



Government of Newfoundland and Labrador
Department of Fisheries and Land Resources

Construction Standards

for Resource Access Roads in Newfoundland and Labrador

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Forest Engineering and Industry Services

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FORWARD

A Timber Sale Agreement (TSA) is a contractual agreement between government and a registered company, for the harvest and extraction of timber from forested parcels of Crown land. Any registered business that qualifies and has an interest in harvesting TSA areas may bid in an open and fair competition through an established bidding process.

The Guide to Construction Standards for Resource Access Roads in Newfoundland and Labrador provides applicants with an understanding of their responsibilities under Timber Sale Agreements. The document contains a general overview of provincial road construction requirements and should be reviewed when developing a Resource Access Plan.

RESOURCE ACCESS PLAN

A Resource Access Plan refers to all activities related to the planned transport of forest products from a TSA area to a provincial highway (i.e. generally paved road). This includes all primary resource roads, operational resource roads and timber extraction trails. It includes all aspects of road and trail planning, layout, construction, maintenance, snow clearing and decommissioning (if applicable).

All activities related to resource access are the responsibility of the Company. All forestry operations on Crown land must comply with the *Forestry Act*, associated regulations, and all other municipal, provincial and federal laws and regulations. All road construction activities must be done so in accordance with the Department's Environmental Management System and must follow standard operating procedures.

The department will provide a suggested Resource Access Plan for each TSA area as part of the TSA Information Package. The suggested Resource Access Plan will include:

- suggested road and trail layout (map);
- proposed construction specifications; and
- a decommissioning and road rehabilitation plan (if applicable).

TSA applicants are asked to review the suggested Resource Access Plan before submitting bids. Interested parties are highly encouraged to visit the TSA area to verify the information presented in the package. If the applicant determines that revisions are necessary to the suggested Resource Access Plan, then they must submit a revised Resource Access plan for review and consideration with their bid.

There are a number of factors which may result in revised Resource Access Plans being submitted. These may include, but are not limited to:

- The identification of alternate extraction routes;
- Seasonal harvesting schedules that do not require extensive road; or
- Extraction methods using alternate types of equipment.

Resource Access Plans must be approved by the Department before construction begins.

ROAD TYPES

Generally, there are three types of resource access roads:

- Primary Resource Road – provides access to the TSA harvest block
- Operational Resource road – provides access within a TSA harvest block
- Trails – provide access for harvesting/forwarding machinery within TSA harvest block

As a rule, primary resource roads are constructed to A, B or C-2 specifications and are often referred to as “main haul roads”. Depending on harvesting requirements, operational resource roads are normally constructed to a C, C-1 or D specifications, and typically branch off primary resource roads. Trails are developed to provide access for harvesting and forwarding equipment throughout the harvest block. Trails exist temporarily while operations are active.

The following is a summary of resource road construction specifications on Crown land.

| Road Specification | A | B | C-2, C, C-1 | D |
|---|--|--|--|--|
| Design Load | Tractor Trailer | Tractor Trailer | Tandem (Pallet) Truck | Single Axle (<= 3 tonnes) |
| Design Speed | 55 km/hr | 50 km/hr | 30 km/hr | 25 km/hr |
| Road (Surface) Width | 9.0 m | 7.5 m | 6.0 m, 5.0 m, 4.0 m | 3.5-4.5 m |
| Max. Grade | 6 % | 8 % | 10 % | 15 % |
| Right-Of-Way | 30 m | 20-30 m | 20 m | 15-20 m |
| Min. Sight Distance | 150 m | 120 m | 90 m | 45 m |
| Max. Grade Change (Blind Hill) | 0.6 / 20 m | 0.8 / 20 m | 1.0 / 20 m | N/A |
| Min. Ditch Depth | 1.0 m | 0.8 m | 0.6 m | 0.3 m |
| Surface Material (Type and Depth) | Min. 15cm of AASHO class A-1-b or better | Granular, no stones > 10 cm in the top 30 cm | Granular, no stones > 15 cm in the top 30 cm | Granular, no stones > 15 cm in surface |
| Fill Slope | 2:1 | 1.5:1 | 1.5:1 | N/A |
| Cut Slope (Back Slope) | 2:1 | 1.5:1 | 1.5:1 | N/A |
| Stream Width | 3.5 m | 3.5 m | 3.0 m | 2.5 m |
| Culvert to Bridge conversion point (personal judgement) | | | | |

CONSTRUCTION STANDARDS

The following outlines general, provincial road construction requirements.

