

Highway Maintenance Specification Sections

2.260 Drainage Appliance Maintenance

Available at:

[http://www.th.gov.bc.ca/BCHighways/contracts/maintenance/Schedule\\_21\\_Maintenance\\_Specifications.pdf](http://www.th.gov.bc.ca/BCHighways/contracts/maintenance/Schedule_21_Maintenance_Specifications.pdf)

5.6 Drainage Appliance Management

Drainage appliance management activities are undertaken to ensure that highway surfaces are safe and efficiently drained, water is efficiently channeled to ditches and watercourses, and erosion of highways and adjacent properties is prevented. They include the cleaning and maintenance of drainage appliances and related hardware, as well as the replacement of existing and installation of new drainage appliances.



Environmental Issues

Primary environmental issues relating to routine drainage appliance management activities are summarized in the following table. It should be noted that site-specific conditions might present additional issues you will need to address in planning and undertaking your works.

Work Activity	Potential Environmental Impacts	Performance Standards and Legal Requirements
Debris and Sediment Removal	May introduce sediment or other deleterious substances (de-icing compounds in accumulated winter aggregate, heated water used to clear ice blocks from drainage appliance) to a watercourse through removal activities	No release of any substance that could be deleterious (toxic) to fish or fish habitat ( <i>Fisheries Act</i> , Sections 34(1) and 36(3)). Deleterious substances include, but are not limited to, gasoline, oils, sediment, de-icing compounds and chlorinated water.
	May damage roadside riparian vegetation or other significant habitats through the side casting of rock or soils	No harmful alteration, disruption or destruction of fish habitat without authorization ( <i>Fisheries Act</i> , Section 35(1)). No alteration of a stream unless authorized by an approval, licence, or order ( <i>Water Act</i> , Section 9), or through a Notification ( <i>Water Act</i> Regulation, Part 7).
	May damage habitat through the improper location of disposal sites in ditches, wetlands, or other significant habitat areas	No harmful alteration, disruption or destruction of fish habitat without authorization ( <i>Fisheries Act</i> , Section 35(1)). No alteration of a stream unless authorized by an approval, licence, or order ( <i>Water Act</i> , Section 9), or through a Notification ( <i>Water Act</i> Regulation, Part 7).

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Work Activity	Potential Environmental Impacts	Performance Standards and Legal Requirements
Repair Works	May release deleterious substances (sediment, cement-based products, epoxies, sealants) to a watercourse	No release of any substance that could be deleterious (toxic) to fish or fish habitat ( <i>Fisheries Act</i> , Sections 34(1) and 36(3)). Deleterious substances include, but are not limited to, gasoline, oils, paints, sealants, concrete leachate, and sediment.
	May contaminate surface waters, groundwater, and soils through improper storage or disposal of materials	Reporting of any polluting substance spills ( <i>Environmental Management Act</i> , Section 79(5)) and disposal of all waste materials in accordance with the <i>Act</i> ( <i>Environmental Management Act</i> , Waste Disposal Regulation).
Installation of New Drainage Appliances	May damage habitat by altering instream and bank structures and vegetation through construction and installation activities	No harmful alteration, disruption or destruction of fish habitat without authorization ( <i>Fisheries Act</i> , Section 35(1)).  No alteration of a stream unless authorized by an approval, licence, or order ( <i>Water Act</i> , Section 9), or through a Notification ( <i>Water Act</i> Regulation, Part 7).
	May damage habitat through the enclosure of an existing open channel, should the drainage appliance be located on a roadside channel containing fish habitat	No harmful alteration, disruption or destruction of fish habitat without authorization ( <i>Fisheries Act</i> , Section 35(1)).  No alteration of a stream unless authorized by an approval, licence, or order ( <i>Water Act</i> , Section 9), or through a Notification ( <i>Water Act</i> Regulation, Part 7).
	May release deleterious substances (sediment, cement-based products, epoxies, sealants) to a watercourse	No release of any substance that could be deleterious (toxic) to fish or fish habitat ( <i>Fisheries Act</i> , Sections 34(1) and 36(3)). Deleterious substances include, but are not limited to, gasoline, oils, paints, cleaners, concrete leachate, and sediment.
Placement of Scour Protection (Riprap)	May damage habitat by altering instream and bank structures and vegetation through the placement of riprap	No harmful alteration, disruption or destruction of fish habitat without authorization ( <i>Fisheries Act</i> , Section 35(1)).  No alteration of a stream unless authorized by an approval, licence, or order ( <i>Water Act</i> , Section 9), or through a Notification ( <i>Water Act</i> Regulation, Part 7).
	May introduce sediment or other deleterious substances to a watercourse through bank disturbance or the placement of rock material contaminated with fine sediment	No release of any substance that could be deleterious (toxic) to fish or fish habitat ( <i>Fisheries Act</i> , Sections 34(1) and 36(3)).



