



Halifax Water Best Management Practices For Halifax Water, and Crown Managed Lands

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Halifax Water

Supported by:
Elmsdale Lumber Company Ltd.
Department of Natural Resources
Pockwock Watershed Management Committee
Lake Major Watershed Advisory Board
Bennery Lake Watershed Advisory Board

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1.0 Introduction

Halifax Water is responsible for managing many activities on its watersheds. As a means of better managing these activities, Halifax Water has developed and implemented the following Best Management Practices (BMPs) to guide activities on Company and Crown managed lands, as supported by Elmsdale Lumber Company, the Pockwock Watershed Management Committee, the Lake Major Watershed Advisory Board, the Bennery Lake Watershed Management Committee and the Department of Natural Resources. For all other watershed lands, these BMPs are meant to be used for educational and awareness purposes. The following BMPs are not considered a complete collection but will continue to evolve to improve outcomes. In addition, these BMPs are not meant to replace existing legislation that governs activities on the watersheds. Furthermore, persons operating on the watersheds, regardless if it is designated as a Protected Water Area or not, should be familiar with current legislation that apply to the activities they are carrying out. A list of applicable legislation sited throughout these BMPs is listed in Appendix 1.

2.0 Definitions

1. **Watershed** – For the simplicity of this document, Halifax Water defines well head areas and surface water supply areas collectively under the term “watershed”.
2. **3-Point Contact** – A combination of 2 hands and one foot or 2 feet and 1 hand.
3. **Company lands** – Lands privately owned by Halifax Water.
4. **Crown managed lands** – Crown lands managed alone by Halifax Water or jointly by Halifax Water and NSDNR.
5. **Chicot** – Standing dead trees.
6. **Special Management Zone (SMZ)** – Special Management Zone as defined by the Department of Natural Resource
7. **Lodged or Spring Trees** – Trees that have become unsafe while operations are being conducted on the block. For example trees that are leaning against another tree for support or trees whose tops have broken and become lodged in other standing timber.
8. **Grubbing** – The removal of vegetative or organic matter by machine exposing bare mineral soil.
9. **Overburden** – Vegetative or organic matter which covers bare mineral soil.
10. **Cultural Heritage Zone** – An area that has been positively identified or having potential cultural or heritage significance by a trained expert. For example a trapper’s cabin, grave stones.
11. **Fording** – Traversing of a machine through a watercourse, water body, and wetland as defined under the Environment Act.
12. **Rip Rap** – Clean, washed angular aggregate greater than 4 inches in size. Usually used around culverts or for erosion control purposes. The material must be free of sulphide bearing or acid slate.
13. **Shelterwood Management** – The practice of removing 30-50% of the stand basal area to create light conditions suitable for growth conditions. This harvest technique favours long lived tree species that are shade-tolerant., NSDNR Forest Research Report, “*Regeneration Following White Pine Shelterwood Cuts in Shelburne Co., NS.*” March 1995.
14. **Selection Management** – With respect to *Uneven-aged Management* it is “the practice of leaving 3 or more height classes on site with a minimum height difference of 3m between

classes, and one height class greater than 10m.” Association for Sustainable Forestry, “*Selection Management*.” October 2009.

15. Variable Retention Management – The practice of leaving as much hardwood and shade-tolerant species as operationally possible in the identified harvest block. The residual standing trees would be in addition to the *Wildlife Habitat and Watercourses Protection Regulations*.

16. Clear Cut Management – The total removal of all tree species within an identified harvest block while meeting the minimum *Wildlife Habitat and Watercourses Protection Regulations*.

17. Travel Corridor – Solid linear feature that is used to physically break up larger harvest blocks into smaller harvest blocks.

3.0 Heavy Equipment

Use 3-point contact for mounting and dismounting equipment. Check for hazards prior to dismounting and ensure handles and footholds are intact.

Hard hats, safety boots and highly visible clothing or straps must be worn at all times. When working in a fully enclosed cab, exception may be given to hard hats.

Lunch, fueling and maintenance areas will be kept clean and all garbage removed from the watershed on a daily basis. Deposit refuse, garbage, and tires in an approved waste disposal site.

Be aware of all persons or vehicles around you. When you see a person or vehicle approaching, immediately stop operating your machine and lower the blade or boom to the ground, make eye contact, and signal for safe passage.

Be aware of potential overhead danger such as a chicot, large dead branches and power lines.

Shut machine down during times of repairs or maintenance.

Ensure the blade or boom is always down and emergency brake is on when operator is out of the machine.

While inside the HRM core, the HRM noise by-law will be applied and followed.

During breaks and non working hours, park heavy equipment at least 30m from a defined stream channel or flowing water (e.g., where water is flowing in the ditch, etc.) and 60m from a well head location.

3.01 Fueling and Fluid Disposal

No fuel bulk storage stations may exceed 450 litres unless approved by Halifax Water or NSDNR.

All Halifax Water authorized fuel storage tanks must be fully contained.

An emergency plan must be located on site and known to all users.

All fuel tanks must conform to the Transportation of Dangerous Goods (TDG) Regulations.

During transport, ensure all fluid containers, including jerry cans, are leak-free and secured to avoid damage and spills.

All fuel containers, including jerry cans, must be marked clearly identifying their contents.

Vehicles specifically designed for delivering fuel/fluids must be escorted at all times.

Pumping devices for all fuel tanks must have automatic shut-off valve and be attended at all times while in use; no gravity fed pumps allowed.

Designated fueling areas must be at least 30m from a defined stream channel or flowing water (e.g., where water is flowing in the ditch, etc.) and 60m from a well head location.

All fuel tanks must have a 10 pound 6A80BC serviceable fire extinguisher available at all times.

All fuel stations must maintain a complete spill kit which will include a plug and dyke kit. Chainsaw fueling stations will maintain gas and oil absorbing material which will be placed under saws when refueling and oiling.

All motorized equipment must have an appropriate sized spill kit located on board.