1. CLEARING RIGHT-OF-WAY

1.1. DESCRIPTION OF WORK

Under this item, the Contractor must perform all operations in connection with clearing for the permanent work along the length of the project route for the purpose of salvaging merchantable timber and cutting a clear area for the roadway.

1.2. GENERAL

Clearing shall be performed within a minimum width of 15 metres on such areas within or without the limits of the roadway, unless specified, for the purpose of constructing the roadway, side slopes, push lanes, stream diversions and borrow pits.

1.3. CLEARING

Clearing consists of the felling, trimming, cutting up of trees and the satisfactory salvage of the trees together with the cutting down of snags, brush and rubbish occurring within the area to be cleared. Trees, other vegetation, stumps, roots and brush in areas to be cleared shall be cut off 15 centimetres above the original ground surface or as close to the ground as practical under snow conditions.

1.4. SALVAGE OF CLEARED MATERIAL

All timber shall be salvaged as stated in the Contractor's Cutting Permit (and associated Regulations).

1.5. BRUSH MATS / CORDUROY

The Contractor may encounter instances where either the use of brush mats or corduroy are necessary. In constructing a brush mat or corduroy the Contractor should first use sub-merchantable or non-merchantable stems. In the event that these are not present or sufficient; permission must be obtained from the Department prior to merchantable stems being utilized. Stems should be placed in a "butt-to-top" alternating fashion for the entire length of the area to be brush matted.

2. STRIPPING

2.1. DESCRIPTION

Under this item the Contractor will perform all operations in connection with stripping designated areas along the uncompleted length of the route.

2.2. GENERAL

Areas to be stripped will consist of all excavations and embankments less than one metre high and all ditches. Embankments greater than one metre must not be stripped and brush, rotten wood and other refuse from clearing may be used as a mat or used as fill in areas requiring deep fill provided it is well packed and covered with at least one metre of acceptable granular fill.

2.3. STRIPPING

Stripping consists of the removal and disposal of all stumps and roots larger than four centimetres in diameter, matted roots, moss, bog, surface boulders, and any other vegetation or debris. Stripped material not used in the construction of the road bed must be pushed to the edge of the right-of-way and left in a neat and tidy fashion so as not to obstruct access to adjacent forest land. Stripped material must not exceed one (1) metre in height.

3. CULVERTS

3.1. DESCRIPTION

This work shall consist of supplying and placing Corrugated Metal Pipe (CMP) or High Density Polyethylene (HDPE) culverts, jointing material and couplers on all stream crossings which appear on a 1:50,000 topographic map or where cross drainage is required for proper water control.

3.2. MATERIALS

All culverts should be of sufficient size as to handle peak flows. All culverts must have diameters equal to or greater than 450 millimetres. Culvert length must be at least one metre greater than the bottom length of the roadbed to ensure that the ends are not filled in following repeated grading. Corrugated metal pipe (CMP) 600 millimetres or less in diameter must be 1.6 millimetre thickness or heavier metal. CMP's greater than 600 millimetres up to 1,000 millimetres must have a thickness of 2.0 millimetres or heavier metal. CMP's greater than 1,000 millimetres must not have a thickness less than 2.8 millimetres. CMP's greater than 1,400 millimetres must have a corrugation profile of 76 millimetres x 25 millimetre. Unless otherwise stated, HDPE Culvert's will be an acceptable substitute to CMP's. These culverts must be constructed of high density polyethylene with 210 kPa stiffness, be double walled, hollow inside and applicable for forestry application.

In certain situations properly constructed bottomless box culverts would be an acceptable alternative to CMP or HDPE culverts. Use of these culverts would be pending the inspection by forestry officials to determine if the size and construction materials are adequate. See Figure 1.