### Environmental Best Practices

The following BPs have been compiled for routine maintenance works that do not require a *Water Act* Notification or further approvals from regulatory agencies (i.e., works on non-fish bearing roadside runoffs, ephemeral channels which do not contain fish habitat). Should your works require a *Water Act* Notification or DFO authorization (i.e., works on ditches or watercourses which contain fish and other aquatic species or fish habitat), you will be provided with more detailed BPs by the regulatory agencies in response to your application.

### Assessing Potential Risks

Watercourses can generally be divided into the following three classes based on their habitat value and the level of protection they require:

1. Any fish-bearing wetted channel
2. Any wetted channel where fish may not be present yet which provides food, nutrients, or cool water to downstream watercourses and habitat for other aquatic species
3. Any non-fish-bearing channel which dries after rainfall and provides insignificant food, nutrient or habitat value

Consider what type of watercourse you will be working in when assessing the level of regulatory agency contact your works will require.

If you are planning work in or around watercourses that provide direct or indirect fish habitat, contact MoE and DFO.

The BPs in this document are provided as guidelines to help you ensure your works are completed in compliance with the performance standards and environmental legislation. Please note that the general BPs apply for most work activities within this category; if BPs specific to the activity are available they are also noted below.

### Regulatory Agency Contact

- Prior to beginning your drainage appliance management activities, identify any sensitive habitat areas, including wetted ditches and natural watercourses—streams, lakes and marine foreshores, found within your work area.
- Determine how much impact your required works will have on the identified areas. Are you planning to replace a small diameter culvert that conveys storm water to a non-vegetated roadside drainage ditch? Are you required to remove debris jams from a culvert on a permanently wetted fish-bearing watercourse that crosses the highway right-of-way? What type of equipment and materials are you planning to use to stabilize a large lakeside section of highway embankment that has been damaged by erosion? Are there any areas within your jurisdiction prone to regular debris accumulations or erosion issues? By asking these questions, you should be able to identify any planned works or areas that may be of concern to regulatory agencies.
- Meet with the appropriate regulatory agency contact, as listed in Section 8, to discuss site-specific environmental protection measures. Refer to Section 7 for information on the Memorandum of Understanding with MoE, and the recommended protocol for maintaining regular communications with regulatory agencies.

### Timing of Works

For most work activities within this category, the following general BPs apply:

- Works are preferably undertaken during periods of dry weather (e.g., summer) as this allows easier control of sediment. Typically this is also a less sensitive period for fish and wildlife than other seasons. If the work schedule requires working in the rain, the area of work must be

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isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances.

- If your maintenance activities require work instream, you must schedule them to coincide with your region's instream work window. Contact your local MoE and DFO offices for further information on timing windows in your District.

### **Important Note:**

The *Water Act* (Section 44 (1)(p)) permits MoT to remove obstructions, including beaver dams, as an **emergency** measure if the dams are obstructing bridges or road culverts during flood conditions. However, DFO may view dam removal as causing a harmful alteration, disruption, or destruction (or "HADD") of fish habitat and require you to obtain an authorization for your works under Section 35 (2) of the *Fisheries Act* prior to undertaking the works.