Do not smoke while refueling equipment.

Fuel equipment on bare-mineral, stable, level ground.

Prior to beginning work, all fluid maintenance must be completed.

Dispose of waste fluid at an approved government facility.

3.02 Maintenance and Inspections

When performing equipment maintenance and inspections, ensure that:

- Machinery is parked on bare-mineral, stable, level ground.
- Parking brake is on.
- Blade or boom is in contact with ground.
- Machine/energy is off; hydraulics and pneumatics are off and in zero energy state.
- Operator inspects for and repairs all fluid leaks.
- Operator inspects all electrical components and repairs any damaged or loose parts.

When welding:

- Machine must be 10m from a refueling area, and parked on bare-mineral soil.
- A 20lb serviceable 6A80BC fire extinguisher is available.
- Fuel caps must be in place and combustibles must be cleaned up prior to welding or grinding.
- A fire watch must be implemented, that will continue for 15 minutes after welding is complete
- A welding mask and gloves must be worn.

Remove flammable debris from equipment daily.

No welding or grinding is permitted during high to extreme fire conditions.

Machinery and tools showing above normal leaking fuels or other fluids will cease operation immediately and fluids contained. Repairs are to be made or machinery moved from watershed. Report spills as per Emergency Spill Regulations.

3.03 Floating Equipment

Check with provincial or local authorities for weight, height, length, and timing restrictions on deliveries.

Do not use defective tie downs to secure machinery.

Check load security prior to entering onto a public highway as well as routinely throughout the duration of the trip.

Check for loose debris prior to transporting.

Be aware of all persons in the vicinity of the float when lowering; make eye contact to ensure person(s) see you and are aware of the potential danger.

4.0 Communication

“Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time.

Use private contractors channel within the operating block to maintain contact of location throughout area.

Calling frequency depends on traffic on the road. Increase calling frequency as vehicles approach one another.

Identify location by kilometer markers and be clear about direction. Do not use “nick names” to identify location as this could cause confusion amongst workers in area.

Vehicles carrying flammable liquids or chemicals hazardous to water quality, and exceed the minimum TDG requirements, that do not have communication capabilities must be escorted to and from the drop off/ pickup point by a vehicle that has communication capabilities.

5.0 Gates

Only authorized Halifax Water staff will be permitted to duplicate gate keys that fall under Halifax Water control.

Only authorized Halifax Water staff will be permitted to issue gate keys that fall under Halifax Water control. A key issuance sheet must be completed by Halifax Water Staff and signed by both Halifax Water Staff and the party(s) receiving the key(s). A copy will be given to the receiving party(s) and the original be kept on file at Halifax Water. Once the key(s) has been returned to Halifax Water the key issuance sheet will be completed as returned, a copy will be issued to the returning party and the original will be kept on file at Halifax Water

A master list of key holders will be kept by Halifax Water.

A key issuance is considered written authorization. A key issuance form must be completed and kept on file with Halifax Water.

Gates must be locked at all times unless authorized by Halifax Water.

Authorized users must report any illegal activities or unauthorized personnel behind Halifax Water controlled gates to Halifax Water staff immediately or when within communication range.

6.0 Emergency Response and Reporting

In the event of any emergency on watershed lands Halifax Water is to be contacted immediately as well as the emergency responders responsible.

The Halifax Water Emergency Response Plan manual, dated December 2006, will be the guiding document for Halifax Water staff. The ERP manual can be found at Halifax Water's main office located at 450 Cowie Hill Road, Halifax.

6.01 Fire Prevention and Reporting

In case of a fire on watershed lands, immediately contact:

HALIFAX WATER (24 hour contact line).....490-6940

FOREST FIRE EMERGENCY 24 HOUR LINE.....1-800-565-2224

FIRE CONTROL (Shubenacadie office).....1-902-758-2232

Person(s) reporting a fire must provide location, size, estimated time, name and contact information of person reporting.

For designated watersheds, fire season is dependent on the applicable watershed regulations. For the Pockwock PWA the fire season is from **April 1st to Oct 31st** of each year while the Lake Major and Bennery Lake PWA fire season is from **April 15th to Oct 15th** of each year. For all other watershed lands that fall outside of a designated PWA, the fire season depends on the provincial fire season for that area. **(legal requirement)**

All operators are to be aware of where the fire equipment is stored.

No open fires are permitted on Company lands unless otherwise authorized by Halifax Water. For all other watershed lands follow the applicable watershed regulations pertaining to fire restrictions or contact Halifax Water or your local NSDNR office.

During fire season, smoking shall only take place on bare mineral soil; all precautions must be taken to ensure the cigarette or cigar has been extinguished.

During fire season, all motorized equipment is required to have applicable fire fighting equipment as per the Nova Scotia Fire Protection Act. The fire plan must be on site during fire season.

During fire season, while conducting operational activities fire indices must be checked daily and followed. A daily log must be kept.

During high to extreme fire hazard conditions only operations conducted on bare mineral soil shall take place. Written permission to operate must first be obtained and a fire watch must be conducted daily 30 minutes after operations have ceased.

Move equipment to mineral soil and shut off master switch at the end of each working day.

Remove all accumulation of flammable material from equipment daily.

No equipment shall operate within 300m of a forest or woodlands without an adequate device for arresting sparks. **(legal requirement)**

Chainsaws must be equipped with spark arresters.

Do not start chainsaws within 3m of a fueling area.

Chainsaw must have a 0.5kg (1 lb) pouch fire extinguisher or 5kg (10 lb) extinguisher.

6.02 Petroleum and Chemical Spill Response and Reporting

In the case of a petroleum or chemical spill on watershed lands, immediately contact:

HALIFAX WATER (24 hour contact line).....490-6940

COAST GUARD.....1-800-565-1633 or 426-6030

ENVIRONMENTAL EMERGENCIES 24 HOUR LINE.....426-6200

One hundred (100) litres (22.2 gallons) of fuel or used oil constitutes a reportable spill to government agencies. ALL-SIZED SPILLS must be reported to Halifax Water. See appendix 2 for a complete list of reportable toxins.