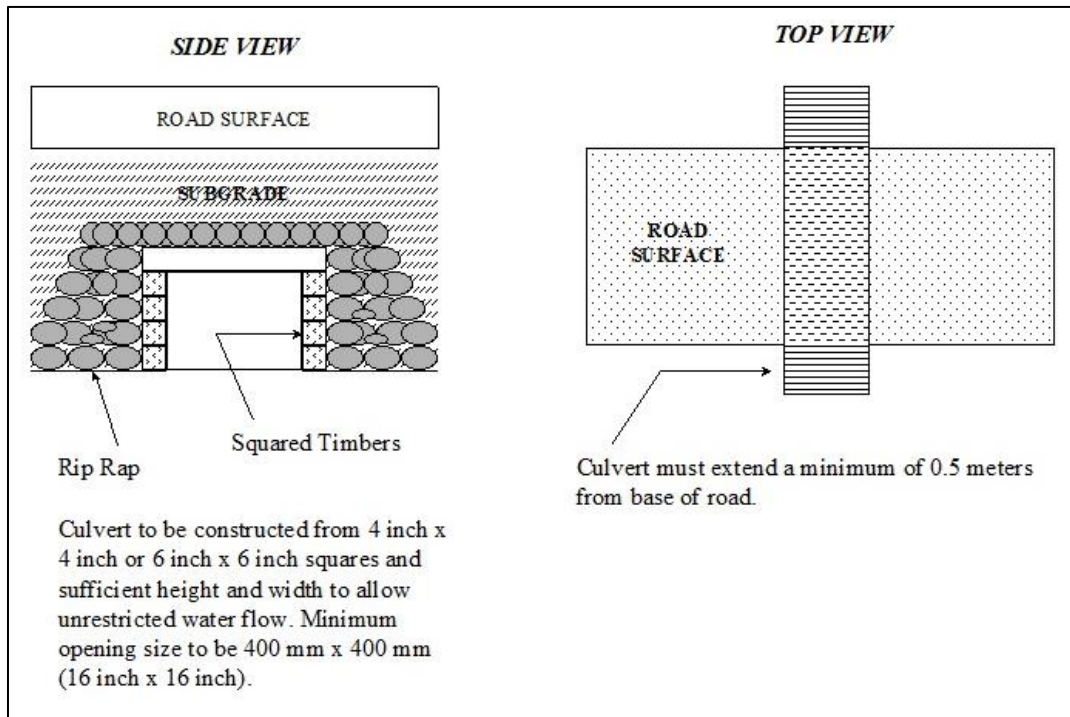


FIGURE 1: DRAWING OF BOTTOMLESS BOX CULVERT

3.3. CULVERT PLACEMENT

The Contractor must shape the trench to conform to the bottom of the culvert and provide a uniformly firm bed throughout the entire length. Where an unsuitable soil is encountered at the bottom of the trench, suitable material must be substituted and compacted. Culverts are to be backfilled with select granular material to a point not less than 60 centimetres above the top of the culvert. This backfill material must be deposited equally on both sides of the culvert in layers and thoroughly compacted. If the road depth is such that the culvert cannot be placed 60 centimetres into the roadbed, the road must be built up to this height. It will be necessary to back slope 25 metres on both side of such culvert.

3.4. EMBEDDING AND IN THE DRY INSTALLATION

All culvert bottoms in fish bearing streams are to be placed below the natural streambed level according to the following criteria: for culverts less than 750 millimetre outside diameter, one-third the diameter of the pipe should be below the streambed; for culverts greater than 750 millimetre outside diameter, a minimum of 300 millimetres below the streambed. The only exception to this would be when bedrock is encountered and it is impossible to embed the culvert. Such situations must be identified to forestry officials prior to culvert placement.

3.5. BLOCKING

All culverts 900 millimetres and greater must be blocked during installation to avoid failure. The Contractor will place rough lumber along the top and bottom of the culvert and blocks in between to provide support during backfilling of the culvert. Once properly placed backfill material has reached 3/4 of the height of the culvert, this blocking is to be removed to allow for proper culvert settlement.

A mechanical tamper should be utilized to ensure proper installation of all culverts 900 millimetres or greater. Backfill should be spread and compacted in 150 millimetre lifts alternating from one side of the culvert to the other.

3.6. EMBANKMENT SLOPE AND COMPACTION

The Contractor must ensure that the road embankment slope is at 1.5:1, as per Figure 2, for a minimum of 10 metres on all sides of culverts. The immediate area around culvert inlet and outlet is to be compacted (with excavator bucket) prior to placement of riprap or armour stone.