For information on emergency works and application submission requirements, contact your local MoE Habitat Officers or review *MoE's Standards and Best Practices for Instream Works* document at <http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

### **Emergency Debris Removal**

- If there is a demonstrable risk posed to highway stability and safety by debris or other materials limiting drainage within or across the highway right-of-way during a flood event, it is appropriate for you to undertake works to reduce the flood threat as soon as possible. Where possible, notify your local MoE Habitat Officers and DFO Habitat Management staff before beginning your debris removal works or as soon as you are able. Limit your work to only that which is required to reduce the threat to the highway and associated structures. Take steps to minimize your impact to watercourse structures and vegetation and ensure that appropriate measures (e.g., erosion and sediment control, re-vegetation) are in place to mitigate any impacts resulting from your work.

### **Site Management**

- Minimize disturbance to areas surrounding the worksite and avoid impacts to surrounding trees and shrubs when preparing your worksite and undertaking your maintenance works. To assist with bank stability and invasive plant prevention, leave topsoil and root systems intact on channel banks surrounding your work area.
- Apply native grass and ground cover seed mixes to exposed soils to reduce the risk of invasive plant establishment.
- Ensure any works to repair damaged appliances retain the pre-repair channel conditions (e.g., streambed profile, substrate, channel cross-section) and do not constrict the stream width.

### Beaver and Beaver Management

If your works require you to modify or remove a beaver dam, you will require a permit for the works under the *Wildlife Act* Regulations. Contact your local Conservation Officer for assistance. Permit applications may be submitted online through MoE's Permit and Authorization Service Bureau (<http://www.env.gov.bc.ca/pasb/>)

Best Management Practices for beaver dam modifications and removals may be found in the MoE Standards and Best Practices for Instream Works document, accessible online at

<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

### Equipment Use

- Select appropriate equipment and work access routes to reduce damage to riparian vegetation and watercourse banks when using earth-moving equipment.
- For smaller scale debris and sediment removal activities, remove materials by hand.
- If working near a watercourse, operate equipment from the bank or road shoulder. Do not allow machinery to cross through water.
- Ensure all equipment used on site is well maintained and free of fluid leaks. Refuel and lubricate equipment on dry land away from watercourses. Use drip trays to contain any spillage during maintenance.

### Worksite Isolation

- Isolate your work area from any flowing water that may be present. Ensure any flows are temporarily diverted around the portion of the ditch or watercourse where you are working.
- If potentially deleterious materials (e.g., cement-based products) are used for repair works, ensure raw material and wash water will not be released to any watercourse.
- Contain any sediment-laden water generated during your works in your isolated work cell. Use a pump to draw sediment-laden water out of the work cell and discharge it to a level vegetated area where sediment can settle as the water infiltrates the ground.

### Waste and Materials Management

- Have a spill response plan in place and spill kits on site.
- Clean equipment and tools off-site, if possible. Ensure that any wash water generated by cleaning tools and equipment is managed in a manner that will prevent its release to watercourses or road drains.
- Where possible, sweep up loose material or debris. Any material thought to pose a risk of contamination to soils, surface water or groundwater should be disposed of appropriately off-site. Any clean surplus material should be removed to an area where it will not enter any watercourse, ditch, or channel.
- Dispose of excess materials, excavated soils, and removed debris away from any watercourse. Ensure that the material is placed in such a manner as to prevent its future introduction into any watercourse by installing silt fencing, seeding, or using similar sediment control BPs.

### Debris Removal

- If excavated materials or any other erodible materials are to be left on site, ensure they are placed in a manner that will prevent the introduction of sediment to any watercourse (i.e., temporary covers, grading and seeding, installation of silt fence around spoil piles).

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### Repair Works

- Store any hazardous materials use (chemicals, sealants, patching materials) in accordance with applicable regulations and ensure that deleterious substances are handled with care.
- Mix concrete compounds, sealants or other chemicals used in a contained area and away from any watercourse if there is the potential for materials used in your work to contact soils or surface waters adjacent to the road surface.