Person(s) reporting a petroleum or chemical spill must provide location, estimated quantity, time, substance, if known; name and contact information of person reporting.

Halifax Water will maintain, at all pumping station locations, a supply of oil absorbent material to be used in the event of an oil spill to create an oil boom around the intake of the pumping station and/or absorb oil on the water supply surface.

All Halifax Water employees, Department of Natural Resources staff, and contractors working on watershed lands must report any overturned engine-equipped machines, such as trucks, skidders and tractors, to Halifax Water immediately. They must also report any foreign substance on the surface of the water supply or land that could pollute the water.

When a petroleum or chemical spill has been reported to Halifax Water, the applicable treatment plant operator and Director of Water Services will be contacted as well as the **COAST GUARD/ENVIRONMENTAL EMERGENCIES** immediately.

7.0 Road Construction and Maintenance

7.01 Road Planning

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

Where possible, use existing roads as they usually provide the best long term access. When using existing roads, reconstruct only to the extent necessary to provide adequate drainage and safety.

Avoid areas that require large cuts and fills, in order to reduce construction costs and soil erosion.

Plan road systems that will minimize the number, width, and length of roads in order to limit the total area disturbed and loss of productive ground.

Where possible, locate roads on high ground and along ridges to reduce erosion and prevent sedimentation of streams. Avoid locating roads along the sides of hills with greater than 30% slope.

Identify landings, loading areas, meeting places, turn-a-rounds and potential gravel pits during road layout.

Plan turnouts for opposing traffic at one kilometer intervals along single lane roads and turnarounds at the ends of all roads.

Attempt to locate roads parallel to the natural drainage system to minimize the number of watercourse and stream crossings.

Maintain a belt of undisturbed vegetation between the road and a stream or lake to allow silt carried by runoff from the road to be collected in the undisturbed area. Vegetative widths: Slope of land <30% = 30m buffer, Slope of land >30% = 40m buffer.

Ensure all merchantable right-of-way (ROW) wood is delivered to a mill facility.

Where possible, avoid hilly terrain (<10% if possible), erodable soils, bedrock and shallow soils when locating roads and crossings.

Select crossings well in advance of operations to avoid delays in receiving approvals.

Plan crossings at right angles to prevent any redirection of the flow in the water course.

Plan crossing at the narrowest spot possible with no braided channels or obstructions.

Ensure all Special Management Zones (SMZs) and crossings that may require special mitigation techniques have been addressed (e.g., visual buffer or slope dependant).

7.02 Road Layout

Road layout will be completed using a GPS hand held unit or a compass accompanied by photo and map showing a minimum:

- Harvest boundaries
- Special Management Zones
- Waterways and water bodies
- Roads
- Property Boundaries
- Significant areas such as wetlands, heritage sites, and wildlife values

Ribbon layout:

- Three (3) ribbons indicate the end of a road
- Two (2) ribbons indicate a corner in the road or block

Blue ribbon marked will be used to mark road centre line location as well as skid trails into or between harvest blocks that have not already roaded.

Ensure the ribbons are tied in a manner that is clearly visible to the operator during anytime of the year.

If an alteration to the road location is required, remove old ribbons so as not to create confusion of the correct road ribbons to follow.

If operations do not start up within a year of completing road layout, the site is to be revisited and the lines are to be refreshed where needed. Halifax Water and NSDNR are to be notified once completed.

7.03 ROW Clearing and Road Construction

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

Road construction shall only take place from **June 1 to September 30** of each year as per applicable watershed regulations (Bennery Lake, Lake Major, and Pockwock). For all other Company and Crown managed lands outside of a designated watershed where road construction is required, approval will only be granted to those situations where there is little to no risk of the water supply being affected. **(legal requirement)**

“Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time.

Cut landings and pile wood away from drainages to avoid obstructing water.

Trees must be never be felled into a watercourse.

No landings or wood piling areas are to be located within a SMZ, riparian area or within 30m of a watercourse.

Ditches, water bars, off-take ditches, cross drains and settling ponds must be a minimum of 30m from any watercourse.

Where ditches are required, construct them in a manner to divert water into the green belt.

Cut down chicots that are closer than one treelength from the road edge.

Do not leave lodged or spring trees.

ROW width outside of a SMZ must not exceed 30m from standing timber to standing timber unless otherwise approved by Halifax Water or NSDNR. The exception to the rule is ROW that run through a harvest block.

ROW width inside a SMZ or riparian zones must not exceed 20m from standing timber to standing timber unless otherwise approved by Halifax Water or NSDNR.

No grubbing shall take place within a cultural heritage zone without the approval of Halifax Water or NSDNR.

Post safety signs as required, such as: slow, stop, blind curve, steep hill, narrow bridge, and kilometer markers.

Contractors working must attend a minimum of one start up meeting per year to review the requirements specific to the applicable watershed as per the contractor start up agenda.

Slash and stumps created from ROW clearing and road construction must be used in a manner that minimizes the roadside debris (e.g., construction of roadbeds, turn-arounds, back filling of borrow pits) unless otherwise approved by Halifax Water or NSDNR.

Where possible, construct roads and landings away from areas of advanced regeneration.

Stop operations if a potential value that has not been previously identified is encountered (e.g., stream, stick nest, cabin, grave site). Immediately notify Halifax Water or NSDNR to be advised on how and where to resume operations.

Cross drainage culverts will be a minimum diameter of 300mm (12inches).

All watercourse crossings will be calculated using the 100 hundred year event (Q100).

The travel surface on all forest access roads (Class-D = 3m) will be covered to a thickness of 10cm to 15cm with 5cm (2inch) gravel, free of contaminants, in order to reduce erosion and potential sedimentation from the road surface.

Ensure a copy of the most recently approved map is on site at all times showing the location during operations. The old versions are to be destroyed.

