inspect all equipment daily for leaks, accumulated grease, and fix any identified problems before the equipment is used near water.
   - Operate machinery from existing roads and paved areas where they exist in proximity to the site. Use wood chippings and timber mats to provide a temporary surface where heavy equipment can access a work site.
   - Use an extension arm with bucket or similar attachment if mechanized equipment is used within the OHW or MHHW. Conduct debris removal and work below OHW or MHHW during low water levels (fresh waters) or at low tide (marine waters) to prevent material from entering the water during construction.
   - Restrict the use of equipment operating below the OHW or MHHW to designated access corridors.

- Use vegetable-based hydraulic fluid on machines that will operate in sensitive areas or their buffer.

7. **Riprap Installation:**
   - Include rootwads or large woody debris to increase habitat complexity when installing riprap.
   - Cover all newly placed riprap with habitat mix to fill voids and cover the rock to benefit benthic organisms. In locations where habitat mix will wash away rapidly, it may be deemed unnecessary to install.

BMP Maintenance During Site Work

1. **Filter Fence:**

   - Inspect filter fences immediately after each rainfall, and at least daily during prolonged rainfall, and repair as necessary.
   - Remove sediment when it reaches approximately one-third of the height of the filter fence.

2. **Turbidity Curtain:**

   - During construction, inspect the turbidity curtain daily for holes or other problems, and make any needed repairs promptly.
   - Schedule additional inspections during storm events and make any required repairs.
   - Ensure that water discharged from the turbidity curtain meets permit requirements at the point of discharge.

Site Cleanup

1. **Filter Fence:** Spread out any sediment deposits that remain after the filter fence is removed so that the restored surface conforms to the existing grade.

2. **Sediment Barriers/Containment Booms:** Remove contained debris to prevent it from entering the waterway at construction completion.

3. **Turbidity Curtain:**

   - Allow remaining suspended particles to settle for 6 to 12 hours after removing sediment before removing the turbidity curtain.
   - Follow the manufacturer's recommendations for removing turbidity curtains which may include installing furling lines along the curtain, detaching from anchors, and towing out of the water.
   - Recycle or reuse the turbidity curtain, if applicable.

4. **Waste Disposal:** Retrieve any debris generated during construction that has entered the water and dispose of it at an approved upland facility.

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)	Seattle Biological Evaluation (Seattle 2007)
2.37 - Concrete Containment (2) 2.79 - Inlet Protection 2.162 - Turbidity Curtain	C1.20 - Use of Chemicals During Construction C1.40 - Temporary Dewatering C1.45 - Solid Waste Handling and Disposal E2.95 - Turbidity Curtain E3.10 - Filter Fence E3.25 - Storm Drain Inlet Protection E3.65 - Cleaning Inlets and Catch Basins	BMP 5 - Spill Prevention and Cleanup BMP16 - Concrete Pouring, Concrete/ Asphalt Cutting, and Asphalt Application	C151 - Concrete Handling	6A-2.33 - Concrete Handling	CM-1 – Protected Species Work Window CM-3 – Written Spill Prevention Plan on Site CM-4 – Spill Kit on Site CM-7 – Limit Clearing of Vegetation CM-12 – Installation of Sediment Barriers CM-15 – Cleaning of Equipment CM-16 – Fueling of Equipment CM-19 – Placement of Operating Equipment CM-27 – Placement of In-Water Containment Barriers CM-28 – Limit Equipment Material and Debris from Entering Water CM-29 – Equipment Entering Water CM-44 – Use of Containment Boom CM-52 – Noise Reduction CM-54 – Work Performed in Dry 80% to 90% of Time CM-55 – Conduct Work at Minus Tides CM-62 – Remove All Debris that has Entered Water