### Erosion and sediment control

- Install appropriate erosion and sediment control devices (e.g., silt fence installed below disturbed slopes, rock check dams and temporary silt dikes in low velocity, low volume ditches) to prevent the transportation of sediment to downstream watercourses. Ensure that any structures installed are maintained and monitored until they are no longer needed (i.e., vegetative cover on seeded areas is adequate to control erosion).
- Use clean materials, free of fine soils that may contribute sediment to the watercourse, when installing rock or other scour protection measures.



### Key Information Sources

The documents and websites listed below are recommended resources for drainage appliance management. They can provide examples of existing protocols and management strategies, as well as additional information on specific operational BPs (e.g., erosion and sediment control techniques).

### MoT Technical Circulars:

There are no relevant Technical Circulars authored to-date for this activity.

All Technical Circulars are available at:

[http://www.th.gov.bc.ca/Publications/Circulars/Current\\_technical.asp](http://www.th.gov.bc.ca/Publications/Circulars/Current_technical.asp)

### Locally Developed BPs

#### (Provide any locally-developed BPs):

- *Riprap – Skeena BMPs for Road Maintenance*. 2003. MoT.  
[http://www.th.gov.bc.ca/publications/eng\\_publications/best\\_practices/bp.pdf](http://www.th.gov.bc.ca/publications/eng_publications/best_practices/bp.pdf)

### Other Resources:

**Standards and Best Practices For Instream Works**. March 2004. BC Ministry of Water, Land and Air Protection.

<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>

**Culvert Maintenance – Pacific Region Operational Statement**. 2008. Fisheries and Oceans Canada (DFO). [http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/os-culvert\\_maint\\_e.htm](http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/os-culvert_maint_e.htm)

**Culverts and Fish Passage Fact Sheet.** Oct. 2000. Environmental Management Section, Engineering Branch. BC Ministry of Transportation. [http://www.th.gov.bc.ca/publications/eng\\_publications/environment/references/Culverts\\_and\\_Fish\\_Passage.pdf](http://www.th.gov.bc.ca/publications/eng_publications/environment/references/Culverts_and_Fish_Passage.pdf)

**Fish Stream Crossing Guidebook.** 2002. Forest Practices Branch, BC Ministry of Forests. <http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/FishStreamCrossing/FSCGdBk.pdf>

**General Best Management Practices to Protect Water Quality website.** June 2004. Environmental Protection Division, BC Ministry of Environment. [http://www.env.gov.bc.ca/wat/wq/nps/BMP\\_Compndium/nps\\_bmp.htm](http://www.env.gov.bc.ca/wat/wq/nps/BMP_Compndium/nps_bmp.htm)

**Manual of Control of Erosion and Shallow Slope Movement.** August 1997. BC Ministry of Transportation. [http://www.th.gov.bc.ca/Publications/eng\\_publications/environment/references/Man\\_Control\\_Erosion.pdf](http://www.th.gov.bc.ca/Publications/eng_publications/environment/references/Man_Control_Erosion.pdf)

**T.I.P.S.: Targeted Invasive Plant Solutions.** Invasive Plant Council of British Columbia. 2008. <http://www.invasiveplantcouncilbc.ca/resources/targeted-invasive-plant-solutions-tips>

**Catalogue of Stormwater Best Management Practices.** September 2005. Idaho Department of Environmental Quality. [http://www.deq.state.id.us/water/data\\_reports/storm\\_water/catalog/index.cfm](http://www.deq.state.id.us/water/data_reports/storm_water/catalog/index.cfm)

**Application of Best Management Practices to Erosion and Sediment Control on Alberta Highways.** Alberta Transportation. <http://www.transportation.alberta.ca/Content/docType372/Production/erogoodbad.pdf>

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### Checklist for Environmental Protection Requirements

- Is your proposed work considered a “routine” maintenance activity? If not, approvals or permits may be required. Contact your local municipal, provincial, or federal regulatory agency staff.
- Has this project been discussed with local environmental regulatory staff? In addition to the BP information presented, other site-specific conditions may apply.
- Have site-specific environmental protection requirements been identified? List below:
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