The construction of loop roads is not permitted without the permission of Halifax Water or NSDNR.

The use of explosives must be authorized by Halifax Water and carried out by a certified explosives specialist.

Once operations are completed, leave all existing roads, ditches and culverts in the same or better condition as prior to operations.

7.04 Erosion Control

Use erosion control techniques (i.e., straw bales, filter cloth, seeding, silt fences, ditch dams, etc.) to prevent foreign material from entering the water. Install erosion control measures prior to working near streams.

Seeding and mulching on “sensitive” areas with high sedimentation potential such as bridge approaches or cut and fill areas within 30m of streams are especially important.

Use clean rip rap to line all bridge and culvert faces above the high water mark to protect against erosion during periods of high water. Rip rap must be free of acidic bearing slate.

Avoid operating equipment on unstable slopes, stream banks or soft ground. Use straw, hay or clean crushed stone to stabilize banks or slopes to prevent soil from falling into stream.

Continuously monitor and conduct routine maintenance as required on erosion and sediment control measures during and after road construction operations.

Ensure that drainage features are fully functional prior to spring or fall runoff.

Where erosion is anticipated on steeper sections or near culverts/bridges consider using surfacing material (gravel and rocks) to reduce erosion and potentially extend the operating season.

Diversion ditches must be at least 30m away from a water body or watercourse. Where slope is greater than 10%, a diversion ditch is required every 30m into the green belt.

No grubbing shall take place within 30m of any water body or watercourse to prevent sedimentation.

Minimize grubbing within a SMZ to reduce the disturbance of the overburden unless otherwise approved by Halifax Water or NSDNR.

Vehicle traffic should be restricted on soft roads during the wet season of the year and during heavy rains when road surface is rutting.

Avoid skidding or forwarding on truck roads unless conditions are such that the road profile will be maintained.

For roads with a slope of 10% or less, avoid having water run in a ditch for greater than 300m to minimize erosion.

For roads with a slope of greater than 10%, avoid having water run in a ditch for greater than 30m to minimize erosion.

When construction lasts more than one day, exposed soils must be stabilized at the end of each day.

7.05 Water Crossing Installation

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

All watercourse crossings requiring approval for installation must be completed by person(s) who have successfully completed the NS Watercourse Alteration Certification Program, who is to remain on site to supervise the installation. Person(s) responsible for the installation must be able to provide proof of successfully completing taking the course.

All permanent bridge and culvert installations must be completed between **June 1 and September 30** of each year. Temporary bridges can be installed year round; however, the installer must comply with the Water Course Alteration Certification Program, manufacturer instructions, and obtain approval from Nova Scotia Environment (NSE), Halifax Water and NSDNR. Exception to the rule is the emergency repair of any water course structure as a result of a wash out or failure.

“Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time.

Minimize soil disturbance near streams.

No in-water work is allowed unless approved by NSE.

Ensure no fluids, debris or soils enter the water. Allow free flow of water at all times to allow fish passage. Temporary obstruction maybe allowed with the approval of NSE if there is no other means of water crossing installation, such as cofferdam or dam and pump option.

No fording through water bodies or water courses of any kind is permitted unless approved by NSE.

If a sediment control plan is required for the crossing, have the plan on site at all times.

Ensure a copy of the most recently approved map is on site at all times showing the location during operations. The old versions are to be destroyed.

Equipment must be clean and free of debris prior to work beginning.

Equipment must be mechanically sound ensuring no fluid leaks of any kind prior and during water crossing installation.

No merchantable wood may be used in a crossing without approval by Halifax Water or NSDNR.

Where possible, build crossing at right angles to the stream to build more stable crossings and prevent changes in the water flow.

Avoid wetlands, sensitive and unique areas where possible when choosing a water crossing.

No beaver dams are to be removed unless approved by Halifax Water or NSDNR.

When constructing bridge cribbing use geo-textile and clean fill to prevent sedimentation.

Remove all leftover debris or building material from the site.

Culvert(s) must be imbedded 20% of the culvert diameter into stream bed. **(legal requirement)**

Ensure slope of road shoulder at the culvert is 2:1 or less to maintain stability. **(legal requirement)**

Whenever possible use open bottom culverts or bridges for fish bearing streams. If closed bottom culverts must be used, ensure free fish passage. **(legal requirement)**

When installing closed bottom culverts the slope gradient must not exceed 0.5%. If the slope is greater than 0.5% then an open bottom culvert or bridge must be installed to ensure fish passage and water flow. Align structure with the channel to ensure water flows freely. **(legal requirement)**

When installing culverts, backfill with earth or gravel and pack material. For culverts greater than 600mm (24inches), pack backfill material to at least half the diameter of the culvert using a tamping machine. **(legal requirement)**

Cover culvert with a minimum of 30cm (12 inches) of gravel leaving a 2:1 slope at each end. Culvert ends must extend a minimum of 30cm out from the end of the culvert to the toe of the finished banks. **(legal requirement)**

When installing bridges and open bottom culverts, cribbing and footings must be 30cm back from the high water mark. Do not excavate below the normal high water mark. **(legal requirement)**

No multiple culvert installations are permitted unless approved by NSE, Halifax Water or NSDNR.

No chemically treated wood is allowed for the construction of water crossing structures. It is recommended that untreated hemlock, tamarack/juniper, or cedar, pre-cast concrete, corrosion resistant steel, or plastic be used.

After construction is complete, re-vegetate disturbed soils located within 30m of water bodies, outside the travel surface.

Regularly inspect and clean culverts when necessary to avoid washouts and ponding from occurring on the upstream side of the culvert. A routine culvert inspection and

maintenance program can avoid costly repairs and reduce negative water quality impacts.

Where possible, adjust the height of the bridge deck so that it is slightly higher than the road approaches, preventing road surface water from running onto the bridge and into the stream.