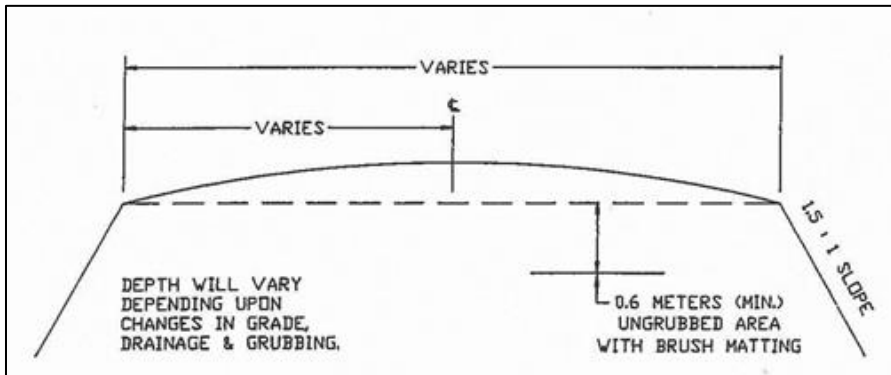


FIGURE 2: CROSS SECTION OF ROADWAY EMBANKMENT

3.7. RIPRAP

Riprap must be laid at the upstream and downstream ends of all culverts. Stones with an average diameter between 20 and 30 centimetres are to be used as rip rap. The Contractor must place larger stones at the bottom and take care to place the stones as close together as possible. The minimum requirements for riprap are shown in Figure 3.

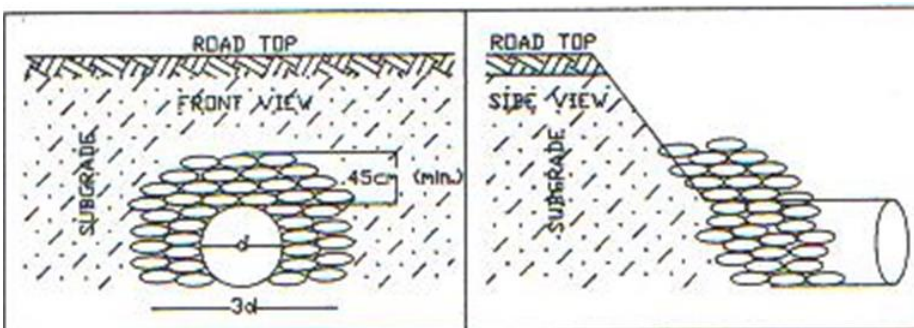


FIGURE 3: RIPRAP SPECIFICATIONS FOR CULVERTS

4. ROADWAY EXCAVATION AND GRADING

4.1. DESCRIPTION

This work shall consist of excavating materials as required to construct the roadway to a minimum top width and with such materials as to permit loaded trucks to travel at normal speeds. Grading shall consist of the hauling, levelling, shaping, ripping of cuts, filling of embankments, trimming of side slopes and the construction of ditches.

4.2. EXCAVATING EARTH

Earth shall be excavated as required to complete earth cuts, ditching, sub-excavation and shall include hauling, handling and disposal. The Contractor may, with the approval of forestry officials, excavate outside the limits of the roadway ditching for the purpose of obtaining suitable and/or sufficient material to complete embankments. Additional subgrade material required to build the road can also be obtained from approved borrow pits. All holes/pits are to be filled in with grubbing material.

4.3. EARTH EMBANKMENT CONSTRUCTION

The Contractor shall be responsible for selecting material from excavations which can be spread and compacted. In no case shall fill containing frozen material, material with an excessive moisture content, or any deleterious materials be used for earth embankment construction. Earth embankments shall be built to uniform grades and cross sections. The depth of the embankment shall be a minimum of 0.6 metres unless otherwise specified in those areas where no grubbing has been undertaken and the brush has been left as a mat. See Figure 4. In those areas that have been grubbed, embankments must be deep enough to provide a uniform surface and to avoid roadway surface water accumulating from surrounding areas. In areas where brush is required as a mat, the Contractor shall utilize brush from the roadway right-of-way.