Bridge decking (permanent/temporary) must be entirely closed with outside a minimum of 15cm x 15cm (6inch x 6inch) bumpers installed to catch vehicle and water runoff. Decking and bumpers must be kept clean to reduce negative water quality impacts.

Ensure all end corners of the bridges are well marked with reflective bridge markers.

Regularly inspect and maintain bridges for structural repairs and to remove any debris which may clog the opening and hinder stream flow.

7.06 Water Crossing Removal

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

No in water-work is allowed unless approved by NSE.

Ensure no fluids, debris or soils enter the water. Allow free flow of water at all times to allow fish passage. Temporary obstruction may be allowed with the approval of NSE if there is no other means of water crossing installation, such as cofferdam or dam and pump option.

Stabilize approaches once crossing has been removed (e.g., seeding, rip rap).

Minimize disturbance to greenbelt (riparian zone)

Ensure construction material has been removed from site once crossings completely removed

Machines must be cleaned and leak free prior to crossing removal.

All crossings that are to be removed must be removed during dry conditions. During wet periods (rain, snow melt) removal will be suspended until the ground around the removal location has dried up.

Ensure a copy of the most recently approved map is on site at all times showing the location during operations. The old versions are to be destroyed.

Ensure short term and long term erosion measures are put in place during and after removal to maintain bank stability and prevent sedimentation.

Safety measures must be taken to notify users of removal and to proceed with caution. Place barriers and warning signs in plane view to allow for adequate warning time.

7.07 Gravel Pits

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

Pit extraction can only take place from June 1 to September 30 of each year or as approved by NSE, Halifax Water or NSDNR.

Ensure the pit boundaries are clearly identified prior to cutting and excavating to eliminate excess exposure of bare-mineral soil.

Remove trees within 5m of the extraction face.

Organic overburden and trees must be piled so as to be used for site remediation once pit operations have been completed.

The use of explosives must be authorized by NSE, Halifax Water, or NSDNR and carried out by a certified explosives specialist.

During Gravel pit extraction, no aggregate is to be removed within 10m of the road bed edge and property boundary lines.

There is to be no aggregate removal allowed within a SMZ or riparian zone or 30m of a watercourse or water body.

Excavation faces must be sloped and stabilized to prevent erosion during and after extraction has been completed. Once excavation has been completed all pit faces must be sloped 3:1 to prevent erosion and reduce safety concerns.

During extraction, the water table must remain 1.5m below the lowest extraction point to avoid the area from filling up with water.

Drainage of the excavation area will be designed to prevent sedimentation from entering a water body or water course.

7.08 Road Upgrade and Maintenance

Contact Halifax Water before conducting any emergency repairs on roads if water crossings are involved.

“Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time.

No chemical application for the purpose of controlling vegetation is allowed unless approved by NSE, Halifax Water or NSDNR.

Ensure no material is deposited on bridge decking or over the ends of culverts during grading operations.

Grade road surfaces only as often as necessary to maintain a stable running surface and retain the original surface drainage.

Avoid grading sections of road where it is not required. Grading creates a source of sediment from the newly disturbed surface. Raise the grader blade where grading is not necessary.

While grading, bring loose material back towards the centre of the road to prevent the creation of windrows along the edge of the road that may channel runoff and erode slopes.

Shape road to allow for proper drainage and runoff

Wing back snow during plowing operations to minimize spring saturation and erosion of the road. Ensure the plowed road surface does not appear wider than the actual road.

During hauling operations, road and weather conditions will be monitored to ensure proper maintenance measures are in place and being followed (eg. sanding/plowing). By doing so will minimize road repairs and lessen sediment runoff.

Sand is the preferred winter maintenance tool; however salt may be used as a last resort, and only in areas that are considered to be a safety concern. For example, on roads with hilly terrain. Permission must first be obtained from Halifax Water or NSDNR

8.0 Forest Management Planning

Halifax Water considers forest management planning to be an important tool in watershed management for the improvement of water quality.

It is Halifax Water's goal to manage the forested watersheds with the support of NSDNR to have no more than 50% of the forested watershed less than 50 years of age while supporting the provincial *Environmental Goals and Sustainable Prosperity Act* 12% protected areas target.

The maximum annual harvest area (AHA) is recommended to not exceed 1% of the forested watershed. However if market or weather conditions do not allow the 1% AHA to be reached, a maximum AHA of 2% is recommended to be harvested in the following year. It is not recommended that the maximum 2% AHA be exceeded in any one year. Exception to this rule maybe given in the event of an unplanned natural disaster such as a fire or wind storm damage. If harvesting is required for the protection of water quality, it is recommended that up to 6% of the watershed may be harvested annually for a period of no more than 3 years; after which, harvesting must return to 1% or less over the next 6 years.

Additional to the *Wildlife Habitat and Watercourses Protection Regulations*' Halifax Water considers forest management planning that take into consideration natural disturbance patterns, the re-establishment of the Acadian Forest, and climate change, while maintaining the highest priority in protecting water quality.

Typical harvest blocks are not to exceed 10 hectares. Special exemption for salvage operations of wind, insect, disease, and fire damaged sites can be approved by Halifax Water or the applicable watershed advisory board where there is a threat to water quality.

In addition to salvage operation, special block size exemption maybe given to harvest systems that improve forest stand health such as Hardwood, Selection and Shelterwood Management.

Adhere to the harvest adjacency rule of 10 years or 2m for softwood and 3m for hardwood, whichever comes first, before considering the next harvest treatment.

For harvest blocks exceeding the 10 hectare size limit and do not meet special block size exemption conditions or do not meet the adjacency rule, a block separation or travel corridor must be used. The corridor is meant to break up the larger block into smaller blocks less than 10 hectares. The corridors must continually run between blocks and be at least 50m wide.

For Wildlife Tree retention, priority will be given to disease-free, long-lived, deep rooted species. Preferences in order, are;

- American White Ash, Red Oak, Yellow Birch, Sugar Maple, Iron Wood, American Beech, White Pine, Red Pine, Eastern Hemlock, Red Spruce, Red Maple, White Birch, Black Spruce, White Spruce, Balsam Fir.

Other values will be considered during forest management planning, in areas such as cultural heritage sites, wildlife habitat (e.g., deer wintering areas), and Species at Risk (e.g., lichens, flying squirrels, etc.).

Identify the area to be harvested, including the location of water bodies and sensitive area such as wetlands and high erosion hazard areas (e.g., thin soils) within the harvest area.

During forest management planning, Halifax Water must consider using harvesting techniques that do not require the use of chemicals as a post treatment to control hardwood and unwanted vegetative species as Halifax Water does not support their use. In lieu of chemicals the following practices are applied:

- Where forest stands would best benefit from the variable retention management system, Halifax Water will promote leaving as much standing hardwood and shade-tolerant species as operationally possible. The intention is to reduce clear cut management methods within the watersheds and promote leaving as much overhead canopy as possible.
- Where forest stands would best benefit from Hardwood, Selection, and Shelterwood management systems, Halifax Water will promote leaving shade-tolerant, long lived, deep-rooted species that leave a uniform canopy over the landscape.

Time harvesting activities to minimize environmental impacts. For example, typically harvesting activities should occur during the drier summer months, or if needed will occur during the winter months when the ground is frozen and/or there is a snow pack.

Consider timing restrictions around other values such as tourism season (June 15 to Oct.15 of each year).

The width of any water course within a watershed will have a riparian zone greater or equal to the Provincial minimum standard of 20m from high water mark; however, depending on depth to water table, soil conditions, slope, etc., the riparian zone may be increased to protect the integrity of the riparian area.

All lake shore riparian zones widths will be no less than 60m from high water mark; however, depending on depth to water table, soil conditions, slope, etc., the riparian zone may be increased to protect the integrity of the riparian area.

Consider potential water quality impacts and risk of erosion and sedimentation in the selection of silvicultural and regeneration systems (e.g., variable retention harvest, shelterwood, hardwood selection) in order to plan forwarding routes and trails.

Consider the additional contributions from harvesting or roads to any known existing water quality impairments or problems in watersheds of concern. For example, acid bearing slate in the Bennery Lake Watershed.

Ensure all contracts and agreements are in place prior to operations commencing (e.g., land owner, stumpage, service agreements etc.).

Use silvicultural practices that promote native natural species.

9.0 Forest Operations

9.01 Block Layout

Block layout will be completed using a GPS hand held unit or a compass accompanied by photo and map showing a minimum:

- Harvest boundaries
- Special Management Zones
- Waterways and water bodies
- Roads
- Property boundaries
- Significant areas such as wetlands, heritage sites, and wildlife values

Ribbon layout:

- The tails of the ribbons indicate the inside of the operating area and will be facing the operator
- Three (3) ribbons indicate the end of a road
- Two (2) ribbons indicate a corner in the road or block

Solid pink ribbon or pink ribbon marked with “Cut Block Boundary” or “Boundary Layout” will be used to mark the harvest area boundaries during block layout. Pink ribbon with black stripes will be used to mark out buffer and significant areas (water course/ heritage zones).

Blue ribbon marked will be used to mark skid trails into or between harvest blocks that have not already roaded.

Orange ribbon will be used to mark sample points for forestry data collection during silviculture or harvesting operations (e.g. stem count or volume count).

Ensure the ribbons are tied in a manner that is clearly visible to the operator during anytime of the year.

If an alteration to the boundary location is required, remove old ribbons so as not to create confusion of the correct boundary ribbons to follow.

If operations do not start up within a year of completing the block layout, the site is to be revisited and the lines are to be refreshed where needed. Halifax Water and NSDNR to be notified once completed.

9.02 Harvesting

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

Ensure harvest areas, all applicable leave areas, and riparian zones are flagged off as according to the *Wildlife Habitat and Watercourses Protection Regulations* or any applicable watershed regulations and company policies.

Ensure a copy of the most recently approved map showing the location is on site at all times during operations. The old versions are to be destroyed.

The harvesting machine(s) must have a copy of the most recently approved map on board showing a minimum:

- Harvest boundaries
- Special Management Zones
- Water ways and water bodies
- Roads
- Property Boundaries
- Significant areas such as wetlands, heritage sites, and wildlife values

In addition to the most recently approved map, it is highly recommended that the harvesting machine have a GPS on board that reflects the approved map boundaries.

“Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time.

Do not pile wood on top of culverts in order to avoid obstruction or damage.

No cutting or other works are to take place within the designated riparian zone of any lake, river, wetland, or stream (including seasonal streams) without special approval from NSE, Halifax Water or NSDNR.

Do not fall trees into any watercourse.

All water bodies and watercourses must be kept free of debris generated from forest operations. No slash accumulations resulting from the operation is to be left on roads so that vehicle traffic is impeded. All ditch-lines are to be functional post harvesting.

The Stump height BMP is as follows:

- For trees with a diameter of 30cm or less, measured as the outside diameter at the point of cutting, the maximum stump height allowed is 30cm. For trees with a greater outside diameter than 30cm, the maximum stump height must not be greater than its’ measured outside diameter. Regardless of the diameter, no tree may be felled so that its’ stump height is greater than 60cm. Special exemption may be given by Halifax Water or NSDNR for reasons such as safety; for example, the clean up of wind damaged sites.

All merchantable timber harvested must be moved to roadside in a timely fashion for trucking purposes.

Ensure all merchantable timber within the harvest block as identified in the forest management plan is harvested with the exception of leave areas, riparian zones and wildlife trees.

While felling trees along a harvest boundary ensure the boundary ribbons are left intact.

While felling trees along a property boundary ensure the boundary markers and blazes are left intact and do not fall trees into adjacent property.

Do not fall trees over block boundary lines.

Ensure no lodged or spring trees are left in the harvest area.

Protect advanced growth and residuals.