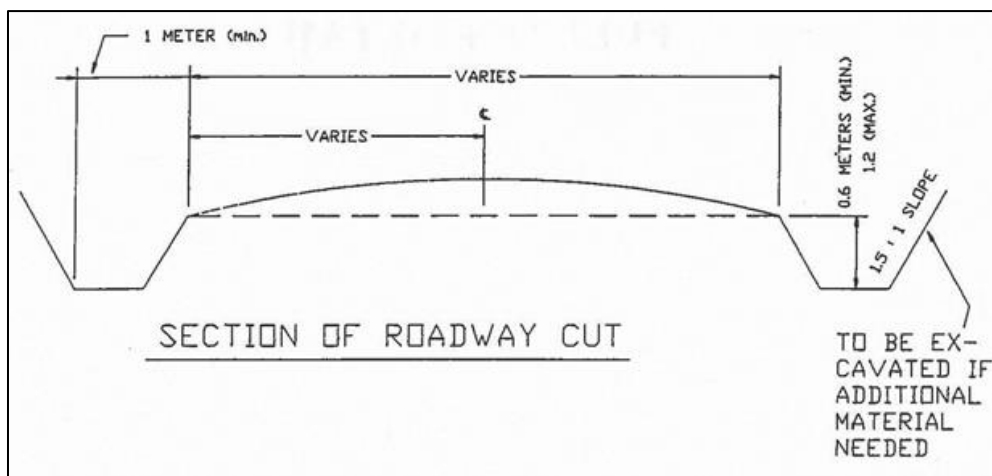


FIGURE 4: CROSS SECTION OF ROADWAY CUT

4.4. DITCHES

All materials excavated from ditches, if suitable for constructing roadway fills, must be deposited in adjacent embankments. Materials not suitable for roadway fills shall be deposited in flat waste banks. Ditches shall be a minimum of 0.6 metres deep and a maximum of 1.2 metres deep. All side slopes must be scaled down and all rocks and fragments liable to slide down the slopes and block the drainage are to be removed. All drainage is to be so channeled as to avoid damage to roadway areas by erosion.

Hills with excessive grades will require the construction of ditch blocks and push lanes. See Figure 5.

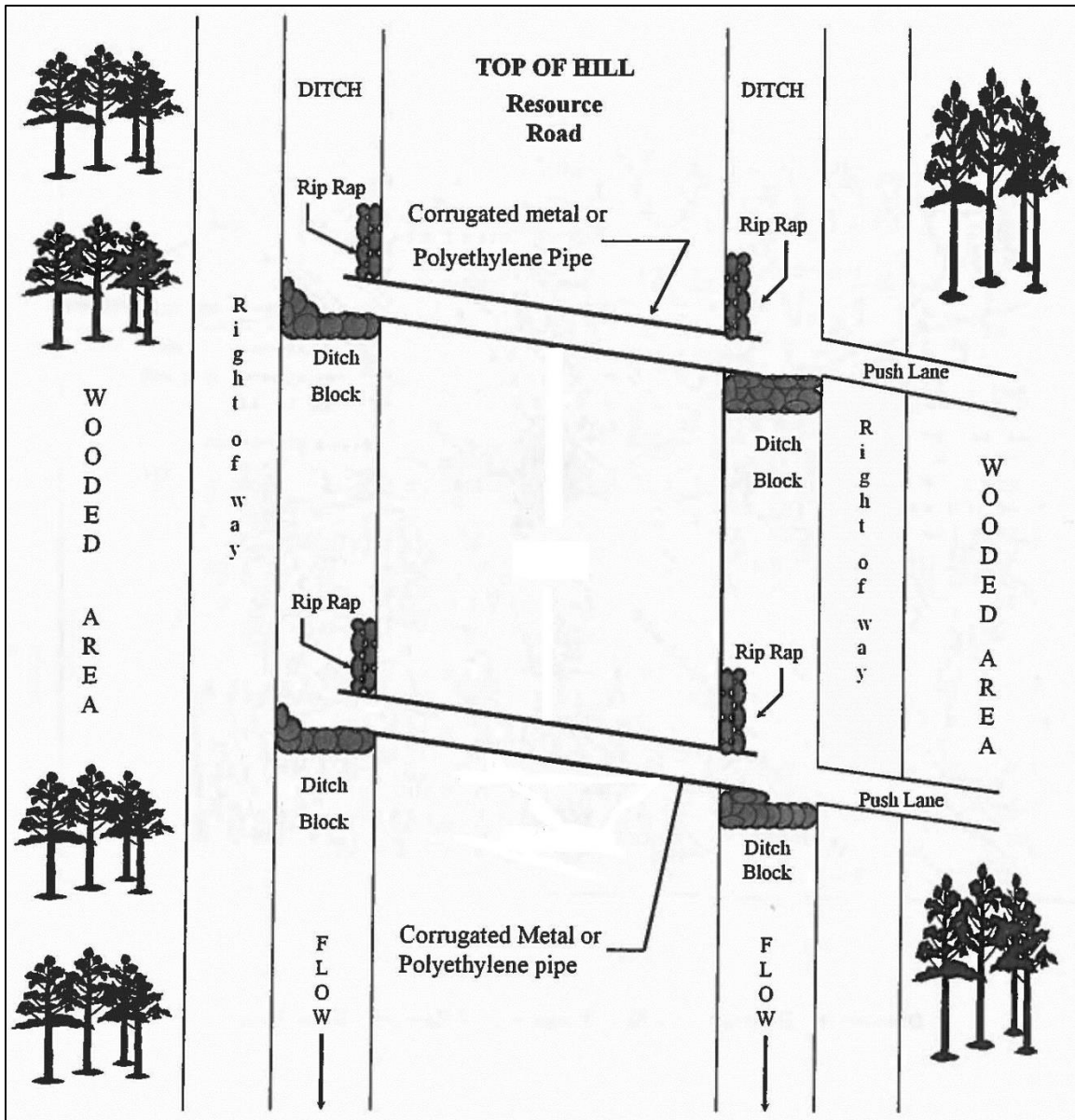


FIGURE 5: PLACEMENT OF DITCHES AND CULVERTS ON SUSTAINED GRADES

4.5. ROADWAY SURFACE

The surface shall be of suitable granular material, compacted and sufficiently crowned to permit runoff. Roadway surface includes all turnarounds and pull offs.

4.6. COMPACTION

Compaction resulting from the normal traffic of dump trucks during construction is considered sufficient. However, the Contractor should route trucks and earth moving equipment to the softer shoulders of the road in order that these may be compacted to a degree similar to the travelled centre portion of the road. Should little or no traffic by wheeled dump trucks result during construction, the Contractor is encouraged to affect an equivalent degree of compaction by means of a rubber tire compactor. This operation should be carried out just prior to final grading.

4.7. FINAL GRADING

After all traffic by heavy construction machinery has ceased, all road surfaces shall be given a heavy and thorough grading by a wheeled grader so as to give a proper crowned and even surface to the road.

It is important to avoid windrows of graded material on the shoulders of the road as this can cause water to accumulate on the road surface and potentially cause erosion issues.

4.8. TURNAROUNDS

Turnarounds are constructed at various locations to permit trucks to turn around.

The following points should be considered:

- Entire turnaround should be level, surfaced and graded.
- Ditching is required around the entire turnaround.
- Push lanes, to divert water away from turnaround and into vegetated areas, should be installed as required.
- Turnarounds should be located on the driver's side to make backing in easier.
- Turnarounds should be located a minimum of 30 metres from the end of the road.

Figure 6 provides details as to the general specifications of turnarounds on resource roads.

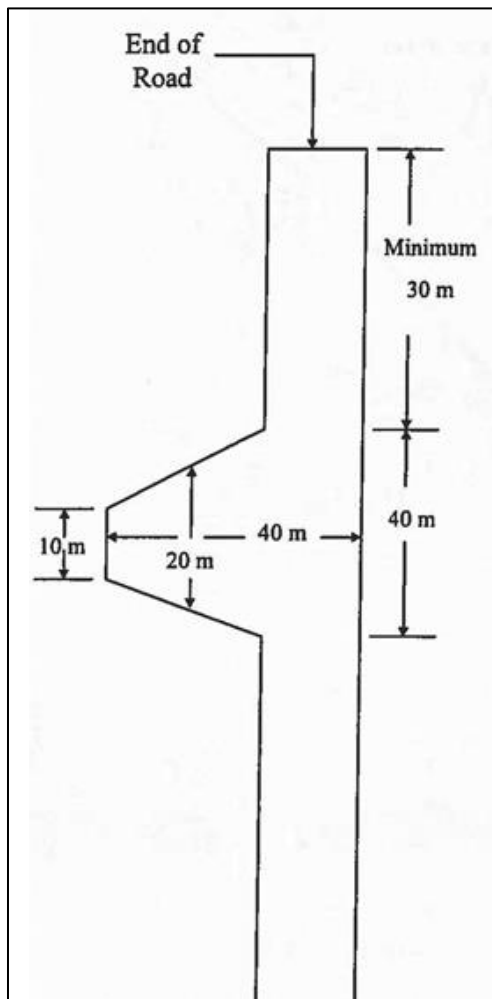


FIGURE 6: TURNAROUND DETAIL

4.9. PULL OFFS

Pull offs are constructed to allow traffic to pass on narrow resource roads.

The following points should be considered:

- Entire pull off should be level, surfaced and graded.
- Ditching is required around the entire pull off.

Figure 7 provides details as to the general specifications of pull offs on resource roads.