Stop operations if a potential value that has not been identified is encountered (e.g. stream, stick nest, cabin) and notify Halifax Water or NSDNR immediately. Halifax Water or NSDNR will advise on how to resume.

Do not use roads if rutting of the road surface, sedimentation of streams or damage to culverts is likely to occur.

If, in the opinion of Halifax Water or NSDNR, forest operations are causing excessive damage to the natural forest environment that may result in erosion or other unnatural disturbances, the operation will be ordered discontinued until the situation has been corrected.

Cut down chicots that are closer than one tree length from the edge of the road.

When using a chainsaw, operators must meet Occupational Health and Safety Guidelines. When operating a chainsaw, the operator must wear appropriate chainsaw safety pants, hard hat, protective eye wear, ear protection, gloves and safety boots at all times. **(legal requirement)**

Chainsaws must be equipped with an operable chain catcher and chain break.

When harvesting using a chainsaw, all chicots must be removed from the block for safety reasons.

No camping, accommodation trailers or buildings are to be brought into the watershed area.

Contractors must attend a minimum of one start up meeting per year to review the requirements specific to the applicable watershed as per the contractor start up agenda.

The contractor engaged in forest operations in the watershed will be responsible for the conduct of all his employees and agents with respect to law, regulations and guidelines pertaining to activities on watershed lands.

Any deviance on the part of the contractor or employees of the contractor from these working conditions will be immediately corrected as directed by Halifax Water.

Leave known recognized recreational trails (i.e. hiking, walking) in as good as or better condition than found, and clear off debris.

If the harvesting operation occurs in the vicinity of identified recreational trails (HRM) or residential areas (closer than 100m) , ensure the club and/or residents are aware of the operation and post warning signs at each end of the trail/road within 100m of the operation. The signs are to remain in place during the length of the operation until all wood is removed.

Skidders and forwarders are to travel in the same path as the felling and processing machines to minimize site disturbance and damage to residual stems.

No extraction trails may be located within a plantation without first obtaining permission from Halifax Water or NSDNR.

No motorized equipment may travel through/over a watercourse unless an appropriate crossing structure is in place.

To reduce the risk of wood being left behind, place a skid log under roadside piles. This will reduce the number of logs laying in wet/frozen conditions.

Harvested trees must be utilized to the fullest extent; however, if form and length do not allow for ideal utilization, the minimum top diameters are defined as:

- Minimum top diameter of 7.5cm (3inch) for Red Spruce, Black Spruce, White Spruce, Tamarack.
- Minimum top diameter of 16cm (6inch) for Hardwood, White Pine, Red Pine.
- Discretion must be used when measuring for top diameter as form could be a deciding factor of where the tree must be topped. Both the roadside piles and in bush tops will be inspected by Halifax Water or NSDNR to ensure quality topping practices are being conducted.

9.03 Grinding and Chipping

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

No chipping or grinding of wood products is to be conducted within 60m of a watercourse.

“Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time.

No stock piling of woodchips within 60m of a watercourse

Chipping debris created from the chipping process must be cleaned off road surfaces on a regular basis so as not to impede vehicular passage.

Once operations have been completed, chipping debris must be completely cleaned off of road surfaces and spread out to a maximum thickness of 30cm within the block boundary.

9.04 Loading and Hauling

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

“Active Operation” signs or similar worded signs must be posted in work area to advise people of heavy equipment operating. The signs must be posted in plain sight so as to allow for adequate warning time.

Ensure all tie down cables, chains, and chip van covers are working accordingly and replace any damaged ones immediately.

Ensure all wood is centered between the pickets for safe loading.

Ensure the truck driver has checked both sides of the load prior to leaving the block.

Truckers must not tie down next to another truck loading.

Check for loose debris prior to transporting.

Check load security prior to entering onto a public highway as well as routinely throughout the duration of the trip.

The loader operator must thoroughly search through the snow to ensure no merchantable wood is left behind.

If merchantable wood cannot be loaded because it is frozen to the ground, Halifax Water or NSDNR must be notified.

10.0 Silviculture

10.01 General

Applicable permits and approvals must be obtained prior to operations beginning and on site at all times.

All water bodies and watercourses must be kept free of debris from silviculture operations. No slash resulting from the operation is to be left on roads, and felled saplings near culvert inlets are to be removed.

Do not use roads if rutting of the road surface, sedimentation of streams, or damage to culverts is likely to occur.

Lunch, fueling and maintenance areas will be kept clean and all garbage removed from the watershed on a daily basis. A gas and oil absorbing material will be placed under saws when refueling and oiling. Report spills as per the Emergency Spill Regulations.

Designated fueling areas must be at least 30m from a defined stream channel or flowing water (i.e., where water is flowing in the ditch, etc.).

Fuel containers (Jerry cans) when transported in vehicles are to be leak-free and secured to avoid damage and spills.

All fuel containers (Jerry cans) must be marked clearly identifying their contents.

Machinery and tools showing above normal leaking fuels or other fluids will cease operation immediately and fluids contained. Repairs are to be made or machinery removed from watershed.

All vehicles on the forest operation will have an appropriately sized spill kit and required fire fighting equipment on board.

No camping, accommodation trailers or buildings are to be brought into the watershed area.

Be aware of wildlife habitat features, such as cavity trees or nests, and protect these from disturbance during silviculture operations.

No chemicals are allowed for herbicide, pesticide, biocide, or fungicide purposes unless otherwise approved by NSE, Halifax Water or NSDNR.

The contractor engaged in forest operations in the watershed will be responsible for the conduct of all his employees and agents with respect to law, regulations and guidelines pertaining to activities on watershed lands.

If forest operations are causing excessive damage to the natural forest environment that may result in erosion or other unnatural disturbances, the operation will be ordered discontinued until the situation has been corrected.

Any deviance on the part of the contractor or employees of the contractor from these working conditions will be immediately corrected.

10.02 Regeneration Assessment

Regeneration Assessments for initial post-harvest treatment (natural establishment/ planting) will be completed by Halifax Water or NSDNR two years after harvesting operations have been completed.