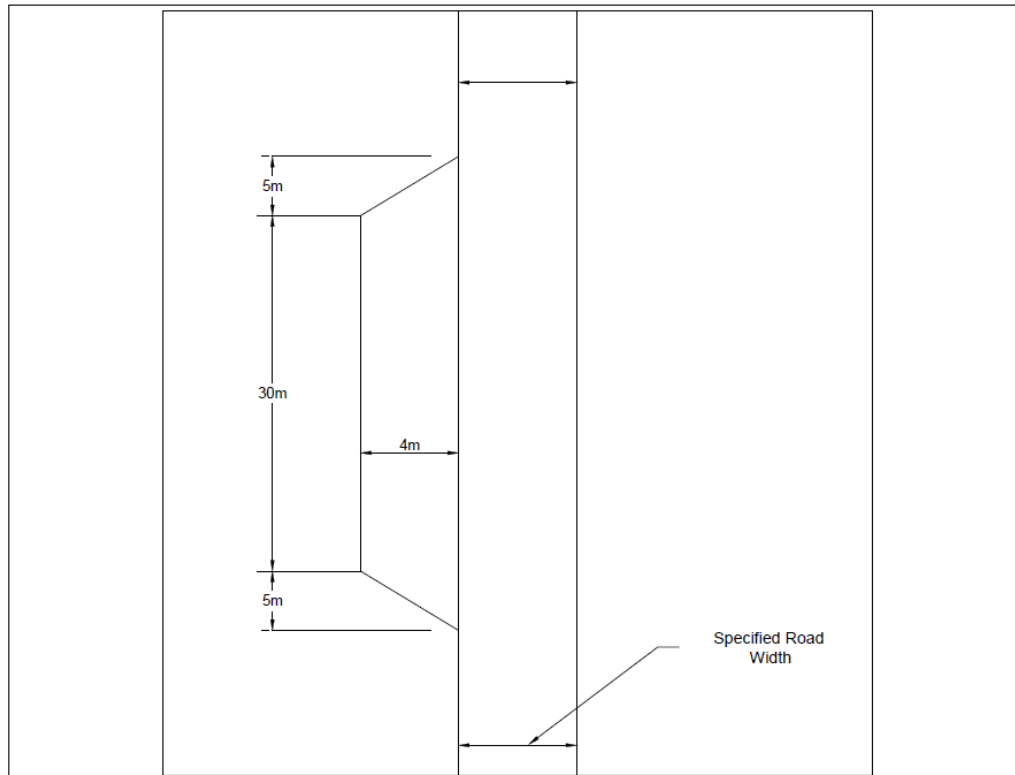


FIGURE 7: PULL OFF DETAIL

5. ENVIRONMENTAL SPECIFICATIONS

Contractors are required to comply with these specifications in order to eliminate or minimize the detrimental effects of road construction on the environment of this Province.

All efforts must be made by the Contractor to prevent the entry of silt, slash, tops or any other deleterious materials into any streams or ponds located on or adjacent to the construction route. Excessive bulldozing will not be tolerated. All costs for environmental adherence are to be borne by the Contractor.

5.1. SILTATION

- i. The Contractor must maintain a buffer strip of at least 30 metres between the road construction area and any adjacent body of water.
- ii. The Contractor will not extend push lanes to streams or ponds. The Contractor will not back fill into streams or ponds.
- iii. The Contractor will not remove gravel from the bed or bank of any pond or stream.
- iv. Where activities may cause sediment-laden run-off, sediment control measures such as filter fabrics or sedimentation ponds are to be installed by the Contractor.

5.2. STREAM CROSSINGS

- i. The Contractor must make every effort to ensure that slash, tops or other construction materials do not enter streams or ponds. Any material felled in a waterbody is to be removed.
- ii. The Contractor must leave a ground vegetation buffer zone of at least 30 metres on both sides of any proposed watercourse crossing. Gravel for these sections of road, including the bridge approach embankments, must be trucked.
- iii. The Contractor must minimize the use of heavy equipment in streams. Any work should be carried out from dry stable areas where possible.
- iv. All culverts should be set into the stream as stated in the "Culverts" Section.
- v. Push lanes shall be used on both sides of the road or in conjunction with culverts to divert the ditch flow into the woods or stable vegetation areas before reaching the waterbody.
- vi. When working near waterbodies, road building operations causing erosion or siltation are to be suspended during periods of intense rainfall or when soils are saturated.
- vii. All in stream work is to be done in the dry. Cofferdams of non-erodible material are to be used to separate work areas from the stream when installing bridges or similar structures requiring abutments, or footings. Water pumped from work areas and cofferdams is to be directed into a settling pond or stable vegetation areas.
- viii. Not more than one-third of the stream width is to be blocked at any one time.

- ix. The stream banks are to be restored to their natural state upon completion and removal of the coffer dam. In some instances, this may mean seeding and other stabilization controls.

5.3. GRAVEL PITS

- i. Overburden or grubbed material pushed off any gravel pit site must be retained in a manner that allows it to be pushed back into the pit after construction and spread in a neat and tidy fashion.
- ii. Existing pits are to be used where possible; minimize the opening of new pits.

5.4. SITE

- i. The Contractor is to make every effort to maintain a clean and tidy work site. No garbage, construction debris, oil, diesel or their containers are to be deposited on the site.

Failure to comply with the Environmental Specifications could result in:

- i. Charges being laid by the Provincial Department of Environment, the Federal Department of Fisheries and Oceans or other Government agencies.
- ii. Termination of the Contract by the Department of Fisheries and Land Resources.

6. ENVIRONMENTAL SPECIFICATIONS WHEN OPERATING IN A PROTECTED WATER SUPPLY AREA (PWSA)

6.1. FUEL STORAGE AND USAGE

- i. If bulk fuel storage facilities are not permitted within the PWSA, fuel must be transported to the operating area in no more than two, 205 litre barrels, one 500 litre “slip tank”. Fuel may also be delivered to the site by a fuel supplier.
- ii. Refueling sites shall be located at least 150 metres from any water body or wetland.
- iii. The proponent is hereby informed that fuel storage and handling requires a separate approval under the Storage and Handling of Gasoline and Associated Products Regulations, CNR 775/96.
- iv. All waste material and products are to be collected in refuse containers and disposed of at an approved waste disposal site outside of the protected area in accordance with the Waste Material Disposal Act. RSN 1990 c.W-4.

6.2. OIL SPILL AND CLEAN UP

- i. An oil spill clean-up kit must be on site at all times when gasoline or fuel powered equipment is being used or refueled.
- ii. If bulk fuel storage facilities are located in Protected Water Supply Areas, spill clean-up capabilities must be increased by the following tools and materials unless additional requirements are specified on PWSA:
 - One fire pump
 - 100 metres of fire hose
 - Two hand-operated fuel pumps
 - Six empty 45 gallon drums
 - Four long-handled shovels
 - Two pick axes
 - 10 metres of containment boom
 - 25 absorbent pads
 - 100 litres of loose absorbent material
- iii. Oil spills of gasoline, fuel or oil, regardless of volume, shall be reported immediately to the Regional Watershed Management Specialist and the appropriate Municipal Authority or Watershed Management Committee by calling (709) 261-2300 and (709) 292-4280, respectively.
- iv. Oil spills in excess of 70 litres shall be reported immediately to the 24 hour spill report line at (709) 722-2083 or 1-800-563-9089.

6.3. EQUIPMENT AND MAINTENANCE

- i. All equipment used in conjunction with this project must be in good working order with no leaking fuel or oil. Equipment storage and maintenance facilities associated with resource access road construction must not be located within the project area and all maintenance other than emergency repairs must be conducted outside the PWSA.

7. DEFINITIONS

- a) "Contractor" means the person or persons, firm or company named as such in the Form of Agreement or Timber Sale Agreement.
- b) "Drawings" means the drawings, plans, maps or diagrams forming part of a Contract, Timber Sale Agreement or Commercial Cutting Permit.
- c) "Engineer" means the Project Engineer with the Department of Fisheries and Land Resources or his or her duly appointed representative.
- d) "Equipment" means all fixed or mobile machines, tools, or other things required in the execution and completion of the works.
- e) "*Forestry Act*" means the *Forestry Act*, RSNL1990 CHAPTER F-23 as amended and associated regulations thereunder.
- f) "Forest Operations" mean all activity related to forest access road construction and maintenance, harvesting operations, silviculture operations, and insect and disease forest protection.
- g) "Forestry Official" means an official of the department authorized by the minister to carry out the provisions of the *Forestry Act* and the regulations.
- h) "Resource Access Plan" means the activities related to the planned transport of forest products from a TSA area to a provincial highway (i.e. paved road). This includes all primary resource roads, operational resource roads and timber extraction trails, and includes all aspects of road and trail planning, layout, construction, maintenance, snow clearing and decommissioning (if applicable)
- i) "Specifications" means the directions and written instructions contained in the Contract pertaining to the method and manner of performing the work, or to the quantities and qualities of the materials to be furnished under the Contract.
- j) "Timber Sale Agreement Area" means the area depicted in the Request For Bids Information Package.