Regeneration Assessments will be completed as per the 'Nova Scotia's *Forest Sustainability Regulations*'.

10.03 Planting

Halifax Water prefers to promote the re-growth of native species to the harvest area through natural regeneration. Planting of native species will be used as an alternative if regeneration assessments show inadequate restocking through natural regeneration.

Halifax Water does not promote the planting of non-native species, however, if conditions warrant, approval must be given by Halifax Water or NSDNR.

Planting will be completed as per the 'Nova Scotia's *Forest Sustainability Regulations*'.

10.04 Spacing

Halifax Water's silviculture program includes a spacing program which targets healthy immature stands. Spacing is only conducted on stands that warrant it as per the 'Nova Scotia's *Forest Sustainability Regulations*'.

10.05 Chemical Use

As per applicable watershed regulations.

Halifax Water does not support the use of chemicals on any watershed lands.

11.0 Recreation

Halifax Water does not promote its lands or watersheds as open to the public for recreational activities; rather it takes the approach of “user-beware”.

Halifax Water tolerates the use of low impact recreational activities on its lands and watersheds unless otherwise posted. Low impact watershed activities include hiking, mountain biking, and cross country skiing as long as they does not impair water quality or impede on the systems in place to conduct watershed management.

In addition to the applicable Protected Water Area regulations, no motorized vehicles are allowed on Halifax Water lands without written authorization. The written authorization must be carried on the authorized vehicle(s) at all times. A penalty may be issued to those who do not comply.

No open fires are allowed, including camp fires, on Company lands without written permission being first obtained from Halifax Water. The written permission must be carried on the person(s) conducting the fire activity. A penalty may be issued to those who do not comply.

There will be no cutting of wood allowed for recreational, personal or commercial purposes without the written authorization of Halifax Water or NSDNR. The written permission must be carried on the person(s) doing so. A penalty may be issued to those who do not comply.

Hunting and fishing activities must comply with provincial and watershed regulations unless otherwise posted.

Boating, canoeing, and kayaking must comply with provincial and watershed regulations unless otherwise posted.

Swimming must comply with provincial and watershed regulations unless otherwise posted.

Appendix 1 – Applicable Legislation

Applicable Municipal By-laws that may affect Halifax Watersheds:

- Halifax Regional Municipality By-laws regions. Listed below are those By-Law regions that directly influence activities on Halifax Water watershed lands in addition to the Protected Water Area regulations:
 - Cole Harbour/ Westphal
 - North Preston/ Lake Major/ Lake Loon/ Cheery Brook/ East Preston
 - Lake Echo/ Porter/s Lake
 - Shubenacadie Lakes
 - St. Margaret’s Bay
 - Beaver Bank/ Hammonds Plans/ Upper Sackville

For more information please visit the website www.halifax.ca or contact (902) 490-4210.

- East Hants Municipality By-laws for Commercial Zones:
 - East Hants – Zones within the Pockwock PWA
 - East Hants – Zones outside of the PWA, but still within the Pockwock Watershed; specifically:
 - 8.10.7 Special Requirements for the Pockwock Watershed
 - a) No open storage shall be located within the Pockwock watershed area as identified on the official zoning mapping.
 - b) No hazardous materials shall be stored within the Pockwock watershed area as identified on the official zoning mapping.

For more information please visit the website www.easthants.ca or contact (902) 758-2715.

Provincial Act and Regulations:

- *Lake Major Watershed Protected Water Area Designation and Regulations*
- *Pockwock Lake Watershed Protected Water Area Designation and Regulations*
- *Bennery Lake Watershed Protected Water Area Designation and Regulations*
- *Halifax Regional Water Commission Act*
- *Provincial Forest Protection Regulations*
- *Wildlife Habitat and Watercourses Protection Regulations*
- *Nova Scotia’s Forest Sustainability Regulations*
- *Emergency Spill Regulations*
- *Used Oil Regulations*
- *Transportation of Dangerous Goods Regulations*

The above Acts and Regulations maybe viewed on line for the most recent versions.

Appendix 2 – List of Reportable Toxins

Item No.	TDGA Class	Description of Contaminant	Amount Spilled
1.	1	Explosives	any amount
2.	2.1	Compressed gas (flammable)	100 L
3.	2.2	Compressed gas (non-corrosive, non-flammable)	100 L
4.	2.3	Compressed gas (toxic)	any amount
5.	2.4	Compressed gas (corrosive)	any amount
6.	3	Flammable liquids	100 L
7.	4.1	Flammable solids	25 kg
8.	4.2	Spontaneously combustible solids	25 kg
9.	4.3	Water-reactant solids	25 kg
10.	5.1	Oxidizing substances	50 L or 50 kg
11.	5.2	Organic peroxides	1 L or 1 kg
12.	6.1	Poisonous substances	5 L or 5 kg
13.	6.2	Infectious substances	any amount
14.	7	Radioactive substances	any amount
15.	8	Corrosive substances	5 L or 5 kg
16.	9.1 (in part)	Miscellaneous products or substances, excluding PCB mixtures	50 L or 50 kg
17.	9.1 (in part)	PCB mixtures of 50 or more parts per million	0.5 L or 0.5 kg
18.	9.2	Environmentally hazardous substances	1 L or 1 kg
19.	9.3	Dangerous wastes	5 L or 5 kg
20.	none	Asbestos waste, as defined in the Asbestos Waste Management Regulations	50 kg
21.	none	Used oil, as defined in the Used Oil Regulations	100 L
22.	none	Contaminated used oil, as defined in the Used Oil Regulations	5 L
23.	none	A pesticide in concentrated form	5 L or 5 kg
24.	none	A pesticide in diluted form	70 L
25.	none	Unauthorized sewage discharge into fresh water or sensitive marine water	100 L
26.	none	Ozone-depleting substances, as defined in Ozone Layer Protection Regulations	25 kg